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MAKE IN INDIA : WHERE ARE WE NOW &WHERE TO GO (ICMII2016)

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PREFACE

"MAKE IN INDIA: WHERE ARE WE NOW & WHERE TO GO" *is an all-encompassing term with comprehensive connotations for Technology & Innovation, micro and macroeconomics, Medical, Nursing & Health, management, financial investment, banking, business development, manufacturing, marketing and policy formulation. It requires various sectors to work in sync and complements each other.*

We invite you to present a paper/showcase your work in this stimulating platform of thinking minds. We will be highly obliged if you could kindly circulate the conference Brochure among your faculty, colleagues and the students and motivate them to send their research papers/articles for the Conference.

School of Engineering and Technology – Department of Computer Science & Information Technology is organizing two days International Conference on Make in India: Where Are We Now& Where to Go from 18-19 February 2016.

This conference will offer a platform to discuss and exchange concept of current developments, innovations and expansions on Make in India. In this conference, apart from invited talks, there are scope for contributory talks and posters. Researchers from various disciplines are welcome for applying to present their current works in the conference.

We express our heartiest gratitude to Noida International University for funding the conference and administrators, faculty members from different schools, research scholars, students and staff members for their co-operation throughout the conduct of this successful event.

We wish all the delegates, academicians, industrialists, researchers of the conference enjoy the academic program with fruitful interaction, the ambience of Noida International University and have a pleasant stay

Editors
Prof. (Dr.) Neeta Awasthy
Prof. (Dr.) Anuranjan Mishra
Ms. Neeta Sharma
Mr. Kunwar Babar Ali

THEMES

TECHNOLOGY & INNOVATION

MICRO AND MACROECONOMICS

MEDICAL

NURSING & HEALTH

MANAGEMENT

FINANCIAL INVESTMENT

BANKING

BUSINESS DEVELOPMENT

MANUFACTURING

MARKETING

POLICY FORMULATION

Message from Chancellor

I am happy to note that Noida International University has taken the initiative to provide an International platform to academics, researchers, scientists and industrialists to share and discuss numerous themes under "Make in India: Where we are &"Where we go. The theme of the conference being contemporary would evoke many views and perspectives and deliberations should prove to be thought proving exercise.

I congratulate to NIU Family for this endeavor.

With proud regards

Dr. Arvind Singh
Chancellor
Noida International University

Message from Pro-Chancellor

I am delighted to know that International Conference on "Make in India: Where we are & Where we go" is being organized on February 18-19, 2016. This is indeed a momentous day for Noida international university and a proud moment for one and all. Events like this involve the meeting of best minds, leading to meaningful debates and fruitful interactions.

Conferences like these are not only the platform for exchange of ideas but they are 'Samagam' of researchers, scientists and industrialists.

I wish you and this conference all success.

With proud regards.

Dr. Vikram Singh
Former Director General of Police- Uttar Pradesh
Pro – Chancellor
Noida International University

Message from Vice Chancellor

I welcome all the delegates to International Conference on "Make in India: Where we are & Where we go" February 18-19, 2016. This conference will provide a platform for bringing together researchers communities in the field of skill development from different areas. This conference is aimed to communicating current progress in the fields of Technology & Innovation, micro and macroeconomics, Medical, Nursing & Health, management, financial investment, banking, business development, manufacturing, marketing, policy formulation and many more. Being a truly international meeting with researchers from several countries, it is also aims for building bridges to strengthen global collaborations in many recent trends that are global in nature.

My warm welcome to all delegates to Noida international university a splendid temple of learning.

Prof. (Dr). Kumkum Dewan
Vice Chancellor
Noida International University

Message from Conference Director

After 'Make in India' initiative by Government of India, so many policies were floated to make inclusive growth of each citizen of India. It has been almost one and a half years that the campaign was proposed. This is high time to analyze impact of the said campaign on the society and how it has percolated down to the poorest of poor.

This conference brings-in eminent speakers and researcher from all walks of life together to see the sustenance of these initiations.

On behalf of NIU family, I welcome all speakers and delegates to NIU campus.

Prof. (Dr.) Neeta Awasthy
Conference Director
ICMII-2016
Noida International University

Message from Conference Convener

I am happy to invite all the delegates to Noida international university that is organizing its 1st International Conference on Make in India: Where we are & Where we go" February 18-19, 2016, covering and extensive array of themes including Technology & Innovation, micro and macroeconomics, Medical, Nursing & Health, management, financial investment, banking, business development, manufacturing, marketing, policy formulation and many more.

I wish all the delegates of ICMII-2016 a very pleasant and fruitful stay at Noida international university. I also wish success to all delegates of icmii-2016 in their research work and future endeavors.

Dr. Anuranjan Misra
Convener - ICMII-2016
Noida International University

ICMII-2016

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RESEARCH PAPER

ROLE OF CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN SMART CITIES

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ABSTRACT

All over the world, the growth of construction industry is enormous in the past decade. The pace of generation of C&D waste is also significant. The C&D waste stream is comprised of four major sub-categories: *land clearing* debris, *transportation related* debris, *building* construction, demolition debris and *disaster* debris. According to the United States Environmental Protection Agency (USEPA), renovation and demolition accounts for 88% of all C&D debris from residential and commercial buildings. The countries like U.K, U.S.A., France, Denmark, Germany and Japan have succeeded in developing economically feasible technologies for recycling up to 80 or 90 percent of C&D waste. However least effort has been reported for the utilization of construction waste in India. This paper enlightens the efficient use of construction and demolition waste as limited availability of the aggregates for production of the concrete is the major problem faced by the construction industry. There is a need to lay emphasis on (3R) concept i.e. Reduce, Reuse & Recycling which will ultimately add to the green and smart city initiative of government of India.

Keywords: Construction, Demolition, Management and Building.

1. INTRODUCTION

The construction industry in India is booming. Already at 10 per cent of the GDP, it has been growing at an annual rate of 10 per cent over the last 10 years as against the world average of 5.5 per canter annum. Almost 70 per cent of the building stock in India is yet to come up. The built-up area is expected to swell almost five times from 21 billion sq. ft. in 2005 to approximately 104 billion sq. ft. by 2030.This immense surge will have fallouts. Buildings are at the core of all our demands water, energy and material— but they also create waste. This waste, generated in the construction, maintenance and disposal phases of a building, is called construction and demolition (C&D) waste. This includes waste from demolished structures, renovations in the real estate sector and construction and repair of roads, flyovers, bridges, etc.

Figure 1: Construction Waste

Construction waste is normally combined with demolition waste and described as "construction and demolition" (C&D). There are many definitions for C&D. Virtually every state has a slightly different definition for C&D waste. The EPA's *Characterization of Building-Related construction and Demolition Debris in the United States* (EPA530-R-98-01O) contains a partial list of these varied state definitions. For the purpose of this study, C&D waste is defined as the waste resulting from new construction, remodelling, or the demolition of a structure.

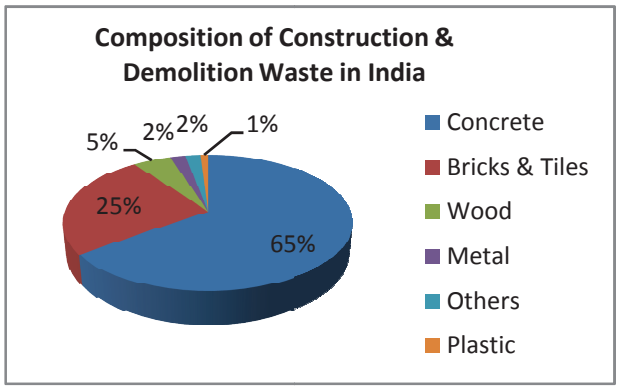


Figure 2: Composition of construction Waste

Globally, cities generate about 1.3 billion tonne of solid waste per year. This volume is expected to increase to2.2 billion Tone by 2025, says a 2012 report by the World Bank. Building materials account for about half of all materials used and about half the solid waste generated worldwide. But C&D waste can be an invaluable source of building material. As per the estimates of Centre for Science and Environment (CSE), since 2005, India has newly constructed 5.75 billion sq. m of additional floor space with almost one billion sq. m in 2013 itself. If (according to the Technology Information, Forecasting and Assessment Council's, or TIFAC's, thumb rule) a new construction generates 40-60 kg of C&D waste per sq. m,

then taking an average of 50 kg per sq. m, India must have generated 50 million tonne(MT) of C&D waste in 2013.

Over the last eight years, it would have produced 287 MT of this waste. This estimate only accounts for new construction. Demolition and renovation/repair-related waste of the older stock generates additional waste. The waste produced per sq. m of demolition is 10 times that generated during construction: as per TIFAC, 300-500 kg of waste per sq. m. If it is assumed that five per cent of the existing building stock gets demolished and rebuilt completely annually, then about 288 MT more of C&D waste would have been generated in 2013 alone because of demolitions.

Landfill has been the traditional disposal mechanism for C&D waste, but in accordance with the waste management hierarchy and having regard to the resource value of the discarded materials and the current exhaustive pressures on landfill space, recycling must take over as the main management route for this waste stream.

2. CONSTRUCTION WASTE

The large metropolitan areas account for about 58% of total waste but 88% construction waste. Likewise, the rural areas account for 34% of the total waste but only 5% of the construction waste. There seems to be several reasons for this difference.

- There is more construction in the metropolitan areas than the rural areas.
- The metropolitan areas have more regulations concerning waste disposal and enforcement of illegal dumping activities.
- Many rural areas allow open burning and therefore much of the carbon-based waste is burned and not disposed in landfills.
- Many urban construction contracts require proper disposal in landfills, whereas many rural construction contracts leave disposal options unstated.

Recovery of some construction waste may be possible in the larger metropolitan areas where there are large construction waste volumes. However recovery in rural areas, where volumes are very low, seems to be impractical.

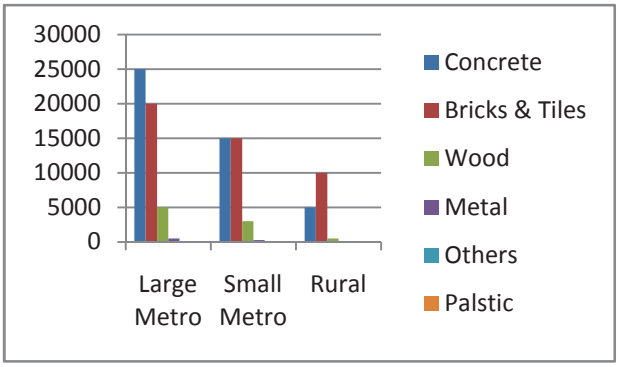


Figure 3: Disposal of Construction Waste - Tons per Year

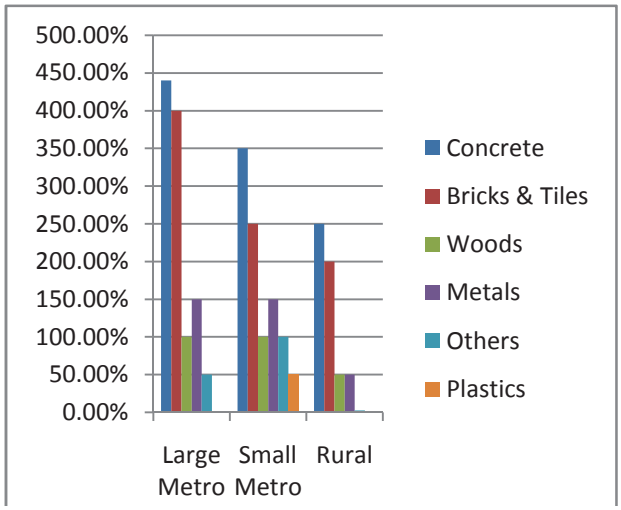
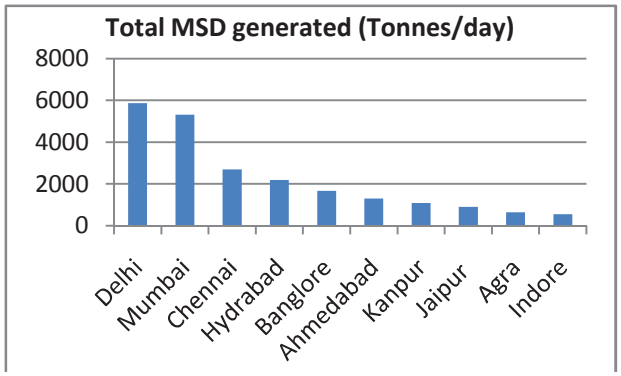


Figure 4: Disposal of Construction Waste – Percent by Landfill Type

TIFAC also says building repair produces 40-50 kg per sq. m of waste. Assuming that one-third of the existing building stock underwent some sort of repair or renovation in 2013, India must have generated an average of 193 MT of C&D waste just from repair and renovation in that year. Thus, the total C&D waste generated in India just by buildings in one year — 2013 — amounts to a humungous 530 MT, 44 times higher than the official estimate. Imagine the scenario if the waste generated by infrastructure projects such as roads and dams is added. Not surprisingly, in India, if C&D waste is quantified, it will be more than all the other types of solid waste put together. Where is all this C&D waste going? A lot of it is being used by land sharks to illegally fill up water bodies and wet lands around urban centres for real estate development. The rest is just being dumped into rivers and open spaces.

3. CURRENT PRACTICES FOLLOWED IN INDIA:-

Delhi estimates generation of about 3000 to 4000tons per day (TPD) of C&D waste. The primary responsibility of disposal of C&D waste is on the generator of the waste. Municipal Corporation of Delhi (MCD) is responsible for the transportation and disposal of unclaimed waste (Delhi Municipal Corporation Act, 1957). The total quantity of C&D waste collected and disposed by MCD is significantly less than the quantity of C&D waste generated in the city. Considerable amount of C&D waste is completely unaccounted for and is dumped illegally in desolate areas like the Delhi Ridge and Yamuna flood plains. Moreover, there is no scientific method followed at the disposal sites, where waste is disposed without any processing. In addition to the ad hoc nature of the system, constraints of space for storage of the C&D waste, and lack of space for landfill are also important areas of concern.



In collaboration with MCD, a pilot project has been developed by IL&FS Environmental Infrastructure &Services Ltd (IEISL) to demonstrate the potential of a scientifically managed process in relation to the collection and recycling of C&D waste in Delhi. The pilot project envisages an appropriate collection mechanism for C&D waste generated in the city, its transportation to the designated processing site, processing of the waste and reclaiming of the land by filling up, levelling and compaction. Being the first such project of organized management of C&D waste in the country, it will set an example, which can be replicated by other cities in India.

Hence the learning from this pilot project is of great importance. The project has been set up on a PPP basis at Burarion approximately seven acres of land provided by the MCD for a period of 10 years. The PPP model created for addressing the collection, processing and disposal of C&D waste is successful as it serves the dual purpose of saving of landfill space on the one hand, and also developing a market for C&D waste recyclables.

4. STRATEGIES FOR IMPLEMENTATION OF C& D WASTE MANAGEMENT PLAN

Reducing construction and demolition (C&D) waste requires commitment and attention by all parties key to the building's construction, but is not inherently complicated. Significant waste prevention and diversion from landfills requires that we view materials as resources to be conserved.

Opportunities for reducing C&D waste focus on three approaches, typically expressed as Reduce–Reuse–Recycle.

Reducing waste, the first approach, yields the greatest environmental benefits. Using less material costs less, reduces pollution from its manufacture and transportation, saves energy and water, and keeps material out of landfills. Waste reduction should be the top priority in your waste management plans.

Reusing, the second approach, extends the life of existing materials and decreases the new resources needed. Of course, entire buildings can be reused through renovation, whether for the same or new use, saving both resources and money. There use or salvage of building components, common in historic renovations, is being extended to non-decorative elements such as doors and light fixtures as well. This approach can be pushed further by not assuming that new always performs better. For example, energy modelling for two EPA headquarters buildings found that adding interior storm windows saved more energy than new windows, costless and didn't expose the interior to the elements during construction. Andasa long-term approach, designing buildings to easily accommodate evolving use and technology is an excellent and sometimes overlooked strategy to prevent future waste.

Recycling, the third approach again conserves resources and diverts materials from landfills. Demolition and renovation projects, which account for approximately two-thirds of DDC's work, present numerous opportunities for recycling. The most sustainable form of recycling converts waste into new products, such as scrap to new steel or asphalt into new paving. Additionally, finding alternative uses for waste is a form of recycling. Inert waste, such as concrete and brick, can be crushed and used as alternative daily cover for municipal landfills, substituting for dirt, or wood scrap can be burned as boiler fuel.

5. SURVEY EXISTING BUILDINGS FOR ITEMS THAT COULD BE SALVAGED AND REUSED

Renovation, a majority of DDC work, yields opportunities for reusing building components on the project, or salvaging them for another building. Reuse is implicit in historic renovation, but other projects also present opportunities. Strategies include:

- Start in the schematic design phase.
- Review the existing furnishings and equipment to determine which items are in good condition and could be reused to meet the planned program, could be salvaged for another DDC project or donated to a non-profit group. (Ask OSD for suggestions.)
- Identify system components and equipment with reuse potential, such as chillers, ductwork and lighting, but weigh their reuse in light of future energy efficiency, indoor air quality or early replacement.
- Assess the architectural components for possible uses and discuss with the client/user. Potential materials include doors, panelling, shelving, wood, stone/marble, lighting fixtures (revamped), windows, etc. Evaluate these with function, proposed location and ease of removal and storage (time/Rs) in mind.

A well-managed C& D Management requires that specification sections be included that require the contractors to recycle C&D waste. It provides C&D specification sections that can be adapted to suit your individual project. Although some recycling is normal practices on every job, the specifications require the contractor to develop a Waste Management Plan and to provide

Strategies include:

- At a minimum for all projects, Typical Project C&D specification sections. This version sets a target goal for recycling, and requires a Waste Management Plan and the collection of documentation.
- For a more rigorous approach, use LEED Project C&D specification sections. This version requires that a specific minimum percentage of C&D waste be recycled, e.g. 50% or 75%percentby weight.

The minimum percentage and documentation are aimed at meeting the U.S. Green Building Council's LEED requirements (version 2.1) for Construction Waste Management credit Follow-through during construction. Success will only be determined at the end of the job, when goals and reality meet. Vigilance is needed to survive the many construction pressures and competing priorities.

Strategies include:

- Assist the contractor in developing a written Waste Management Plan that identifies the following: components to be recycled reuse/salvaged, and land filled; estimated amounts; processors that will receive the C&D waste; on-site procedures and responsibilities; and documentation to be provided.
- Discuss waste management at all job meetings.
- Observe the on-site provisions during site visits.
- Review the contractors' reports in a timely manner and compare to the Waste Management Plan to gauge progress, bring lagging results to the Contractor's attention.
- Forward the collected contractor's reports to DDC's Office of Sustainable Design, for agency-wide analysis.
- Be firm but flexible about real construction difficulties.

6. CONCLUSION

Develop a Waste Management Plan: Although recycling already takes place on most projects and every project is different, the development of goals, formal procedures and documentation are new. Planning will be necessary to effectively organize a site-wide effort, analyze its economics, and carry it out. Strategies include:

- Designate a Recycling Coordinator, who will be responsible for developing the details of the plan and monitoring its progress.
- Analyse the waste anticipated in the construction and demolition. Resources available to help estimate the types/amount of waste include the other contractors, waste disposal records from previous projects, and materials estimates from bidding.
- Target first materials that are plentiful, easy to recover, and those with low recycling costs or high paybacks.
- Dispose of all hazardous materials properly. Hazardous materials, such as asbestos-containing materials, lead paint and pcb-containing ballasts are outside the scope of this document. Their removal and disposal are subject to Federal,
- State and City regulations.
- Identify products, such as carpet or ceiling tiles, which will be picked up and recycled by the manufacturers.
- Determine the appropriate waste processors, considering costs, procedures, convenience and other pertinent factors. Some C&D waste processors will pick-up from the job site.
- Review DDC's Sample Waste Management Plan for a better understanding. (See www.nyc.gov/ddcgreen.)
- Plan on-site procedures that will accomplish your goals, using some of the strategies that follow.

7. REFERENCES

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[3] www.wastematch.org - Web site of New York Wa$te Match, a NYC materials exchange service, linking generators of industrial and commercial waste by-products with local end-users. Wa$teMatch has effectively located outlets for by-products such as pallets, shipping crates and other types of packaging. With a grant from the EPA and DOS, NY Wa$teMatch has compiled a very extensive list of Recycling and Reuse Outlets for building materials in NY. Call 212-442-5219.

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[5] www.mfta.org - Web site of Materials for the Arts, a NYC-based organization that accepts donations for re-distribution to art and cultural organizations. MFA accepts items such as computer equipment, used furniture and lighting fixtures.

[6] www.perscholas.org - Web site of Per Scholas, a Bronx-based non-profit that reconditions used computers for distribution to low-income families and educational institutions. When computers can no longer be reconditioned, Per Scholas recycles them.

[7] www.nema.org/lamprecycle- Web site of the National Electrical Manufacturers Association, describing the benefits of lamp recycling and the state and federal regulations regarding mercury-containing lamps. The site provides a list of association companies that process or recycle spent mercury-containing lamps

[8] www.shinglerecycling.org - Web site with comprehensive information on asphalt shingle recycling, is including contaminant issues, processing techniques, end-markets and regulatory references.

[9] www.epa.gov/epaoswer/non-hw/debris/ - Site of the U.S. Environmental Protection Agency that discusses construction and demolition waste issues, and links to other resources.

[10] www.informinc.org/fact_CWPconstruction.php- Web Site of Inform, an independent research organization. One of their focus topics is waste prevention, and this site describes strategies for reducing waste and preventing pollution generated during building construction, renovation and demolition. Additional links are included.

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[12] Internet Resources DDC Reducing And Recycling Construction & Demolition Waste
[13] www.dec.state.ny.us - Web site of New York State Department of Environmental Conservation. Offers information on the "Green Buildings Initiative" and green building legislation.
[14] www.nerc.org - Web site of the Northeast Recycling Council, which is a source for news, conferences, resources and links.
[15] The Council covers the ten northeast states, including New York.
[16] www.resourceventure.org/construction.htm - Web site of the Business and Industry Resource Venture of Seattle/King County. The site has information on sustainable design practices, in particular construction recycling. See their Contractor's Guide.
[17] www.ciwmb.ca.gov - Web site of the California Integrated Waste Management Board. Provides C&D recycling resources, including sample local ordinances encouraging recycling and case studies.
[18] www.loadingdock.org - Web site of a Baltimore-based non-profit building materials reuse center that salvages reusable building materials such as flooring, electrical fixtures, toilets, doors, lumber and windows.

●●●

RESEARCH PAPER

MAKE IN INDIA: TOWARDS A MANUFACTURING HUB FOR KEY SECTORS

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ABSTRACT

India is on the threshold of monumental changes to surpass all other economies. Its prime drivers are hopes, dreams and aspirations of tech-savvy youngsters who form over 30% of our population.

Government's "Make in India" campaign will be a fulcrum to attract FDI via ushering in a proactive policy regime.

Make in India captures new hopes and aspirations of emerging India, where, we are witness to an entire new phenomenon of hundreds of 'Start-ups' powered by our young engineering and management graduates.

Government plans to integrate entrepreneurship education into the mainstream curriculum in 3,000 colleges around India.

Besides catapulting country's GDP growth to over 7% per annum on a sustainable basis, 'Make in India' will create more than 10 million jobs.

This paper is an overview of the subject and outlines the blueprint prepared by NITI Ayog.

Keywords: Make in India', Entrepreneurship Education.

1. INTRODUCTION

INDIA's manufacturing sector fared quite indifferently during the last three years. The country had been recording sustained trade deficits since 1980 mainly due to the high growth of imports, particularly of crude oil, gold and silver. Under severe pressure to generate jobs in the country, the Government of India did something really visionary that lays down roadmap for a vibrant India. After intense brainstorming, a novel blueprint emerged, called, 'Make in India'.

Make in India is an initiative of the Government of India to encourage Multinational companies to manufacture their products in India. Launched by Prime Minister, Narendra Modi on 25 September 2014, it catapults India to be the top destination for Foreign Direct Investment surpassing China and the US. IMF recently announced India's GDP growth in 2016 to surpass all other countries.

This strategic push to revive an ailing manufacturing sector found resonance with business community: fresh overseas investment proposals of over $ 18 billion fructified. The initiative hopes to increase GDP growth and tax revenue on a sustainable basis. Fostering innovation, protecting intellectual property, and enhancing skill development are the other aims of the program.

Ultimate objective is to make India a renowned manufacturing hub for key sectors. Companies across the globe would be invited to make investment and set up factories and expand their facilities in India Using India's highly talented and skilled manpower to create world class zero-defect products. The program targets growth in the manufacturing sector to 12-14% per annum to increase share of manufacturing in the country's Gross Domestic Product from 16% to 25% by 2022.

2. FOCUS ON 25 SECTORS OF THE ECONOMY

Make in India focus is on 25 sectors of the economy for job creation and skill enhancement: • Automobiles • Automobile Components • Aviation • Biotechnology • Chemical • Construction • Defence Manufacturing • Electrical Machinery • Electronic Systems • Food

Processing • IT and BPM • Leather • Media and Entertainment • Mining • Oil and Gas • Pharmaceuticals • Ports • Railways • Renewable Energy • Roads and Highways • Space • Textile Garments • Thermal Power • Tourism and Hospitality • Wellness sector.

The aim of 'Make in India' is to take the share of manufacturing in the country's GDP from a stagnant 16% currently to 25% by 2022, as stated in the National Manufacturing Policy, and to create 100 million jobs by 2022. India had fallen to a lowly 134th rank out of 189 countries this year (three down from 2013) in the World Bank's Ease of Doing Business rankings.

Currently, it takes 12 procedures and 27 days to start business, 35 procedures and 168 days to get construction permits and 1420 days to enforce contracts in India. Single-window clearances, minimal procedures & cutting of any red-tapism, the new proactive approach provides for a structural change in government's strategy to usher golden opportunity to domestic companies for growth and creating employment.

Each 1 per cent increase in FDI adds about 0.4 per cent to a country's GDP growth. So, to boost GDP growth by about 2 per cent, India will need about 5 per cent increase in FDI. Government's "Make in India" campaign will be a fulcrum to attract FDI via ushering in proactive policy regime.

Make in India 'Logo' is a majestically striding lion made of cogs, symbolizing strength, manufacturing and national pride & dignity.

Undoubtedly, India is on the threshold of monumental changes to surpass all other economies. Its prime drivers are hopes, dreams and aspirations of tech-savy youngsters who form over 30% of our population. They are lapping up newly launched products like Apple iPhones with gusto. This creates and sustains the momentum of exponentially rising demand that is music to the industry's ears.

The new found hope is best exemplified by meteoric strides made in the Space sector. Our space programme stands out as one of the most cost-effective in the world enabling India to launch over 40 satellites for 19 countries. With ISRO undertaking the development of technologies & interplanetary exploratory mission, there is unlimited scope in contribution to realization of operational mission and new areas. FDI up to 74% is allowed in satellites-establishment and operation.

3. INNOVATION IN ENGINEERING

Make in India is not just about manufacturing but *innovation* & *engineering* too. India has the potential to be at the forefront of innovation. The encouraging steps in this direction notwithstanding, our country lags behind many others. India is ranked 76th in the Global Innovation Index 2014, much below China which is at the 29th position. Even Russia, at the 49th place and Brazil at 61, performed better than us.

A nation's economic development is powered by competitiveness. Competitiveness is powered by knowledge. Knowledge is powered by technology. Technology is powered by innovation. Technology and innovation are powered by resource investment.

Innovation opens up new vistas of knowledge and new dimensions to our imagination to make everyday life more meaningful and richer in depth and content. Innovation is born out of creativity.

As an example, we could have innovation through technology-enabled supply chain through the use of RFID, advanced GIS/GPS, tracing and traceability systems. We could get `more from less' by reducing wastage and ensuring quality throughout the supply chain.

Precision agriculture could be achieved with the use of advanced GIS/GPS and sensors can guide planting/irrigation, monitor yields, fine tune inputs and achieve `more from less' by improving yields as well as reduce the use of water and fertilizer.

Moderately skilled agricultural workers with access to smart apps using smart phones or tablets can benefit from digital farm extension and advisory services.

Farmers can have real time market information by using mobile communications, voice based call centers and expert systems for real time price discovery, weather information and cultivation trends.

Again we can achieve `more from less' by using leakage-free public distribution system, which uses computerized allocation of food grains, GPS/SMS monitoring, verifiable digital identify and web portal for public grievances

Similarly, we can have technology enabled crop insurance, where use of real time data from weather stations could be used to predict the rainfall and calculate the insurance payouts, which can be automatically transformed to the farmers through mobile banking. These seamless transactions can achieve `more from less'.

4. ENTREPRENEURSHIP DEVELOPMENT

An entrepreneurship development scheme is currently being developed by Ministry of Skill Development and Entrepreneurship. The scheme is being designed around the following major elements.

Entrepreneurial Education: In partnership with experts, a world class entrepreneurship education curriculum will be developed. This curriculum will be delivered to all aspiring entrepreneurs at no cost. Leveraging online learning, entrepreneurship courses can be taken as and when needed by students and business people alike through Massively Open Online Courses (MOOCs).

In addition, entrepreneurship education will be integrated into the mainstream curriculum in 3,000 colleges around

India. Entrepreneurship education courses will also be delivered in approximately 325 industrial clusters across the nation. Through 50 nodal Entrepreneurship Hubs (E-Hubs) set up across all states, existing and potential entrepreneurs will be targeted for entrepreneurship education modules that suit their need.

Connect Entrepreneurs to peers, mentors, incubators: To support young entrepreneurs, a web and mobile based platform connecting the entire entrepreneurial ecosystem will be established. Platform members will access content online, including information on government services and special packages offered by service providers.

The creation of new incubators will be encouraged and a national network of incubators and accelerators established to support young entrepreneurs. A national network of high quality, screened mentors will also be created, leveraging existing networks and successful local entrepreneurs where possible.

Entrepreneurship activities in innovative and cutting edge technology areas will be aligned with initiatives such as Atal Innovation Mission (AIM) and Self Employment Talent Utilisation (SETU).

Support entrepreneurs through Entrepreneurship Hubs: Support to entrepreneurs, including coordinated delivery of national and state government entrepreneurship programs and access to enabling resources, a national network of Entrepreneurship Hubs (E-Hubs) will be established. One national, 30 states, 50 Nodal and 3,000 colleges based E-Hubs will be set up to deliver support. These E-Hubs will, collectively, cover the entire nation.

Catalyse a culture shift to encourage entrepreneurship: To promote entrepreneurship, state and national level interactions with stakeholders will be convened. International linkages will be established through internship opportunities and exchange trips to global entrepreneurship hubs such as Silicon Valley and Israel. To build awareness, national brand ambassadors will be created to champion entrepreneurial culture in India.

5. THE STARTUP LANDSCAPE

In recent years, the Indian startup ecosystem has really taken off and come into its own—driven by factors such as massive funding, consolidation activities, evolving technology and a burgeoning domestic market.

The numbers are telling—from 3,100 startups in 2014 to a projection of more than 11,500 by 2020, this is certainly not a passing trend. It's a revolution. And it's going to change the way the markets are working today in India. As a contrast, China reports as many as 10000 startups commencing every day!

A lot of startups in India have entered the industry either unearthing an entirely new market or through gaps in existing markets or product lines. Between 2010 and 2014, the infusion of VC and PE increased from $13 million to $1,818 million. Angel investment too has multiplied almost 8 times from $4.2 million to $32.2 million.

As an example, take Paytm that boasts of 80 million mobile wallets and more than 15 million orders per month, Paytm has revolutionized mobile commerce in India. It's a leading payment solutions provider to e-commerce merchants using its RBI approved semi-closed wallet, also its USP. From Domino's Pizza to Zivame to Uber, it's everywhere.

Another Case Study is of Ola Cabs. Ola, in April 2015, announced raising $400 million in its series E round of funding led by DST Global with participation from GIC, Falcon Edge Capital, and existing investors SoftBank Group, Tiger Global, Steadview Capital and Accel Partners US. From this amount, Ola has earmarked $100 million towards fuelling expansion and growth of the acquired TaxiForSure.

While the range of services offered like Mini, Sedan, Prime, Auto-rickshaws, Taxis, and Café (food delivery) has continued to increase over the past year, Ola plans to further invest in localising its offerings for the benefit of citizens and driver partners in every market. Ola plans to be in 200 cities by the end of this year.

Through "Ola Pragati" in partnership with the State Bank of India, drivers can now avail of a daily loan repayment facility and a lower down payment to buy a car of their choice. Ola aims to offer this program to over 100,000 driver entrepreneurs across India within the next two years under its expansion arm.

Following graph depicts funding data for a few cities of the country for the year 2014.

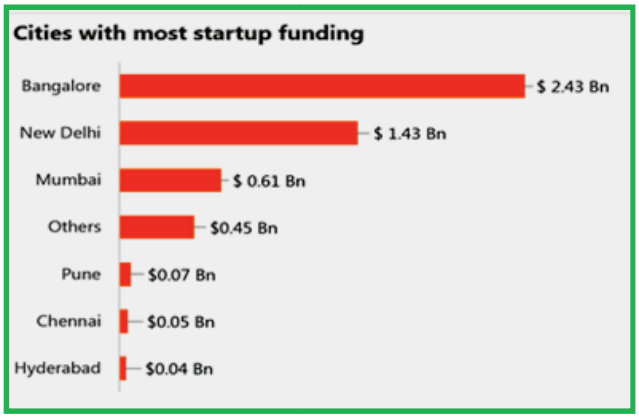

Fig. 1: Citywise Startup Funding

Based on available published data in 2014, Helion Venture Partners was top of the investors list going by the total number of deals made, followed by Sequoia Capital, Blume Ventures, Kalaari

Capital and Accel Partners. Following graph shows the sectorwise breakup of funding.

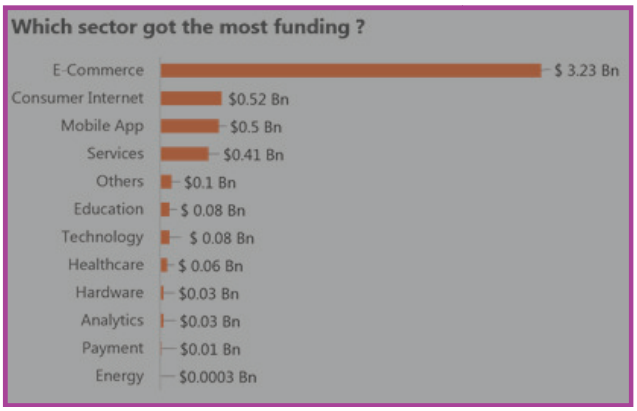

Fig. 2: Sectorwise Startup Funding

Startups in India have given rise to more startups. Enablers, accelerators, and incubators are firms providing startups with growth advice and decision-making tools. From advising on government policies to act as market catalysts, they grow the maturity of young ventures.

Enablers like NASSCOM and iSpirt bring together key stakeholders of the ecosystem including startup incubators, accelerators, angel investors, venture capitalists, support groups, mentors, and technology corporations.

NASSCOM has come up with an ambitious initiative called “10,000 Startups”, aiming to scale up the startup ecosystem in India by 10x. The program is supported by Microsoft, Google, Intel, Verisign, and Kotak.

10,000 Startups aims to enable incubation, funding and support for 10,000 startups in India over the next ten years.

The program has been able to successfully impact 150+ technology startups, aiding in the raising of funds, acceptance into acceleration programs, found customers, and on-boarded members through the initiative.

6. ROADMAP FOR IMPLEMENTATION

India has to do things differently to stay ahead and hence moving on to higher technologies, as is being done by the United States. The trajectory of Indian manufacturing has to go to a different level. Hence, there is a need to revamp our manufacturing process by using next generation technology to stay competitive and ahead of other south-east Asian countries.

NITI Aayog is preparing a road map to implement the Make in India programme in a manner that will give India an edge over its competing neighbours and prove sustainable over the long term.

The institution will soon come out with a blueprint for various technological interventions that need to be taken up by different sectors of the manufacturing economy to ensure that India does not lose out to countries such as Bangladesh and Vietnam in scale as well as technological advancement.

Focus of the suggestive paper, which is expected to be ready by the beginning of the next fiscal after due consultation with all stakeholders, will be on a shift towards green manufacturing, digital manufacturing and additive manufacturing.

Green manufacturing will involve manufacturing of green products, particularly those used in renewable energy systems and clean technology equipment of all kinds, and the "greening" of manufacturing, thereby reducing pollution and waste by minimising use of natural resources and recycling of waste. It holds potential economic benefits including long-term cost savings, waste reduction and process efficiency improvements.

Additive manufacturing, often referred to as beginning of a third industrial revolution, refers to various processes used to synthesis a three-dimensional object while in digital manufacturing or computer-integrated manufacturing functional areas such as design, analysis, planning, purchasing, cost accounting, inventory control and distribution are linked through the computer with factory floor functions such as materials handling and management, providing direct control and monitoring of all the operations.

The Aayog feels that a shift in manufacturing focus from traditional methods to scientific methods will help in substantially reducing the turnaround time, help India scale up its manufacturing and finally pitch itself in the global market as a "green manufacturing" country.

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RESEARCH PAPER

ANALYZING BIG DATAWITH HADOOP TECHNOLOGIES

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ABSTRACT

Big data is a term that refers to data sets or combinations of data sets whose size (volume),complexity (variability), and rate of growth (velocity) make them difficult to be captured, managed, processed or analyzed by conventional technologies and tools, such as relational Databases and desktop statistics or visualization packages, within the time necessary to make them useful.

While the size used to determine whether a particular data set is considered big data is not firmly defined and continues to change over time, most analysts and practitioners currently refer to data sets from 30-50 terabytes(10 12 or 1000 gigabytes per terabyte) to multiple peta bytes (1015 or 1000 terabytes per peta byte) as big data.

Keywords: Big Data, Hadoop, Map Reduce, HDFS, Hadoop Components.

1. INTRODUCTION

The term describes innovative techniques and technolnologies to capture, store, distribute, manage and analyze petabyte- or larger-sized datasets with high-velocity and different structures. Big data can be structured, unstructured or semi-structured, resulting in incapability of conventional data management methods. Data is generated from various different sources and can arrive in the system at various rates. In order to process these large amounts of data in an inexpensive and efficient way, parallelism is used. Big Data is a data whose scale, diversity, and complexity require new architecture, techniques, algorithms, and analytics to manage it and extract value and hidden knowledge from it. Hadoop is the core platform for structuring Big Data, and solves the problem of making it useful for analytics purposes. Hadoop is an open source software project that enables the distributed processing of large data sets across clusters of commodity servers. It is designed to scale up from a single server to thousands of machines, with a very high degree of fault tolerance.

2. WHAT COMES UNDER BIG DATA?

Big data involves the data produced by different devices and applications. Given below are some of the fields that come under the umbrella of Big Data.

Black Box Data: It is a component of helicopter, airplanes, and jets, etc. It captures voices of the flight crew, recordings of microphones and earphones, and the performance information of the aircraft.

Social Media Data: Social media such as Facebook and Twitter hold information and the views posted by millions of people across the globe.

Stock Exchange Data: The stock exchange data holds information about the 'buy' and 'sell' decisions made on a share of different companies made by the customers.

Power Grid Data: The power grid data holds information consumed by a particular node with respect to a base station.

Transport Data: Transport data includes model, capacity, distance and availability of a vehicle.

Search Engine Data: Search engines retrieve lots of data from different databases.

3. BENEFITS OF BIG DATA

Big data is really critical to our life and its emerging as one of the most important technologies in modern world.

Using the information kept in the social network like Facebook, the marketing agencies are learning about the response for their campaigns, promotions, and other advertising mediums.

Using the information in the social media like preferences and product perception of their consumers, product companies and retail organizations are planning their production.

Using the data regarding the previous medical history of patients, hospitals are providing better and quick service.

4. BIG DATA TECHNOLOGIES

Big data technologies are important in providing more accurate analysis, which may lead to more concrete decision-making resulting in greater operational efficiencies, cost reductions, and reduced risks for the business.

To harness the power of big data, you would require an infrastructure that can manage and process huge volumes of structured and unstructured data in real time and can protect data privacy and security.

There are various technologies in the market from different vendors including Amazon, IBM, Microsoft, etc., to handle big data. While looking into the technologies that handle big data, we examine the following two classes of technology:

5. HADOOP

Doug Cutting, Mike Cafarella and team took the solution provided by Google and started an Open Source Project called HADOOP in 2005 and Doug named it after his son's toy elephant. Now Apache Hadoop is a registered trademark of the Apache Software Foundation.

Hadoop runs applications using the Map Reduce algorithm, where the data is processed in parallel on different CPU nodes. In short, Hadoop framework is capable enough to develop applications capable of running on clusters of computers and they could perform complete statistical analysis for huge amounts of data.

Hadoop is an Apache open source framework written in java that allows distributed processing of large datasets across clusters of computers using simple programming models. A Hadoop frame-worked application works in an environment that provides distributed storage and computation across clusters of computers. Hadoop is designed to scale up from single server to thousands of machines, each offering local computation and storage.

6. RELATED WORK

There has been some recent work on bringing together ideas from Map Reduce and database systems; however, this work focuses mainly on language and interface issues. The Pig project at Yahoo, the SCOPE project at Microsoft, and the open source Hive project aim to integrate declarative query constructs from the database community into Map Reduce-like software to allow greater data independence, code reusability, and automatic query optimization. Greenplum and Aster Data have added the ability to write Map Reduce functions (instead of, or in addition to, SQL) over data stored in their parallel database products. Although these five projects are without question an important step in the hybrid direction, there remains a need for a hybrid solution at the systems level in addition to at the language and interface levels. This paper focuses on such a systems-level hybrid.

Hadoop Architecture: Hadoop framework includes following four modules:

Hadoop Common: These are Java libraries and utilities required by other Hadoop modules. These libraries provide filesystem and OS level abstractions and contains the necessary Java files and scripts required to start Hadoop

Hadoop YARN: This is a framework for job scheduling and cluster resource management.

Hadoop Distributed File System (HDFS™): A distributed file system that provides high-throughput access to application data.

Hadoop Map Reduce: This is YARN-based system for parallel processing of large data sets.

We can use following diagram to depict these four components available in Hadoop framework. Since 2012, the term "Hadoop" often refers not just to the base modules mentioned above but also to the collection of additional software packages that can be installed on top of or alongside Hadoop, such as Apache Pig, Apache Hive, Apache HBase, Apache Spark etc.

7. SOLUTION FOR BIG DATA PROCESSING

Hadoop is a Programming framework used to support the processing of large data sets in distributed computing.

Hadoop has developed Google Map Reduce that is a software framework where an application breaks down into various parts. The Current Apache Hadoop ecosystem consists of the Hadoop Kernel, Map Reduce, HDFS and numbers of various components like Apache Hive, Base and Zookeeper. HDFS and Map Reduce are explained in following points.

8. HADOOP DISTRIBUTED FILE SYSTEM

Hadoop can work directly with any mountable distributed file system such as Local FS, HFTPFS, S3 FS, and others, but the most common file system used by Hadoop is the Hadoop Distributed File System (HDFS).

The Hadoop Distributed File System (HDFS) is based on the Google File System (GFS) and provides a distributed file system that is designed to run on large clusters (thousands of computers) of small computer machines in a reliable, fault-tolerant manner.

HDFS uses a master/slave architecture where master consists of a single Name Node that manages the file system metadata and one or more slave Data Nodes that store the actual data.

A file in an HDFS namespace is split into several blocks and those blocks are stored in a set of DataNodes. The Name Node determines the mapping of blocks to the Data Nodes. The Data Nodes takes care of read and write operation with the file system. They also take care of block creation, deletion and replication based on instruction given by Name Node.

HDFS provides a shell like any other file system and a list of commands are available to interact with the file system. These shell commands will be covered in a separate chapter along with appropriate examples.

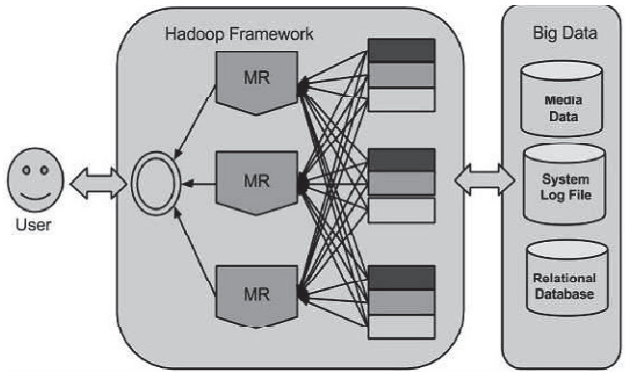
9. ADVANTAGES OF HADOOP

Hadoop framework allows the user to quickly write and test distributed systems. It is efficient, and it automatic distributes the data and work across the machines and in turn, utilizes the underlying parallelism of the CPU cores.

Hadoop does not rely on hardware to provide fault-tolerance and high availability (FTHA), rather Hadoop library itself has been designed to detect and handle failures at the application layer.

Servers can be added or removed from the cluster dynamically and Hadoop continuesto operate without interruption.

Another big advantage of Hadoop is that apart from being open source, it is compatible on all the platforms since it is Java based.



10.LITERATURE REVIEW

S. Vikram Phaneendra & E. Madhusudhan Reddy Illustrated that in olden days the data was less and easily handled by RDBMS but recently it is difficult to handle huge data through RDBMS tools, which is preferred as "big Data". In this they told the big data differs from other data in 5 dimensions such as volume, velocity, variety, value and complexity. They illustrated the hadoop architecture consisting of name node, data node, edge node, HDFS to handle big data systems.

Kiran kumara Reddi & Dnvsl Indira Enhanced us with the knowledge that Big Data is combination of structured, semi-structured, unstructured homogenous and heterogeneous data. The author suggested to use nice model to handle transfer of huge amount of data over the network .Under this model, these transfers are relegated to low demand periods where there is ample ,idle bandwidth available. This bandwidth can then be repurposed for big data transmission without impacting other users in system. The Nice model uses a store –and forward approach by utilizing staging servers. The model is able to accommodate differences in time zones and variations in bandwidth. They suggested that new algorithms are required to transfer big data and to solve issues like security, compression, routing algorithms.

11.HADOOP – HDFS OVERVIEW

Hadoop File System was developed using distributed file system design. It is run on commodity hardware. Unlike other distributed systems, HDFS is highly fault tolerant and designed using low-cost hardware.

HDFS holds very large amount of data and provides easier access. To store such huge data, the files are stored across multiple machines. These files are stored in redundant fashion to rescue the system from possible data losses in case of failure. HDFS also makes applications available to parallel processing.

12.FEATURES OF HDFS

Hadoop provides a command interface to interact with HDFS.

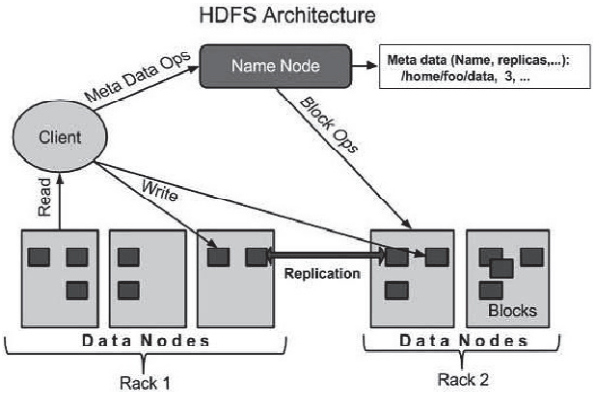
The built-in servers of name node and data node help users to easily check the status of cluster.

Streaming access to file system data.

HDFS provides file permissions and authentication.

13.HDFC ARCHITECTURE

Given below is the architecture of a Hadoop File System.



HDFS follows the master-slave architecture and it has the following elements.

14.GOALS OF HDFS

Fault detection and recovery: Since HDFS includes a large number of commodity hardware, failure of components is frequent. Therefore HDFS should have mechanisms for quick and automatic fault detection and recovery.

Huge datasets: HDFS should have hundreds of nodes per cluster to manage the applications having huge datasets.

Hardware at data: A requested task can be done efficiently, when the computation takes place near the data. Especially where huge datasets are involved, it reduces the network traffic and increases the throughput.

Jimmy Lin used Hadoop which is currently the large scale data analysis "hammer" of choice, but there exists classes of algorithms that aren't "nails" in the Sense that they are not particularly amenable to the Map Reduce programming model. He focuses on the simple solution to

find alternative non-iterative algorithms that solves the same problem. The standard Map Reduce is well known and described in many places .Each iteration of the page rank corresponds to the Map Reduce job.

15.EXPERIMENTAL RESULTS

Code	Program	Data Size	Notes
S-Wr	Synthetic Write	10GB / node	Hadoop sequential write
S-Rd	S-Rd Synthetic Read	10GB / node	Hadoop sequential read
Rnd-Text	Rnd-Text Random Text Writer	10GB / node	Hadoop sequential write
Rnd-Bin	Rnd-Bin Random Binary Writer	10GB / node	Hadoop sequential write
Sort	Sort Simple Sort	40GB / cluster	Hadoop sort of integer data
Search	Search Simple Search	40GB / cluster	Hadoop search of text data for rare string

16.CONCLUSION

We have entered an era of Big Data. The paper describes the concept of Big Data along with 3 Vs, Volume, Velocity and variety of Big Data.

The paper also focuses on Big Data processing problems. These technical challenges must be addressed for efficient and fast processing of Big Data. The challenges include not just the obvious issues of scale, but also heterogeneity, lack of structure, error-handling, privacy, timeliness, provenance, and visualization, at all stages of the analysis pipeline from data acquisition to result interpretation.

These technical challenges are common across a large variety of application domains, and therefore not cost effective to address in the context of one domain alone. The paper describes Hadoop which is an open source software used for processing of Big Data.

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●●●

RESEARCH PAPER

INTERNET OF THINGS AND ITS APPLICATIONS

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ABSTRACT

We are witnessing the dawn of a new era of Internet Technology, Internet of Things (also known as Internet of Objects). Generally speaking, IoT refers to the networked interconnection of everyday objects, which are often equipped with ubiquitous intelligence. IoT will increase the ubiquity of the Internet by integrating every object for interaction via embedded systems, which leads to a highly distributed network of devices communicating with human beings as well as other devices. Thanks to rapid advances in underlying technologies, IoT is opening tremendous opportunities for a large number of novel applications that promise to improve the quality of our lives. In recent years, IoT has gained much attention from researchers and practitioners from around the world.

Keywords: Internet of Things, Wireless Sensor Networks, RFID, Smart Environments.

1. INTRODUCTION

In the Internet of Things (IoT) paradigm, many of the objects that surround us will be on the network in one form or another. The Internet revolution led to the interconnection between people at an unprecedented scale and pace. The next revolution will be the interconnection between objects to create a smart environment.

The term Internet of Things was first coined by Kevin Ashton in 1999 in the context of supply chain management.

A radical evolution of the current Internet into a Network of interconnected objects that not only harvests information from the environment (sensing) and interacts with the physical world (actuation/command/control), but also uses existing Internet standards to provide services for information transfer, analytics, applications, and communications.

The effort by researchers to create a human-to-human interface through technology in the late 1980s resulted in the creation of the ubiquitous computing discipline, whose objective is to embed technology into the background of everyday life. Currently, we are in the post-PC era where smart phones and other handheld devices are changing our environment by making it more interactive as well as informative.

Mark Weiser, the forefather of Ubiquitous Computing (ubicomp), defined a smart environment as "the physical world that is richly and invisibly interwoven with sensors, actuators, displays, and computational elements, embedded seamlessly in the everyday objects of our lives, and connected through a continuous network".

The creation of the Internet has marked a foremost milestone towards achieving ubicomp's vision which enables individual devices to communicate with any other device in the world. The inter-networking reveals the potential of a seemingly endless amount of distributed computing resources and storage owned by various owners.

The advancements and convergence of micro-electro-mechanical systems (MEMS) technology, wireless communications, and digital electronics has resulted in the development of miniature devices having the ability to sense, compute, and communicate wirelessly in short distances. These miniature devices called nodes interconnect to form a wireless sensor networks (WSN) and find wide ranging applications in environmental monitoring, infrastructure monitoring, traffic monitoring, retail, etc. This has the ability to provide a ubiquitous sensing capability which is critical in realizing the overall vision of ubicomp as outlined by Weiser.

2. IOT COMPONENTS

There are three IoT components which enables seamless ubicomp:

- **Hardware**—made up of sensors, actuators and embedded communication hardware
- **Middleware**—on demand storage and computing tools for data analytics and
- **Presentation**—novel easy to understand visualization and interpretation tools which can be widely accessed on different platforms and which can be designed for different applications

3. APPLICATIONS

There are several application domains which will be impacted by the emerging Internet of Things. The applications can be classified based on the type of network availability, coverage, scale, heterogeneity,

repeatability, user involvement and impact. We categorize the applications into four application domains:

Personal and Home:

- An extension of the personal body area network is creating a home monitoring system for elderly care, which allows the doctor to monitor patients and the elderly in their homes thereby reducing hospitalization costs through early intervention and treatment.
- Control of home equipment such as air conditioners, refrigerators, washing machines etc., will allow better home and energy management.
- Social networking is set to undergo another transformation with billions of interconnected objects.

Enterprise:

One of the major IoT application areas that are already drawing attention is Smart Environment IoT. Smart environment includes subsystems that are grouped according to their impact areas. The applications or use-cases within the urban environment that can benefit from the realization of a smart city includes the effect on citizens considering health and well-being issues; transport in light of its impact on mobility, productivity, pollution; and services in terms of critical community services managed and provided by local government to city inhabitants.

Utilities:

- Smart grid and smart metering is another potential IoT application which is being implemented around the world. Efficient energy consumption can be achieved by continuously monitoring every electricity point within a house and using this information to modify the way electricity is consumed. This information at the city scale is used for maintaining the load balance within the grid ensuring high quality of service.
- Water network monitoring and quality assurance of drinking water is another critical application that is being addressed using IoT. Sensors measuring critical water parameters are installed at important locations in order to ensure high supply quality. This avoids accidental contamination among storm water drains, drinking water and sewage disposal. The same network can be extended to monitor irrigation in agricultural land. The network is also extended for monitoring soil parameters which allows informed decision making concerning agriculture.

Mobile: Smart transportation and smart logistics are placed in a separate domain due to the nature of data sharing and backbone implementation required. The transport IoT will enable the use of large scale WSNs for online monitoring of travel times, origin–destination (O–D) route choice behavior, queue lengths and air pollutant and noise emissions. The IoT is likely to replace the traffic information provided by the existing sensor networks of inductive loop vehicle detectors employed at the intersections of existing traffic control systems. They will also underpin the development of scenario-based models for the planning and design of mitigation and alleviation plans, as well as improved algorithms for urban traffic control, including multi-objective control systems. Combined with information gathered from the urban traffic control system, valid and relevant information on traffic conditions can be presented to travelers.

4. SCOPE OF IOT

Ever since the invention of the first micro-chip, we have seen digital technologies advancing at an alarming rate, but soon we are going to experience exponential in newer ways. Smartphone, the most ubiquitous IoT device will be an important connecting tool in making this new “Machine to Machine”, “Man to Machine” or “Machine to Mobile” technology a convention.

Armed with necessary sensors, embeddable chips and efficient network technologies, IoT can enable items of daily use like car keys, watches, alarm clocks, electronic appliances, household lights and even buildings to be part of this all-pervasive network.

5. ADOPTION OF IOT IN COMING YEARS

Recent advancements like the newer IPv6, internet protocol version and reduction in costs of many building blocks of IoT is propelling the quick adoption of the IoT technology. The cost of adding connectivity to devices is now less than USD 5 which can run on batteries and with the potential of these chips to “sip” energy harvested from their ambient environment, will surely make them ubiquitous in machines, appliances, devices and individuals. As a result, the enormous streams of data generated in real-time would provide huge opportunities to analytics, networking companies who can derive actionable intelligence from them.

Industrial Sector: In the industrial sector, the first application of the Internet of Things would be in business processes as remote maintenance of industrial machinery, supply chain optimization, advanced metering infrastructure, enterprise manufacturing intelligence and facilities energy management.

Enterprise Sector: The enterprise sector would see intelligent business operations, RFID for logistics and transportation, IoT in insurance and smart workspace as emerging areas.

Public Sector: In the public sector, technologies coming to the forefront would take longer time such as the smart city framework, IoT for government and vehicle to infrastructure communication. However, smart transportation and commercial telematics are expected to be adopted in a span of two to three years.

Consumer Sector: Lastly, the consumer sector will be delighted with an array of intelligent products devised to improve the quality of their lives. The options range from wearable devices, smart appliances, autonomous vehicles,

connected homes, quantified self, consumer telematics, mobile health monitoring and wireless power charging.

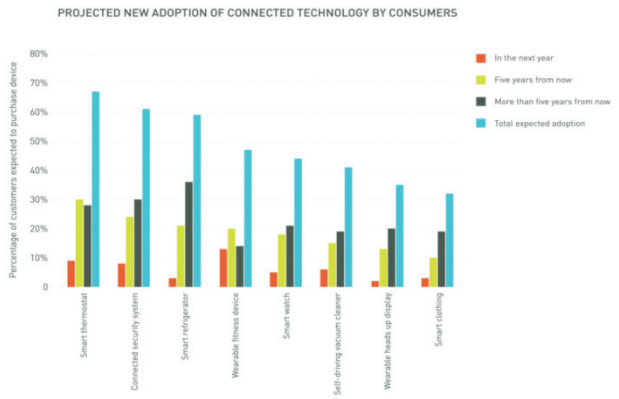


Fig. 1: Forecast for Connected Technology in Future Coming Years

6. RECENT SCENARIOS IN THE IOT PARADIGM

Even though the IoT is in a nascent stage, but the following examples provide a glimpse into the futuristic possibilities of the IoT's usage of sensors and networked intelligence.

GlowCaps: It is a high profile product in connected health; it lights up and plays music to remind people to take their pills and if the user still misses a dose, the system will call their phones. Vitality along with CVS Caremark, Express Scripts Inc. is notable ones to come up with these high-tech med products.

Smartphone Sensors: Tracking a user's activity levels has become quite handy with a range of Smartphone Sensors available like GPS, Accelerometer, Gyro along with connectivity options like WiFi, Bluetooth, NFC etc. The user is well-equipped to monitor his or her workouts, movements, goals and location.

Phillips Hue: Web enabled lights like the Phillip's Hue provide the option to users to light their homes in new ways like turning on or off lights depending on requirements and thereby saving electricity.

HarvestGeek: These systems can take care of your plants and backyard lawns by taking care of the time when they need to be watered and other growing needs thus automating much of the labor processes.

Proteus Ingestible Pill Sensor: Proteus is a well-known innovator in creating new pills, products to improve medication adherence, these digital medicines consist of edible sensors in pills, wearable patches and wearable devices that integrate and transmit data.

Nest: Nest is a smart, self-learning thermostat that can be used to regulate the temperatures of houses efficiently using sensors, weather forecasts and actual activity inside houses that can reduce a user's monthly energy consumption by almost 30%.

7. CURRENT TECHNOLOGY AND TRENDS

The current lots of sensors which constitute the hardware element of IoT employ low-power consumption wireless protocols such as Bluetooth Low Energy (BLE), Zigbee or Radio-Frequency Identification (RFID). Wireless sensing networks (WSN) and other wireless battery-free sensors will account for 60% of total IoT devices by 2020. Their usage is gradually moving to adapt IP-based sensor networks using the 6LoWPAN/IPv6 standards.

According to IDC, the global IoT market stood at $1.9 trillion and is expected to grow to $7.1 trillion by 2020. The worldwide IoT install base will see a CAGR of 17.5% from 2013 to 2020 encompassing billions of connected devices in the world. A Gartner estimate reveals that the IoT business will generate incremental revenue exceeding $3oo billion in 2020.

The IoT constitutes a disruptive and transformative environment for the automotive industry driven by "smart cars" prompting a business model upheaval.

Fig. 2: Market Size in the Coming Years

According to ABI Research, the number of installed active wireless devices will double in 2020 from current level of 16 billion in 2014. 75% of the growth between today and 2020 will be from non-hub devices – sensor nodes and accessories.

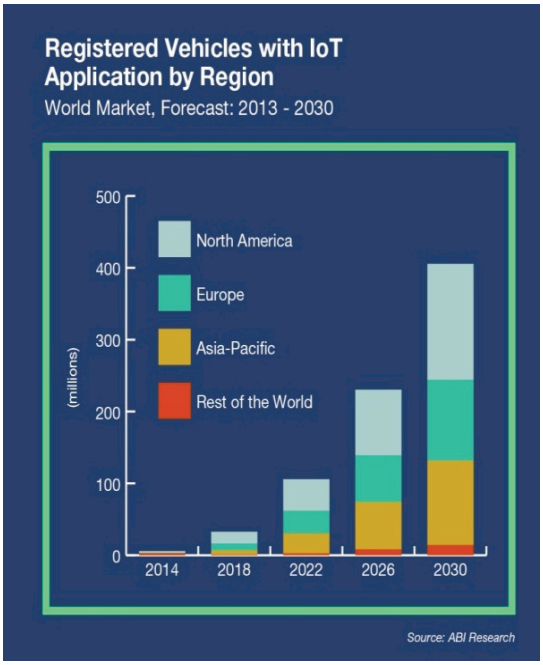
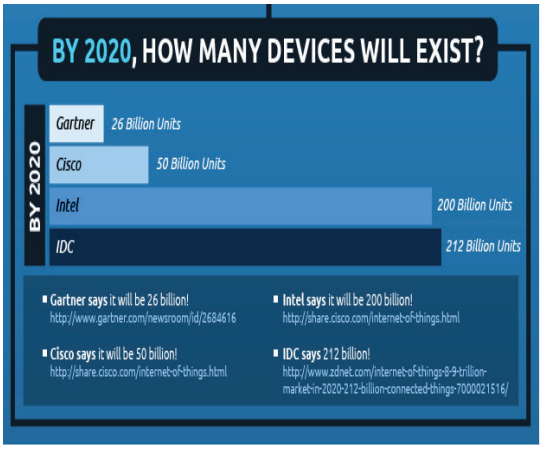


Fig.3: IoT Market Size in the coming years by Region

The number of registered vehicles having IoT application will see a huge growth all over the world as can be seen in the chart.

8. OPEN CHALLENGES AND FUTURE DIRECTIONS

Some open challenges are discussed based on the IoT elements presented earlier. The challenges include IoT specific challenges such as privacy, participatory sensing, data analytics, GIS based visualization and Cloud computing apart from the standard WSN challenges including architecture, energy efficiency, security, protocols, and Quality of Service (QoS).



The end goal is to have Plug n' Play smart objects which can be deployed in any environment with an interoperable backbone allowing them to blend with other smart objects around them. Standardization of frequency bands and protocols plays a pivotal role in accomplishing this goal.

9. CONCLUSION

For the realization of a complete IoT vision, efficient, secure, scalable and market oriented computing and storage resourcing is essential.

Internet of Things activities are gathering momentum around the world, with numerous initiatives underway across industry, academia and various levels of government, as key stakeholders seek to map a way forward for the coordinated realization of this technological evolution.

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RESEARCH PAPER

INTERNET TRAFFIC MATRICES

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ABSTRACT

The increasing demand of various services from the Internet has led to an exponential growth of Internet traffic in the last decade, and that growth is likely to continue. With this demand comes the increasing importance of network operations management, planning, provisioning and traffic engineering. A key input into these processes is the traffic matrix, and this is the focus of this paper.

The traffic matrix represents the volumes of traffic from sources to destinations in a network. Here, we first explore the various issues involved in measuring and characterizing these matrices. The insights obtained are used to develop models of the traffic, depending on the properties of traffic to be captured: temporal, spatial or spatio-temporal properties. Peer-to-Peer (P2P) applications have witnessed an increasing popularity in recent years, which brings new challenges to network management and traffic engineering (TE). As basic input information, P2P traffic matrices are of significant importance for TE. Because of the excessively high cost of direct measurement. In this paper, A multipath connection model for traffic matrices in operational networks. Media files can share the peer to peer, the localization ratio of peer to peer traffic. This evaluates its performance using traffic traces collected from both the real peer to peer video-on-demand and file-sharing applications. The estimation of the general traffic matrices (TM) then used for sending the media file without traffic. Share the media file, source to destination traffic is not occurring. So it gives high performance and short time process.

Media files can share the peer to peer, the localization ratio of peer to peer traffic will occur. The network traffic is usually illustrated by a traffic matrix (TM), which presents traffic volumes between each pair of ingress and egress nodes (e.g., routers) in the network. As basic input information, TM in the context of the Internet is crucial for a wide range of traffic engineering (TE) tasks, such as network planning and load balancing.

Keywords: Traffic Matrix, **ISP Network,** Autonomous System

1. INTRODUCTION

In the era of the telephone voice traffic dominated physical telecommunication lines. With the birth of the Internet, and its subsequent adoption as a key means of communication, data traffic has taken over (though some of this data traffic is actually re-badged voice traffic using Voice over IP). With the advent of new applications such as video streaming, and the rapid growth of data traffic from mobile devices, we are witnessing a global data explosion. Given the ever increasing importance of the Internet, knowledge of its traffic has become increasingly critical. The Internet, however, is just an all-encompassing term to describe the vast global collection of networks, and so it largely falls on individual network providers to determine their own traffic. This knowledge is vital for continued operations because it allows network operators to perform important tasks such as providing enough network capacity to carry the current traffic, as well as to predict and prepare for future trends. Traffic data is also important in network maintenance, which is necessary if services and content are to be provided to customers with minimal interruption. The focus of this chapter is on the traffic matrix, which, in a nutshell, is an abstract representation of the traffic volume flowing between sets of source and destination pairs. Each element in the matrix denotes the amount of traffic between a source and destination pair. There are many variants: depending on the network layer under study, sources and destinations could be routers or even whole networks. And "Amount" is generally measured in the number of bytes or packets, but could refer to other quantities such as connections.

Traffic matrices, as will be clearer below, are utilized for a variety of network engineering goals, such as prediction of future traffic trends, network optimization, protocol design and anomaly detection. Network operators need to know how traffic flows through their network in order to make many of the design and management decisions they face. The traffic is typically described by a traffic matrix that captures the amount of traffic transmitted between every pair of ingress and egress points in a network. Each element of a traffic matrix is typically referred to as an Origin-Destination (OD) pair (or flow). Network operators have expressed a pressing need to obtain accurate traffic matrices since a multitude of their activities need such traffic matrices as inputs. These activities include failure management, provisioning, traffic engineering, routing policy design and load balancing. Traffic matrices can also be used to detect sudden shifts in traffic due to anomalies. Anomalies include sudden unexpected events, such as network

failures, or more malicious events, such as the September 11 World Trade Centre attack, worm infections and distributed denial of service (DDoS) attacks [99]. Regardless, these anomalies need to be detected so as to develop appropriate measures against possible threats to the network. Traffic matrices may also be used to conduct reliability analyses, where the effect (on traffic) of network failures is considered. A basic task in most network design is to create redundant paths to carry traffic in case of failure, but if high reliability is required, then an operator should also ensure that there is sufficient capacity in the network to carry this traffic along its alternate paths. Further, the performance of many network protocols depends on the traffic they carry, and the cross traffic which forms their background. Design of new protocols therefore requires realistic measurements, or models of such traffic. Models can be used to test protocols on artificially synthesized traffic. In this way, the limitations of a protocol may be understood in a controlled environment before running it on an actual network.

2. OBJECTIVE

Approach SPARSITY REGULARIZED MATRIX FACTORIZATION (SRMF) finds sparse approximations (in the sense that they are low-rank) to TMs, augmented by spatio-temporal operators and local interpolation to achieve high accuracy. While most of the known approaches are best described as purely spatial or purely temporal to the best of my knowledge, SRMF represents the first genuine spatio-temporal model of TMs, and its performance in problems involving interpolation with real TMs is excellent.

3. RESEARCH METHODOLOGY

SYSTEM ARCHITECTURE: The architecture we propose a multipath connection model for traffic matrices in peer to peer network.

ARCHITECTURE MODEL: Media files can share the peer to peer, the localization ratio of peer to peer traffic. This evaluates its performance using traffic traces collected from both the real peer to peer video-on demand and file-sharing applications. The estimation of the general traffic matrices then used for sending the media file without traffic. Share the media, source to destination traffic is not occur. Give high performance and short time process traffic is reduced.

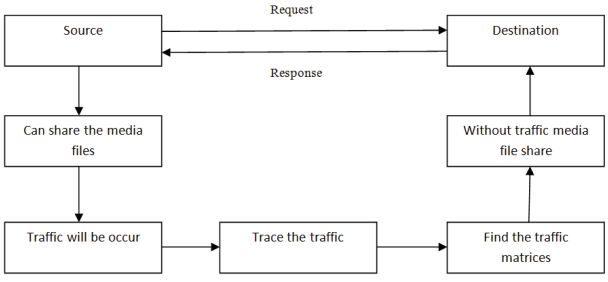

Fig. 1: Peer to Peer Traffic Matrices

SYSTEM MODULES:

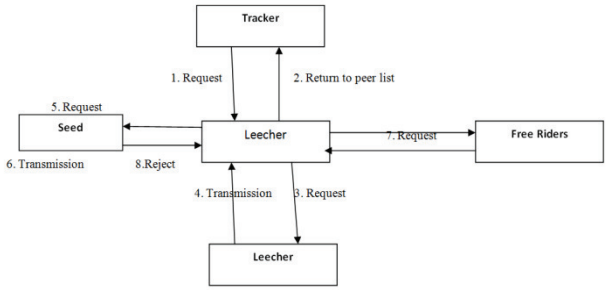

Figure 2: Working Process of YouTube

In YouTube, Seed: Do not have any bias on choosing which neighbor(s) to upload data to.

Free-Riders: peers that download a lot of data but seldom upload. Free-riders are more likely to reject the data requests from other peers.

Leechers: peers that not only download but also upload data. In YouTube, leechers prefer uploading peers who have uploaded more data to them before.

4. PEER TO PEER TRAFFIC MATRICES TECHNIQUE

Recently developed techniques have been very successful in accurately estimating intra-Autonomous System (AS) traffic matrices. These techniques rely on link measurements, flow measurements, or routing-related data to infer traffic demand between every pair of ingress-egress points of an AS. They also illustrate an inherent mismatch between data needed and data most readily available. This mismatch is exacerbated when try to estimate inters traffic matrices, i.e., snapshots of Internet-wide traffic behavior over coarse time scale between ASs. Present a method for modeling inter-AS traffic demand that relies exclusively on publicly available/obtainable measurements. Very few techniques have been proposed for estimating traffic matrices in the context of Internet traffic. The primary contribution is the outcome of a detailed comparative evaluation of the three existing techniques. Here evaluate these methods with respect to the estimation errors yielded, sensitivity to prior information required and sensitivity to the statistical assumptions they make.

ESTIMATION ALGORITHM

Input: Peer files matrix A, file similarity graph S
Output: Peer similarity matrix P

1: for all pairs of peers (pi, pj)ЄA do
2: B← Ø
3: for all pairs of files (fik,fjr)Є (pi, pj) do
4: if fik= fjrthen
5: w = 1
6: else
7: w = d-1(shortest_ path (fik ,fjr)) , on S
8: end if
9: B(fik ,fjr) ←w
10: end for
11: M = maximal _ weighted matching (B)

12: P(pi, pj) = M / min{|pi|,|pj|}
13: end for
14: Return P

A Measurement Study of Peer-to-Peer File Sharing Systems: Provide a first step toward understanding the differences between pollution and poisoning, and their respective impact on content availability in peer-to-peer file sharing networks. To that effect, conduct a measurement study of content availability in the most popular peer-to-peer file sharing networks, in the absence of poisoning, and then simulate different poisoning strategies on the measured data to evaluate their potential impact.

Caching the P2P Traffic in ISP Network: Some research efforts focus on P2P systems, trying to understand the mechanism of various implementations and the behavior pattern of P2P users, and then improve the systems' performance. Others look at the issue from the angle of ISPs, trying to help ISPs solve various issues brought by P2P applications. In this article, conduct a review study on recent research efforts in these two areas. The first part of this article focuses on several key strategies that have significant influence on the performance of P2P systems.

An Information-Theoretic Approach to Traffic Matrix Estimation: However, it is very difficult to estimate the traffic matrix for a large-scale network. This is because the estimation problem from limited link measurements is highly under constrained. Here propose a simple probability model for a large-scale practical network. The probability model is then generalized to a general model by including random traffic data. Traffic matrix estimation is then conducted under these two models by two minimization methods. It is shown that the Normalized Root Mean Square Errors of these estimates under our model assumption are very small. For a large-scale network, the traffic matrix estimation methods also perform well. The comparison of two minimization methods shown in the simulation results complies with the analysis.

5. CONCLUSION

Develop a deep insight into user behaviors and traffic characteristics of peer to peer systems, and then propose a novel model to estimate P2P traffic occur. In order to better reflect the features of peer to peer traffic, consider several important factors, including the localization ratio of peer to peer traffic. Although we say third generation techniques are ”less” adaptive than tom gravity, we note that these methods do adapt well enough. This is visible through their errors which are, in both space and time, generally far lower than tom gravity's. Because of its bias, tom gravity exhibits errors consistently throughout the lifetime of an OD flow, whereas the third generation methods only exhibit larger errors during periods of adaptation. Furthermore, the next generation of hybrid measure-and-infer strategies can handle.

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RESEARCH PAPER

MAKE IN INDIA WAVE IN E-COMMERCE ECO-SYSTEM

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ABSTRACT

Since 1990, after economic reforms took place in India as a result of opening of economy with a view to integrate itself with the global economy the need to facilitate international trade both through policy and procedure reforms has become the foundation stone of India's trade and fiscal policies.

E-Commerce as part of the I.T revolution became widely used in the world trade in general and Indian economy in particular. The e commerce industry in India has come a long way since its early days. The markets have matured and new players have entered the market place.

This paper gives an overview of the present scenario of online market places in India and the impact that India's fledging $ 3.2 billion e commerce industry has got after getting a boast of prime minister Narendra Modi's MAKE IN INDIA campaign . The nascent yet rapidly growing sector, which has been working with small and medium enterprises and helping them sell their products online, hopes to involve more such players. The paper also emphasizes some big road blocks that these start-ups face due to some infrastructural barriers responsible for slow growth of e-commerce in India.

Keywords: ME, E-Commerce, Make in India, Start-Ups.

1. INTRODUCTION

The cutting edge for a business today is E-Commerce. E-Commerce stands for electronic commerce simply put it means in dealing with goods and services through the electronic media and internet. Although, not just buying or selling it also includes various business processes within organizations that support the goal. The E-commerce sector in India is projected to cross USD80 billion by 2030 and USD300 billion by 2030 and is already changing the way small and medium business operate in India.

As with e commerce it has a number of different definitions and is used in a number of different contexts. For developing countries like India, e commerce offers considerable opportunity. It is believed that the low cost of computers, a growing installed base of internet use and an increasingly competitive internet service provider (ISP) will help fuel e commerce growth in Asia's 2nd most populist nation. The past two years have seen a rise in the number of companies using e commerce technologies and internet in India. Major Indian portals have also shifted towards e commerce instead of conventional advertising.

2. CONCEPTS AND DEFINITION

Electronic commerce or e-commerce refers to a wide range of online business activities for products and services. It also pertains to "any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact." A more complete definition is: E-commerce is the use of electronic communications and digital information processing technology in business transactions to create, transform, and redefine relationships for value creation between or among organizations, and between individuals.

3. STATUS OF E-COMMERCE IN INDIA

Today E-commerce is a byword in Indian society and it has become an integral part of our daily life. There are websites providing any number of goods and services. Then there are those, which provide a specific product along with its allied services Multi-product e-commerce- These Indian E-commerce portals provide goods and services in a variety of categories. To name a few: Apparel and accessories for men and women, Health and beauty products , Books and magazines, Computers and peripherals, Vehicles, Software, Consumer electronics, Household appliances, Jewelry, Audio/video, entertainment, goods, Gift articles, Real estate and services Single-product e-commerce Some Indian portals/websites deal in a specialized field, for example:

- **Automobiles:** On these sites we can buy and sell four wheelers and two-wheelers, new as well as used vehicles, online. Some of the services they provide are: Car research and reviews, online evaluation, Technical specifications, Vehicle Insurance, Vehicle Finance.
- **Stocks and shares and e-commerce:** In India today, we can even deal in stocks and shares through e-commerce. Some of the services offered to registered

members are: Online buying/selling of stocks and shares, Market analysis and research, Company information, Comparison of companies, Research on Equity and Mutual Funds.

- **Real estate and e-commerce:** They provide information on new properties as well as properties for resale. One can deal directly with developer through consultant. Allied services: Housing Finance, Insurance companies, Architects & Interior Designers, NRI services, Packers & Movers.
- **Travel & tourism and e-commerce:** India has a rich history and heritage and e-commerce is instrumental, to a large extent, in selling India as a product, encouraging Indians as well as foreigners to see its multifaceted culture and beauty. The tourist destination sites are categorized according to themes like: Adventure - trekking, mountain climbing etc, Eco-Themes pertains to jungles, flora and fauna.
- **Gifts and e-commerce:** In the bygone days, one had to plan what to gift a loved one, trudge across to your favorite shop, and browse for hours before purchasing a gift. The gifts are categorized as: Collectibles like paintings and sculptures, Luxury items like leather goods, perfumes, jewelry boxes, etc, household curios and carpets, etc, Toys & games, Chocolates, Flowers, Woodcraft & metal-craft.
- **Hobbies and e-commerce:** The most popular hobbies from time immemorial are reading, music and films. The book's cover a wide range of topics like Business, Art, Cookery, Engineering, Children.

4. DIFFERENT TYPES OF E-COMMERCE

Generally speaking, when we think of e-commerce, we think of an online commercial transaction between a supplier and a client. However, and although this idea is right, we can be more specific and actually divide e-commerce into six major types, all with different characteristics.

There are 6 basic types of e-commerce:

- Business-to-Business (B2B)
- Business-to-Consumer (B2C)
- Consumer-to-Consumer (C2C)
- Consumer-to-Business (C2B).
- Business-to-Administration (B2A)
- Consumer-to-Administration (C2A)

Business-to-Business (B2B): Business-to-Business (B2B) e-commerce encompasses all electronic transactions of goods or services conducted between companies. Producers and traditional commerce wholesalers typically operate with this type of electronic commerce.

Business-to-Consumer (B2C): The Business-to-Consumer type of e-commerce is distinguished by the establishment of electronic business relationships between businesses and final consumers. It corresponds to the retail section of e-commerce, where traditional retail trade normally operates.

These types of relationships can be easier and more dynamic, but also more sporadic or discontinued. This type of commerce has developed greatly, due to the advent of the web, and there are already many virtual stores and malls on the Internet, which sell all kinds of consumer goods, such as computers, software, books, shoes, cars, food, financial products, digital publications, etc.

Consumer-to-Consumer (C2C): Consumer-to-Consumer (C2C) type e-commerce encompasses all electronic transactions of goods or services conducted between consumers. Generally, these transactions are conducted through a third party, which provides the online platform where the transactions are actually carried out.

Consumer-to-Business (C2B): In C2B there is a complete reversal of the traditional sense of exchanging goods. This type of e-commerce is very common in crowd sourcing based projects. A large number of individuals make their services or products available for purchase for companies seeking precisely these types of services or products.

Examples of such practices are the sites where designers present several proposals for a company logo and where only one of them is selected and effectively purchased. Another platform that is very common in this type of commerce is the markets that sell royalty-free photographs, images, media and design elements, such as istockphoto.

Business-to-Administration (B2A): This part of e-commerce encompasses all transactions conducted online between companies and public administration. This is an area that involves a large amount and a variety of services, particularly in areas such as fiscal, social security, employment, legal documents and registers, etc. These types of services have increased considerably in recent years with investments made in e-government.

Consumer-to-Administration (C2A): The Consumer-to-Administration model encompasses all electronic transactions conducted between individuals and public administration.

5. MAKE IN INDIA: SELL IN INDIA

The Make in India initiative launched by Prime Minister Narendra Modi aims to Make India a global manufacturing hub. The government is aiming to increase the contribution of manufacturing output to 25 percent of gross domestic production (GDP) by 2025, from its current 16 percent, according to an IBEF report on the manufacturing sector in India. However for this to happen India should also focus on "SELL IN INDIA" which will keep the domestic market alive and thriving.

Ecommerce platforms are helping bring the sellers and buyers together thereby fueling growth of both local manufactures and the domestic market. Today e-commerce has made it easy for consumers to access and

purchase products from local manufacturers, small traders, SMEs at the click of a button. E commerce has become an integral part of our daily life and rising consumer spending on online purchases projects an optimistic outlook for the future. The Indian SME sector has been the biggest beneficiaries from this exploding growth, Indian SMEs now have access to many opportunities enabling them to scale their business across the country. Not only ecommerce has brought back focus on make in India but selling in India as well.

Indian governments ambitious "Make in India campaign is one such initiative which is designed to offer multiple benefits to manufacturers and incentivize them to produce locally .some of these policies include loans at lower interest rates ,tax breaks, single window clearances etc.

Initiatives like "Make in India" are aimed at creating a favorable ecosystem for the manufacturing sector to grow by making and selling their products in India. India can achieve its goal of becoming a major manufacturing hub only if both the manufacturing and domestic consumer markets grow together. The e commerce industry has the unique ability to boast this growth.

6. E-COMMERCE BOOM AND IMPACT ON INDIAN SMES

Small and medium enterprises are India's backbone and it's impossible to imagine much fruitful times for these than this. The future is full of opportunities for SMEs and it is up for grabs by the virtue of opportunities offered by e commerce boom in India.

7. E-COMMERCE: AN AGILE FOR GROWTH OF SMES IN INDIA- E COMMERCE BOOM AND IMPACT ON INDIAN SMES

We have seen a remarkable transformation in the way Indians shop and in the modus operandi of trading by SMEs, despite significant contribution to Indian economy SMEs are faced with a number of challenges including competitive pressures, locally and internationally this is where e-commerce comes in to improve their competiveness and provides business a platform to achieve on a truly global scale. It will be very valid to mention here that 85% of the SMEs who adopted e-commerce believe that it is cost effective medium to grow sales[1]. Around 77 percent of SMEs who have adopted e-commerce were listed on online marketplaces. It has been found that SMEs who actively adopt the internet for business activities boast 51 percent higher revenues , which results in 49 percent more profit and a 7 percent broader customer base than their offline- only counterparts [2].

8. OUTLOOK FOR ONLINE START UP ECOSYSTEM IN INDIA

The e-commerce has effected radical changes in the business sector providing Net- enabled market for all manufacturing sectors. Business has changed the traditional process of business and could remove inefficiencies of the market and thereby helps to add new dimension to business by increasing revenue and profit.

In the light of "Make in India" campaign, e-commerce major FLIPKART has inked a pact with the textiles ministry to provide weavers a marketplace to showcase their products. For manufacturers, analytical data will be provided to help them acquire a customer base, and accordingly scale up supply.

Generally, small entrepreneurs tend to contribute over 20 percent of total sales for online companies such as Fab furnish.com and Paytm. Several online firms have begun associating with the prime ministers initiative, which focuses on manufacturing in India, and are using their technology and platforms to support local manufacturers and craftsmen.

It's not without reason that a NASCOM research in India suggested the growth of almost 3100 technological start-ups in India since 2010, with 800 of them coming in the last year alone. And ecommerce giants Flipkart, Snapdeal, Myntra, Jabong, and Zomato are just a few among the list of those 3100 listed.

9. WHERE WE ARE : AND WHERE WE TO GO

Leading e-commerce portals in the country include Flipkart.com, Futurebazaar.com, Ebay.in, Homeshop18.com, Snapdeal.com, Indiaplaza.com, Starcj.com, Amazon.com, Fashionandyou.com, Rediffshopping.com., inkfruit.com, myntra.com, futurebazaar.com, yebhi.com, zoomin.com and hushbabies.com. Internet on mobile phones and e-commerce are set to lead the trend in the IT sector, trends such as mobile internet, social networking, and internet video will only accelerate the e- commerce boom in India. Another e-commerce player HomeShop18.com has grown by over 70 per cent in headcount terms in 2015 over the last year and is further poised to grow by a similar percentage this year, including an augmentation of the technology team. Meanwhile, the e-commerce sector is fast hiring the best talent available in the country and this placement season saw e-commerce companies recruiting big numbers at premier institutions like the Indian Institutes of Management (IIMs) and Indian Institute of Technology (IITs).

10. MAJOR CHALLENGES FACED BY E-COMMERCE IN INDIAN MARKET PLACE

There are some major infrastructural problems and challenges faced by e commerce in India. Not only this, also the significant growth in e-commerce sector in India is still lagging behind than other developed countries. Factors like safety and security of online money transaction being the biggest problem among others; these can actually hamper the growth path of many e-markets.

Payment Collection: Most of the Indian consumers do not possess plastic money, debit card credit cars or net banking, which is one of the prime reasons to curtail the growth of e- commerce. Even when payment is done by net banking one has to end up giving a significant share of (4 %) even with a business of thin margin, this means one parting away with almost half of profits. Fraudulent charges, charge backs, return logistics all become merchants responsibility and hence to be accounted for in the business model.

Logistics: In India, logistics and courier services require lots of improvement. While, perfect and strong logistics service is one of the key reasons behind the success of any online company, India is lagging far behind in this sector as most of the town and small villages are still not covered under serviceable area of many of the courier and logistics companies. e-commerce is affected in a big way owing to the limited services offered by the courier service companies.

Vendor Management: However advanced system may be, vendor will have to come down and deal in an inefficient system for inventory management. This will slow down drastically. Most of them won't carry any digital data for their products. No nice looking photographs, no digital data sheet, no mechanism to check for daily prices, availability to keep your site updated

Taxation: Tax structure of Indian market is another factor for lesser growth rate of e commerce in India in comparison to other developed countries like USA and UK. . Octroi, entry tax, VAT and lots of state specific forms which accompany them can be very tedious and confusing.

Fear factor: Cyber crime is a key alarm that consumers have regarding e-commerce. No one wants to become a victim of cyber crime, which is a real hazard to e-commerce. Cyber crime is an e-crime. Cyber crime is a criminal act that involves computers and networks. Cyber crime includes criminal acts such as computer viruses, phishing, and denial of service attacks that cause e-commerce websites to lose revenues. Understanding and defending against cyber crime is critical for companies involved in e-commerce. E-commerce companies lose billions of dollars in lost business, stolen assets, and damaged reputations as a result of cyber crime (Smith et al. 2010). Cash is stolen, literally with the push of a button. When an e-commerce website crashes, business activity stops. The usual outcome is that a company loses business to a competitor who has a working website. In addition to losing sales, companies that become victims of cyber crime also experience damaged reputation. Vulnerability to cyber crime may cause some customers to lose confidence in a company's ability to accurately process sales transactions and effectively protect confidential customer information.

Touch and Feel Factors: Indian customers are still more comfortable in buying physically. They tend to choose the product by touching the product directly. Thereby, Indian buyers are more inclined to do only ticketing and booking in online in travel sectors, companies dealing with the products like apparel, handicraft, jewellery still have to face challenges to sell their products.

International Orders: It is found that 40% of the e-commerce shopping portals turn down international orders as most of them doesn't have the logistics, and other systems to fulfill the order and this is a major challenge facing the global e-commerce. Duties and tariffs are other problem as customers tend to reject purchase due to such high cost.

Product Return, Refund etc: Product which is not satisfactory for the customers tends to get replaced or returned. This is another major issue which leads into overall loss in revenue, loss of shipment and more than all these loss of reputation Make E-commerce has effected radical changes in the business sector providing Net- enabled market for all manufacturing sectors. Business has changed the traditional process of business and could remove inefficiencies of the market and thereby helps to add new dimension to business by increasing revenue and profit.

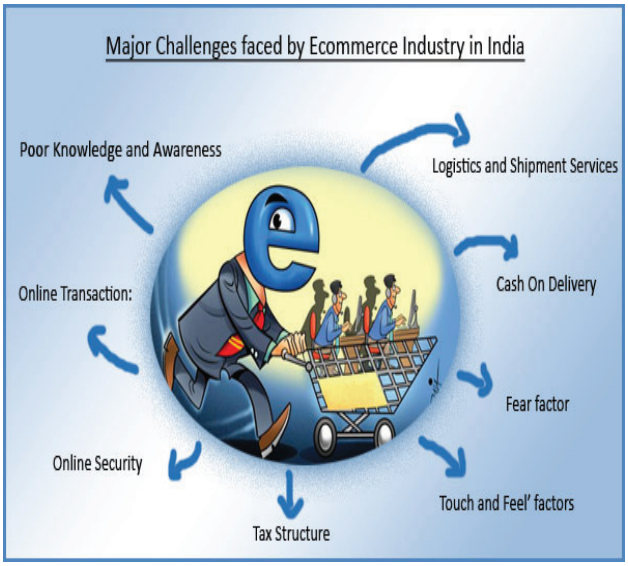

Fig. 1: Major Challenges faced by E-Commerce Industry in India

11.CONCLUSION

Several important phenomena are associated with e-commerce. E-Commerce has unleashed yet another revolution, which is changing the way businesses buy and sell products and services. New methodologies have evolved. The role of geographic distances in forming business relationships is reduced. E-Commerce is the future of shopping. With the deployment of 3G and 4G wireless communication technologies, the internet economy will continue to grow robustly. In the next 3 to 5 years, India will have 30 to 70 million internet users which will equal, if not surpass, many of the developed countries. Internet economy will then become more meaningful in India. With the rapid expansion of internet, E-commerce is set to play a very important role in the

21st century, the new opportunities that will be thrown open, will be accessible to both large corporations and small companies. The role of government is to provide a legal framework for E-Commerce so that while domestic and international trade are allowed to expand their horizons, basic rights such as privacy, intellectual property and prevention of fraud, consumer protection etc are all taken off.

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RESEARCH PAPER

APPLICATION AND SECURITY ISSUES IN MOBILE COMPUTING

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ABSTRACT

The invention of computer, as a major invention, has changed the world. During these days every field of life seems to be computerized. Later in the 21st century, a new technology was introduced in the world known as mobile computing. Now-a-days computers are modified into mobile computers known as laptops. Advancement in the fields of computers & telecommunications technology resulted in mobiles handsets. Latest advancements of mobile computing made it possible for complex applications to get solutions accurately &fast. This paper focuses on recent trend security issues with their applicability requirements.

A technology that allows transmission of data, via a computer, without having to be connected to a fixed physical link is known as mobile computing. It is human–computer interaction by which a computer is expected to be transported during normal usage. Mobile computing involves mobile communication, mobile hardware and mobile software. Communication issues include ad-hoc and infrastructure networks as well as communication properties, protocols, data formats and concrete technologies. Hardware includes mobile devices or device components. Mobile software deals with the characteristics and requirements of mobile applications.

Keywords: Mobile Computing, human–computer interaction, distributed systems, Mobile IP

1. INTRODUCTION

Mobile Computing is a technology that allows transmission of data, without having to be connected to a fixed physical link. Mobile voice communication is widely established throughout the world and has had a very rapid increase in the number of subscribers to the various cellular networks over the last few years. An extension of this technology is the ability to send and receive data across these cellular networks. This is the principle of mobile computing. Mobile data communication has become a very important and rapidly evolving technology as it allows users to transmit data from remote locations to other remote or fixed locations. This proves to be the solution to the biggest problem of business people on the move - mobility. In this article we give an overview of existing cellular networks and describe in detail the CDPD technology which allows data communications across these networks. Finally, we look at the applications of Mobile Computing in the real world.

Mobile computing is a form of human–computer interaction by which a computer is expected to be transported during normal usage. Mobile computing has three aspects: mobile communication, mobile hardware, and mobile software. The first aspect addresses communication issues in ad-hoc and infrastructure networks as well as communication properties, protocols, data formats and concrete technologies. The second aspect is on the hardware, e.g., mobile devices or device components. The third aspect deals with the Mobile computing is taking a computer and all necessary files and software out into the field. Mobile computing is being able to use a computing device even when being mobile and therefore changing location. Portability is one aspect of mobile computing. Mobile computing is the ability to use computing capability without a predefined location and/or connection to a network to publish and/or subscribe to information .Mobile Computing is a variety of wireless devices that has the mobility to allow people to connect to the internet, providing wireless transmission to access data and information from where ever location they may be.

2. DIFFERENT TYPES OF MOBILE SYSTEMS

In many ways, mobile computing has several characteristics reminiscent of distributed systems. In order to understand mobile systems, one must first understand where the similarities and the differences of distributed and mobile systems lie. The following section is an explanation of the different types of distributed systems ranging from the traditional type to nomadic, ad-hoc and finally ubiquitous ones.

Traditional Distributed System: Traditional distributed systems consist of a collection of fixed hosts that are themselves attached to a network– if hosts are disconnected from the network this is considered to be abnormal whereas in a mobile system this is quite the norm. These hosts are fixed and are usually very powerful machines with fast processors and large amount of memory. The bandwidth in traditional systems is very high too. Traditional distributed systems also need to guarantee non-functional requirements such as scalability (accommodate a higher load at some time in the future),

openness (possibility to extend and modify the system easily), heterogeneity (integration of components written using different programming languages, running on different operating systems, executing on different hardware platforms), fault-tolerance (recover from faults without halting the whole system) and finally resource-sharing (some form of access control).

Nomadic Distributed System: This kind of system is composed of a set of mobile devices and a core infrastructure with fixed and wired nodes. Mobile devices move from location to location, while maintaining a connection to the fixed network. There are problems that arise from such shifts in location. The mobile host has a home IP address and thus any packets sent to the mobile host will be delivered to the home network and not the foreign network where the mobile host is currently located. Such problem can be solved by forwarding packets to the foreign network with the help of Mobile IP. Nevertheless, Mobile IP also suffers from efficiency (routing issues), QOS, security (authentication of mobile host at foreign network and end-to-end security required) and wireless access (reduced capacity) problems. These systems are susceptible to the uncertainty of location, a repeated lack of connections and the migration into different physical and logical environments while operating. However, compared to ad-hoc networks, nomadic systems still have comparatively reliable connections and services since most of these are actually supported by the fixed infrastructure ("backbone") of the network.

Ad-Hoc Mobile Distributed System: Ad-hoc distributed systems are possibly the only type of network that comes close to mobile networks in the sense that every node is literally mobile. It is these networks that are very much seen as the systems of the future, whereby hosts are connected to the network through high-variable quality links (e.g.: from GPS to broadband connection) and executed in an extremely dynamic environment. A-hoc systems do not have any fixed infrastructure which differs them both from traditional and nomadic distributed systems. In fact, ad-hoc networks may come together as needed, not necessarily with any assistance from the existing (e.g.: Internet) infrastructure. When nodes are detached from the fixed/mobile network they may evolve independently and groups of hosts opportunistically form "clusters" of mini-networks. The speed and ease of deployment make ad-hoc networks highly desirable.

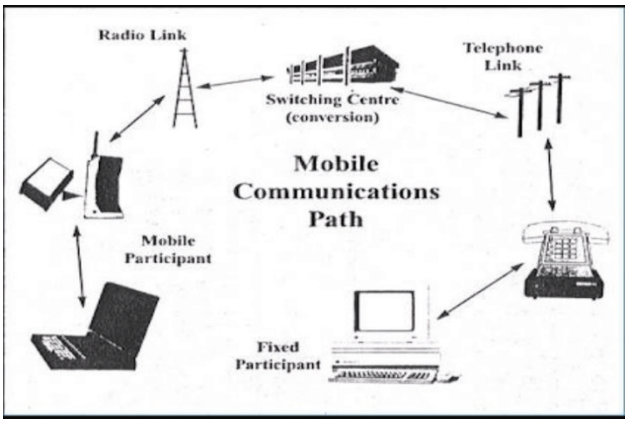
3. SECURITY ISSUES INVOLVED IN MOBILE COMPUTING

Mobile security or mobile phone security has become increasingly important in mobile computing. It is of particular concern as it relates to the security of personal information now stored on the smart phone. More and more users and businesses use smart phones as communication tools but also as a means of planning and organizing their work and private life. Within companies, these technologies are causing profound changes in the organization of information systems and therefore they have become the source of new risks. Indeed, smart phones collect and compile an increasing amount of sensitive information to which access must be controlled to protect the privacy of the user and the intellectual property of the company.

All smart phones, as computers, are preferred targets of attacks. These attacks exploit weaknesses related to smart phones that can come from means of communication likes SMS, MMS, and WIFI Networks. There are also attacks that exploit software vulnerabilities from both the web browser and operating system.

Different security counter-measures are being developed and applied to smart phones, from security in different layers of software to the dissemination of information to end users. There are good practices to be observed at all levels, from design to use, through the development of operating systems, software layers, and downloadable apps.

Data Communications: Data Communications is the exchange of data using existing communication networks. The term data covers a wide range of applications including File Transfer (FT), interconnection between Wide-Area-Networks (WAN), facsimile (fax), electronic mail, access to the internet and the World Wide Web (WWW).



Data Communications have been achieved using a variety of networks such as PSTN, leased-lines and more recently ISDN (Integrated Services Data Network) and ATM (Asynchronous Transfer Mode)/Frame Relay. These networks are partly or totally analogue or digital using technologies such as circuit - switching, packet - switching etc. Circuit switching implies that data from one user (sender) to another (receiver) has to follow a pre specified path. If a link to be used is busy, the message cannot be redirected, a property which causes many delays. Packet switching is an attempt to make better utilization of the existing network by splitting the message to be sent into packets. Each packet contains information about the sender, the receiver, the position of the packet in the message as well as part of the actual message. There are many protocols defining the way packets can be send from the sender to the receiver. The most widely used are the Virtual Circuit-Switching system, which implies that packets have to be sent through the same path, and the Datagram system which

allows packets to be sent at various paths depending on the network availability. Packet switching requires more equipment at the receiver, where reconstruction of the message will have to be done. The introduction of mobility in data communications required a move from the Public Switched Data Network (PSDN) to other networks like the ones used by mobile phones. PCSI has come up with an idea called CDPD (Cellular Digital Packet Data) technology which uses the existing mobile network (frequencies used for mobile telephony). Mobility implemented in data communications has a significant difference compared to voice communications. Mobile phones allow the user to move around and talk at the same time; the loss of the connection for 400ms during the hand over is undetectable by the user. When it comes to data, 400ms is not only detectable but causes huge distortion to the message. Therefore data can be transmitted from a mobile station under the assumption that it remains stable or within the same cell.

Wireless Network: Ad hoc wireless networks inherit the traditional problems of wireless and mobile communications, such as bandwidth optimization, power control, and transmission quality enhancement. In addition, the multichip nature and the lack of fixed infrastructure generate new research problems such as configuration advertising, discovery, and maintenance, as well as ad hoc addressing and self-routing. In mobile ad hoc networks, topology is highly dynamic and random. In addition, the distribution of nodes and, eventually, their capability of self-organizing play an important role. The main characteristic can be summarized as follows:

- The topology is highly dynamic and frequent changes in the topology may be hard to predict.
- Mobile ad hoc networks are based on wireless links, which will continue to have a significantly lower capacity than their wired counterparts.
- Physical security is limited due to the wireless transmission.
- Mobile ad hoc networks are affected by higher loss rates, and can experience higher delays and jitter than fixed networks due to the wireless transmission.
- Mobile ad hoc network nodes rely on batteries or other exhaustible power supplies for their energy. As a consequence, energy savings are an important system design criterion. Furthermore, nodes have to be power-aware: the set of functions offered by a node depends on its available power (CPU, memory, etc.)

Challenges in Ad hoc network: A peer-to-peer or a mobile ad-hoc network is a collection of mobile nodes connected together over wireless medium with or without any fixed infrastructure. Though mobile ad-hoc networks bringing some special to features of the technology great opportunities towards human generation together with different challenges. Challenges in the area of mobile ad-hoc network include security, dynamic network topology, routing, quality of service, and power efficiency.

- **Control free** - Autonomous: In case of Ad- hoc network there is no centralized administration entity is available to manage the operation of the different mobile nodes.
- **Security**: Since mobile ad-hoc networks do not have any centrally administrated secure routers, chances are good that attackers can easily exploit or possibly disable a mobile ad-hoc network, if no security mechanism is adopted. In general, security goals in mobile ad-hoc networks are gained through cryptographic mechanisms, such as public key encryption or digital signature.
- **Dynamic topology:** Due to the dynamic nature of a mobile ad-hoc network, it suffers with frequent topology changes. Links of the network vary timely and are based on the proximity of one node to another node. The mobile nodes in the network dynamically establish routing among themselves as they move about; moreover a user in the mobile ad-hoc network may not only operate within the ad-hoc network, but may require access to a public fixed network.
- **Device discovery:** As consequence of dynamic topology devices enter into new cell or leave previous one. Identifying relevant newly moved in nodes and informing about their existence need dynamic update to facilitate automatic optimal route selection.
- **Bandwidth**: Since the available bandwidth is limited so you cannot utilize the whole bandwidth; Wireless links have significantly lower capacity than the wired links.
- **Poor Transmission Quality:** This is an inherent problem of wireless communication caused by several error sources that result in degradation of the received signal. Causes may be Interference, moister/rain, noise, lack of signal etc.
- **Quality of Service**: Providing quality of service levels in a constantly changing environment is a challenge. The inherent stochastic nature of communications quality in a mobile ad-hoc network makes it difficult to offer fixed guarantees on the services offered to a device. An adaptive quality of service must therefore be implemented over the traditional resource reservation to support the multimedia services in mobile ad-hoc network.
- **Energy-constrained operation**: Some or all of the nodes in a MANET may rely on batteries or other exhaustible means for their energy. For these nodes, the most important system design criteria for optimization may be energy conservation. Network configuration: - The whole MANET infrastructure is dynamic and is the reason for dynamic connection and disconnection of the variable links.
- **Topology maintenance:** Updating information of dynamic links among nodes in MANETs is a major challenge.

4. ADVANTAGES

- **Improved decision making**: Mobile Computing lets you conduct business at the point of activity. The ability to collect, access and evaluate critical business information quickly and accurately means

better decision making that can have a far-reaching effect on company's ability to compete successfully.

- **Increased productivity and reduced costs:** Mobile computing can lead to increased individual productivity, increased sales per sales person, more service calls per repair person, less time spent by professionals on administrative work, and much more--all of which ultimately translates into higher sales at lower cost. And, on-the-spot invoice production in service vehicles can lead to shorter payment cycles and better cash flow.
- **Improved customer relations:** The success of a business can often be measured by its ability to satisfy customers. Mobile computer enables your field worker to answer customer questions, check order status and provide other services anytime to their customers.
- **Portability:** The main benefit of mobile computers is that you do not have to bind yourself to a certain place. It is possible to work while sitting in a car or a train& communicate with other people while sitting anywhere in the world. Chat online with friends and family members, office work while sitting anywhere.
- **Economy:** When people can do their work while sitting anywhere they will do more work. This will play an important role in the economy of the country and the world.

5. ACKNOWLEDGEMENT

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6. CONCLUSION

Current distributed systems platforms designed for mobile environments are based on synchronous, connection oriented communications with associated monitoring and management. There is little doubt that mobile computing will enhance many aspects of the lives of humans. One must wonder whether or not everyone will want to have such an “invading” technology, especially when it comes to ubiquitous computing. The trend in our results for the differences between devices is less surprising. Each tablet provides a larger individual display which is likely more usable that a smaller UMPC display. And while the UMPCs were not the preferred devices, our data indicates that the system was still usable. When using smaller devices such as UMPCs or MIDs, an especially rich area for future work will be to explore how different configurations of multi-display composition (mirroring and extending) compare to more traditional collocated collaboration techniques on the same devices.

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RESEARCH PAPER

REINFORCEMENT LEARNING: ROLE IN AI

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ABSTRACT

Reinforcement Learning is a type of Machine Learning, and thereby also a branch of Artificial Intelligence. It allows machines and software agents to automatically determine the ideal behaviour within a specific context, in order to maximize its performance. Simple reward feedback is required for the agent to learn its behaviour; this is known as the reinforcement signal. There are many different algorithms that tackle this issue. As a matter of fact, Reinforcement Learning is defined by a specific type of problem, and all its solutions are classed as Reinforcement Learning algorithms. In the problem, an agent is supposed decide the best action to select based on his current state. When this step is repeated, the problem is known as a Markov Decision Process

Reinforcement learning is an area of machine learning inspired by behaviorist psychology, concerned with how agent sought to take actions in an environment so as to maximize some notion of cumulative reward. The problem, due to its generality, is studied in many other disciplines, such as game theory, control theory, operations research, information theory, simulation-based optimization, multi-agent systems, swarm intelligence, statistics, and genetic algorithms.

. In batch mode, it can be achieved by approximating the so-called Q-function based on a set of four-tuples (xt ,ut ,rt ,xt+1) where xt denotes the system state at time t, ut the control action taken, rt the instantaneous reward obtained and xt+1 the successor state of the system, and by determining the control policy from this Q-function.

Keywords: Reinforcement Learning, Regression Trees, Ensemble Methods, Supervised Learning, Fitted Value Iteration, Optimal Control.

1. INTRODUCTION

Reinforcement Learning-An Introduction: The general aim of Machine Learning is to produce intelligent programs, often called agents, through a process of learning and evolving. Reinforcement Learning (RL) is one approach that can be taken for this learning process. An RL agent learns by interacting with its environment and observing the results of these interactions. This mimics the fundamental way in which humans (and animals alike) learn. As humans, we have a direct sensori-motor connection to our environment, meaning we can perform actions and witness the results of these actions on the environment. The idea is commonly known as "cause and effect", and this undoubtedly is the key to building up knowledge of our environment throughout our lifetime.

The "cause and effect" idea can be translated into the following steps for an RL agent:

- The agent observes an input state
- An action is determined by a decision making function (policy)
- The action is performed
- The agent receives a scalar reward or reinforcement from the environment
- Information about the reward given for that state/action pair is recorded

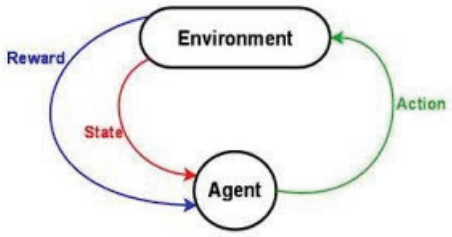

Fig. 1: RL Model

Reinforcement learning is the problem of getting an agent to act in the world so as to maximize its rewards.

Supervised and Unsupervised Learning: Supervised and Unsupervised learning are two quite different techniques of learning. As the names suggest, supervised learning involves learning with some supervision from an external source (i.e. a teacher) whereas unsupervised learning does not. An example of supervised learning is a student taking an exam, having it marked and then being shown which questions they answered incorrectly. After being shown the correct answers, the student should then learn to answer those questions successfully as well. An example of unsupervised learning is someone learning to juggle by themselves. The person will start by throwing the balls and attempting to catch them again. After

dropping most of the balls initially, they will gradually adjust their technique and start to keep the balls in the air.

As described above, an RL agent learns by receiving a reward or reinforcement from its environment, without any form of supervision other than its own decision making policy. So, RL is a form of unsupervised learning. What this means is that an agent can learn by being set loose in its environment, without the need for specific training data to be generated and then used to teach the agent.

Uses for Reinforcement Learning: Reinforcement learning is the problem of getting an agent to act in the world so as to maximize its rewards. For example, consider teaching a dog a new trick: you cannot tell it what to do, but you can reward/punish it if it does the right/wrong thing. It has to figure out what it did that made it get the reward/punishment, which is known as the credit assignment problem. We can use a similar method to train computers to do many tasks.

A variety of different problems can be solved using Reinforcement Learning. Because RL agents can learn without expert supervision, the type of problems that are best suited to RL are complex problems where there appears to be no obvious or easily programmable solution. Two of the main ones are:

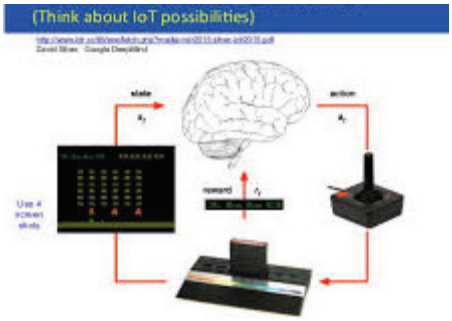

Fig. 2: Possibility with RL

Game playing - determining the best move to make in a game often depends on a number of different factors, hence the number of possible states that can exist in a particular game is usually very large. To cover this many states using a standard rule based approach would mean specifying an also large number of hard coded rules. RL cuts out the need to manually specify rules, agents learn simply by playing the game. For two player games such as backgammon, agents can be trained by playing against other human players or even other RL agents.

Control problems - such as elevator scheduling. Again, it is not obvious what strategies would provide the best, most timely elevator service. For control problems such as this, RL agents can be left to learn in a simulated environment and eventually they will come up with good controlling policies. Some advantages of using RL for control problems is that an agent can be retrained easily to adapt to environment changes, and trained continuously while the system is online, improving performance all the time.

Key Concepts:

- *Policy:* Mapping from perceived states to actions to be taken when in those states - stimulus-response rules
- *Reward:* Short term intrinsic desirability of the state. RL agent's sole objective is to maximize the total reward it receives in the long run
- *Value:* Total amount of reward an agent can expect to accumulate over the future starting from that state. Long term desirability of the state
- *Backup:* Updating the value of a state using values of future states
- *Sweep:* A sweep consists of applying a backup.

RL vs Other AI Methods

Reinforcement Learning	Supervised Learning
Agent is told immediate reward and the next state agent is not told which action is best in the long term	Presentation of input/output pairs
Online performance is important system is evaluated while the agent is learning	Learning occurs offline
Explicit exploration of the environment is required	No exploration of the environment

Reinforcement Learning	Search
Requires entire state space to be enumerated and stored in memory	Entire state space need not be enumerated

Measuring Learning Performance:

- Eventual Convergence to optimal
  - Provable guarantee of asymptotic convergence to optimal behavior. e.g. Value functions in an MDP
- Speed of convergence to optimality
- Speed of convergence to near-optimality
- Level of performance after a given time
- Regret
  - Difference between the expected total rewards gained by following a learning algorithm and expected total reward one could gain by playing for the maximum expected reward from the start.

Formalization of RL Problem: We can formalize the RL problem as follows. The environment is a modelled as a stochastic finite state machine with inputs (actions sent from the agent) and outputs (observations and rewards sent to the agent)

- State transition function $P(X(t)|X(t-1),A(t))$
- Observation (output) function $P(Y(t) \mid X(t), A(t))$
- Reward function $E(R(t) \mid X(t), A(t))$

(Notice that what the agent sees depends on what it does, which reflects the fact that perception is an active process.) The agent is also modelled as stochastic FSM with inputs (observations/rewards sent from the environment) and outputs (actions sent to the environment).

- State transition function: S(t) = f (S(t-1), Y(t), R(t), A(t))
- Policy/output function: A(t) = pi(S(t)))

The agent's goal is to find a policy and state-update function so as to maximize the expected sum of discounted rewards

E [R_0 + g R_1 + g^2 R_2 + ...] = E sum_{t=0}^inftygamma^tR_t

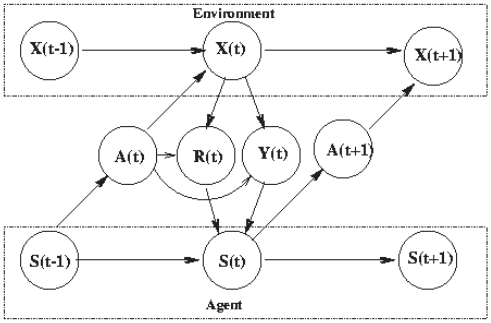

Fig. 3: RL Model

In the special case that Y(t)=X(t), we say the world is fully observable, and the model becomes a Markov Decision Process (MDP). In this case, the agent does not need any internal state (memory) to act optimally. In the more realistic case, where the agent only gets to see part of the world state, the model is called a Partially Observable MDP (POMDP), pronounced "pom-dp". We give a bried introduction to these topics below

RL MODEL:

- Problem faced by an agent that must learn behavior through trial -and-error interactions with a dynamic environment.
  - Class of problems opposed to a set of techniques
- Formal Definition of a RL model
  - Discrete set of environment states, S;
  - Discrete set of environment actions, A; and
  - Set of scalar reinforcement signals; {0,1}.

2. OBJECTIVE

Methods for approximating, decomposing and incorporating bias into problems.

3. EXPLORATION AND EXPLOITATION

One of the interesting problems that arises when using Reinforcement Learning is the tradeoff between exploration and exploitation. If an agent has tried a certain action in the past and got a decent reward, then repeating this action is going to reproduce the reward. In doing so, the agent is exploiting what it knows to receive a reward. On the other hand, trying other possibilities may produce a better reward, so exploring is definitely a good tactic sometimes. Without a balance of both exploration and exploitation the RL agent will not learn successfully. The most common way to achieve a nice balance is to try a variety of actions while progressively favouring those that stand out as producing the most reward.

- A Simple RL problem: *k*-armed bandit problem
  - Agent is permitted h pulls→h step finite horizon
- Immediate boolean payoff 0 1 with a probability Pi
  - Exploit or explore
  - Typically premature sub-optimal decisions may affect optimal strategy
- **Solutions**
  - Formally Justified Techniques
  - Ad-Hoc Techniques

Formally Justifed Techniques:

- Dynamic Programming Approach
  - *Belief State:{* $n_1,w_1,n_2,w_2,\ldots\ldots n_k,w_k$ *}*
  - Each *pi* has an independent prior uniform distribution(Beta)
  - $V^*(n_1,w_1,n_2,w_2,\ldots\ldots n_k,w_k)$: expected future payoff when we act optimally
  - If $\sum_i n_i=h$, then $V^*(n_1,w_1,n_2,w_2,\ldots\ldots n_k,w_k)=0$, then=0….(Basis)
  - $V^*(n_1,w_1,n_2,w_2,\ldots\ldots n_k,w_k)$ = $\max_i$ E(Future payoff of performing action i then acting optimally for the remaining pulls) = $\max_i$ $E(\rho_i V^*(n_1,w_1,n_2,w_2,\ldots, n_{i+1},w_{i+1}\ldots n_k,w_k)+(1+\rho_i)V^*(n_1,w_1,n_2,w_2,\ldots, n_{i+1},w_i\ldots n_k,w_k)$
  - ρ_i $_i$s the posterior payoff probability of action *i* paying off given $n_i w_i$ and our prior probability distribution → Bayesian updating
- Gittins Allocation Indices
  - Utilizes the Discounted Expected Reward Model
  - Gives a table of *allocation index* values for different discount factors: $I(n_i, w_i)$
  - Index value: Expected payoff of action *I* + value of information in selecting *i.*
  - At each step choosing action with the largest index guarantees optimal balance between exploration and exploitation
  - Indexes are computed through an iterated dynamic programming approach
  - Simple table lookup makes it computationally efficient.

Ad-Hoc Techniques:

- Greedy Strategy
  - Select the action with the highest estimated payoff true optimal action may get starved
  - *Optimism in the face of uncertainty* Assume optimistic prior beliefs; Actions are not easily eliminated from consideration
- Randomized Strategy
  - '*p*:: Random action; 1-*p* : Greedy action *p* controls the amount of exploration
  - *Boltzmann exploration*: $P(a) = \frac{eER(a)/T}{\sum_{a'\in A}^{\infty} eER(a)T}$ T controls the amount of exploration

- Interval-based Estimation
  - Tabulate for each $a_i : n_i, w_i$
  - Compute an upper bound with 100. (1-α) %confidence interval on ρ_i
  - Select an action with the largest upper bound
  - Small α encourage greater exploration

4. DELAYED REWARD

- Agent may take a long sequence of actions receiving insignificant rewards and then finally arrive at a statewith a high reward
- Markov Decision Processes(MDP)
  - A set of states$S$
  - A set of actions A
  - A reward function $R : S X A \rightarrow$ R
  - A state transition function $I : S X A X S \rightarrow \prod$ (S)
- Model is markov if the state transitions are independent of any previous states or actions

5. MDP-MARKOV DECISION PROCESS

A Markov Decision Process (MDP) is just like a Markov Chain, except the transition matrix depends on the action taken by the decision maker (agent) at each time step. The agent receives a reward, which depends on the action and the state. The goal is to find a function, called a policy, which specifies which action to take in each state, so as to maximize some function (e.g., the mean or expected discounted sum) of the sequence of rewards. One can formalize this in terms of Bellman's equation, which can be solved iteratively using policy iteration. The unique fixed point of this equation is the optimal policy.

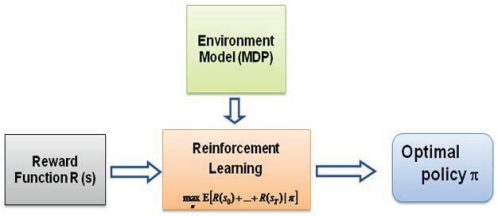

Fig. 4: RL AlgorithmDescription

More precisely, let us define the transition matrix and reward functions as follows.

T(s,a,s') = Pr[S(t+1)=s' | S(t)=s, A(t)=a]
R(s,a,s') = E[R(t+1)| S(t)=a, A(t)=a, S(t+1)=s']

(We are assuming states, actions and time are discrete. Continuous MDPs can also be defined, but are usually solved by discretization.)

We define the value of performing action a in state s as follows:

Q(s,a) = sum_s' T(s,a,s') [R(s,a,s') + g V(s')]

where 0 < g <= 1 is the amount by which we discount future rewards, and V(s) is overall value of state s, given by Bellman's equation:

V(s) = max_a Q(s,a) = max_asum_s' T(s,a,s') [R(s,a,s') + g V(s)]

In words, the value of a state is the maximum expected reward we will get in that state, plus the expected discounted value of all possible successor states, s'. If we define

R(s,a) = E[R(s,a,s')] = sum_{s'} T(s,a,s') R(s,a,s')

the above equation simplifies to the more common form

V(s) = max_a R(s,a) + sum_s' T(s,a,s') g V(s')

which, for a *fixed policy* and a *tabular (non-parametric) representation* of the V/Q/T/R functions, can be rewritten in matrix-vector form as V = R + g T V Solving these n simultaneous equations is called value determination (n is the number of states).

6. PROBLEM FORMULATION

Need and significance of proposed research work

There is still much work to be done and many interesting questions remaining for learning techniques and especially regarding methods for approximating, decomposing, and incorporating bias into problems.

The general aim of Machine Learning is to produce intelligent programs, often called agents, through a process of learning and evolving. Reinforcement Learning (RL) is one.

For complex problems, tabulation of values may not be enough. Inductive biases will give leverage to the learning process

- Shaping Imitation
- Problem decomposition
- Reflexes Objective Matter
- Methods for o problems.

7. BREIF LITERATURE SUMMARY

As stated in the Introduction, the idea of trying to approximate the Q-function from a set of four tuples by solving a sequence of supervised learning problems may already be found in Ormoneit and Sen (2002).

While in our formulation state and action spaces are handled in a symmetric way and may both be continuous or discrete, in their work Ormoneit and Sen consider only discrete action spaces and use a separate kernel for each value of the action.

The work of Ormoneit and Sen is related to earlier work aimed to solve large-scale dynamic programming problems (see for example Bellman et al., 1973; Gordon, 1995; Tsitsiklis and Van Roy, 1996; Rust, 1997).

The main difference is that in these works the various elements that compose the optimal control problem are

supposed to be known. We gave the name fitted Q iteration to our algorithm given in Figure 1 to emphasize that it is a reinforcement learning version of the fitted value iteration algorithm whose description may be found in Gordon (1999). Both algorithms are quite similar except that Gordon supposes that a complete generative model is available,9 which is a rather strong restriction with respect to the assumptions of the present paper. In his work, Gordon characterizes a class of supervised learning methods referred to as averagers that lead to convergence of his algorithm.

These averagers are in fact a particular family of kernels as considered by Ormoneit and Sen. In Boyan and Moore (1995), serious convergence problems that may plague the fitted value iteration algorithm when used with polynomial regression, back propagation, or locally weighted regression are shown and these also apply to the reinforcement learning context. In their paper, Boyan and Moore propose also a way to overcome this problem by relying on some kind of Monte-Carlo simulations.

In Gordon (1995a) and Singh et al. (1995) on-line versions of the fitted value iteration algorithm used with averagers are presented. In Moore and Atkeson (1993) and Ernst (2003), several reinforcement learning algorithms closely related to the fitted Q iteration algorithm are given. These algorithms, known as modelbased algorithms, build explicitly from the set of observations a finite Markov Decision Process (MDP) whose solution is then used to adjust the parameters of the approximation architecture used to represent the Q-function. When the states of the MDP correspond to a finite partition of the original state space, it can be shown that these methods are strictly equivalent to using the fitted Q iteration algorithm with a regression method which consists of simply averaging the output values of the training samples belonging to a given cell of the partition.

In Boyan (2002), the Least-Squares Temporal-Difference (LSTD) algorithm is proposed. This algorithm uses linear approximation architectures and learns the expected return of a policy. It is similar to the fitted Q iteration algorithm combined with linear regression techniques on problems for which the action space is composed of a single element. Lagoudakis and Parr (2003a) introduce the Least-Squares Policy Iteration (LSPI) which is an extension of LSTD to control problems. The model-based algorithms in Ernst (2003) that consider representative states as approximation architecture may equally be seen as an extension of LSTD to control problems. Finally, we would like to mention some recent works based on the idea of reductions of reinforcement learning to supervised learning (classification or regression) with various assumptions concerning the available a priori knowledge (see e.g. Kakade and Langford, 2002; Langford and Zadrozny, 2004, and the references therein). For example, assuming that a generative model is available,10 an approach to solve the optimal control problem by reformulating it as a sequence of standard supervised classification problems has been developed (see Lagoudakis and Parr, 2003b; Bagnell et al., 2003), taking its roots from the policy iteration algorithm, another classical dynamic programming algorithm. Within this "reductionist" framework, the fitted Q iteration algorithm can be considered as a reduction of reinforcement learning to a sequence of regression tasks, inspired by the value iteration algorithm and usable in the rather broad context where the available information is given in the form of a set of four-tuples. This batch mode context incorporates indeed both the on-line context (since one can always store data gathered on-line, at least for a finite time interval) as well as the generative context (since one can always use the generative model to generate a sample of four-tuples) as particular cases.

There are a variety of reinforcement-learning techniques that work effectively on a variety of small problems. But very few of these techniques scale well to larger problems. This is not because researchers have done a bad job of inventing learning techniques, but because it is very difficult to solve arbitrary problems in the general case. In order to solve highly complex problems, we must give up tabula rasa learning techniques and begin to incorporate bias that will give leverage to the learning process.

The necessary bias can come in a variety of forms, including the following:

Shaping: The technique of shaping is used in training animals (Hilgard& Bower, 1975); a teacher presents very simple problems to solve first, then gradually exposes the learner to more complex problems.

Shaping has been used in supervised-learning systems, and can be used to train hierarchical reinforcement-learning systems from the bottom up (Lin, 1991), andto alleviate problems of delayed reinforcement by decreasing the delay until the problem is well understood (Dorigo&Colombetti, 1994; Dorigo, 1995).

Local reinforcement signals: Whenever possible, agents should be given reinforcement signals that are local. In applications in which it is possible to compute a gradient, rewarding the agent for taking steps up the gradient, rather than just for achieving the final goal, can speed learning signicantly (Mataric, 1994).

Limitation: An agent can learn by \watching" another agent performs the task (Lin, 1991).

For real robots, this requires perceptual abilities that are not yet available. But another strategy is to haveahuman supply appropriate motor commands to a robot through a joystick or steering wheel (Pomerleau, 1993).

Problem decomposition: Decomposing a huge learning problem into a collection of smaller ones, and providing useful reinforcement signals for the subproblems is a very powerful technique for biasing learning. Most interesting examples of robotic reinforcement learning employ this technique to some extent (Connell &Mahadevan, 1993).

Reflexes: One thing that keeps agents that know nothing from learning anything is that they have a hard time even finding the interesting parts of the space; they wander 275 Kaelbling, Littman, & Moore around at random never getting near the goal, or they are always \killed" immediately.

These problems can be ameliorated by programming a set of "reflexes" that cause the agent to act initially in some way that is reasonable (Mataric, 1994; Singh, Barto, Grupen, & Connolly, 1994).

These re exes can eventually be overridden by more detailed and accurate learned knowledge, but they at least keep the agent alive and pointed in the right direction while it is trying to learn.

Recent work by Millan (1996) explores the use of re exes to make robot learning safer and more efficient. With appropriate biases, supplied by human programmers or teachers, complex reinforcement learning problems will eventually be solvable.

8. ACKNOWLEDGEMENT

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9. CONCLUSION

There are a variety of reinforcement-learning techniques that work effectively on a variety of small problems. But very few of these techniques scale well to larger problems. This is not because researchers have done a bad job of inventing learning techniques, but because it is very difficult to solve arbitrary problems in the general case. In order to solve highly complex problems, we must give up tabula rasa learning techniques and begin to incorporate bias that will give leverage to the learning process. The necessary bias can come in a variety of forms, including the following: shaping: The technique of shaping is used in training animals (Hilgard& Bower, 1975); a teacher presents very simple problems to solve first, then gradually exposes the learner to more complex problems. Shaping has been used in supervised-learning systems, and can be used to train hierarchical reinforcement-learning systems from the bottom up (Lin, 1991), and to alleviate problems of delayed reinforcement by decreasing the delay until the problem is well understood (Dorigo&Colombetti, 1994; Dorigo, 1995). local reinforcement signals: Whenever possible, agents should be given reinforcement signals that are local. In applications in which it is possible to compute a gradient, rewarding the agent for taking steps up the gradient, rather than just for achieving the final goal, can speed learning significantly (Mataric, 1994). Imitation: An agent can learn by \watching" another agent performs the task (Lin, 1991). For real robots, this requires perceptual abilities that are not yet available. But another strategy is to have human supply appropriate motor commands to a robot through a joystick or steering wheel (Pomerleau, 1993). problem decomposition: Decomposing a huge learning problem into a collection of smaller ones, and providing useful reinforcement signals for the subproblems is a very powerful technique for biasing learning. Most interesting examples of robotic reinforcement learning employ this technique to some extent (Connell & Mahadevan, 1993). re exes: One thing that keeps agents that know nothing from learning anything is that they have a hard time even finding the interesting parts of the space; they wander 275 Kaelbling, Littman, & Moore around at random never getting near the goal, or they are always \killed" immediately. These problems can be ameliorated by programming a set of \re exes" that cause the agent to act initially in some way that is reasonable (Mataric, 1994; Singh, Barto, Grupen, & Connolly, 1994). These re exes can eventually be overridden by more detailed and accurate learned knowledge, but they at least keep the agent alive and pointed in the right direction while it is trying to learn. Recent work by Millan (1996) explores the use of re exes to make robot learning safer and more efficient. With appropriate biases, supplied by human programmers or teachers, complex reinforcement learning problems will eventually be solvable. There is still much work to be done and many interesting questions remaining for learning techniques and especially regarding methods for approximating, decomposing, and incorporating bias into problems.

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RESEARCH PAPER

SOLVE TRAVELING SALESMAN PROBLEM USING ANT COLONY OPTIMIZATION ALGORITHM

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ABSTRACT

Ant colony optimization (ACO) is a heuristic algorithm which has been proven a successful technique and applied to a number of combinatorial optimization problems and is taken as one of the high performance computing methods for Traveling salesman problem (TSP). TSP is one of the most famous combinatorial optimization (CO) problems and which has wide application background. ACO has very good search capability for optimization problems, but it still remains a computational bottleneck that the ACO algorithm costs too much time to convergence and traps in local optima in order to find an optimal solution for TSP problems. The presented paper proposes an improved ant colony optimization algorithm with two highlights. First, candidate set strategy is adapted to rapid convergence speed. Second, a dynamic updating rule for heuristic parameter based on entropy to improve the performance in solving TSP.

Ant colony optimization (ACO) has been widely used for different combinatorial optimization problems. In this paper, we investigate ACO algorithms with respect to their runtime behaviour for the traveling salesperson (TSP) problem. Ant Colony Optimization (ACO) is a heuristic algorithm which has been proven a successful technique and applied to a number of combinatorial optimization (CO) problems. The traveling salesman problem (TSP) is one of the most important combinatorial problems. There are several reasons for the choice of the TSP as the problem to explain the working of ACO algorithms it is easily understandable, so that the algorithm behavior is not obscured by too many technicalities; and it is a standard test bed for new algorithmic ideas as a good performance on the TSP is often taken as a proof of their usefulness.

Keywords: Ant colony Optimization, Traveling Salesman Problem.

1. INTRODUCTION

The traveling salesman problem (TSP) is one of the most widely studied NP-hard combinatorial optimization problems. Its statement is deceptively simple, and yet it remains one of the most challenging problems in Operational Research. The simple description of TSP is: Give a shortest path that covers all cities along. Let G = (V; E) be a graph where V is a set of vertices and E is a set of edges. Let C = (c_{ij}) be a distance (or cost) matrix associated with E. The TSP requires determination of a minimum distance circuit (Hamiltonian circuit or cycle) passing through each vertex once and only once. C is said to satisfy $_{the}$ triangle inequality if and only if $c_{ij} + c_{jk} \geq c_{ik}$ for i, j, k ∈ V.

Swarm intelligence is a relatively new approach to problem solving that takes inspiration from the social behaviors of insects and of other animals. The attempt in the research of computer technology is to develop algorithms inspired by insect behavior to solve optimization problems. ant colony optimization (ACO) is one of the most successful techniques in the wider field of swarm intelligence. Many research works have been devoted to ant colony optimization techniques in different areas. It is a relatively novel meta-heuristic technique and has been successfully used in many applications especially problems that belong to the combinatorial optimization. ACO inspired by the foraging behavior of real ant was first introduced by dorigo and his colleagues in early 1990s and has become one of the most efficient algorithms for TSP. ACO is based on the pheromone trail laying and following behavior of some ant species, a behavior that was shown to allow real ant colonies to find shortest paths between their colony and food sources. These ants deposit pheromone on the ground in order to mark some favorable path that should be followed by other members of the colony. The ants move according to the richer the pheromone trail on a path is, the more likely it would be followed by other ants. So a shorter path has a higher amount of pheromone in probability, ants will tend to choose a shorter path. Artificial ants imitate the behavior of real ants how they forage the food, but can solve much more complicated problem than real ants can. Ant colony optimization exploits a similar mechanism for solving optimization problems.

ACO algorithms the theoretical analysis of their runtime behavior has been started only recently. We increase the theoretical understanding of ACO algorithms by investigating their runtime behavior on the well-known traveling salesperson (TSP) problem. For ACO the TSP problem is the first problem where this kind of algorithms has been applied. Therefore, it seems to be natural to study the behavior of ACO algorithms for the TSP problem from a theoretical point of view in a rigorous manner. ACO algorithms are inspired by the behavior of ants to search for a shortest path between their nest and a common source of food. It has been observed that ants find such a path very quickly by using

indirect communication via pheromones. This observed behavior is put into an algorithmic framework by considering artificial ants that construct solutions for a given problem by carrying out random walks on a so-called construction graph. The random walk (and the resulting solution) depends on pheromone values that are values on the edges of the construction graph. The probability of traversing a certain edge depends on its pheromone value. It is a relatively novel meta-heuristic technique and has been successfully used in many applications especially problems in combinatorial optimization. ACO algorithm models the behavior of real ant colonies in establishing the shortest path between food sources and nests. Ants can communicate with one another through chemicals called pheromones in their immediate environment. The ants release pheromone on the ground while walking from their nest to food and then go back to the nest. The ants move according to the amount of pheromones, the richer the pheromone trail on a path is, the more likely it would be followed by other ants. So a shorter path has a higher amount of pheromone in probability, ants will tend to choose a shorter path. Through this mechanism, ants will eventually find the shortest path. Artificial ants imitate the behavior of real ants, but can solve much more complicated problem than real ants can. Consider Fig. 1A Ants arrive at a decision point in which they have to decide whether to turn left or right. Since they have no clue about which is the best choice, they choose randomly. It can be expected that, on average, half of the ants decide to turn left and the other half to turn right. This happens both to ants moving from left to right (those whose name begins with an L) and to those moving from right to left (name begins with a R). Figs. 1B and 1C show what happens in the immediately following instants, supposing all ants walk at approximately the same speed. The number of dashed lines is roughly proportional to the amount of pheromone that the ants have deposited on the ground. Since the lower path is shorter than the upper one, more ants will visit it on average, and therefore pheromone accumulates faster. After a short transitory period the difference in the amount of pheromone on the two path is sufficiently large so as to influence the decision of new ants coming into the system (this is shown by Fig. 1D). From now on, new ants will prefer in probability to choose the lower path, since at the decision point they perceive a greater amount of pheromone on the lower path. This in turn increases, with a positive feedback effect, the number of ants choosing the lower, and shorter, path. Very soon all ants will be using the shorter path.

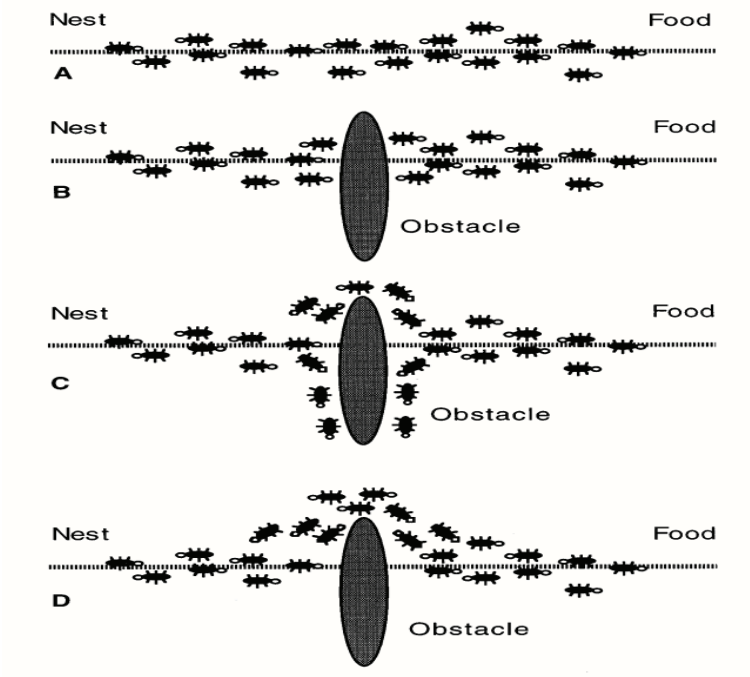


Fig:-how real ant finds the shortest path

A).Ants arrives at a decision point. B) Some ants choose the upper path and some the lower path. The choice is random. C) Since ants move at approximately constant speed, the ants which choose the lower, shorter, path reach the opposite decision point faster than those which choose the upper, longer, path. D) Pheromone accumulates at a higher rate on the shorter path. The number of dashed lines is approximately proportional to the amount of pheromone deposited by ants. The above behavior of real ants has inspired ant system, an algorithm in which a set of artificial ants cooperate to the solution of a problem by exchanging information via pheromone deposited on graph edges. Ant system has been applied to combinatorial optimization problems such as the traveling salesman problem.

In this paper, an improved ant colony optimization algorithm is developed for solving TSP. This algorithm is used to produce near-optimal solutions to the TSP.

2. TRAVELLING SALESMAN PROBLEM

The traveling salesman problem (TSP) is the problem of finding a shortest closed tour which visits all the cities in a given set. In this article we will restrict attention to TSPs in which cities are on a plane and a path (edge) exists between each pair of cities (i.e., the TSP graph is completely connected). Traveling salesman problem (TSP) is one of the well-known and extensively studied problems indiscrete or combinational optimization and asks for the shortest round-trip of minimal total cost visiting each given city (node) exactly once. TSP is an NP-hard problem and it is so easy to describe and so difficult to solve. The definition of a TSP is: given N cities, if a salesman starting from his home city is to visit each city exactly once and then return home, find the order of a tour such that the total distances (cost) travelled is minimum. Cost can be distance, time, money, energy, etc. A complete weighted graph G= (N, E) can be used to represent a TSP, where N is the set of n cities and E is the set of edges (paths) fully connecting all cities. Each edge (i, j) ∈ E is assigned a cost dij, which is the distance between cities i and j. dij can be defined in the Euclidean space and is given as follows:

$$d_{ij} = \sqrt{(x_i - x_j)^2 + (y_i - y_j)^2} \quad (1)$$

One direct solving method is to select the route which has minimum total cost for all possible permutations of N cities. The number of permutations can be very large for even 40cities. Every tour is represented in 2n different ways (for symmetrical TSP). Since there are n! possible ways to permute n numbers, the size of the search space is then |S|=n!/(2n)=(n-1)!/2.

3. MATHEMATICAL MODEL OF ANT ALGORITHM

Ant System was first introduced and applied to TSP by Marco dorigo. Initially, each ant is placed on some randomly chosen city. An ant k currently at city i choose to move to city j by applying the following probabilistic transition rule

$$p_{ij}^{k}(t) = \begin{cases} \dfrac{[\tau_{ij}(t)]^{\alpha}[\eta_{ij}]^{\beta}}{\sum_{l \in J_k(i)}[\tau_{il}(t)]^{\alpha}[\eta_{il}]^{\beta}} & if\ j \in J_k(i) \\ 0 & otherwise \end{cases} \quad (2)$$

where n_{ij} is the heuristic visibility of edge (i, j), generally it is a value of 1/dij, where d_{ij} is the distance between city i and city j. J_k (i) is a set of cities which remain to be visited when the ant is at city i. α and β are two adjustable positive parameters that control the relative weights of the pheromone trail and of the heuristic visibility. If α=0, the closed vertex is more likely to be selected. This is responding to a classical stochastic greedy algorithm. If on the contrary β=0, only pheromone amplification is at work: This method will lead the system to a stagnation situation, i.e. a situation in which all the ants generate a sub-optimal tour. So the trade-off between edge length and pheromone intensity appears to be necessary. After each ant completes its tour, the pheromone amount on each path will be adjusted according to equation.

$$\tau_{ij}(t+1) = (1-\rho)\tau_{ij}(t) + \Delta\tau_{ij}(t) \quad (3)$$

In this equation,

$$\Delta\tau_{ij}(t) = \sum_{k=1}^{m} \Delta\tau_{ij}^{k}(t) \quad (4)$$

$$\Delta\tau_{ij}^{k}(t) = \begin{cases} \dfrac{Q}{L_k} & \text{, if (i, j) } \in \text{ tour done by ant k} \\ 0 & \text{otherwise} \end{cases} \quad (5)$$

(1-p) is the pheromone decay parameter (0<p<1) where it represents the trail evaporation when the ant chooses a city and decides to move. m is the number of ants, Lk is the length of the tour performed by ant k and Q is an arbitrary constant.

4. ANT COLONY SYSTEM

Dorigo and other researchers have introduced many improved ACO algorithms based on AS, among which ant colony system has better performance and is a representative of ACO. ACS mainly differs from AS in the way it chooses the next city to visit and in the way it updates pheromone levels on the edges. These changes increase the emphasis on exploitation by ensuring that most of the edges each ant follows occur around the best known tour. Each ant is placed on some randomly chosen city as in AS. An ant k currently at city i choose to move to city j specified by the following rule:

Step 1: Initiation. The amount of the pheromone on each side is initiated into a tiny constant value; allocate m ants randomly to n cities.

Step 2: In ACS, the so-called pseudorandom proportional rule is used: the probability for an ant to move from city i to city j depends on a random variable q uniformly distributed over [0, 1], and a predefined parameter q0

$$j = \begin{cases} \arg\max_{u \in allowed_k(i)} \{ [\tau_{iu}]^{\alpha}.[\eta_{iu}]^{\beta} \} & \text{if } q < q_0 \\ J & \text{otherwise} \end{cases} \quad (6)$$

J is a random variable determined in accordance with equation (2). This strategy obviously increases the variety of any searching, thus avoiding any premature falling into the local optimal solution and getting bogged down.

Step 3: The local pheromone update is performed by all the ants after each construction step. Each ant applies it only to the chosen city,

$$\tau_{ij}(t+1) = (1-\rho)\tau_{ij}(t) + \rho.\tau_0 \quad (7)$$

Where 0< ρ<= 1 is a decay parameter, τ0=1/n. L_{nn} is the initial values of the pheromone trails, where n is the number of cities in the TSP and L_{nn} is the cost produced by the nearest neighbor heuristic. Equation (2) is mainly to avoid very strong pheromone paths to be chosen by

other ants and to increase the explorative probability for other paths. Once the edge between city i and city j has been visited by all ants, the local updating rule makes pheromone level diminish on the edge. So, the effect of the local updating rule is to make an already edge less desirable for a following ant.

Step 4: Computing of the optimal path. After m ants have travelled through all the cities, compute the length of the optimal.

Step 5: Global updating of pheromone. After all the ants have travelled through all the cities, update only the amount of the pheromone on the optimal path with equation (8):

$$\tau_{ij}(t+1) = (1-\rho)\,\tau_{ij}(t) + \rho.\Delta\tau_{ij}(t) \quad (8)$$

$$\Delta\tau_{ij}(t) = \begin{cases} \dfrac{1}{L_{gb}}, & \text{if } (i,j) \in \textit{global best tour} \\ 0 & \text{otherwise} \end{cases} \quad (9)$$

Where ρ is constant and L_{gb} is the length of global best tour.

Step 6: If the designated search number is not attained, then repeat the above steps.

5. PROPOSED APPROACH

Well Distribution Strategy of Initial Ants At the beginning of ACO algorithm, some paths are walked through by the ants, others are never passed. The local heuristic controlled by visibility, encourages them to choose cities which are closer. This means that they are likely to choose to travel along short edges. Thus some cities may have many ants while some Cities may have no ant at all. Because the amount of pheromone on each path is initially identical, therefore the ant mainly uses the distance between the two cities as the heuristic factor when it chooses the next city.

Heuristic Parameter Updating In ACO algorithm, the heuristic information is very important in generating high quality tours in the initial search stages. Because the value of the pheromone trails don't have much information in the early stage of learning and cannot guide the artificial ants in constructing good tours. In this situation, the heuristic parameter may be set to a large value. On the other hand, in the later stage, the heuristic parameter may need a small value because the pheromone trails may have collected enough information to behavior as required and the heuristic information may mislead the search due toots locality. Thus, in this situation, we may need a small value for the heuristic parameter. The heuristic parameter is set as a constant in traditional ACO algorithms. In this study, a high value of heuristic parameter can always provide high quality tours. This means that the influence of pheromone is greatly reduced, and ants are able to search other paths in constructing feasible solutions. Each trail is a discrete random variable in the pheromone matrix. The entropy of a random variable is defined as

$$E(X) = -\sum_{i=1}^{r} P_i \log P_i \quad (10)$$

Where pi represents the probability of occurrence of each trails in the pheromone matrix. For a symmetric n cities TSP, there are n(n-1)/2 distinct pheromone trails and r= n(n-1)/2.It is easy to see that when the probability of each trail is same, E will be the maximum (denoted as E max) and is given by:

$$E_{\max} = -\sum_{i=1}^{r} P_i \log P_i = -\sum_{i=1}^{r} \frac{1}{r}\log\frac{1}{r} = \log r \quad (11)$$

We propose to use the entropy value as an index to indicate the degree about how much information has been learned into the pheromone trails and then the heuristic parameter can be updated accordingly. Notice that in this study, the heuristic parameter β is set to be an integer so as to avoid complicated computation because β is used as a power in Eqs. (2) and (6). Hence, we propose that β is update according to the rule given by

$$\beta = \begin{cases} 5 & \textit{threshold } X < E' \le 1 \\ 4 & \textit{threshold } Y < E' \le \textit{threshold } X \\ 3 & \textit{threshold } Z < E' \le \textit{threshold } Y \\ 2 & 0 < E' \le \textit{threshold } Z \end{cases} \quad (12)$$

$$E' = 1 - \frac{E_{\max} - E_{current}}{E_{\max}}$$

Where E' is the entropy value for the current pheromone matrix and X, Y and Z are thresholds according to the city size. In study, threshold X is set within 0.8~0.9(according to the city size) and threshold B is within0.75~0.55 (according to the city size), and threshold Z is decided heuristically based on the value of Y.

6. PROPOSED ALGORITHM

The proposed algorithm is combined with candidate list strategy and dynamic updating of heuristic parameter. The proposed algorithm is described as follows: Procedure proposed ACO algorithm for TSP Set parameters, initialize pheromone trails Calculate the maximum entropy Loop /* at this level each loop is called iteration*/ Each ant is positioned on a starting node according to distribution strategy (each node has at least one ant) For k=1 to m do /*at this level each loop is called a step */ At the first step moves each ant at different route Repeat Compute candidate list Select node j to be visited next (the next city in the candidate list) according to solution construction A local updating rule (7) is applied Until ant k has completed a tour End for Local search (2-opt, 2.5 opt) apply to improve tour A global updating rule (8) is applied Compute entropy value of current pheromone trails Update the heuristic parameter Until end condition End.

7. EXPERIMENTAL RESULTS

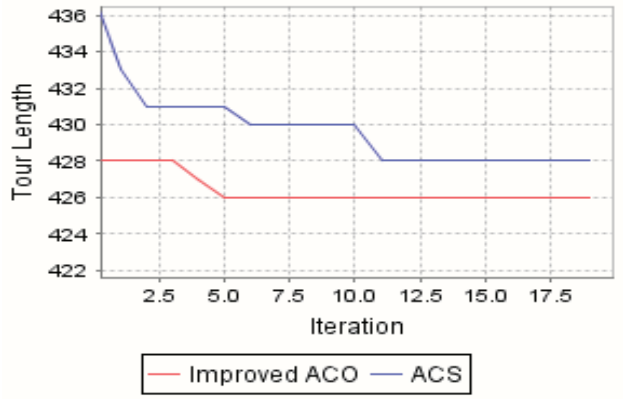
In order to validate the efficiency of the proposed method, several TSP problems are considered. They are obtained from the TSPLIB. In this study, we compared its performance with the ACS algorithm. In all experiments, parameters are set to the following values: ρ= 0.1, q0 = 0.7, α=1, β value is dynamically value of the proposed algorithm and β=2 is in ant colony system. The maximum for all TSPs instances and the number of ant m is 20. The experiment shows that the ant colony algorithm proposed in this paper attained better results for TSPs, its efficiency of solution are higher than ant colony algorithm and the convergence speed is better than that of ant colony system.

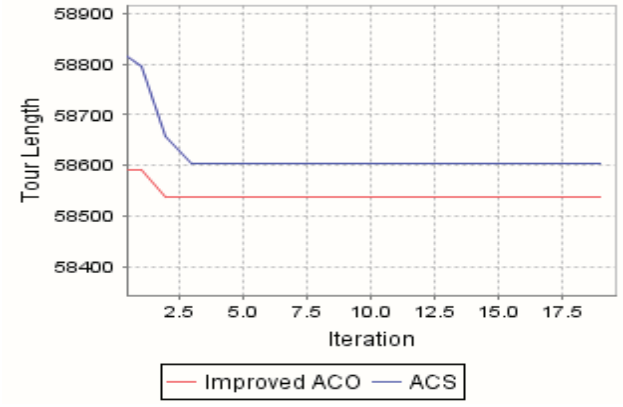
Table I: Comparison of Tour Length Results of TSP Problems

TSP	Best length of proposed algorithm	Best length of reference[1]	Best length of reference[2]
eil51	426	-	429.98
eil76	538	548.2376	-
bBerlin52	7542	7544.3659	-
st70	675	677.1076	677.1096

Table II :A comparisons between proposed algorithm and ACS

TSP	Optimum (1)	Best (2)	Average	Relative Error ((2)-(1)/(1)	Best (3)	ACS +2 opt Average	Relative error ((3)(1)/(1
KroA100	21282	21282	21384.2	0%	21379	21756.4	0.46%
KroA150	26524	26524	27142.1	0%	27249	27756.3	2.73%
Pr1444	58537	58537	58637.75	0%	58603	58809.15	0.11%





8. CONCLUSION

This paper presents an approach for solving traveling salesman problem based on improved ant colony algorithm. An improved version of ACO algorithm based on candidate list strategy and also proposed dynamic heuristic parameter updating based on entropy and mergence of local search solution is proposed. The experimental results and performance comparison showed that the proposed system reaches the better search performance over ACO algorithms do. The proposed system is more in terms of convergence speed and the ability to finding better solutions.

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RESEARCH PAPER

IOT LIVING : A PARADIGM SHIFT

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ABSTRACT

This paper brings a perspective on living that can be significantly influenced by various devices connected in a home or city, how Internet Of Things (IoT) can bring a paradigm shift in our day-to-day life, a sample use case showing how house appliances can communicate with each other and send required alert to house owner to make our living safe, convenient and comforting.

Keywords: IoT (Internet of Things), Network Stack and its Layers.

1. INTRODUCTION

The entire world is going through a phase of transformation via technology. One of the most recent and impactful transformations witnessed was by the use of smart phones which allowed people to do various useful and fancy things. Some of the examples such as camera, calculator and wrist watches are almost phased out from normal household as these jobs are very well done by smart phones. People have been doing everything on smart phones that they used to do on personal computers. After this technological transformation, world is going to witness a new transformation that will come via various devices connected, not necessarily physically but by a logical connection building up a use case to make the life of people simpler. This paper discusses about some interesting scenarios of smart living, how this can is feasible by the use of IoT (Internet of Things) enabled devices and what are the challenges ahead

2. SMART DEVICES AND INTERNET OF THINGS

Internet of Things is a term that is used to refer to the network of physical objects like devices, buildings, vehicles and others which communicate with each other using some network communication technology and perform a meaningful operation. In other words, the Internet of Things (IoT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction [1]. To give an analogy with internet or World Wide Web, internet is a collection (millions, billions) of web pages which are linked together. When a user surf the internet, he/she can move across smoothly across these web pages to ready or feed the information from/to internet. As a result of this, internet gives its users an enormously profound experience when pages are seamless connected.

In the same way, a device performs a specific function or set of functions. Wrist watch is a device that displays the time, coffee vending machine is a device that gives coffee when user presses a specific button and so on. At the broad level, when the networking communication capability is added to the device which allows it to communicate with other designated device(s) then it can be called as IoT device. In strict sense, apart from network communication ability, it should also be uniquely identifiable over the network, should provide a secure communication, should have ability to configure and should be able to upgrade itself over the network without physical intervention. But for the context of this paper, we will refer communication ability as being the most important and essential feature of a device to be called as IoT device. For example, if you have a wrist watch that correctly displays the time but it doesn't not have any communication capability in it, then it is a regular device but not an IoT device. But if this watch had a networking capability like Bluetooth, WiFi or other then it would be called as IoT device i.e. it can be used to connect with another device say smart phone to sync time with the smart phone.

There can be various examples of IoT devices for examples, temperature sensor based device that measures the temperature of environment with the help of temperature sensor embedded in it and reports the data to a server, air pollution measuring device that measures the pollution level in the air and reports the data to a server and so on. It includes almost everything from cell phones, coffee machine, wearable devices, machines parts in a factory or anything device that one can think of and that performs some function. The next section will focus on a smart user case scenario enabled by IoT.

3. IOT ENABLED USE CASES; SMART LIVING

There can be various use cases which can improve the modern living using the IoT enabled device. Some use cases are given below.

- A house hold can have a fire alarm system which detects (senses) if there is a smoke (possibly caused by fire) in the house. In case of fire, normal fire

alarms usually ring the loud sound so that everyone around the house becomes alert. But if this fire alarm system is IoT enabled, it will not only ring the loud sound but also in some way send the message to the user (owner of the house). There are various technologies which can be used to notify the user by the device like cellular communication, WiFi, Bluetooth, ZigBee and others. ZigBee is the only open, global wireless standard to provide the foundation for the Internet of Things by enabling simple and smart objects to work together, improving comfort and efficiency in everyday life [2]. The key point is device must have a mechanism to communicate with another device to report the data/event it collects from the environment.

- A house hold may have a water meter installed which measures the amount of water consumed per day. If water is consumed more than a threshold limit set by the user, then water meter will send an alert to user indicating that if family has gone out but left one of the tap running, the family can take corrective action to close the tap.
- A house may have IoT enabled door locking system which can be used to notify the user if someone tries to force open the door. Such door locking system will not only raise the loud alarm but will also send a message to the user via any of the wireless technology built-in the system

Following figure shows a use case where multiple devices in a house communicate with a residential gateway which in turn, communicate with the user (house owner) to report any unwanted event that happens in the house so that user can take the correction action accordingly. In the figure above, residential gateway is part of solution being provided here but this is not the only solution. The IoT devices may directly communicate with the user depending on the technology they are embedded with.

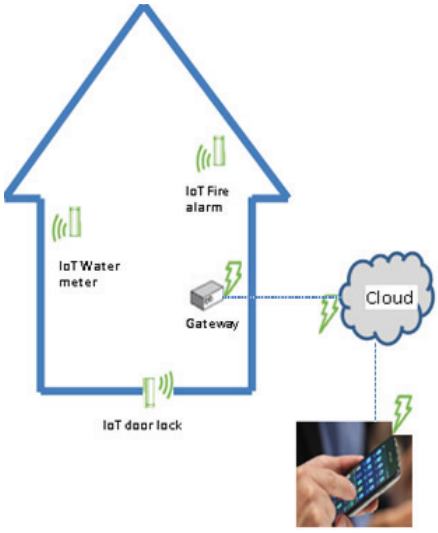

Fig. 1: IoT Devices in Smart Home

As shown in the figure above, each IoT device installed in the house communicates with a residential gateway device to send the alert based on the event occurred in the house. The gateway device is in turn connected to the cloud server. As soon as gateway receives a message from IoT device installed in a house, it sends to message to the cloud server. House owner is connected to the cloud server and gets the notification on his cell phone as soon as event occurs. The key point is that each device does not have to communicate directly to the user's cell phone i.e. doesn't need to have GSM/GPRS based connectivity (doesn't need to have a SIM card). Instead, the IoT device will communicate with the residential gateway via short range communication technology like WiFi and gateway will communicate with the user via long range communication technology.

Likewise, there can be numerous examples where devices can act in much smarter way when added with networking capability. Such devices can be referred as IoT enabled devices.

The use of IoT enabled devices is not limited to just homes. It fits very well in the larger context of smart cities too. The smart cities context is outside of the purview of this paper.

4. COMMUNICATION TECHNOLOGIES CONSIDERATIONS

There are various wired and wireless communication technologies that can "technically" provide the networking capability in a device. Some of the examples are Ethernet, WiFi, Bluetooth, ZigBee and others. The choice is technology depends on various factors before it can be launched commercially but at broad level, following parameters can be identified as key parameters.

- **Data Rate**: How fast the data has to be sent by the device. Ethernet can provide the data rate in the order to hundreds of Gigabits per seconds, WiFi can provide data rate in the order of hundreds of Megabits per seconds, Bluetooth can provide data rate in the order of tens of megabits per seconds and

so on.

- **Cost**: The cost of device should not drastically increase for adding the networking capability to the device. Each technology comes with its associated cost with it. Hence, cost indeed plays an important role.
- **Power consumption**: If device runs on main power supply or on battery fitted in it. Generally, IoT devices are expected to be battery operated. So these devices will need to consume power as less as possible in order to last longer. Nobody will want to install a fire alarm system which needs battery to be replaced every week for obvious reasons.
- **Range of communication**: The IoT device has to network with another device located at very long distance or it is a few meters away. Each technology option comes with its own communication range capability

5. NETWORK STACK OF A DEVICE

Any device which has to communicate with other device has to have a networking stack running on it. The network stack is generally based on 7 layers OSI model. Layer 1-4 are implemented on most devices which are connected on internet. Layer 5, 6 are Session Layer and Presentation Layer which are dependent on the application being built on the stack. For the purpose of IoT devices, Layer 1-4 are more relevant and briefly described below to set the network stack context.

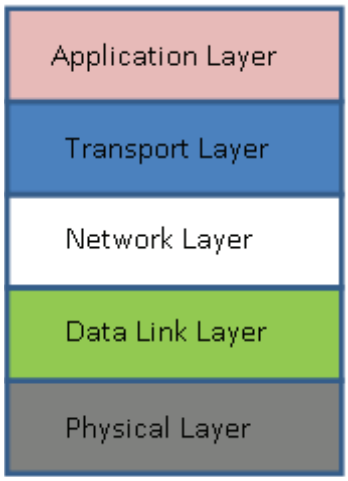

Fig. 2: Network Stack

- **Physical Layer (Layer 1):** This layer is responsible for sending the bit over the physical medium. The physical medium could be wired like Ethernet wire or it could be wireless like for WiFi, Bluetooth. In both cases, this layer takes the bits from higher layer and modulates it and transmits it over the medium. At the receiver end, it does the reverse processing i.e. receives the signals from the physical medium and converts them into the bits.
- **Data Link Layer (Layer 2):** This layer is responsible for taking decisions about when to send the data over the medium and ensuring if data transmitted has been received at the other end successfully or not. It has a sub-layer called Medium Access Control (MAC) which controls access to the medium. It first senses if medium is free of not. If it is free (idle), then it starts its transmission otherwise it waits for some time and tries again to check if medium has become free. Each frame that is sent by this layer is acknowledged by the receiver. If transmitter didn't receive the acknowledgement, it reseeds the frame to the receiver.
- **Network Layer (Layer 3):** This layer is responsible for packet forwarding including routing through intermediate routers. It uniquely identifies the device based on the unique IP address of the device. The IP address could be IPv4 or IPv6 address. Considering already so many devices connected over the network, IPv4 address space has almost exhausted and hence version 6 i.e. IPv6 was devised to cater to billions of devices needing the unique IP address. IP protocols and routing algorithms run on this layer which makes the decision how a packet has to be routed on the network to reach to its final destination.
- **Transport Layer (Layer 4):** This is layer 4 of the OSI model. UDP (User Datagram Protocol) and TCP (Transmission Control Protocol) protocols run on this layer. The key responsibility of this layer to provide a mechanism to high layer to specify where the packet has to be sent (i.e. IP Address) and on a certain machine, which is the intended application to receive the packet. Note that on a certain machine, there are many applications that may be running. Each application by the transport layer protocol is identified by the port number. In other words, each standard application listens for packets on the specific port number. UDP protocol just sends a packet to the network without waiting for the acknowledgements whereas TCP is acknowledgement based protocol which ensures that each packet sent by transmitter is expected to receive an acknowledgement from the other end.
- **Application Layer (Layer 5):** This layer refers to the application that performs specific function of the device based on what is the functionality that is provided by the device. The other layers except

application layer, of the stack ensure the data is properly transmitted and received by the device. They are not interested which source device (fire alarm system, water meter etc.) the data is coming from whereas application layer runs the application specific logic which is as per the device. For example, in case of fire alarm, how loud the sound alarm should ring, who the packet should be sent to, what should be the priority of the message

It is worth emphasizing that OSI model based network stack is very widely used on internet and almost on all machine that are connected to internet. For IoT devices, considering that they are low power, low cost devices there may be various other protocols to build the network of devices and establish communication among them. It is the choice of IoT solution providers to choose the right communication and network protocols that suits their needs.

6. CONCLUSION

Internet of Things (IoT) technology is going to bring a paradigm shift in the way people live. It is not just about adding more luxury in the life style of people but it can solve the many complex problems of the society which people are struggling to solve. Like efficient use of natural resources (water, electricity etc.), bring safety to people (smart homes), contributing to smart cities where different types of objects will communicate with each other to build a working use case.

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RESEARCH PAPER

DoS & WEB BASED ATTACKS ON CLOUD SYSTEMS : TECHNIQUES AND MITIGATION

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ABSTRACT

A key technology towards enabling the use of Software as a Service (SaaS) in the cloud computing is Web 2.0. As growing rate of using web based applications its vulnerabilities are also being discovered and disclosed at an alarming rate. Cloud computing systems are facing a web based and network attacks. This type of attacks are used to exploit the authorization, authentication and accounting the vulnerability of Cloud Systems. Malicious programs can be uploaded to cloud systems to create damage and perpetrated in many ways such as consuming computational resources, disruption of information and obstructing the communication media. Cloud systems are susceptible to malware injection attacks and its security risks and threats were investigate based on the nature of the cloud service models and network attack such as DoS attack allows the attacker to get the administrative control of the systems. Dos attack can be launched for sending the flood or crashes the services of the system. It is essential to identify the possible cloud attacks and threats for implement the better security mechanisms to protect cloud computing environment. In this paper we have present most common prominent web based malware injection with two category cross-site scripting and SQL injection attacks and DoS attacks on the cloud with different techniques used to exploit the cloud systems and some mitigation technique to avoid such type of attacks.

Keywords: Cross-Site Scripting, Cloud Computing, DoS, Buffer Overflow, Flood, Cloud Server.

1. INTRODUCTION

Cloud computing is an important paradigm, with the potential to significantly reduce costs. The complexity and opportunity of Cloud Computing Systems weaknesses are regularly rising with the use of this technology. Due to this high growth rate of expertise of malicious users and its existing security holes cloud systems going to becomes insure. For this reason we have to check that our software and hardware should be able to mitigate the attacks like web and network attacks (DoS, Cross-scripting and Sql attacks) which are very common security intrusion attack. Since, IaaS (Infrastructure as a Service) supports multiple virtual machines; it provides an ideal platform for hackers to launch attacks like DoS attack, which require a large number of attacking instance. Currently many DoS tools are available to compromise the system first then exploit known vulnerabilities to gain the access to system which they use to launch further attacks. In other words, a remote attacker could exploit the vulnerability to execute arbitrary code or cause a denial-of-service. It can severely limit the ability of an organization to perform normal business on the internet. One common method of attack involves saturating the target mechanism with external communications requests so much, so that it cannot respond to legitimate traffic or responds so slowly as to be rendered essentially unavailable. Such attacks usually lead to a server overload.

A DoS attack generally consists of efforts to temporarily or indefinitely interrupt or suspend services of a host connected to cloud using internet and sometimes responsible for website attacks also best known for cloud security vulnerability, as DoS attack can be performed in legacy as well as newly developed technology.

Web-based applications are generally provides dynamic web pages for Internet users to access applications (as an email or banking system) via web browser. Cloud applications on SaaS (Software as a Service) are also vulnerable to malware injection attacks. The web-servers are vulnerable to web based attacks, which includes injection flows, cross-site scripting, session management, broken authentication, information leakage, improper data validation, failure to blocked URL access, insecure communications and malicious program execution etc. Attackers inject a malicious program into target cloud virtual machines and applications on different models such as PaaS, IaaS and SaaS [1]. Once attack launch successfully, malicious code is execute as on the valid instances running in the cloud then attacker can do whatever he/she desires such as data theft, eavesdropping and manipulation of data. SQL Injection and XSS attacks are more prominent in the web application of cloud computing systems. Cross-site scripting is a type of computer security vulnerability commonly found in a web based application in which cross-site scripting information from one context, where it is not trusted, can be inserted into another context, where it is trusted, an

attack can be launch. If web server application that generates web pages is fail to validate user input and to ensure that the generated pages are properly encoded than it can be easily exploited. An exploiter performs this task in a number of ways, such as by inserting a link in a message or in a spam message and it is also be executed by using e-mail spoofing that pretend to be a trusted source.

2. TYPES OF DOS & WEB BASED ATTACKS

Types of DoS Attacks:

Distributed Denial of Service Attack: It occurs when multiple systems devise a synchronized DoS attack to a single target. In this attack, the target is attacked from many locations at once. In other words, the DDoS attack makes used of many different source to send a lots of useless packets to the target in very short time, which will consume target resources and make the target's services unavailable. Among all the networks attacks, the DDoS attack easy to carry out, more harmful, difficult to prevent tough to detect, so it is more serious [2].

HTTP POST DDoS Attack: In this attack, sends a complete, legitimate HTTP POST header which includes a "Content-Length" field to specify the size of the message body. Then attacker proceeds to send the actual message body at an extremely slow rate nearly 1 byte/110 seconds. Because the message being complete and correct than the target server will attempt to obey the "Content-Length" field in the header and wait for the entire body of the message to be transmitted, thus slowing it down[3].

Permanent Denial of Service: It is purely hardware targeted attack which can be much faster and required fewer resource than using botnet in DDoS. It is also known as phlashing that damages a system so badly that it requires replacement or reinstallation of hardware. Contrasting the DDoS attack, PDoS attack exploit security flows which allow remote administration on the management interfaces of the victim's hardware, such as printers, or routers etc. The attacker uses these vulnerabilities to replace a device's firmware with corrupt firmware and this process known as flashing. The potential and high probability of security exploits on (NEEDs) Network Enabled Embedded Devices. PhlashDance is a tool used to detect and demonstrate PDoS vulnerabilities [4].

XML Denial of Service (XDoS): These are less common than unintentional XDoS attacks which occur when a programming error by trusted customer causes a handshake to go into an infinite loop. Main purpose of this attack is to shut down a web service or system running that service. It occurs when an XML message is sent with a multitude of digital signatures and a naïve parser would look at each signature and use all the CPU cycles, eatin g up all resources.

Advanced Persistent DoS Attack (APDoS): DoS attack which is simultaneous and persistent in the network is known as APDoS. This involves massive network layer DDoS attack through to focused application layer (HTTP) flood, followed by repeated SQLI and XSS attacks. It signify a clear and emerging threat needing specialized monitoring and incident response services and the defensive capabilities of specialized DDoS mitigation service providers. Attacker can use 2 to 5 attack vectors involving up to several tens of millions of requests per second and it persist for several weeks noted time 38 days. Attacker is tactically switches between several targets to create a diversion to avoid defensive DDoS countermeasures but at the same time also concentrating on primary victim. With continuous access to several very powerful network resources are capable of sustaining an extended crusade generating enormous levels of un-amplified DDoS traffic [3].

Types of Web Based Attacks: Tow most common malware injection attacks are SQL injection and Cross-site scripting attacks in the web application vulnerability of the cloud computing.

Cross-site scripting Attack: It is the kind of exploitation and a powerful phishing attacks. In this attack, usually hyperlink with malicious code is used to gathered data.After data collection by the web application, malicious data is send to the user in the form of output page and user think that it is a valid content from the website [5]. Cross-site scripting is the most common attack for retrieval of information stored in user cookies, which can create the security confidential problem. The attacker gains the ability to capture the session information, such as users ID, passwords, credit card information and others. With this type of attack, an attacker can change the user's setting and hijack the account, theft cookie, or false advertising. In some situations, it might be possible that attacker can run arbitrary code on a victim's computer when XSS is combined with other flaws. Martin said that Cross-site scripting became the main software flaw that exploits the software or application [6].

Cross-site scripting attack is usually sidelined since it does not affect the organization but rather its users. Attacker to bypass access control such as the same origin policy uses an exploited cross-site scripting vulnerability. XSS attack can easily detect than the other attacks, however many IPS (Intrusion Prevention Systems) fail for accomplish detection. It is perceived as minimal threats by many security experts and developers [7]. The reason behind this perception is its easy detection by signature. Cross-site scripting attacks can be detected accurately by knowing the source, time, and types of signature. Cross-site scripting attack occurs either with malicious pages or with parameter values. Therefore, it is better for a system to detect cross-site scripting to look scripting signature either within parameter or within the requests that return exception handlers. To know the signatures in parameter values the system should correctly parse the URL and retrieve the value-part then start searching for signature from the value to overcome the encoding issues and for the signature in pages that return error messages the system need to know the

specific URL, which returned an error code. The simple text pattern "<scripts>" can be used to detect cross-site scripting attacks. Protection against cross-site scripting attack, experts suggests that web applications servers should include appropriate security mechanisms and validate user input. Cross-site scripting attack mitigation required efforts of server administrators, browser manufacturers, application developers and better to keep in mind that web-application security practices should be continually growing process [8].

SQL Injection Attack: SQL injection attack can take advantage of security vulnerability in cloud software. This means the attackers can exploit vulnerable web-servers after injecting a malicious code for gain unauthorized access to the database. In this attack, hacker's main target is SQL servers that running vulnerable database applications. Generally, this attack launched with help of botnet (used a thousand bots that were equipped with an SQL injection kit to fire an SQL injection attack) and if attacker launches it successfully than he/she can remotely retrieve sensitive data, manipulate the content of database and take the control of the web-server also after executing system commands [9]. In the Cloud Computing Environment, retailers host their products and sell them online using SaaS applications and it can be victimize by SQL injection attack by botnet. There are some following classes of SQL injection attack:

- Inference or Blind SQL injection
- DBMS-specific
- Compounded SQL1
    - SQL injection + insufficient authentication [10]
    - SQL injection + DDoS attacks [11]
    - SQL injection + DNS hijacking [12]
    - SQL injection + XSS [13]

3. METHODS OF ATTACKS

DoS Attack: There are generally two methods of DoS attacks which are as follows:

Flooding attacks: It occurs when the system receives too much traffic for the server to buffer, causing them to slow down and eventually stop.

- Buffer overflow Attack –Network Level
    - SYN
    - ICMP
    - Slow Read attack
- Buffer Overflow Attack-Sever Level
    - Pointer Subterfuge
    - Arc Injection
    - Heap Smashing
    - Stack Smashing

Crashing Services: In this attack, attacker simply exploits vulnerabilities that cause the target system or service to crash. In these attacks, input is sent that takes advantage of bugs in the target that subsequently crash or severely threaten the system, so that cannot be accessed or used.

- Teardrop Attack
- NUKE Attack

XSS Based Attacks: Cross-site scripting attack is most common and prominent web-application vulnerability and there are three standard vectors used for its execution. Use of any type of vector we found the same result. Main motives behind XSS attack is to installation or execution of malicious code on the web-based applications. These are as follows:

Type-0 XSS Attack: Type-0 or local XSS is known as DOM (Document Object Model) based attack. In this type problem exists within a client-side's page scripting itself. This category is completely rely on JavaScript's that has ability to run with privilege of the local zone if the code is executed on the client machine such as an attacker can hijack the session by sending some malicious code through an email or via another mechanism, and use the web page with the privileges of affected user.

Type-1 XSS Attack: Type-1 or non-persistent XSS is known as reflected XSS attack. In this category, an attacker sent perilous content to a vulnerable web-application, which executed by web-browser and reflected back to the user. The frequent method of this category of attack is to include a malicious content in URL as a parameter that sent directly e-mailed or posted publicly to a vulnerable site. As soon as the site reflects the attacker's content to the user the content is executed and starts to transfer the private information to the attacker.

Type-2 XSS Attack: Type-2 or stored XSS is known as Persistent cross-site scripting attack and referred as second-order cross-site scripting vulnerability. This category is considering most powerful XSS attack. It occurs when an exploiter inject malicious content into database that is used later for read and included in dynamic content. The injected content is stored in an optimal place that is displayed to either many users or particularly victims. The victims typically interact with sensitive data which is valuable to the attacker. When the user executes malicious content, an attacker may be able to perform privileges operation(s) on the behalf of the user and gain access to sensitive data of the user [14]

Advanced XSS Attack: Advanced XSS attack vectors are the combination of XSS and phishing (technique to exploit the web-site by creating very similar site which imitate the original site in every aspects, often using a similar looking domain name) attacks, which diminishes the chance of an average user to recognize the attack. User is then tricked into accessing the imitating site providing the logon credential, which the hacker can use to login to the real site. It can be disguises the phishing activity and can perform using the following techniques:

Page Rewriting: Rewriting XSS page can take the advantages of phishing concept without leaving the site by using Java scripting which blank the targeted page and rewrites the code as a formal login page. The page looks like to be genuine even the users don't bothers for this forge page however the login points to the server

machine.

Redirect Disguise: Using redirect techniques for XSS attacks the attacker disguise the user by inserting a script in the web page, which will looks like the same link as the original one, which really acts as a phishing site. The novice web-site user will easily trap by such type of phished URL site.

4. MITIGATION TECHNIQUES

Mitigation Techniques against DoS Attacks: A DoS attack requires a new approach that can help to detects and mitigates the effects of this attack to ensure availability of the resources. Whole DoS defense is built on concept of mitigation of attack for detection or identify traffic to preserve working continuity. The mitigation solution should include performance and architecture to deploy upstream to protect all points of vulnerability and to maintain reliable and cost efficient scalability which delivers the DoS defense. Towards this the following protection attributes are suggested:

- Enables immediate response to DDoS attack through integrated detection and blocking mechanism.
- Without announcing a failure point during attacks and enables on-demand deployment to protect the network.
- Detects and prevent every spoofed packets to guard the valid organization's transactions.
- Offers strong verification mechanism such as Intruder Detector System signatures.
- Work more designed tools to handle flood of DDoS attacks without affecting fate as secure resources.
- Use all communication standard protocols to ensure maximum consistency, reliability, interoperability and consistency.
- Try to avoid dependence on network device resources [15].
- Monitoring whole network packets carefully.

Some tools like Firewall, Intrusion Detection Systems (IDS), Application front end H/W, IPS based prevention and DoS Defense System are also available for detection the DoS attack. Other than these solutions, CISCO Systems also proposes a DDoS protection solution based on the principles of detection, diversion, verification, and forwarding to help ensure total protection.

Mitigation Techniques against XSS & SQL Attacks:

XSS Attack: The most common security problem corbelling is XSS. It is a server side attack that is often craft by rendering user input as HTML. The techniques of cross-site scripting mitigation are discussed as follows:

Input Validation: Input validation is a common mitigation technique used to validate the input malicious data sources. Suppose if form accept some fields, which accept only digits not characters than a server-side routine remove all characters other than digits such that the result cannot contain any script. It is the best way to prevent XSS attack by converting these characters to their HTML equivalents [16].

(,), [,], >, ;, :, <, ', ", /, \

HTTP Cookies: A cookie is sent on the client with HTTP response header to reduce the risk of cross-site script attack. It introduced a new attribute for Internet Explorer to mitigate the risk of information disclosure. This attributes specifies that a cookie is not accessible through script [17].

HTML encoding: The easiest way to apply mitigation strategies is to encode (HTML quote) all user-supplied HTML non alphanumeric characters, thereby preventing them from being interpreted as HTML.

Follow Standards and Checklist: The web designers and maintainers can reduce the cross-site scripting by following the best practices and checklist available. The following is available checklist for the web designer and maintainer to mitigate the XSS attacks [1]

- Ensure that the pages in the web sites return user inputs after validating for any malicious code.
- Convert all non- alphanumeric characters to HTML character entities before displaying the user input in search engines and forums.
- Use of testing tools during the design phase to eliminate the XSS holes in the system before it goes into use.
- Develop some standard script with private and public keys that actually check to ascertain that the script introduced is really genuine.

Training and awareness program for user: At last but not least, it is advisable to educate the end user about safe browsing to reduce the risk that users will be victims of XSS attacks. Countermeasures should also be implemented at the application level (browser) through scripting controls made available in the browser.

SQL Injection Attack: SQL injection attack countermeasures techniques are as follows:

- **Firewall:** Consider software or appliance based web-application firewalls which can help to filter out malicious data.
- **Avoid Dynamic SQL:** Used parameterized queries, prepared statements, stored procedures whenever possible.
- **Reduce your attack surface:** Get free of any database functionality that you don't need to prevent a hacker taking advantage of it.
- **Update and Patch:** Applications and databases that are vulnerable than apply patches and updates as soon as applied.
- **Not Trust to Anyone:** Assume all user submitted data is malicious than validate and sanitize everything.
- **Use Appropriate Privileges:** Use a limit access account instead of administrative privileges. It is safer and can limit what a hacker is able to do.

And so many other techniques like don't reveal more information than you need to, Change the passwords at regular basis and use licensed software. Block SQL

injection attacks with tools such as dotDefender web-application firewall.

5. CONCLUSION AND FUTURE WORK

DoS and Web based attacks generally used to exploit vulnerability of the Cloud Systems. Malicious programs can be uploaded to cloud systems to create damage. It is observe that the security systems of cloud computing required a depth analysis of various vulnerabilities of web-servers for different applications where attacker might try to inject malicious services and exploit cloud system for damage the cloud services and cloud system also.SQL injection and Cross-site scripting attacks are discovered virtually every web based software application, but easy to detect and guard.

There are several techniques for prevent and mitigate the DoS attacks, common security cross-site scripting attack and SQL injection but we have presented some mitigation techniques based on best practices. Applying the abovementioned approaches one can mitigate the malware injection problem and DoS attack impact to some extent. Our motive of future work is to reduce these type of attacks/problem by filtering all the dangerous characters and queries that has been sent or inject via email or other mechanism and converting these dangerous characters into their HTML equivalents to mitigate or block the SQL injection and cross-site scripting attack. Secondly future work required depth analysis of various vulnerabilities of web-servers for different applications where attacker might try to inject malicious services to the cloud system for damage the cloud services and cloud system also and work is to reduce these types of attacks by proposing or making strong framework.

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RESEARCH PAPER

RENEWABLE ENERGY – MAKE IN INDIA, THE NEED OF THE HOUR

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ABSTRACT

India's rising economic activities, growing population and improving living standards have led to a steady growth in her appetite for quality and quantity of energy services. As the economy expands, the electricity demand is going to grow further. Considering the energy security concern for and commitment to a 'Low Carbon Growth Strategy', the 12th Five Year plan of the country included plans to ensure sustainable development of the power sector. Renewable Energy (RE) solves the sustainability problem associated with conventional fuels used for power generation as these sources are non-exhaustible and relatively clean. Further, RE is also an economical off-grid energy solution for remote locations. The 11th Five Year Plan realized the significant role of new and renewable energy to enhance the domestic energy supply options as well as the need to diversify energy sources. The 12th Five Year plan's strategy aims to develop the RE sector through capacity addition in wind power, small hydro power, solar power, and bio-power. Thus the RE space in the country is going to witness a large number of RE projects in coming years.

Keywords: R.E, Solar Energy, Wind Energy, Hydro Electric Power, Biomass Energy Micro Generation Waste-To-Energy Plants.

1. INTRODUCTION

India's power generation has struggled to keep pace with its rapid economic growth, rise in population, growth and rampant urbanization. Energy demand has perpetually outstripped supply by a wide margin, and with the 12th Five Year Plan (2012-17) targeting annual GDP growth of 7 – 8 per cent, a significant increment in energy supply is crucial. This rising energy demand, coupled with less than expected improvements in the production of domestic crude oil, natural gas and coal, has led to a strong reliance on imports. India racked up one of the highest energy import bills in 2012-13 (over $100 billion), and though the pressure has eased at the moment due to the softening of global crude prices, a long-term solution has become critical and need of the hour. It is therefore essential to tackle the energy crisis through judicious utilization of abundant renewable energy resources, such as biomass energy, solar energy, wind energy and geothermal energy. Apart from augmenting the energy supply, renewable resources will help India in mitigating climate change. India is heavily dependent on fossil fuels for its energy needs. Most of the power generation is carried out by coal and mineral oil-based power plants which contribute heavily to greenhouse gases emission.

The government is playing an active role in promoting the adoption of renewable energy resources by offering various incentives, such as generation-based incentives (GBIs), capital and interest subsidies, viability gap funding, concessional finance, fiscal incentives etc. The government has created a liberal environment for foreign investment in renewable energy projects. The establishment of a dedicated financial institution – the Indian Renewable Energy Development Agency, makes for renewed impetus on the promotion, development and extension of financial assistance for renewable energy and energy efficiency/conservation project. Current renewable energy contribution stands at 77 GW of the total installed capacity of 271.722 GW in the country as on 31.03.2015.

The Union Government has made infrastructure growth a national priority, and expects this sector, along with manufacturing, to drive the economy in the next five years. In line with this vision, the Ministry of New and Renewable Energy (MNRE) has scaled up renewable targets manifold to about 175 GW by 2022, with solar and wind-based power accounting for over 90 per cent of this volume. Historically, the Central Government – administered by MNRE, with funds disbursed through the Indian Renewable Energy Development Agency (IREDA) – has offered two types of incentives for RE – Accelerated Depreciation (AD) and Generation-Based Incentive, besides capital subsidies for biomass and small hydro. In the recently-started Phase II of the JNNSM, a new mechanism – Viability Gap Funding (VGF) – has been created for solar projects. The state regulator led RE support mechanisms include the Renewable Purchase Obligation (RPO), which states that distribution companies need to procure a certain percentage of electricity from renewables, and feed-in-tariffs. Also, with the Government allowing 100 per cent Foreign Direct Investment (FDI) in renewables, the sector witnessed cumulative FDI inflows of over US$ 3000 million from April 2000 - March 2014, as per the Department of Industrial Policy and Promotion.

2. A GLANCE AT RENEWABLE ENERGY SOURCES IN INDIA

The average per capita consumption of energy in India is around 500 W, which is much lower than that of

developed countries like USA, Europe, Australia, Japan etc. However, this figure is expected to rise sharply due to high economic growth and rapid industrialization. The consumption of electricity is growing on the worldwide basis. Energy is a necessity and sustainable renewable energy is a vital link in industrialization and development of India. A transition from conventional energy systems to those based on renewable resources is necessary to meet the ever-increasing demand for energy and to address environmental concerns. The Government of India has set targets, which will take the total renewable capacity to almost 175 GW by the end of 2022. This includes 60 GW from wind power, 100 GW from solar power, 10 GW from biomass power and 5 GW from small hydro power. The National Solar Mission aims to promote the development and use of solar energy for power generation and other uses, with the ultimate objective of making solar energy compete with fossil-based energy options. The objective of the National Solar Mission is to reduce the cost of solar power generation in the country through long-term policy, large scale deployment goals, aggressive R&D and the domestic production of critical raw materials, components and products. Prices for solar modules have declined by almost 80% since 2008 and wind turbine prices have declined by more than 25% during the same period.

3. SOLAR ENERGY

Solar power, a clean renewable resource with zero emission, has got tremendous potential of energy which can be harnessed using a variety of devices. The country offers unlimited growth potential for the solar PV industry. With recent developments, solar energy systems are easily available for industrial and domestic use with the added advantage of minimum maintenance. Solar energy could be made financially viable with government tax incentives and rebates. An exclusive solar generation system of capacity of 250 to KWh units per month would cost around Rs. 5 Lacs, with present pricing and taxes. Most of the developed countries are switching over to solar energy as one of the prime renewable energy source. The current architectural designs make provision for photovoltaic cells and necessary circuitry while making building plans.

4. WIND ENERGY

Wind power is one of the most efficient alternative energy sources. There has been a good deal of development in wind turbine technology over the last decade with many new companies joining the fray. Wind turbines have become larger, efficiencies and availabilities have improved and wind farm concept has become popular. It could be combined with solar, especially for a total self-sustainability project.

The economics of wind energy is already strong, despite the relative immaturity of the industry. The downward trend in wind energy costs is predicted to continue. As the world market in wind turbines continues to boom, wind turbine prices will continue to fall. India now ranks as a "wind superpower" having a net potential of about 45000 MW only from 13 identified states.

India is a key exporter of wind turbines, with a mature manufacturing base that has grown in parallel with the deployment of wind projects in the past decade. This has led to a diverse market of manufacturers who are very cost competitive due to lower production cost. It is also fifth largest wind energy producer.

An off shore wind and Energy policy, having following growth drivers has also been announced which aims at promoting deployment of offshore wind farms up to 12 nautical miles from coast.

- To promote investment in energy infrastructure.
- To promote spatial planning and management of maritime renewable energy resources in the exclusive economic zone.
- To achieve energy security and reduce carbon emissions.
- To encourage indigenization of offshore wind energy technology.
- To promote R&D in the offshore wind energy sector

5. HYDRO ELECTRIC POWER

India has a huge **hydro power** potential, out of which around 20 % has been realized so far. New hydro projects are facing serious resistance from environmentalists. Resettlement of the displaced people with their lands becomes major issue.

6. BIOMASS ENERGY

Biomass energy can play a major role in reducing India's reliance on fossil fuels by making use of thermo-chemical conversion technologies. In addition, the increased utilization of biomass-based fuels will be instrumental in safeguarding the environment, creating new job opportunities, sustainable development and health improvements in rural areas. Biomass energy could also aid in modernizing the agricultural economy. A large amount of energy is expended in the cultivation and processing of crops like sugarcane, food grains, vegetables and fruits which can be recovered by utilizing energy-rich residues for energy production. The integration of biomass-fuelled gasifies and coal-fired energy generation would be advantageous in terms of improved flexibility in response to fluctuations in biomass availability with lower investment costs.

Waste-to-energy plants offer two important benefits of environmentally sound waste management and disposal, as well as the generation of clean electric power. Waste-to-energy facilities produce clean, renewable energy through thermo chemical, biochemical and physicochemical methods. Moreover, waste-to-energy plants are highly efficient in harnessing the untapped sources of energy from a variety of wastes.

7. DECENTRALIZED ENERGY GENERATION IN INDIA

Micro generation, also called "micro power", is the

generation of zero or low-carbon electrical power by individuals, small businesses and communities to meet their own needs. The most widely-used micro generation technologies include small wind turbines, solar power photovoltaic or biomass conversion systems that have been promoted for decades as alternative sources of renewable energy. Because of technological advances, micro generation now includes handheld solar and wind-power recharging devices for personal electronics, as well as advanced photovoltaic, biomass and wind-turbine systems for domestic and industrial power generation.

Traditional "mega power" production of electricity is insufficient today because of exponential industrial growth and high living standard. Micro generation can act as a catalyst for cultural changes in consumer attitude, and provides evidence of the important impact that micro generation has on consumers' attitude and behavior regarding energy production and use. Micro generation is both a serious form of clean energy production and also a cultural movement that is gathering momentum worldwide. Micro generation technologies include small wind turbines, biomass gasifiers, solar power, micro-hydro, or a combination of these technologies. Prima-facie, renewable energy may appear a bit costlier than the conventional source of energy, but looking at the benefit of continuous power availability and great contribution against global warming, it is worth.

Industrialized countries, like USA, Australia, Japan, have formulated action plan to foster sustainable energy to make judicious use of renewable energy resources. For example, USA has announced massive renewable energy program, to generate large share of total energy requirement from renewable energy sources by 2025, which will create 5 million new job opportunities in various areas of Renewable Energy.

8. PROPOSED GUIDELINES FOR POLICY MAKERS IN INDIA

- Vigorous promotion of renewable energy by government agencies, corporate, public sector, academic institutions etc.
- Establishment of national-level body to increase awareness of renewable energy at grass-root level
- Financial support and sponsorship for research and development in renewable energy technologies.
- Ambitious goals and targets for power generation non-conventional sources.
- Installation of solar / wind / biomass power generation systems and energy saving in every government office to encourage and inspire people.
- Restriction on using large battery energy storage systems.
- Compulsory installation of solar water heating systems for all urban residential and commercial establishments.
- Mandatory renewable energy systems provision for new residential, commercial and industrial buildings.
- Attractive incentives and subsidies for installation and successful operation of renewable energy equipment.
- Abolishing duties / taxes on import of small-scale renewable energy generating equipment
- Cultivation of energy crops on marginal and degraded land
- Use of biofuels in vehicles.
- Soft loans for setting up renewable energy enterprises.
- Additional incentives for buyers and manufacturers of renewable energy equipments in rural areas.

9. CONCLUSION

There is an urgent need for transition from petroleum-based energy systems to one based on renewable resources to decrease reliance on depleting reserves of fossil fuels and to mitigate climate change. In addition, renewable energy has the potential to create many employment opportunities at all levels, especially in rural areas. An emphasis on presenting the real picture of massive renewable energy potential, it would be possible to herald a Green Energy Revolution in India by attracting direct foreign investments, which is permitted up to 100% under the automatic route for renewable energy generation and distribution projects subject to provisions of The Electricity Act, 2003. Further, the clear and predictable policy support, along with reformatory incentives, being provided by the Union Government is vital to generating investor interest in this sector. All these developments are slowly but surely coming together to put the Indian renewable energy sector on a strong path by bringing about a paradigm change.

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RESEARCH PAPER

COMPARISON OF STATE AND TRAIT ANXIETY RESPONSE TO MUSIC THERAPY AND AEROBIC EXERCISE IN NON-ELITE COLLEGIATE ATHLETES

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ABSTRACT

The present study aim is to determine and compare the effectiveness of relaxing music and aerobic exercises on state and trait anxiety in non-elite collegiate athletic population. Thirty one male and female collegiate athletes were recruited. The subjects were randomly allocated into Music therapy group and aerobic exercise group. Music therapy was given to subjects of music therapy group for 20 minutes in each session. Subjects of aerobic exercise group performed 20 minutes aerobic exercise on treadmill in each session. Protocol lasts for two weeks (one session per day) for both of the groups. STAI measurement was taken before and after completion of two weeks of intervention. Unpaired-t test was used to analyse the between group difference and paired-t test is used to check within group effect. The significant difference has been seen in anxiety level in both of the interventional groups but magnitude of anxiety reduction is more by performing aerobic exercise than having music therapy. So result of the study states that Music therapy and aerobic exercise both are helpful in reducing state and trait anxiety in non-elite collegiate athletes but aerobic exercise is more beneficial than music therapy.

Keywords: State–Trait Anxiety, Aerobic Exercise, Music Therapy, STAI, Non Elite Collegiate Athletes.

1. INTRODUCTION

Stress particularly chronic stress, can lead to mental health problems, including anxiety and anxiety disorders. When such chronic stress lead to feeling of always being - "on guard", anxiety is the resultant experience. This is the feeling that goes beyond normal feelings of worry and fear [1]. Aurbey Lewis (1970) define anxiety - "as an emotional state, with the subjectively experienced quality of fear as a closely related emotions" [2]. In athletes, episodes of anxiety can have very deteriorating effect on their performances. So in order to give one's best performance athletes must have to control their anxiety level. Various measures and techniques are being used by athletes in order to control their anxiety.

There are various forms of anxiety. In 1966, Spielberger defined trait anxiety as individual's predisposition to respond, and state anxiety as a transitory emotion characterised by physiological arousal and consciously perceived feeling of apprehension, dread and tension [3]. There are two state anxiety components (cognitive worry and autonomic emotional) and four trait anxiety components (social evaluation, physical danger, ambiguous, and daily routine) have been identified [4]. Thus state anxiety is assessment of how the individual "feels right now, at this moment" and trait anxiety is an assessment of how the individual "generally feels." [5]

Traditional treatment protocols for anxiety (medication and psychotherapy) are often expensive and time consuming. For quite some times, physical activity (e.g. exercise) has been examined as a potential tool in both the prevention and treatment of anxiety. From previous studies it has been seen that aerobic exercise has very good results in order to reducing anxiety level than any other form of exercise [6]. Aerobic exercises act as a stress buster agent and ultimately reduce anxiety. Most of the studies of aerobic exercises and anxiety have been done on non-athletic population. Music therapy is an upcoming anxiety controlling intervention which can help in controlling anxiety level in athletes. Music therapy is defined as - *A behavioural science that applies music and musical interventions systematically to restore, maintain and improve emotional, physiological and spiritual health and well-being."*[7]. Music, of special relaxing character, helps in reducing anxiety to greater extent. The use of music as a relaxation aid has largely been ignored by sports research; however its use within medical environment has received some attention. Use of music during exercise have ergogenic effect (work - enhancing) [8], [9], [10], [11].So present study is concerned about determining and comparing aerobic exercise and music therapy in order to reduce anxiety in non-elite athletes so that most effective treatment can be used by athletes to control their anxiety level and to enhance performance.

2. REVIEW OF LITERATURE

Anshel et al., define anxiety as a - subjective feeling of apprehension or perceived threat, sometimes accompanied by heightened physiological arousal [12]. It is the state which resulted when individual doubts his or

her ability to cope with situation that causes him or her stress. So it is an apprehensive anticipation of future danger or misfortune accompanied by feeling of dysphoriaor somatic symptoms of tension [13].

Anxiety can be manifested both psychologically and physiologically. Some characterizing features of anxiety are (1) unpleasant feelings, (2) physical symptoms caused by activation of autonomic nervous system, (3) altered cogitative process, (4) altered behaviour, (5) vigilance etc. When the person's appraisal of that stress becomes negative, anxiety is the result. Normal anxiety became clinical anxiety when the number and intensity of the aforementioned symptoms increases and degree of suffering and ensuring dysfunction become disruptive of usual activity. This is the state characterised by worry self-doubt, nervousness, and tension, but it also disrupts thought process and behaviour and alters physiological functioning [1].

Uncontrolled Anxiety has very deteriorating effect on athletic performance. Martens et al., [14] expanded on the inverted U from Yerkes and Dodson to include a multidimensional approach in which they looked at the relationships between cognitive anxiety and performance in addition to somatic anxiety and performance (inverted U).They found that a strong negative linear relationship exists between cognitive anxiety and performance. Woodman and Hardy [15] have determined that cognitive anxiety has a significantly higher negative impact on sports performance in male athlete in comparison to female athletes. Papastergiou et al., established that winners have higher level of self-confidence and low level of anxiety [16].

In 1966, Spielberger suggested that conceptual anxiety could be introduced to multifaceted definitions of anxiety by distinguishing trait anxiety from state anxiety[3].

In general state anxiety may be regarded as temporal cross section in the stream of life of a person [17] and emotional reaction as expression of personality state [18]. An emotional state exists at a given moment in time and at particular level of intensity. It is noticeable, but transient emotional state characterized by feeling of worry and apprehension and by heightened autonomic nervous system activity. Thus state anxiety is an assessment of how the individual feel "right now, at this moment." [1].

The classical definition of trait (Allport, 1937) implies a generalized and enduring predisposition to react to many situations in a consistent manner. Trait anxiety reflects a more general predisposition to respond across many situations with apprehension, worry, and nervousness. Thus trait anxiety is an assessment of how an individual "generally feels."[1].

Previous literature has suggested that physical activity has great influence on psychological status like anxiety and depression [19], [20], [21]. It has been established that there is positive correlation between exercise and acute mood state benefits [22], [23]. Meta-analysis of 124 studies gives a number of potential mechanisms in an attempt to explain the exercise-anxiety [19]. From two studies conducted by Broman et al., it has been seen that aerobic exercise yield significant reduction in self-reported anxiety sensitivity [24], [25]. Very few studies have been done over effect of aerobic exercise on state and trait anxiety specifically on athletic population. Raglin and Morgan found that exercise induced reduction in anxiety, persist for longer period than the anxiolytic effects observed following quite rest [26]. Hale et al., has seen effect of different forms of exercise on state anxiety and concluded that aerobic exercise has great influence in reduction of state anxiety than any other forms of exercise [27].

Music has great influence upon health and well-being and reduction of feeling of stress [28], [29]. The use of music as a relaxation aid has largely been ignored by sports research; however its use within medical environment has received some attention. Use of music during exercise have ergogenic effect (work - enhancing) [8], [9]. Music also helps in fasten the post exercise recovery [30]. It has been seen that Music when combined with exercise intervention produces great physical and psychological benefits [31], [32], [33]. A great effectiveness of music in cardiac care unit has been seen in order to reduce stress and anxiety in cardiac patients [34], [35].

Different types of music shows different responses to psychological status, motivational quality, performance enhancement and imparting relaxation. In order to select relaxing music for anxiety control, it has been seen that music for anxiety researches has generally adopted one of the two approaches. A participant centred- approach in which the participant selects the music, or the experimenter- centred approach in which the music is selected by experimenter. The participant centred approach has an inherent bias as the listener may unwittingly over evaluate the effect of the music [36]. Although the experimenter- centred method nullifies the possible response. It has been reported that state anxiety benefit from acute exercise, and trait anxiety from chronic exercise, [27] but long term effects of exercise on state anxiety is still under studied.

3. OBJECTIVE

To determine and compare the effectiveness of relaxing music and aerobic exercise on state and trait anxiety in non-elite collegiate athletic population.

4. METHODOLOGY AND PROCEDURE

Sample: Thirty one male and female collegiate athletes from Jamia Millia Islamia and other nearby colleges were recruited for the study by convenience sampling method (Mean ± SD for age 20.87 ± 1.82 years, height 164.2± 8.2 cm, weight 57.04±7.2kg and BMI 21.09 ± 1.84). Ethical clearance was taken from Institutional Ethical Committee of Jamia Millia Islamia, New Delhi, India.

Sample size: Prior to conducting the study, sample size was calculated. The number of subjects were determined

using Software G. Power 3.15 using data of changes state anxiety level by Baldari et al.,[33].15 subjects per group were shown to be necessary based on the effect size of 0.14, alpha level of 0.05 and power (1-beta) of 0.80.

Inclusion criteria

- Age = 18-30 years
- Both males and females
- BMI 19 – 24.9 kg/m^2
- Be in good physical health (assessed using physical activity readiness questionnaire, PAR [37].
- No auditory impairment
- Previous experience of treadmill running.
- No injury in last six months.

Exclusion criteria

- Any health condition that would preclude aerobic exercise
- Current involvement in psychotherapy
- Current use of psychiatric medicines

5. RESEARCH DESIGN

Prospective pre-test- post-test experimental design with random allocation into groups using lottery system.

6. VARIABLES

Independent Variables

- Music therapy
- Aerobic exercise

Dependent Variables

State and Trait Anxiety level

- State and Trait Anxiety inventory level for state anxiety (STAI-Y1)
- State and Trait Anxiety inventory level for trait anxiety (STAI-Y2)

Instruments

State trait anxiety inventory for adults

The present study used State trait anxiety inventory for adults (STAI) [38], [39] to measure participant's anxiety levels. STAI represent different anxiety symptoms that participant's rate on 4-point likert scale. The state anxiety scale (STAI Form Y-1) evaluates how respondent feels "right now, at this moment". The trait anxiety scale (STAI Form Y2) assesses how people generally feel. The STAI-Y1 and Y2 (State Anxiety and Trait anxiety) scales are printed on opposite sides of a single page test form.

- State trait anxiety inventory for state anxiety (STAI-Y1)

The state anxiety scale (STAI Form Y-1) consists of twenty statement that evaluate how respondent feels "right now, at this moment". In responding to the STAI state anxiety scale, examines blacken the number on the standard test form to the right of each item statement that best describe the intensity of their feelings: (1) not at all; (2) somewhat; (3) moderately so; or (4) very much so.

State trait anxiety inventory for state anxiety (STAI-Y2)

The trait anxiety scale (STAI Form Y2) consists of twenty statements that assess how people generally feel. In responding to the trait anxiety scale, examinees were instructed to indicate how they generally feel by rating the frequency of their feelings of anxiety on the following four point scale: (1) almost never; (2) sometimes; (3) often; or (4) almost always.

7. PROCEDURE

Subjects who met the inclusion and exclusion criteria were selected for the study. Then subjects were randomly allocated into one of the two groups: music therapy group or aerobic exercise group. Prior to participation, all subjects were explained about the purpose of the study. All subjects gave their informed consent to participate in the study and the information was kept confidential by assigning a number to each subject. Weight and height of the subjects were measured by digital weighing machine and stadiometer respectively. Physical Activity Readiness Questionnaire (par-q) was established, whether the subjects assigned to aerobic exercise group were of optimal physical fitness to complete the activities required to them.

Subjects of music group received no exercise intervention but only music therapy at relaxed seated position in calm and distraction free environment for 20 minutes in each session. Subjects of aerobic exercise group performed 20 minutes aerobic exercise on treadmill in each session without any music intervention .The whole protocol lasts for two weeks (one session per day) for both of the groups. STAI measurement was taken before starting the intervention and then post measurement was taken after completion of two weeks.

Music Selection: In present study, relaxing music was selected by experimenter centred method (nullified the possible response biased due to participant selected music). For this, instrumental Indian classical music was selected for anxiety control as per recommendations of Elliott et al., [40]. For example, tempi ranged between 80 and 100 beats per minute, rhythms were relatively subtle, simple and constant, melodies were strong and secure and harmonies were consonant. The music was transferred to iPod or other portable listening device and played by using headphones. Intensity (volume) was self-selected by the subject according to their comfort [33**].**

Aerobic Exercise Protocol: Participants in the exercise group completed an aerobic exercise regimen designed to expose them to the bodily sensations presumably associated with anxiety. The exercise participants completed 20-minute aerobic exercise sessions daily over a 2-week period. At each session, exercisers were fitted with a Polar heart rate monitor. Consistent with the recommendations of the American College of Sports Medicine (2000) for aerobic activity, exercise participants were asked to briskly walk or jog on a treadmill at a speed that maintained their heart rate between 60 and 90% of their predicted maximum heart rate for the full

20-minute session. The lower and upper bound for each participant's aerobic heart rate range was computed using the following formula: (220-age) x (0.60 [lower bound] or 0.90 [upper bound]). Heart rates were monitored by the experimenter at 2-minute intervals, and treadmill speeds were adjusted as necessary to maintain aerobic heart rates. Participants were not allowed to engage in any other activities while exercising (e.g., talking, eating) to minimize distractions from arousal sensations [24]

8. STATISTICAL ANALYSIS

The SPSS Version 21.0 software programme was used for the data analysis. Mean and standard deviation (SD) of the demographic characteristics of age, height, and weight were analysed. To check within group anxiety difference pair t- test was done and to compare post anxiety measures difference between the groups independent t – test was used. The confidence interval used was 95% with level of significance was set at $p<$ 0.05.

9. RESULT

Comparison of baseline criterion measurement between two groups, group 1 i.e. Music therapy group (n=15) and group 2 i.e. aerobic exercise group (n=16) was done by using independent t – test (Table 1) to prove the homogeneity between the groups. No significant difference in STAI-Y1 and STAI-Y2 was found between the groups (Table 1). So the groups were comparable at the baseline.

Table 1: Comparison of Baseline Criterion Measurement

Variables	Group 1 Mean (SD)	Group 2 Mean (SD)	*F* value	*P* value
STAI -Y1 Pre	49.20 (5.63)	50.75(4.559)	.543	.467
STAI -Y2 Pre	46.53(6.74)	42.88(8.45)	.413	.525

Independent t test was used to compare post anxiety measure i.e. STAI-Y1, STAI-Y2 between two groups. It shows significant difference in both state anxiety level i.e. STAI-Y1, F (1, 29) = 7.57, p = 0.010 and trait anxiety level i.e. STAI-Y2, F (1, 29) =7.81, p = .009, indicating the effect of both intervention in reduction of anxiety. The mean difference of both groups indicates that group 2 is reducing anxiety more in magnitude than group 1 (Table 2).

Table 2: Comparison of Post Anxiety Measurement

Variables	Group 1 Mean (SD)	Group 2 Mean (SD)	df	*F*	*p*	Partial eta squared
STAIY1-Post	39.33(1.29)	34.37(1.25)	1	7.57	.010	.207
STAI– Y2 Post	41.60(1.3)	36.3 (1.3)	1	7.81	.009	.212

Pair-t test was done to check within group effect. That shows significant difference in pre and post anxiety level of both groups (Table 3).

Table 3: Within Group Difference

Groups	Variables	Pre test Mean SD	Post test Mean (SD)	n	t	df	*p*
Group 1	STAI-Y1	49.20 (5.6)	39.3 (6.2)	15	10.06	14	$\leq$ .000
	STAI-Y2	46.53 (6.7)	41.60 (6.1)	15	5.043	14	$\leq$ .000
Group 2	STAI-Y1	50.75 (4.5)	34.38 (3.5)	16	11.04	15	$\leq$ .000
	STAI-Y2	42.88 (8.4)	36.31 (4.3)	16	3.97	15	.001

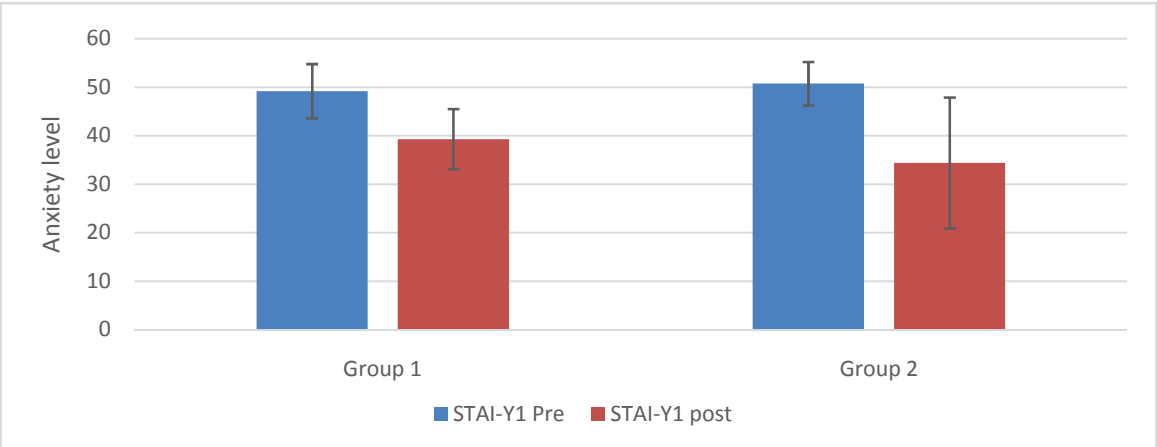

Fig. 1: Comparison of STAI-YI within the Groups

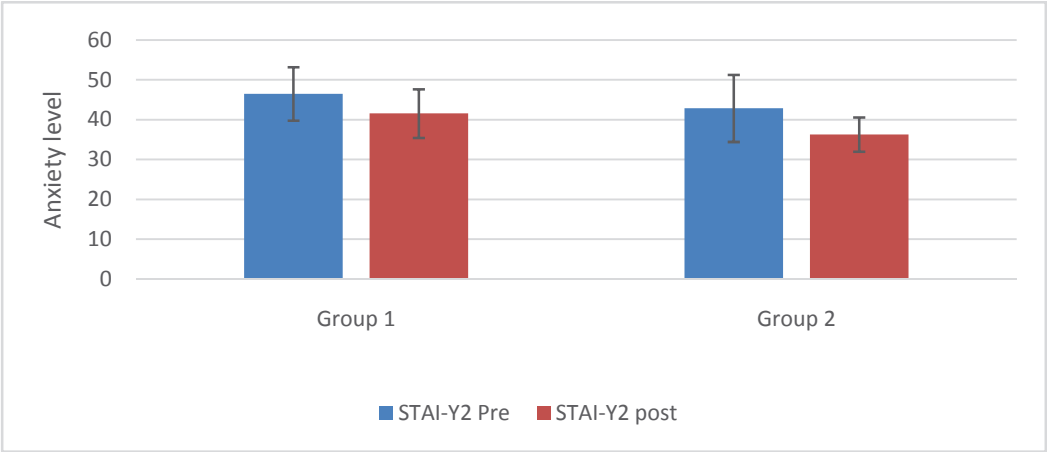

Fig. 2: Comparison of STAI-Y2 within the Groups

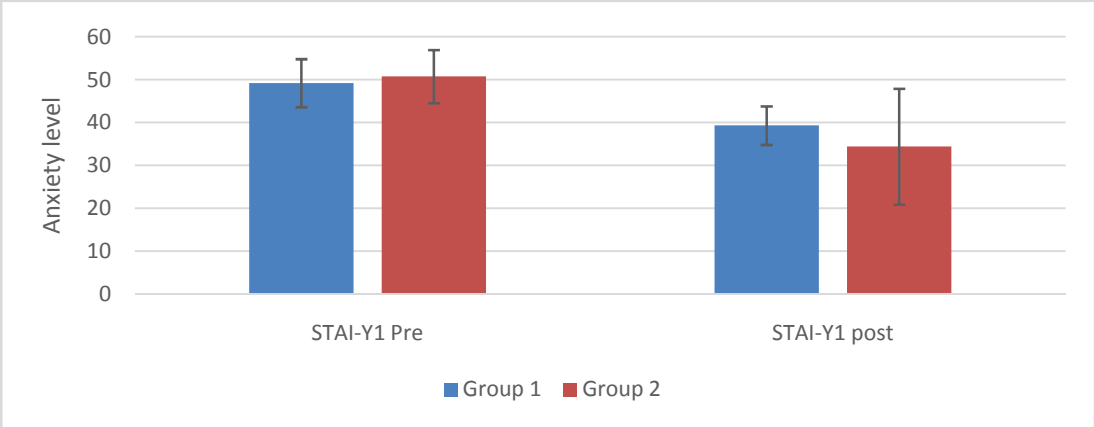

Fig. 3: Comparison of STAI-Y1 between the Groups

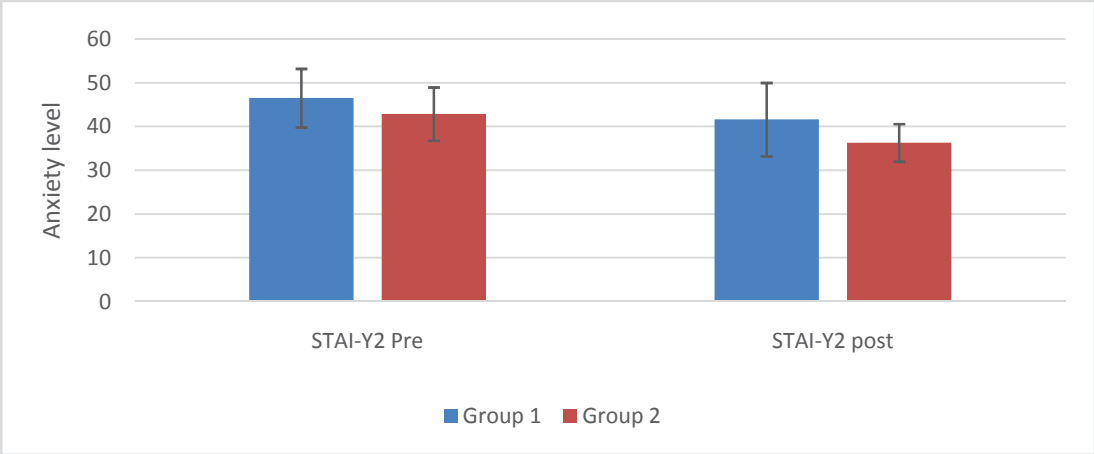

Fig. 4: Comparison of STAI-Y2 between the Groups

10.DISCUSSION

Concerning about aerobic exercise and anxiety the present study found that there is significant difference in anxiety level in both state and trait anxiety before and after the exercise intervention. The present study support the findings of review done by Petruzzello et al that anxiety reduction occurred following exercise training when the exercise was aerobic [19]. But most of these studies have been conducted upon non athletic population. It has been seen that anaerobic form of exercise (e.g. resistance training), did not change the anxiety level or actually resulted in slightly increase in anxiety [19], [6]. Aerobic exercise highly affects the mood statue of an individual and ultimately reduces the stress level [21], [22]. A variety of mechanisms, ranging from simple distraction to changes in brain neurochemistry to the psychological changes associated with exercise is accepted for effect of aerobic exercise on anxiety reduction.

The result of this study showed that there is also a significant reduction in anxiety level in non-elite collegiate athlete after having music therapy intervention. So this study supports the various studies which have investigated the Anxiolytic effects of music; these have generally conducted within medical environment. And some of these studies have been conducted on the normal healthy but non athletic population in any stressful or anxious environment. Very few studies have been done to check effect of music therapy on anxiety level in solely on athletic population so far. Study conducted by Bhana et al. in 2013 has reported that therapeutic use of music is highly beneficial to ICU patients who have had cardiac surgery and that together with routine postoperative care it can promote holistic patient care [34]. Review by Bradt et al., concluded that music reduces stress and anxiety in coronary heart disease patient, Nilsson conducted a systemic review to check the anxiety and pain reducing effects of musical intervention in surgerical, pre-operative and post-operative patients and concluded that music therapy reduces pain and anxiety in hospital settings [35]. MacDonald, R. A. In 2013 stated that music therapy promotes mental health and well-being among community [28]. So result of this study also supports the fact that music therapy exhibits the Anxiolytic

11.MAJOR FINDINGS

Our primary findings are that aerobic exercise and music therapy each reduce anxiety level, but magnitude of anxiety reduction is more by aerobic exercise. So the result of this study support the hypothesis that there is significant difference in these two forms of intervention and aerobic exercise is the more effective than music therapy in anxiety reduction. Moreover, Anxiety reductions were greater among subjects with higher baseline anxiety level than that of lower baseline anxiety level.

12.CONCLUSION

It is concluded from present study that both music therapy and aerobic exercise are helping in reduction of state trait anxiety level in non-elite collegiate athlete, but aerobic exercise reduces anxiety more in magnitude than music therapy. Therefore, an athlete who wishes to regulate their anxiety through physical activity should be encouraged to perform aerobic exercises at moderate intensity.

13.PERSPECTIVE FOR FUTURE STUDY

- Objective measures to assess anxiety like muscular tension, cardiovascular measurement or alteration in central nervous system can be taken
- Subjects from any specific sport can be studied according to arousal required in their sport.

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RESEARCH PAPER

HOME AUTOMATION SYSTEM USING ANDROID TECHNOLOGY

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ABSTRACT

There are several methods that can be used to control a particular system. They may depend on many variables, whether electrical, mechanical or electronic. The most common ones are direct control and remote control, which can be manual or automatic. Automated processes provide comfort for operators, decrease risks, and increase productivity. In the development of remote control systems, the telecommunications, electronics and control concepts, makes it possible to control any mechanism, system or interface from a computer, mobile device or tablet with a friendly interface. Nowadays the smartphones and tablets are becoming powerful and with new and useful characteristics, and they will be a perfect match to develop control systems. The use of smartphones and tablets in development and research is not only found in control systems, but in all areas as they represent a significant business opportunity for manufacturers who consistently develop better hardware and operating systems. In this paper we introduces an Android OS (operating system) based application for Tablet or Smartphone that communicates with the home appliances through Serial connection.

Keywords: Android, Smartphone, Tablet, Bluetooth, Arduino, Automation.

1. INTRODUCTION

In recent years the popularity of home automation has been increasing due to higher affordability and simplicity by connecting through smartphone. Home automation include controlling of lights, fans, appliances, security locks for gates and doors, etc., which are used to improve comfort, energy efficiency and security for home. Home automation is useful for elderly and disabled, who can control the things by staying at one place without the help of others and can increase the life quality of them.

A home automation system (HAS) provides the integration among all the electrical and electronic devices in a house. The techniques used in home automation systems include controlling of electronic and electrical devices, such as home entertainment systems, security systems, air conditioners, lawn watering systems, domestic robots, etc. The devices in the house may be connected to a home network to gain the access of those devices and may also allow remote access through internet. As information technology has been integrated with the home appliances and systems, they are able to communicate in an integrated manner which results in energy saving and safety benefits.

As the wireless technology is emerging day by day, several different connections are introduced such as Bluetooth, WIFI, ZIGBEE and GSM. Each of these connections has their unique specifications. Among the above mentioned wireless connections, Bluetooth is chosen with its suitable capabilities for designing this HAS project. Bluetooth with globally available frequencies of 2400Hz is able to provide connectivity up to 100 meters a speed up to 3Mbps depending on different Bluetooth device classes [1]. Based on the study of different HAS projects done by developers, [4] microcontroller is implemented in wireless HAS. For creating wireless connection, the system implemented a RF transmitter and receiver for establishing RF connection [5]. The other system implemented GSM, Internet and voice wireless HAS [5]. The GSM system [5] cost is low but the GSM mode is not considered. By consider all these systems we came to a conclusion that Bluetooth is considered the best for implementing this HAS as Android device consists of Bluetooth by default.

2. SYSTEM OVERVIEW

Android: Android is everywhere. Present days Phones, Tablets, TVs and set top boxes powered by Google TV. Soon, Android will be in cars, in in-flight entertainment systems on planes, and even in robots.

Android was originally created by Andy Rubin as an operating system for mobile phones around the dawn of this twenty-first century. In 2005, Google acquired Android Inc., and made Andy Rubin the Director of Mobile Platforms for Google. Many think the acquisition was largely in response to the emergence of the Apple iPhone around that time; however, there were enough other large players, such as RIM Blackberry, Nokia Symbian, and Microsoft

Windows Mobile, that it seemed a salient business decision for Google to purchase the talent and intellectual property necessary to assert the company into this emerging space, which has become known as internet 2.0.

Android's releases prior to 2.0 (1.0, 1.5, 16) were used exclusively on mobile phones. Most Android phones and some Android tablets now use a 2.x release and Android 3.0 was a tablet-oriented release but does not officially runon mobile phones. The current Android version is 5.1.1. Android's releases are nicknamed after sweets or

dessert items like Cupcake (1.5), Frozen Yogurt ("Froyo") (2.2), Ginger Bread (2.3), Honeycomb (3.0), Ice Cream Sandwich (4.0),Jelly Bean (4.1), KitKat (4.4) and lollypop(5.1.1) being the recent one.

Android applications are written in the Java programming language. The Android SDK provides tools for code compilation and packaging data and resource files into an archive file with '.apk' extension called as an *Android package*. Android devices used the '.apk' file to install the application. Android's application framework allows for the creation of extremely feature rich and novel applications by using a set of reusable components.

The amalgamation of the Android development environment with the Bluetooth wireless technology is known by Android's support for the Bluetooth network stack, which permits a device to wirelessly exchange data with another Bluetooth device. The application framework enables access to the Bluetooth functionality using the Android Bluetooth APIs. These APIs allow wireless applications to connect to other Bluetooth devices for point-to-point and multipoint wireless features.

Using the Bluetooth APIs, an Android application can carry out the following functions:

- Scrutinize for other Bluetooth devices
- Enquire about the local Bluetooth adapter for paired Bluetooth devices
- Establish the RFCOMM channels
- Connect to other devices through service discovery
- Exchange data to and from other devices
- Administer multiple connections

Bluetooth: Wireless networks for short range communications have a wide spread usage of Bluetooth radio transmissions between 2400–2480 MHz by Telecom vendor Ericsson since 1994 [2]. Bluetooth technology forms small ad hoc networks termed as Personal Area Networks (PANs) also provides a mechanism to emulate the RS-232 data cables, supervised by the Bluetooth Special Interest Group, since 1998. Modern mobile devices embed small, low-powered and cheap integrated chips functioning as short-range radio transceivers for Bluetooth radio communications. Device pairing, authentication, encryption and authorization techniques have given recognition to Bluetooth technology due to its vital security mechanisms.

Different types of Bluetooth applications can be developed using Android platform architecture using the Bluetooth profiles. The device manufacturers provide the services using the support of these profiles in their devices to maintain compatibility for the Bluetooth technology.

The Bluetooth profile used in Home Automation System (HAS) Android mobile phone application is the Bluetooth Serial Port Profile (btspp). RFCOMM is a connection-oriented protocol. It provides streaming communication between the devices. The btspp profile and RFCOMM protocol are used in the application to access the serial port and communicate using streaming data. All of the Bluetooth APIs is available in the android.bluetooth package.

Figure 1 shows the block diagram of the Android application based HAS i.e., control function of the system. The system is directly connected to the electrical and electronic devices present in the home such as fan, light, etc., The Bluetooth connection is established between the system and the application which was designed and installed in the Android device.

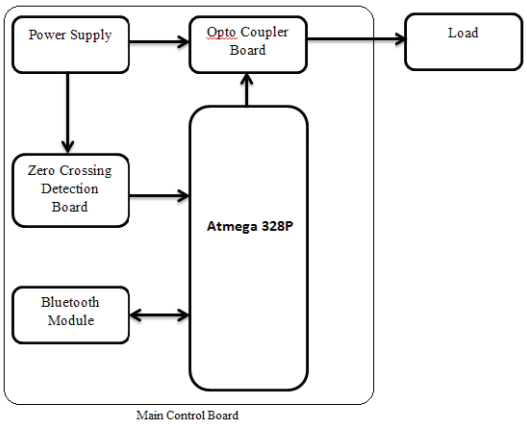

Fig. 1: Functional Block Diagram of System

In order to improve the standard of living, the controlling of the home appliances is done by the Android application installed in Android device. The users can easily access the Android application by sampling tapping the buttons present on the touch screen of Android device. This method is very much useful for the persons who are physically disabled and can't move on their own to the switches to turn on the appliances.

3. HARDWARE DESIGN

In this section we discuss about the hardware construction of the main control board. Figure 2 shows the hardware blocks present in main control board. Atmega Microcontroller, Atmega328P is considered for designing of this hardware due to its capability of performing serial communication using Blue-tooth connection with the Android device. The Bluetooth module, HC-05 is chosen for establishing the connection between the Android device and the main control board due to its low cost.

The electrical current is directly connected to the main control board. The voltage regulator is constructed by 5V SPDT relays with Opto Coupler circuit which consists of trans-former, rectifier and regulator. 3.3V to 5V DC output is needed for the specific components in the main control board.

The system designed is directly installed beside the electrical switches on the wall. The installation of this systems does not need any wiring reinstallation and wiring on the wall, but the existing switches in directly connected to the Opto Copular circuit inside the main

control board.

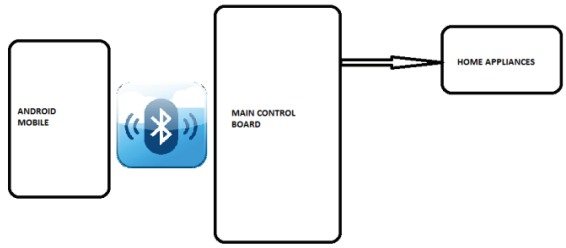

FIGURE 2: MAIN CONTROL BOARD HARDWARE BLOCK DIAGRAM

Fig. 2: Main Control Board Hardware Block Diagram

Depending on the requirement, multiple control boards can be installed in home. With these low cost components, the main control board is constructed in small size but still performs the strong functions of the system.

4. SOFTWARE DESIGN

Software design section is divided into two sections

1. Main function of the system designed in Atmega328 microcontroller

2. Designing of Android application: Figure 3 illustrates the control flow in Atmega328P microcontroller. The input to the main control board is detected by Atmega32 microcontroller. Any input to Atmega32 microcontroller will cause an interrupt to the main function loop of Atmega32. This will cause a change in the output peripherals connected to main control board. The Android application is designed using eclipse kepler. This application is designed at low level API so that both the lower and higher versions of Android are compatible with it. Figure 4 illustrates the Android application i.e., installed and tested using the Android device which has Android 5.1.1.The application is simple to use, user can turn on and off the appliances that are connected to main control board by simply touching the icons present on application.

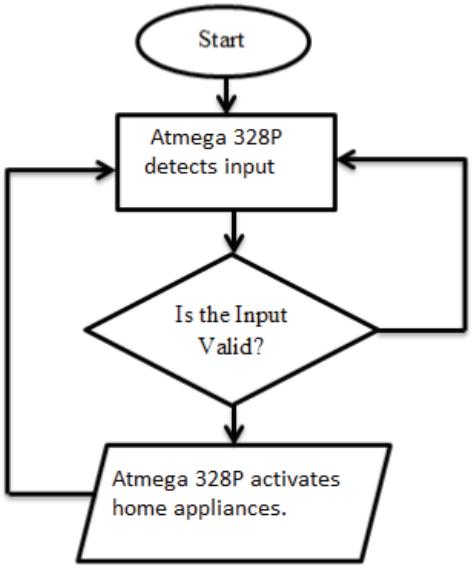

Fig. 3

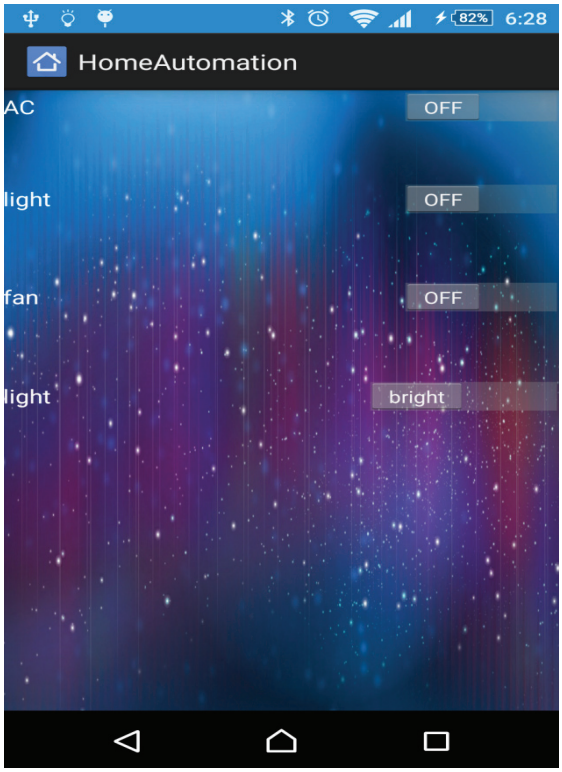

Fig. 4

5. CONCLUSION

In conclusion, this system is designed at low cost and is used to improve the standard of living in home. The wireless connectivity through the Android device provides help to the people especially to elderly and disabled. The implementation of the Bluetooth connection in control board allows the system to install in simple way. The control board can be directly installed besides the electrical switches. For future work, the Android application will be implemented with speech recognition to control appliances with voice commands. All the voice commands given to the Android device will be transmitted to the main control board after signal processing. All the future work can be implemented on the same system by changing the application in the Android device.

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RESEARCH PAPER

RESEARCH AND DEVELOPMENT OF ANDROID APPLICATION ONLOCATION DETECTION SYSTEM

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ABSTRACT

Today, as the developing of hardware of mobile is getting better, the performance index is much higher than the actual requirements of the software configuration. Phone's features more depend on software. As the Android operating system is getting more popular, the application based on Android SDK attracts much more attention. We have all seen the explosive growth of mobile apps in recent years. One category of apps that is very popular is location-based services, commonly known as LBS. LBS apps track your location, and may offer additional services such as may offer suggestions for route planning, and as well as locating amenities nearby. This is usually done by collecting the users' data in MyEclipse open platform called by Sina client and the data will be returned under the format of JSON by the SQL server. Of course, one of the key ingredients in an LBS app is maps, which present a visual representation of your location. In this article, we will include Google maps in our Android application, and by manipulating it programmatically. In addition, we will obtain geographical location using the Location Manager class available in the Android SDK. But now, some of the Android application interface is too cumbersome, pop-up ads is overmuch and the function is too single, these cause some inconvenience to the users. The interface of this Android app is pretty and the operation is smooth. What's more, the cumbersome interface and excessive advertising are eliminated, so that users are able to manipulate this app more conveniently and smoothly. This application, Location Detection Application, we can install on an Android device and can use to track the location of the friends and family using SMS messaging.

Keywords: Android, MyEclipse, Location Manager, Location-Based Services, JSON, Android SDK.

1. INTRODUCTION

In recent years, the emergence of smart phones has changed the definition of mobile phones. Phone is no longer just a communication tool, but also an essential part of the people's communication and daily life. Various applications added unlimited fun for people's lives. It is certain that the future of the network will be the mobile terminal.

Now the Android system in the electronics market is becoming more and more popular, especially in the Smartphone market. Because of the open source, some of the development tools are free, so there are plenty of applications generated. This greatly inspired the people to use the Android system. In addition, it provides a very convenient hardware platform for developers so that they can spend less effort to realize their ideas. This makes Android can get further development.

As the smart phones and Android system getting popular, the operations like listening to music, watching videos, tweeting and some others can be moved from the computer to a phone now.

The applications on the market today are mostly commercial applications, and contain a large number of built-in advertising. If the user prefers to remove the built-in advertising, a certain price must be paid to reach that and this is not convenient. Meanwhile, because of the unfair competition of IT, many applications built illegal program to steal user information and cause some damage to user's personal privacy. Sometimes, users will pay more attention to the user experience of software. Therefore, the development of the application can not only be limited to the function, more attention should be paid to the user's experience. After studying some previous Android applications and access to large amounts of materials, we utilize the Java language, the Eclipse platform, Android ADT and the Android SDK to develop these three mobile applications. These systems have a nice interface and smooth operation. These Apps won't steal any personal information, but can exclude useless information and bring a wonderful user experience.

2. ANDROID ARCHITECTURE

We studied the Android system architecture. Android system is a Linux-based system, Use of the software stack architecture design patterns.

As shown in Figure 1, the Android architecture consists of four layers: Linux kernel, Libraries and Android runtime, Application framework and Applications.

Each layer of the lower encapsulation, while providing call interface to the upper.

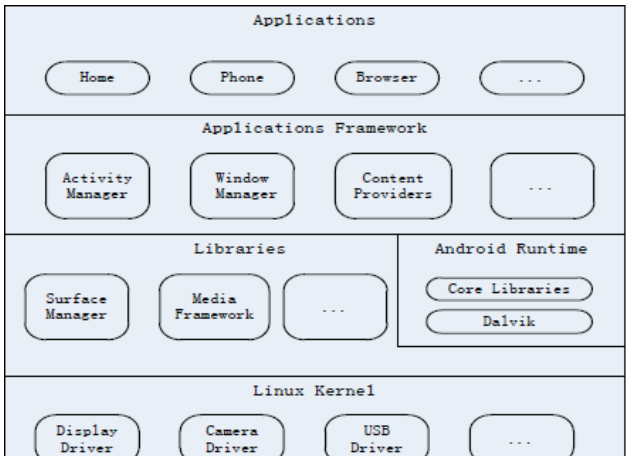


Fig. 1: Android Architecture

Applications: Android app will be shipped with a set of core applications including client, SMS program, calendar, maps, browser, contacts, and others. All these application programs are developed in Java.

Application Framework: The developer is allowed to access all the API framework of the core programs. The application framework simplifies the reuse of its components. Any other app can release its functional components and all other apps can access and use this component (but have to follow the security of the framework). Same as the users can be able to substitute the program components with this reuse mechanism.

Libraries and Android Runtime: The library is divided in to two components: Android Runtime and Android Library. Android Runtime is consisted of a Java Core Library and Dalvik virtual machine. The Core Library provides Java core library with most functions. Dalvik virtual machine is register virtual machine and makes some specific improvements for mobile device.

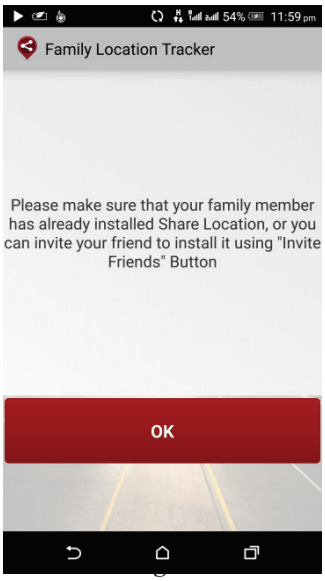
Android system library is support the application framework; it is also an important link connecting between application framework and Linux Kernel. This system library is developed in C or C++ language. These libraries can also be utilized by the different components in the Android system. They provide service for the developers through the application framework.

Linux Kernel: The kernel system service provided by Android inner nuclear layer is based on Linux 2.6 kernel, Operations like internal storage, process management, internet protocol, bottom-drive and other core service are all based on Linux kernel.

3. EXISTING APPS AND THEIR FLAWS

Family Location Tracker

Link:
https://play.google.com/store/apps/details?id=mg.locations.share



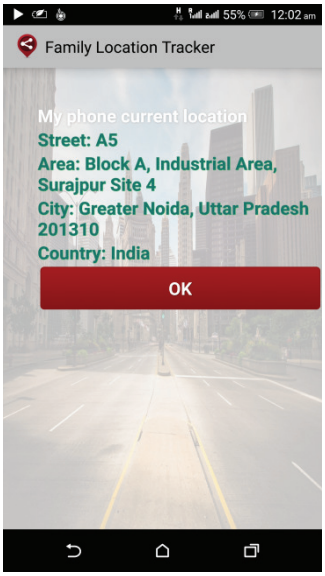


Fig. 2

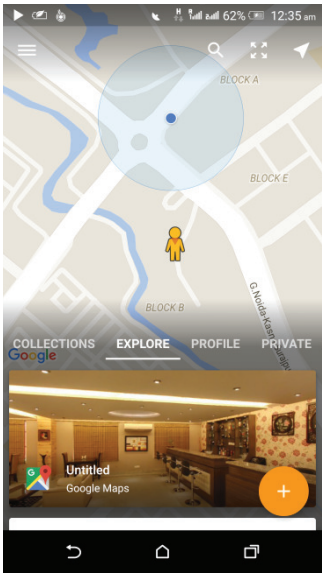


Fig. 3

Problems:

- Every family needs to install the app for its use.
- Obtain inappropriate location.
- The yellow tag is the obtained location and blue dot is my current location. The obtained location is too far from my actual location.

Wherez u
Link:
https://play.google.com/store/apps/details?id=com.kabhos.android.apps.knowmylocation

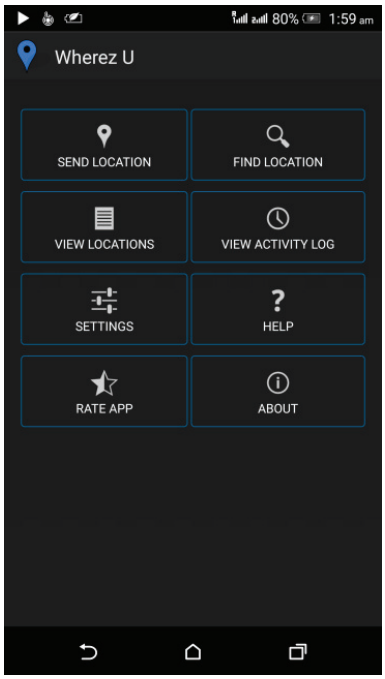


Fig. 1

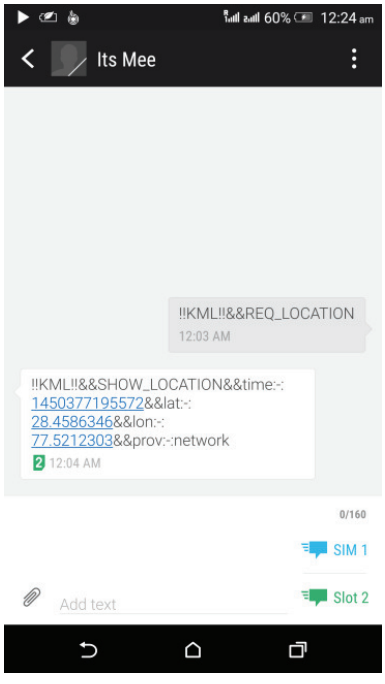


Fig. 2

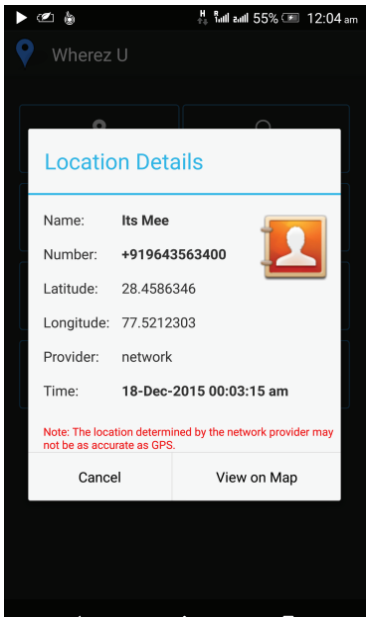


Fig. 3

Problems:

- Requires internet connectivity to find and share location.
- Sends irrelevant request to obtain the location.
- Receives the location in either irrelevant code or in the latitude and longitude form. Hence, it is difficult to track the location.

Vith U
Link:
https://play.google.com/store/apps/details?id=com.startv.gumrah

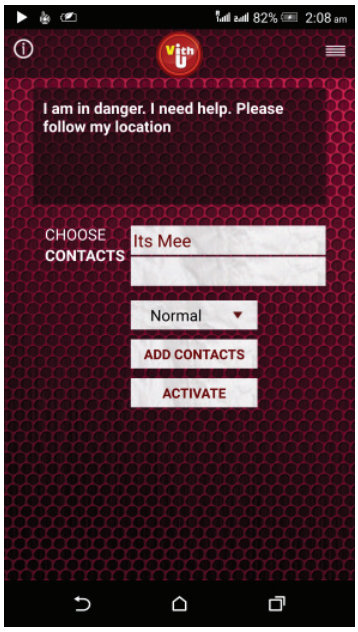


Fig. 1

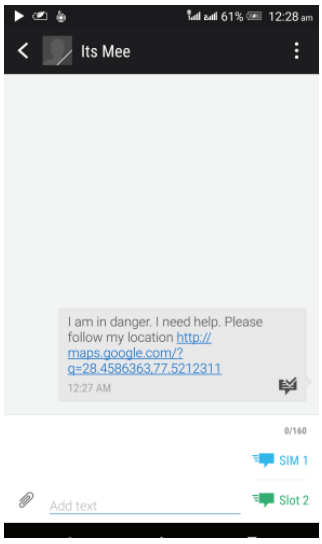


Fig. 2

Problems:

- Sends the message and location in the link format, so, the person doesn't having smart phone or Google maps, can't track the location.

4. COMPARATIVE STUDY

App Name / Properties	Family Location Tracker	Wherez U	Vith U
User Interface	Complex	Decent	Simple
Internet Connectivity	Mandatory	Mandatory	Not Mandatory
Exact Location	Irrelevant Location	Relevant Location	Relevant Location
Location Format	Nearby Location in Text	Latitude and Longitude form	Link to Google Map
Advertisement Pop-up	Yes	Yes	No

5. CONCLUSION

By testing each function of above mentioned Android applications on mobile phone and the MyEclipse Emulator, the result showed that user interface is either complex or too simple, shows irrelevant location, run well and displays advertising pop-up.

So, it is suggested that an Android application should be developed which eliminates all the above mentioned demerits and flaws.

6. FUTURE SCOPE

Expected result is achieved after developing and testing all the functions. And one Android application is build which satisfies all the above mentioned functions.

The interface of this Android app should be pretty and the operation must be smooth. What's more, the cumbersome interface and excessive advertising should be eliminated, so that users are able to manipulate this app more conveniently and smoothly. This application, Location Detection Application, we can install on an Android device and can use to track the location of the friends and family using SMS messaging.

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RESEARCH PAPER

IMPACT OF ICTs' ADOPTION ON JOB SATISFACTION LEVEL : A STUDY ONSELECTED PUBLIC SECTOR BANKING EMPLOYEES

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ABSTRACT

The objective of this study is to determine the impact of Information and Communication Technologies (ICTs) adoption on Job Satisfaction Level (JSL) of the employees working in public sector banks in India. For this purpose primary data from 120 bank employees (40 each from each generation X (age 46-60 years), Y(age 31-45 years) and Z(age18-35 years)) has been collected through a 25 item survey questionnaire based on Minnessota Satisfaction Questionnaire (mini). The data has been analysed using pie-charts, bar charts, correlation analysis, regression analysis and one way ANOVA. The results show an overall positive impact of ICTs adoption on JSL however, there is significant difference in the level of impact on different generations and Gen X exhibits being impacted negatively on JSL due to adoption of ICTs adoption in organisation. There is strong positive correlation between all ten factors used for measuring over all Job Satisfaction Level.

Keywords: ICT, JSL, IS, SBI, NCR.

1. INTRODUCTION

It is said that the only permanent thing is continuous change, but the peculiarity of current time is that the changes are happening at a dramatically accelerating pace, making comprehension of the reality a difficult task for organisations and individuals. One such profound phenomenon associated with this rapid change is the advent of Information and Communication Technology (ICTs) in automating the business processes across the length breadth and verticals of the organisations. While, there is ample evidence of ICTs impact on productivity and profitability in modern networked organisations, how the same adoption of ICTs affect the Job Satisfaction Level of the very employees of the networked organisations still remain less explored domain of HR research. In banking industry for instance, the branch level automation coupled with online platforms for service delivery has revolutionised the way business is done resulting in consequent customer satisfaction benefits. The transparency, speed of service and tele-portability of data with reduced paper work has improved business process efficiency while opening new learning challenges/opportunities to the bank employees.

The challenges facing the networked organisations are threefold, firstly, to understand the Job Satisfaction Level from the psycho-socio-economic perspective , secondly, to grasp the impact of various facets of ICTs adoption in an organisation how they affect the work methods, work output, self esteem , respect of the employees and therefore, their Job Satisfaction Level (JSL) and lastly, to be able to integrate and superimpose both factors in a way to cull out a nuanced business intelligence to maintain high levels of JSL in order to achieve improved efficiency and profitability.

2. LITERATURE REVIEW

Job Satisfaction is a 'global feeling about the job' Spector (1997). Over a period, the society's understanding of Job Satisfaction has progressed from a more pessimistic theory (Taylor, 1911) that a man is motivated by money alone, towards a more humanistic approach that is indeed more realistic and complex (Mirza S Saidain, 2008). Hoppock's (1935) observation that Job Satisfaction is a combination of Psychological, Physiological and environmental circumstances that makes a worker say 'I am satisfied with my Job' is a pertinent work in identifying variety of variables that influence Job Satisfaction. Due to increased understanding of the interplay between new and emerging aspects of work life and human work behaviour, the field of Job satisfaction has become far more challenging and interesting for the top managers and researchers alike.

Theoretical Framework: There are many established theories to understand JSL, human motivation and behaviour. The Abraham Maslaw's theory of hierarchy of needs says that the most potent need will monopolise consciousness and will tend to evoke behaviour in response to it. Once this need is satisfied, higher level need is likely to become activated. He arranged the needs from lower to higher order such as; Physiological, safety, love and belongingness, esteem and self actualization. Another interesting theory to predict JSL is reference-group theory where the 'reference-group' for the individual defines the way he should look at the world and evaluates various phenomena in the environment

(including himself). According to this theory that if a job meets the interest, desires and requirements of a person's reference group, he will like it and if it does not, he will not like it.

For the purpose of this study we have taken Frederick Herzberg's Two-Factor Theory as basis for measuring JSL. The theory proposes that the primary determinants of employee satisfaction are factors intrinsic to work called motivators, i.e. recognition achievement responsibility, advancement, personal growth in competence. The motivation factors are also called job content factors. Whereas, satisfaction is determined by extrinsic factors called hygiene factors like; company policies, supervisory practices, working conditions, salaries, and wages, and interpersonal relationship. The hygiene factors are called job context factors.

Relationship between Motivation Factors & JSL: During the review of literature we discovered that most of the studies done on supervisors, managers and skilled workers and clerks show positive relationship i.e. the motivation factors are the most important factors contributing to job satisfaction level. For this study we have taken top five factors contributing to job satisfaction level as given below:

- Work quality
- Opportunity for advancement
- Challenges/interest in the job
- Recognition of work
- Added responsibility

Relationship between Hygiene Factors & JSL: During the review of literature we discovered that most of the studies done on Indian workers show positive relationship between hygiene factors and job satisfaction level i.e. the hygiene factors are the most important factors contributing to job satisfaction level. For this study we have taken top five factors contributing to job satisfaction level amongst Indian workers are as tabulated below:

- Personal performance
- Working conditions
- Increase in social status
- Transparency in communication with management
- Opportunity to use skill/ability

ICTs adoption, Productivity and Job Satisfaction: Adoption of, ICTs to a large extent has changed the nature of task in many ways including its content and context. For decades, researchers in the field of information systems (IS) have sought to understand the role information and communication technology (ICT) plays in influencing and shaping social outcomes in organisations (Robey and Boudreau, 1999; Orlikowski and Barley, 2001; Autor, Levy and Murnane, 2001). Such outcomes were visualized in the pattern of ICTs use in organizations and how such use patterns influenced the work practices of individuals and their Job Satisfaction Levels in these organisations.

It is now a well accepted concept that high level of Job Satisfaction leads to increased productivity whereas dissatisfaction undermines it. Business research literature is richly filled with research on Job Satisfaction. The construct, measures and the variables selected for Job Satisfaction measurement have been many and varied. For instance, while in one study (Lund, 2003), organisation culture seems to have direct correlation with employees' Job Satisfaction and commitment, in other study (Jaramillo et al., 2006) related Job Satisfaction with emotional exhaustion.

ICTs Adoption and Job Satisfaction Level: Relationship between ICTs Adoption and Job Satisfaction Level of employees is not so new a subject. In fact way back in 1958, Leavitt and Whishler in their seminal article, 'Management in 1980's' speculated on the role of ICTs in organisations and its implications on finer aspects of human resource such as; Job satisfaction Level. However, the literature on impact of ICTs on Job Satisfaction level does not currently support reliable generalisations about the relationships between the facets of ICTs and Job Satisfaction Level (JSL). The probable reasons for such knowledge gap could be the fact that work by several researchers from different academic disciplines and inter disciplinary specialties, including organisational theory, management, sociology and information technology, each with its own preferred concepts, theoretical and methodological biases. This includes ambiguous definitions and different measures of IT (Bakopoulos 1985) and organisational structure (Fry 1982).

Job Satisfaction of Bank Employees working with E-channel service delivery Network: A study on selected private commercial banks in Bangladesh. This paper works on a total of 96 data collected primarily from thirteen private commercial banks in Bangladesh in order to determine the factors affecting Job Satisfaction level among employees working with E-channel service delivery network. The authors have chosen fourteen independent variables developed for measuring Job Satisfaction Level. The objectives of this study are three fold firstly, to find out relationship between demographic variables (age, sex education level) and job satisfaction level of the employees, secondly, to identify the factors affecting Job Satisfaction Level of employees working with E-channel in Bangladesh, and lastly, to measure the level of Job Satisfaction Level of employees working with E-channel. The data so collected has been analysed. The results indicate positive correlation between independent variables and Job Satisfaction Level. The impact of demographic variables such as; age, sex, education Level is considerably low on Job Satisfaction Level of the private Bank employees.

3. BACKGROUND

Job satisfaction is generally defined as a collection of general global feeling that 'I am happy with my job', and is a very well studied field of management and industrial psychology. There are umpteen studies establishing strong positive correlation between Job Satisfaction Level and productivity in any organization. Impact of the adoption of Information and communication technologies

on Job Satisfaction Level of the employees is a relatively newer phenomenon that requires more nuanced understanding by the managers in order to accrue all the advantages of the technology to the organization. This research study is based on this newly created research gap of how the adoption of ICTs impacts the Job Satisfaction Level of the employees. We have approached JSL broadly under two constituents; motivational factors and hygiene factors as envisaged by Herzberg. The study is based on review of available literature and primary data collection through survey questionnaire. The population under study has been chosen of public sector banks in the geographical location of National Capital Region. The population has also been divided into three age groups namely, Gen X (46-60 years of age), Gen Y (31-45 years of age), Gen X (18-30 years of age) in order to investigate the differential impact on JSL of the three generations of employees.

4. MOTIVATION

A large scale adoption and absorption of the ICTs is inevitable and desired in Indian organizations. Banking sector in particular has adopted ICTs at a rapid pace mainly due to two reasons. Firstly, to conform to the Reserve Bank of India (RBI) regulatory requirements and lastly, to stay competitive in the banking sector where all the players are aggressively wooing the customers both in urban and rural India. How does this transformation play on Job Satisfaction Level is quite interesting and contemporary challenge faced by the managers. Certainly adoption of ICTs' is a relatively newer determinant of Job Satisfaction Level in the organizations. The study is motivated by this research gap, situated in technological reforms in banking sector and how does it impact the JSL of various generations of employees.

5. METHODOLOGY

Research Design: It is an Applied, Empirical and Cross-sectional research design with Descriptive objective and Qualitative mode of enquiry with an Inductive approach.

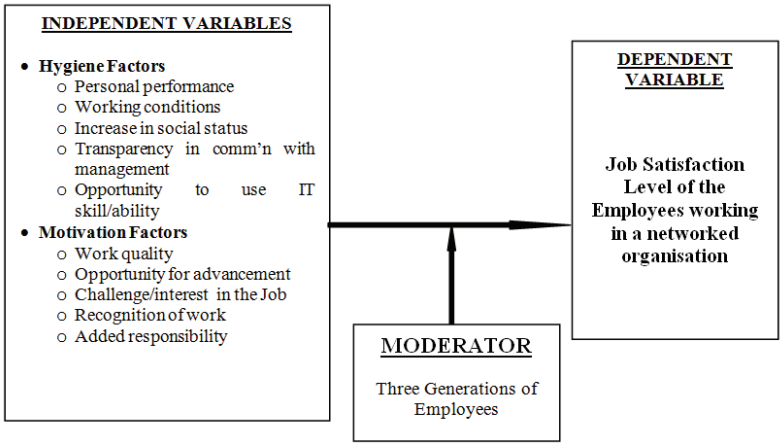

Fig. 1: Research Framework

Sources Data Collection

Secondary Data: Data collection from the printed or published source such as books, journal, research papers, articles and newspapers falls under Secondary data. Secondary data analysis also saves the time, provides larger and high quality databases towards that we have carried out a review of more than 50 studies on Job Satisfaction Level and ICTs adoption to construct a theoretical framework and also to understand how to measure JSL.

Primary Data: For the purpose of study, primary data collection has been done through the responses to Survey Questionnaire. A questionnaire was developed based on Minnesota Job Satisfaction Questionnaire (mini), appropriately modified to measure the impact of ICTs adoption. Questionnaire has 25 items designed to ascertain 10 major attributes under two broad categories of Hygiene Factors and Motivation Factors defining Job Satisfaction Level.

A total of 100 questionnaires were served physically and 200 questionnaires were sent on email through Google form so developed. We got 60 valid responses through physical survey questionnaires and 70 valid responses through email. Keeping in mind the objectives of study which also involve evaluation of impact of ICTs on three different age groups of the employee, it was felt necessary to have almost equal number of participants of each age group for ease of further data analysis. Towards this, a total of 120 valid responses were finally selected 40 responses from each generations X, Y and Z respectively.

Sampling: The sampling technique employed for the study is **Area sampling, proportionate and simple random type**. The State Bank of India branches spread across NCR, have been divided into four areas on geographic basis. Northern, Southern, Eastern and Western sectors. Two branches from each area were randomly selected; further the employees were selected randomly for the sample. A total sample size of 120 valid responses has been considered for analysis.

Target Population: Target population for the study is bank employees of nationalised banks (State Bank of India) in National Capital Region (NCR). There are approximately 300 branches located in NCR of various capacities that makes a reasonable heterogeneous universe for studying the impact of ICTs on their Job Satisfaction Level. A comparative study of the impact of ICTs on three different generations of work force is considered pertinent to discern the contrast in the concept of Job satisfaction level.

Research Hypotheses: This study is based on three null hypotheses while considering studying the impact of ICTs adoption on the Job Satisfaction Level of the employees of Public sector banks in India as follows;

H01: There is significant positive impact on 'Hygiene Factors' of Job Satisfaction Level of employees due to adoption of ICTs solutions in a networked organisation.

H02: There is significant positive impact on the 'Motivation Factors" of Job Satisfaction Level of employees due to adoption of ICTs solutions in a networked organisation.

H03: There is no difference in the impact of ICTs adoption on Job Satisfaction Level of three different generations of employees in a networked organisation.

6. SURVEY RESULTS

The analysis of the data has been carried out with the help of statistical tools provided with Google form and Software Package for Social Sciences (SPSS) version 16.0 for windows.

Mean Impact on Hygiene Factors for Whole Sample: Analysis of mean impact of ICTs adoption on Hygiene Factors of Job Satisfaction Level is as follows: 36% of all the respondents are Very Satisfied, 44%of them are Satisfied, 17% of them are neutral, and 3% of them are Dissatisfied. The result is pictorially represented with the help of pie chart as below.

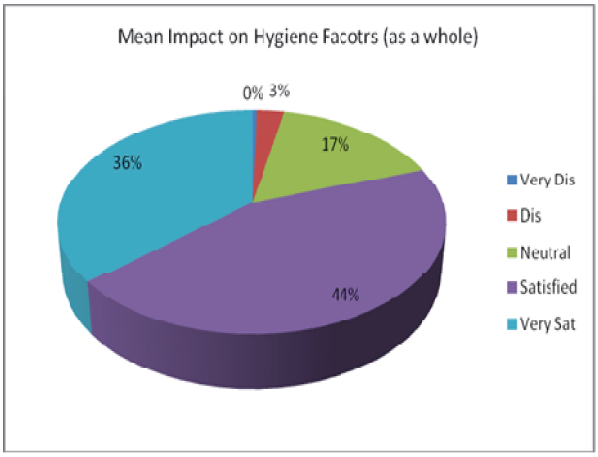

Fig. 2: Mean Impact on Hygiene Factors (On whole Gen)

Mean Impact on Hygiene Factors for each Age Group: Analysis of mean impact of ICTs adoption on 'Hygiene Factors' of the motivation factors of Job Satisfaction Level on each generation (i.e. Gen X, Gen Y, and Gen Z) is based on the responses of item number ..

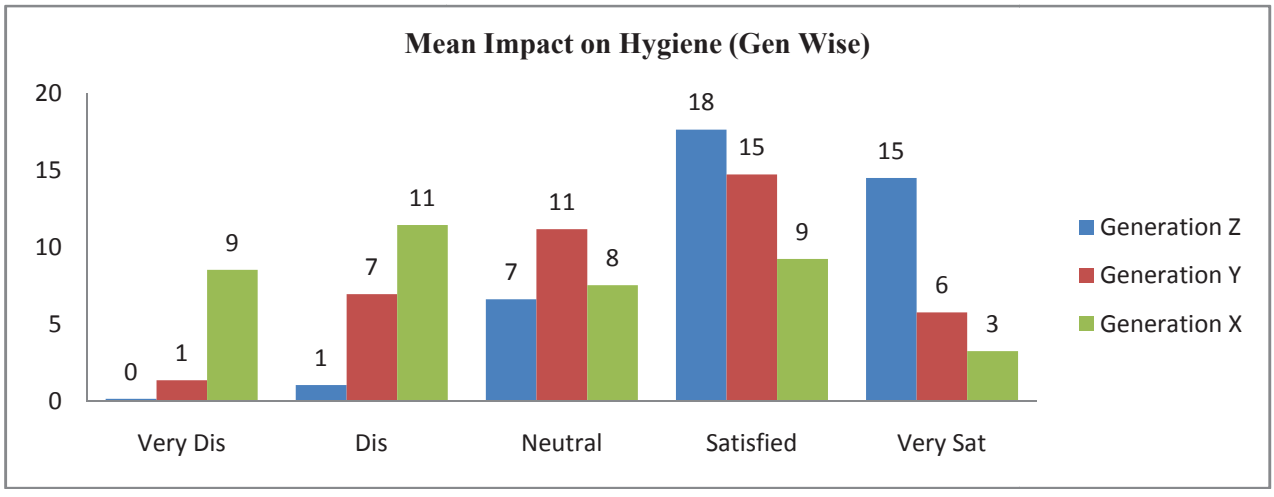

Fig. 3: Mean Impact on Hygiene Factors (Gen wise)

Analysis of mean impact on Hygiene Factors is as follows: of the Gen X, a total of 9 respondents are Very Dissatisfied, 1 of them are Dissatisfied, while 8 of them are neutral, 9 of them are Satisfied, and only 3 of them is Very Satisfied. Of Gen Y, only 1 of them is Very Dissatisfied, 7 of them are Dissatisfied, 11 of them remain neutral, 15 of them are Satisfied, and 6 of them are Very Satisfied

Mean Impact on Motivation Factors for Whole Sample: Analysis of mean impact of ICTs adoption on Motivation Factors of Job Satisfaction Level is as follows: 43% of all the respondents are Very Satisfied, 36%of them are Satisfied, 17% of them are neutral, and 3% of them are Dissatisfied, and only 1% are Very Dissatisfied. The result is pictorially represented with the help of pie chart as below.

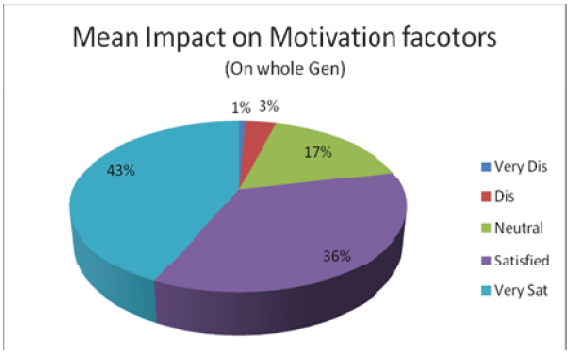

Fig.4: Mean Impact on Motivation Factors (On whole Gen)

Mean Impact on Motivation Factors for each Age Group: Analysis of mean impact on Motivation Factors is as follows: of the Gen X, a total of 12 respondents are Very Dissatisfied, 13 of them are Dissatisfied, while 10 of them are neutral, 4 of them are Satisfied, and only 1 of them is Very Satisfied. Of Gen Y, only 2 of them is Very Dissatisfied, 7 of them are Dissatisfied, 12 of them remain neutral, 14 of them are Satisfied, and 5 of them are Very Satisfied.

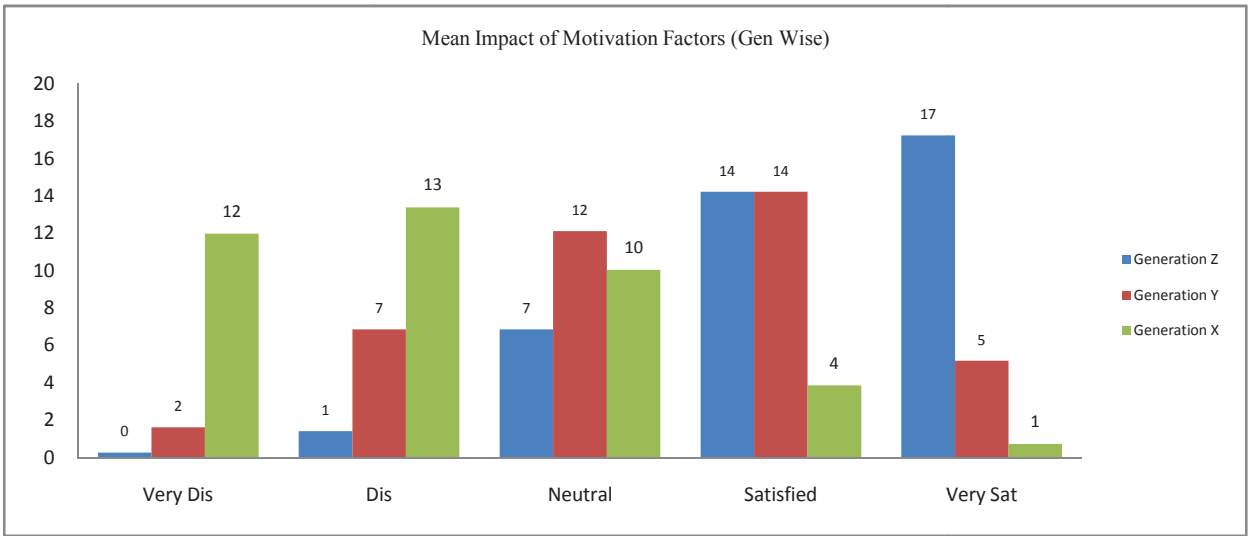

Fig.5: Mean Impact of Motivation Factors (Gen Wise)

Calculation of Overall mean Impact of ICTs Adoption on the whole Sample: The overall mean impact for whole sample shows that on an average 40% of employees are very Satisfied with the impact of ICTs adoption in term of their Job Satisfaction, another 40% of the employees are Satisfied, 17% of the respondents are neutral, whereas only 3% of the respondents are Dissatisfied. The result is pictorially represented in the form of a pie chart as below.

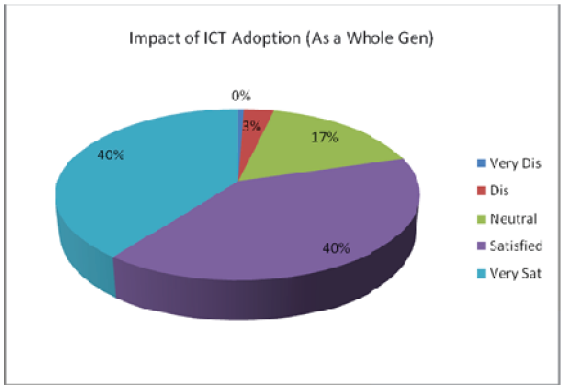

Fig. 6: Impact of ICT Adoption (As whole Gen)

Calculation of Overall mean Impact of ICTs Adoption on each Age Group: The analysis of overall mean impact of ICTs adoption on different Generations of the respondents is quite revealing. Of the Generation X, a total of 10 respondents are Very Dissatisfied, 12 of them are Dissatisfied, 9 respondents remained neutral, 7 of them are satisfied, and only 2 of them are Very Satisfied. Of the Generation Y, a total of 1 respondents are Very Dissatisfied, 7 of them are Dissatisfied, 12 respondents remained neutral, 14 of them are satisfied, and only 5 of them are Very Satisfied. And of the Generation Z, a total of nil respondents are Very Dissatisfied,1 of them are Dissatisfied, 7 respondents remained neutral, 16 of them are satisfied, and only 16 of them are Very Satisfied.

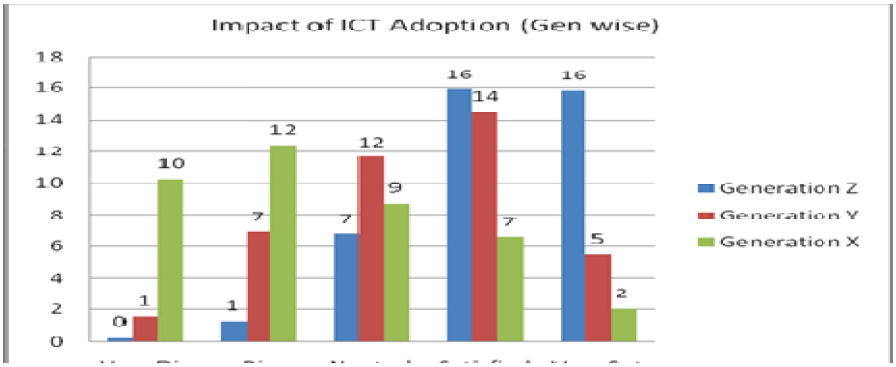

Fig.7: Impact of ICT Adoption (Gen Wise)

It is evident from the data analysis that there exists a significant variation in the impact of ICTs adoption on Hygiene and Motivation factors of different generations of employees under study. While the impact on JSL is strongly positive for generation Z (age group 18 – 30 years), the JSL of generation Y (age group 31-45 years) is impacted moderately and Generation X (age group 46-60 years) is impacted negatively by the adoption of ICTs. This fact may be attributed to many factors including technology averseness, inefficient in-house training, computer illiteracy, and feeling of loss of authority.

Correlation Analysis: Correlation indicates the direction of co-variance and denoted by 'r'. The value of '*r*' lies between ± 1. Positive values of *r* indicate positive correlation between the two variables (i.e., changes in both variables take place in the statement direction), whereas negative values of '*r*' indicate negative correlation i.e., changes in the two variables taking place in the opposite directions. A zero value of '*r*' indicates that there is no association between the two variables. When *r* = (+) 1, it indicates perfect positive correlation and when it is (–)1, it indicates perfect negative correlation, meaning thereby that variations in independent variable (*X*) explain 100% of the variations in the dependent variable (*Y*). We can also say that for a unit change in independent variable, if there happens to be a constant change in the dependent variable in the same direction, then correlation will be termed as perfect positive. But if such change occurs in the opposite direction, the correlation will be termed as perfect negative. The value of '*r*' nearer to +1 or –1 indicates high degree of correlation between the two variables. The correlation table is as shown below:

Table 1: Correlation Analysis for Ten Factors

	PP	W. Con	Social status	transparency	Opportunity	Work quality	Advancement	Ch. job	Recognition	Added Res
PersPerfor		.837**	.820**	.774**	.763**	.877**	.886**	.805**	.878**	.890**
W. Condition			.812**	.815**	.816**	.845**	.831**	.757**	.767**	.799**
Social Status				.873**	.848**	.850**	.890**	.821**	.821**	.816**
Transparency					.901**	.874**	.882**	.818**	.793**	.793**
Opportunity						.849**	.880**	.808**	.793**	.814**
Work Quality							.881**	.785**	.867**	.818**
Advancement								.874**	.876**	.851**
Challenge Job									.770**	.861**
Recognition										.825**
Added Resp										

As can be seen from the correlation table, there is strong correlation between the variables in the range of .757 (between working conditions and challenging job) and .901 (between transparency of communication with management and opportunity for advancement). Further no two factors are negatively correlated showing inverse correlation.

There is a significant and positive correlation between Personal Performance and working conditions (r=.837, p<.001) which implies that if due to ICTs adoption there is an enhancement in working conditions, this will also positively enhance personal performance. Similarly, there exists a positive correlation between all the ten factors, the top three positive correlations being between transparency of communication and opportunity for advancement at (r=.901, *p*<.001), between added responsibility and personal performance at (r=.890, *p*<.001) and social status and advancement at (r=890, *p*<.001).

One Way ANOVA: ANOVA is essentially a procedure for testing the difference among different groups of data for homogeneity. The essence of ANOVA is that the total

amount of variation in a set of data is broken down into two types, that amount which can be attributed to chance and that amount which can be attributed to specified causes.

Table 2: ANOVA for Gen X, Gen Y and Zen Z

Variables	Gen Z	Gen Y	Gen X	F	*p*
Personal Performance	7.6750	5.809	3.6750	66.208	.000
Working conditions	8.0000	5.8571	3.9500	77.842	.000
Increase in social status	11.5250	9.3333	5.1500	111.977	.000
Transparency in comm'n with management	7.4500	5.9286	3.3250	96.205	.000
Opportunity to use IT skill/ability	11.3500	8.5714	5.5750	98.980	.000
Work quality	7.6500	6.0714	3.5000	87.851	.000
Opportunity for advancement	18.6250	14.9048	8.9000	106.524	.000
Challenge/interest in the Job	8.1000	5.6667	3.3500	119.870	.000
Recognition of work	8.0000	6.1429	3.7000	88.737	.000
Added Responsibilities	7.5750	5.5952	3.7500	75.274	.000

The analysis of variance for 'between the groups' is carried out to explore significance of difference between mean scores of three generations of employees namely Gen X, Gen Y and Gen Z. The variable 'challenge/interest in the job' (F (121) = 119.870, p<.001) shows:

Table 3: ANOVA for Gen X, Gen Y and Zen Z

Variables	Gen Z	Gen Y	Gen X	F	*P*
Hygiene	46.0000	35.5000	21.6750	134.489	.000
Motivation	49.9500	38.3810	23.2000	136.222	.000

Hygiene Factors: As can be seen, on Hygiene factors, the mean score for three generations differ significantly (F(212) =134.489, *p*<.001). It can be seen from the table 17 that on Hygiene factors Gen Z (M= 46.00, SD= 4.60) differs significantly from Gen Y(M= 35.50, SD= 6.80) and Gen X (M=21.67, SD=8.07). It shows that the impact of ICTs adoption on hygiene factors of Job Satisfaction Level is far greater for Gen Z (age group of 18 to 30 years) employees of public sector banks. Gen Y (age group of 31-45years) employees' Hygiene factors (of JSL) were moderately impacted by adoption of ICTs in the organisation and further Gen X (age group of 46-60 years) employees' hygiene factors (of JSL) were least impacted by the adoption of ICTs in their organisation.

Motivation Factors*:* As can be seen, on Motivation factors, the mean score for three generations differ significantly (F (121) =136.222, *p*<.001). It can be seen from the table 17 that on Hygiene Factors Gen Z (M= 49.95, SD= 4.38) differs significantly from Gen Y (M= 38.38, SD= 8.87) and Gen X (M=23.20, SD=7.70). It shows that the impact of ICTs adoption on motivation factors of Job Satisfaction Level is far greater for Gen Z (age group of 18 to 30 years) employees of public sector banks. Gen Y (age group of 31-45years) employees' Motivation Factors (of JSL) were moderately impacted by adoption of ICTs in the organisation and further Gen X (age group of 46-60 years) employees' Motivation factors (of JSL) were least impacted by the adoption of ICTs in their organisation.

Regression Analysis: This analysis is adopted when the researcher has one dependent variable which is presumed to be a function of two or more independent variables. The objective of this analysis is to make a prediction about the dependent variable based on its covariance with all the concerned independent variables. Overall, regression analysis gives us the predictors of the impact under study.

Table 4: Regression Table (Hygiene Factors)

Variables	B	T	*p*
Personal Performance	.188	1.489E8	.000
Working conditions	.184	1.371E8	.000
Increase in social status	.274	1.830E8	.000
Transparency in comm'n with management	.181	1.045E8	.000
Opportunity to use IT skill/ability	.249	1.608E8	.000
R^2=1.000, F=,6.206E3 df= (), p=.000			

Hygiene Factors: As can be seen from the table 4 regression table (hygiene factors), 27.4% of the total variance in Hygiene factors is attributable to Increase in Social Status which is significant (F (121) = 111.98, *p*<.001), 24.9% of total variance is attributable to Opportunities to Use IT skills/ Ability, significant at F ((121) = 98.98, *p*<.001) and 18.8% of variance could be attributed to Personal Performance at significance F ((121) = 66.21), 18.4% of total variance is attributable to Working Conditions, significant at F ((121) = 77.84, *p*<.001) and 18.1% of total variance is attributable Transparency in communication with management, significant at F ((121) = 96.20, *p*<.001).

Thus the major predictors for impact on hygiene factors of JSL due to Adoption of ICTs are; Increase in Social Status, Opportunities to Use IT skills/ Ability, and Personal Performance.

Table5: Regression Table (Motivation Factors)

Variables	B	t	*P*
Work quality	.169	3.370E7	.000
Opportunity for advancement	.381	6.094E7	.000
Challenge/interest in the Job	.181	3.631E7	.000
Recognition of work	.173	3.460E7	.000
Added Responsibilities	.159	3.247E7	.000
R^2=1.000, F=,df= (121), p=.001			

Motivation Factors: As can be seen from the table 5 regression table (motivation Factors), 38.1% of the total variance in Motivation factors is attributable to Opportunity for advancement which is significant (F (121) = 106.54, p<.001), 18.1% of total variance is attributable to Challenge/interest in the Job, significant at F ((121) = 119.87, p<.001) and 17.3% of variance could be attributed to Recognition of Work at significance F ((121) = 88.74), 16.9% of total variance is attributable to Work Quality, significant at F ((121) = 87.85, p<.001) and 15.9% of total variance is attributable Added Responsibility, significant at F ((121) = 75.27, p<.001).

Thus the major predictors for impact on motivation factors of JSL due to Adoption of ICTs are; Opportunity for Advancement, Challenge/Interest in Job, and Recognition of Work.

Hypothesis Testing:

Hypothesis H01: This null hypothesis is accepted on the basis of evaluation of overall impact of ICTs adoption on the Hygiene factors of Job Satisfaction Level for the employees of all three generations. The overall impact, as can be seen from Figure 2 which says that 36% of all the respondents are Very Satisfied, 44%of them are satisfied, 17% of them are neutral, and 3% of them are Dissatisfied. Therefore it proves that, there is a strong and positive impact of ICTs adoption on Hygiene factors of Job Satisfaction Level of the employees of a networked organisation. In this case the Public Sector Banking industry.

Hypothesis H02: This null hypothesis is accepted on the basis of evaluation of overall impact of ICTs adoption on the Motivation factors of Job Satisfaction Level for the employees of all three generations. The overall impact, as can be seen from Figure 4 which says that 43% of all the respondents are Very Satisfied, 36%of them are Satisfied, 17% of them are neutral, and 3% of them are Dissatisfied, and only 1% are Very Dissatisfied Therefore it proves that, there is an strong and positive impact of ICTs adoption on Motivation factors of Job Satisfaction Level of the employees of a networked organisation. In this case the Public Sector Banking industry.

Hypothesis H03: This null hypothesis is rejected on the basis of data analysis results as depicted in figure 7. It is evident from the data analysis that there exists a significant variation in the impact of ICTs adoption on JSL of different generations of employees under study. While the impact on JSL is strongly positive for generation Z (age group 18 – 30 years), the JSL of generation Y (age group 31-45 years) is impacted moderately and Generation X (age group 46-60 years) is impacted negatively by the adoption of ICTs.

7. RESULT INTERPRETATION

The results on the basis of primary data analysis could be summarised as follows:

- ICTs adoption as a new determinant of Job Satisfaction Level has quite significant positive impact on JSL of the employees of a networked public sector organisation, particularly of banking industry.
- The Job Satisfaction Level of younger generation of employees (Gen Z) in most positively impacted by adoption of ICTs in the networked organisations.
- The Job Satisfaction Level of older generation of employees (Gen X) is least positively impacted and at instances is negatively impacted by adoption of ICTs in the networked organisations. This fact may be attributed to many factors including technology averseness, inefficient in-house training, computer illiteracy, and feeling of loss of authority.
- The Job Satisfaction Level of middle age generation of employees (Gen Y) is positively impacted by adoption of ICTs in the networked organisations.
- Three most significant predictors of the impact on hygiene factors of JSL are ; Increase in Social Status, Opportunities to Use IT skills/ Ability, and Personal Performance
- Three most significant predictors of the impact on motivation factors of JSL are; Opportunity for Advancement, Challenge/Interest in Job, and Recognition of Work
- Top three attributes of JSL most negatively impacted for Gen X (45-60yrs) are; Transparency in communication, Challenging job and work quality
- There is a strong correlation between and within the attributes of JSL when impact of ICTs adoption is measured in conjunction. The top three positive correlations are between transparency of communication and opportunity for advancement, between added responsibility and personal performance and social status and advancement. Implying that a positive impact on one factor is likely to impact positively, the other factor also. There is no negative correlation found.

8. CONCLUSION

The results of the research provide us with quite interesting insights into how the adoption of Information and Communication Technology would impact the job satisfaction level of the modern networked organisations in general and Indian banking industry in particular. It has been established that adoption of ICTs has a positive impact on the Job Satisfaction Level of the employees in general. This finding demands a renewed impetus on the part of the organisations to get networked and to reap benefits of technology adoption not only in terms of higher productivity and efficiency and transparency but also in terms of achieving higher job satisfaction Levels of their employees. The findings also support the governments push for mission Digital India.

There is a strong correlation between the factors determining job satisfaction level which only means a win – win situation for the managers in the sense that if you increase one of the factor it is going to make an increase in the corresponding factor also thus enhancing JSL. For example, if organisations improve working conditions the personal performance would also improve.

There is one quite interesting finding about the impact of adoption of ICTs on JSL when different Generations of employees were considered separately. While the Gen Z and Gen Y are impacted positively, the JSL of Gen X (45-60 years) has been impacted negatively due to the adoption of ICTs. This in other words mean that, contrary to general belief the older generation of employees may find it uncomfortable to embrace the technology in their job content and job context. Thus, the strategy to keep the JSL of the older generation high while adopting ICTs at organisational level would have to be different. If all three generations are delt with a single strategy, it may prove counterproductive to the JSL of the older generation.

The reasons for such dissatisfaction among older generation may be attributed to multiple factors including, loss of authority for example a senior manager might have to share his/her digital credentials for number of operation with a junior employee because the senior manager is digitally challenged and cannot perform computer functions independently. This situation leads to dilution of his/her authority over the junior employees.

Transparency of communication acts as a double edged sword, for technology savvy junior employee it acts as a tool to show case his/her efficiency and quality of work out put, but for a technology averse older employee it acts as a viel remover from his slow speed, inefficient operation. Thus ICTs adoption to some of the older generation employees brings down their Job Satisfaction Level. Therefore, there has to be a differential strategy to deal with Gen X employees in terms of planning their in-house training, additional responsibilities, goal setting, and incentives.

The findings of the research could be utilised by Human Resource functionaries of any networked organisation to orient their HR policies on recruitment, training, promotion, development, remunerations etc keeping in mind the impact of ICTs adoption on the Job Satisfaction Level of the different generations of the employees. The research study would also open up the opportunities for further research on a larger scale and on other networked organisations in India and other nation-states.

As for any research study, depending upon its scope, there are bound to be some limitations. For this study, the size of the universe has been 1200 employees. A study based on larger geographic area may be at state level or national level is recommended for future researchers. The research is also limited to the population of public sector organisations' employees; it would be of good use if a comparative study of public and private organisations is carried out in future.

9. FUTURE WORK

This study is based on two major fields of study, one technology perspective and other human resource perspective and how the infusion of technology influences the Human Resource functions such as Job Satisfaction Level, in the present day networked organisation. Therefore the study presents an interesting and challenging perspective of the interaction of machines and human ant techno-cognitive level of convergence. It implicitly opens a vast new field of further research in order to take advantage of this new business intelligence towards achieving ever competitive organisational goals.

It is envisaged that there is a strong and compelling requirement to research further into the impact of newer determinants of Job Satisfaction Level in the networked organisations. Technology adoption and absorption is only going to increase in the future in India with government's ambitious Digital India mission. This phenomenon is going to alter the way people perceive job both in terms of content and context. Maintaining high Job Satisfaction Level of all generations of the employees would continue to present a renewed challenge to the management to stay efficient, profitable and competitive across private and public enterprises in India. Therefore, it would be worthwhile to extend this research study's ambit to compare Public sector and Private Sector banking organisations. Also it would benefit all other types of public and private sector networked organisations to understand the differential impact of adoption of ICTs on the Job Satisfaction Level of the employees in order to calibrate their recruitment, training, on-job training and in-house training programs for each generation of employees.

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RESEARCH PAPER

INFORMATION HIDING IN CSS: A SECURE SCHEME TEXT-STEGANOGRAPHY USING PUBLIC KEYCRYPTOSYSTEM

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ABSTRACT

Website is a tool of information disseminator throughout the world; this is certainly can be used to a secret communication by using CSS as a message hider. This paper proposed a new scheme using web tools like CSS for hiding information's. This is a secret communication mechanism using text steganography techniques that is embedded messages on CSS files and is further encrypted using RSA as a public key cryptographic algorithm.

Steganography is the art of hiding the fact that communication is taking place, by hiding information in other information. Many different carrier file formats can be used, but digital images are the most popular because of their frequency on the internet. For hiding secret information in images, there exists a large variety of steganography techniques some are more complex than others and all of them have respective strong and weak points. Different applications may require absolute invisibility of the secret information, while others require a large secret message to be hidden. This project report intends to give an overview of image steganography, its uses and techniques. It also attempts to identify the requirements of a good steganography algorithm and briefly reflects on which steganographic techniques are more suitable for which applications.

Keywords: Text Steganography, Cryptography, Cascading Style Sheet (CSS), RSA Algorithm, Public Key Algorithm.

1. INTRODUCTION

Steganography (usually called as stego), the art of hiding message, has been used for many generations. Steganography is often difficult to distinguish with cryptographic because of similarities these functions areas in terms of protecting critical information.

The difference between these two methods is in terms of how to protect informations. Steganography to disguising the information on the other media so that people do not feel the existence of such information's behind.

Cryptography protects data by altering information into a form that unreadable or cannot understood by unauthorized people but sometimes steganography used in combination with cryptography that offer privacy and security are higher through the communication channel**.**

2. OBJECTIVE

The goal of Steganography is covert communication. So, a fundamental requirement of this Steganography system is that the hider message carried by stego-media should not be sensible to human beings.

The other goad of Steganography is to avoid drawing suspicion to the existence of a hidden message. This approach of information hiding technique has recently become important in a number of application area:

This project has following objectives:

- To product security tool based on Steganography techniques.
- To explore techniques of hiding data using encryption module of this project
- To extract techniques of getting secret data using decryption module.

3. METHODOLOGY

There are two kinds of cryptographic algorithms based on the key that is used for encryption and decryption; there are symmetric algorithm and asymmetric algorithms. In symmetric algorithm, key for encryption is same with a key for decryption, because that is called symmetric cryptography. Whereas in asymmetric algorithm, there are different key for encryption and decryption, public key is for encryption and private key for decryption.

The first inventor of asymmetric key cryptography algorithm is Clifford Cocks, James H. Ellis and Malcolm Williamson (a group of mathematicians who worked for United Kindom's Government. Communications Head Quarters, the British secret agent) at the beginning of the year 1970.

RSA is a popular one than other assymmetric-key cryptographic systems. The security of the RSA cryptosystem relies on the believed difficulty of factoring large composite integers. The RSA algorithm is named after Ron Rivest, Adi Shamir and Len Adleman. It consists of the following procedures: key generation, encryption, decryption.

Key Generation

1. Choose two big primes: p and q.

2. Calculate n=p*q.
3. Randomly choose an integer e, satisfying 1<e < φ (n), gcd (e, φ (n)) = 1. Totient function φ(n) denotes the number of positive integers less than n and relatively prime to n. Here φ (n) =(p-1)*(q-1). The public key is (e, n).
4. Calculate d, satisfying ed mod φ(n) = 1 , the private key is (d, n).

Encryption Procedure
1. Partition the message m to groups mi, i=1,2,…, | mi |= |n|-1; (|a| means the length of a in binaryform) .
2. Encrypt each group: ci = m_i^e mod n.
3. Connect each ci and get the cipher text c.

Decryption Procedure
1. Partition c to ci, i=1,2,…, | ci |= |n|-1;
2. Decrypt each ci =m_i^e mod n
3. Connect each mi and recover the plain text m.

4. OVERVIEW OF CSS STEGANOGRAPHY SCHEME

Web based communication has a great amount of bandwidth and hence can be used for secret communication. HTML and CSS are two basic but important and universal tools for web development. This paper proposes a new scheme on hiding information that is embedded through a Cascading Style Sheet (CSS) by using End Of Line (EOL) on each CSS style properties, exactly after a semi-colon. Before embedded into the cover text, message firstly encrypted using RSA Algorithm, and then it transmitted to the receiver.

In the literature, hiding information within spaces appears to have potential as people can hardly identify the existence of the hidden bits which appear in the whitespaces between the words. Por et al. had shown that one space is interpreted as “0” whereas two spaces are interpreted as “1”. But using two spaces between the words, it would make stegotext more suspicious.

Overcome for this problem hence one the best ways is by hiding information at the end of the line. Mir and Hussain had shown that it was applied on XML files and was further encrypted using Advanced Ecryption Standard (AES). But it is still not secure, as we know, the problems of symmetric-key algorithm is about the key distribution. Therefore, this proposed scheme, as shown in figure 1.1, would be applied an asymmetric-key algorithm for the encryption process.

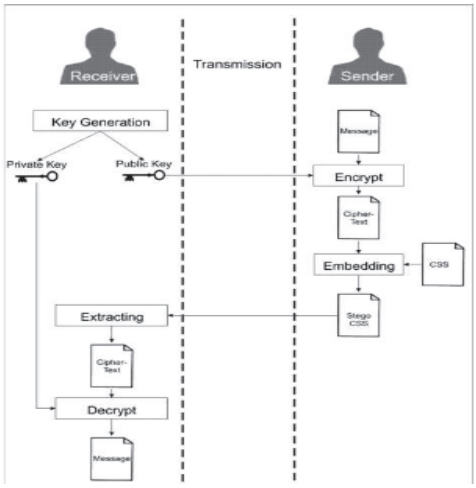

Fig. 1.1: System Flow of a Proposed Scheme

As follow the explanation of figure 1.1:

Step 1, Receiver generate with RSA Algorithm for a pair of key, that is private and public key, as shown in figure 1.2 (below).

Step 2, Receiver sends public key to the Sender.

Step 3, Sender encrypt the secret message with RSA Algorithm, then the cipher text embedding into CSS file. The result of this step is a stego CSS as shown in figure 1.3 (below).
Step 3a, encrypted message with RSA Algorithm.
Step 3b, converting ciphertext to biner.
Step 3c, converting biner to whitespace, and space for 0 and tab for 1.
Step 3d, searching for semi-colon then inserting the whitespaces in the after character ofsemicolon.

Step 4, Sender sending the stego CSS to the Receiver.

Step 5, Receiver get the stego CSS and extract it for getting the cipher text, then Deciphering the cipher text to find out the secret message, this step shown in figure 1.2 (below).

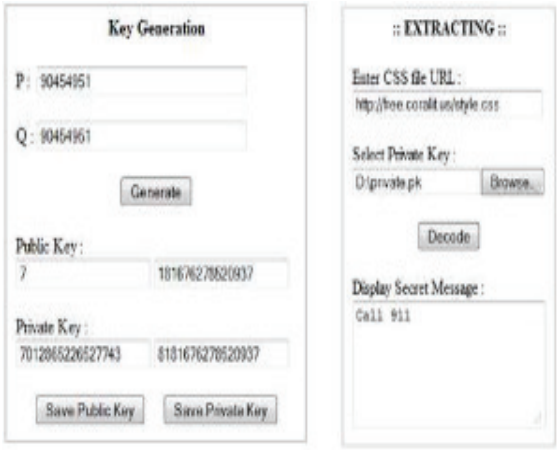

Fig.1.2: GUI for Receiver: Key Generation (Left), Extracting Process (Right)

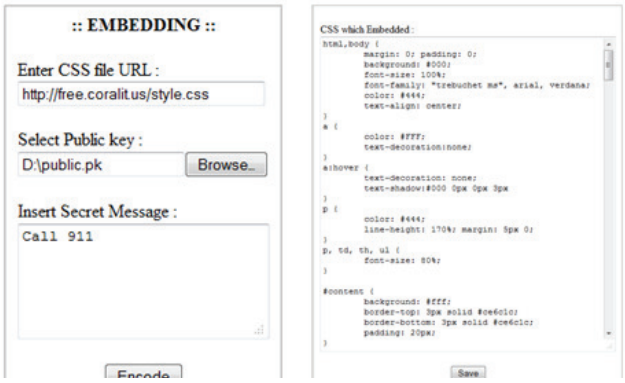

Fig. 1.3: GUI for Sender: Embedding Process

5. EXPERIMENTAL RESULTS AND DISCUSSION

This section presents the experimental result as the given below:

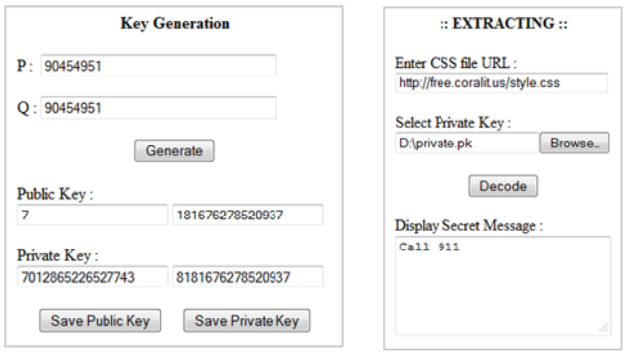

Fig. 1.4 GUI for Receiver: Key Generation (Left), Extracting Process (Right)

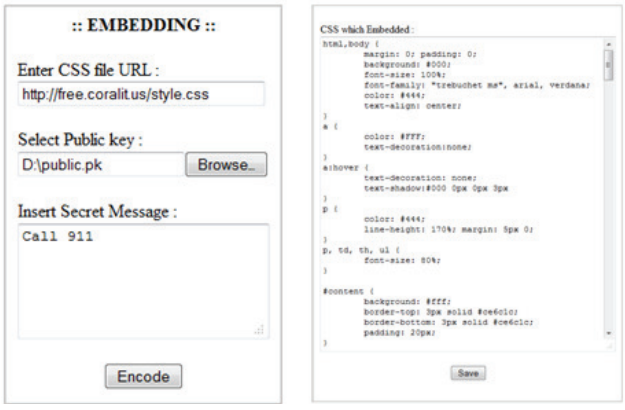

Fig 1.5 GUI for Sender: Embedding Process

Table 1: Key Generation and Extracting

GUI Receiver Key Generation	Extracting Process
Receiver generate with RSA Algorithm for a pair of key, that is private and public key	Receiver get the stego CSS and extract it for getting the cipher text, then Deciphering the cipher text to find out the secret message, this step shown in Fig 1.4 (Left).
Receiver sends public key to the Sender.	
Sender encrypt the secret message with RSA Algorithm, then the ciphertext embedding into CSS file in Fig 1.5 encrypted message with RSA Algorithm converting ciphertext to biner converting biner to whitespace, space for 0 and tab for 1. for semi-colon then inserting the whitespaces in the after character of semicolon	
Sender sending the stego CSS to the Receiver	

6. ACKNOWLEDGEMENT

I would like to express my sincere gratitude to the NIU Professor for their support and assistance in completing this project. I am also indebted to him for taking great pains in going through the script and made valuable logic and my friends who guided me throughout when I required any help during the development of the project.

This paper is the result of many years of interaction and brainstorming with member of the Atma Jaya Yogyakarta University. These members include Herman Kabetta, B. Yudi Dwiandiyanta and Suyoto.

I wish to thank Dr. Anuranjan Mishra the HOD of the Dept of School and Engineering of the NIU for their help in reviewing and improving the presentation of the paper.

7. CONCLUSION

This scheme shows that the stego text looks as same as the original text, by using the "End of Line" techniques for the embedding process makes no obvious changes as shown in figure 1.6. Usage of the public key cryptography is also increasing the security of hidden Information. Since CSS stored on the web server so it is not possible to changing the data by any third parties. Weakness of this technique is the limited amount of characters that can be embedded; it is depending of the available semi-colon amount.

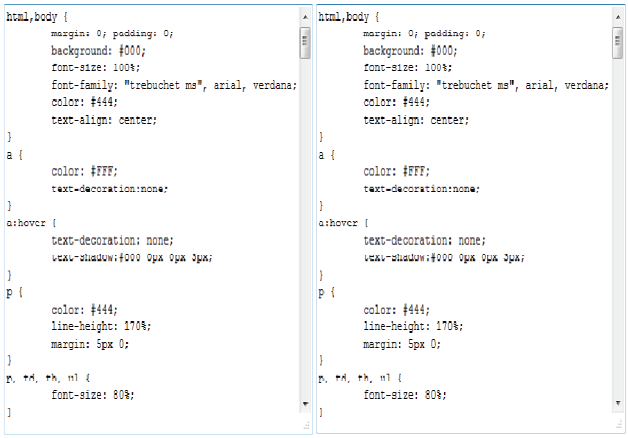

Fig 1.6Original CSS File (Left), Stego CSS with Hidden Information (Right)

The future work should focus towards the range of the

payload size can be increased so that more data is able to be embedded in the CSS files and not only text message can be embedded, but also the image and sound.

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RESEARCH PAPER

LIFESTYLE INTERVENTIONS REDUCE CORONARY ARTERY DISEASE AMONG THE HIGH RISK GROUP

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ABSTRACT

A PRE Experimental evaluatory approach was used for this study. The study was carried out in the selected community of Greater Noida. The research design was pre-experimental one group pre-test post-test design. The sample comprised of 40 high risk subjects. The data was analyzed using descriptive and inferential statistics. Paired 't' test was used to find the effectiveness of SIM and chi-square was used to find the association of pre-test knowledge score w. The results of this study showed that participants in general lacked knowledge on CAD and especially on prevention aspect. The mean knowledge score was 10.56. There was a marked gain in mean knowledge score after administration of SIM (23.54). The difference in mean knowledge score was statistically significant at 0.05 level't' $_{(49)}$ =23.35. There was no significant association between pre-test knowledge score and selected demographic variables such as age (χ^2_1=0.260), gender (χ^2_1=1.212), educational qualification (χ^2_1=0.0035), frequency of exercise performed per week (χ^2_4=7.860), type of exercise performed (χ^2_4=3.100), personal habits (χ^2_3=5.007), and dietary habits (χ^2_3=2.237) at 0.05 level of significance.

The findings of this study support the need for conducting future health camps and awareness programmer on CAD and its prevention in the selected community. The study proved that the subjects had poor knowledge on CAD and its prevention before the administration of SIM. Their knowledge improved to a remarkable extent after the utilization of SIM. The findings of this study shows that the SIM was effective in terms of gaining knowledge on CAD and its prevention among the high risk subjects (t_{49}=23.35, P < 0.05).

Keywords: Cardiovascular Diseases, Information Booklets, CHD, Coronary Artery Disease.

1. INTRODUCTION

Over the past two centuries, the industrial and technological revolutions and their associated economic and social transformations have resulted in dramatic shifts in the diseases responsible for illness and death. Cardio Vascular Disorder has emerged as the dominant chronic disease in many parts of the world[1].

Improper diet, lack of exercise, excessive stress, smoking, high cholesterol, triglycerides, high blood pressure, diabetes and overweight/obesity, are the major causes of heart problems. In some cases, heart problems could be hereditary[2].

Sedentary lifestyle is associated with a greater risk of the development of early CHD. Physical inactivity is an independent risk factor for CHD and roughly doubles the risk[3]. The risk for cardiovascular diseases increases with sedentary lifestyle.

The aim of this study is to evaluate the effectiveness of the Self Instructional Module (SIM) on the knowledge of Coronary Artery Disease (CAD) and its prevention among the high risk group people residing in the selected community Noida.

2. PROBLEMSTATEMENT

A study to assess the effectiveness of self-instructional module on prevention of coronary artery disease among high risk individual living in selected area of community Greater Noida.

3. OBJECTIVES OF THE STUDY

- To assess the pre test level of knowledge regarding prevention of coronary artery disease among high risk group living in the selected community Greater Noida
- To assess the effectiveness of information booklets regarding prevention
- Of coronary artery disease among high risk group living in the selected community Greater Noida
- To assess the post test knowledge regarding the prevention of coronary artery diseases among high risk group living in the selected community Greater Noida.
- To assess the association between post test knowledge of patient with selected Demographic variables

4. HYPOTHESIS

H1: The mean post test knowledge score of group on prevention of coronary artery disease will be significantly more than mean pre test knowledge score of the same group.

H2: There will be significant association between the post test knowledge and selected

Sociodemographic variables of patient with any disease regarding prevention of coronary artery disease.

5. METHODOLOGY

Study Group	Pre-Test	Intervention	Post-Test
	(Administration of structured knowledge questionnaire)	(Administration of information booklet)	(Administration of structured knowledge questionnaire)
High risk group	O_1	X	O_2

A PRE Experimental evaluatory approach was used for this study. The study was carried out in the selected community of Greater Noida. The research design was pre-experimental one group pre-test post-test design. The sample comprised of 40 high risk subjects. The community area was selected by convenience sampling technique and high risk subjects were selected by purposive sampling technique. The data collection was done from 01/02/14 to 23/02/14. Formal written permission was obtained from the authorities to conduct the study and informed consent was obtained from subjects prior to the data collection process. Data was collected by administering a structured knowledge questionnaire before and after the administration of SIM. Post-test was conducted on 7th day using the same structured knowledge questionnaire. The data was analyzed using descriptive and inferential statistics. Paired 't' test was used to find the effectiveness of SIM and chi-square was used to find the association of pre-test knowledge score with selected demographic variables.

6. RESULT

The results of this study showed that participants in general lacked knowledge on CAD and especially on prevention aspect. The mean knowledge score was 10.56. There was a marked gain in mean knowledge score after administration of SIM (23.54). The difference in mean knowledge score was statistically significant at 0.05 level't' $_{(49)}$ =23.35. There was no significant association between pre-test knowledge score and selected demographic variables such as age (χ^2_1=0.260), gender (χ^2_1=1.212), educational qualification (χ^2_1=0.0035), frequency of exercise performed per week (χ^2_4=7.860), type of exercise performed (χ^2_4=3.100), personal habits (χ^2_3=5.007), and dietary habits (χ^2_3=2.237) at 0.05 level of significance.

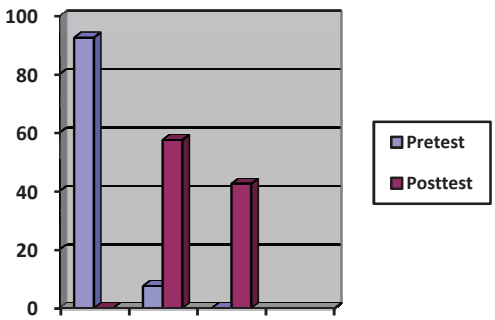

Fig. 1: Percentage distributions of Respondents on pre &Post test knowledge level C

7. INTERPRETATION AND CONLUSION

The findings of this study support the need for conducting health camps and awareness programme on CAD and its prevention in the selected community. The study proved that the subjects had poor knowledge on CAD and its prevention before the administration of SIM. Their knowledge improved to a remarkable extent after the utilization of SIM. The findings of this study shows that the SIM was effective in terms of gaining knowledge on CAD and its prevention among the high risk subjects (t_{49}=23.35, P < 0.05)

8. FUTURE PROSPECTIVES OF STUDY

As prevalence of coronary artery disease has increased at its rapid rate since past. And the major cause of CAD is modifiable factors (obesity, sedentary life style and dietary factors) the study outcome will help in reducing the risk of CAD by altering the modifiable risk factor by mean of health awareness

Based on the finding of the study, the investigator proposes the following recommendations for future research.

- The study can be replicated on larger samples in different settings to have a wider applicability by

generalization.

- A similar study can be carried out with other experimental research design to find out the effectiveness of structured teaching programme regarding prevention of CAD in terms of knowledge among the high risk subjects.
- Similar study can be conducted by using different teaching strategies like informational booklet OR structure teaching programme.
- A study can be conducted to evaluate the effectiveness of self instructional guide (SIG) in the form of pictorial booklet for illiterate group.

9. SUMMARY

This chapter deals with summary of the study undertaken, conclusion drawn from the findings, implication of the study in various areas of nursing, limitations of the study and recommendations for the future research.

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RESEARCH PAPER

FACTORS AFFECTING NEONATAL JAUNDICE AND THE IMPACT OF THE SAME ON GROWTH AND DEVELOPMENT OF CHILDREN LESS THAN 3 YEARS

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ABSTRACT

Thus it is said that "Children are the assets of the world in them lies the life's future". Whatever we invest in our child in terms of developing environment both physical and emotional is going to reap rich individuals in future. WHO(World Health Organization) has dedicated the year 2003 towards the improvement of children through the announcement of World Health Day theme 'Shape the Future of life, Healthy Environment for Children'. Understanding children and their growth and development is essential to promote health and establish healthful patterns.

This study sought to assess the factors affecting neonatal jaundice and the impact of the same on the growth and development of children less than 3 years attending the out-patient department. A descriptive design having cross sectional survey approach with purposive sampling technique was used. Structured interview schedule was conducted to obtain data from mothers, assessment for growth and development of children was done by using Trivandrum developmental screening chart and Denver developmental screening test. The results showed a strong association between infection and nutritional deficiency during pregnancy with the rise in bilirubin level ($p<0.001$), apart from that there was a strong association between mothers obstetrical history ($p<0.005$), order of birth ($p<0.001$), induction of labor ($p<0.001$), stay in hospital ($p<0.001$), ABO and rh incompatibility ($p<0.001$) with the rise in bilirubin level. The findings confirmed that factors such as antenatal, previous obstetrical, natal and neonatal have direct impact on rise in bilirubin level and also that high bilirubin level has an impact on growth and development. Hence, it is felt that the factors affecting neonatal Jaundice to be assessed at an early stage with a view to prevent further complication effecting growth and development of a child.

Keywords: Neonatal Jaundice, Growth and Development.

1. INTRODUCTION

'Today's child is tomorrow's future'. The child is the heritage of the family and children's health is world's health. Just as a young shoot needs to be healthy for a foundation of a strong tree, likewise healthy children are also essential for a healthy world. If children are healthy, future generation will be healthy resulting in a healthy environment. One of the factors in determining a child's health is the pattern of his growth and development which extends through his life cycle from 'cradle to grave'. However, the period in which the principle changes occur is the conception to the end of adolescence. During the phase of life the newborn functions and behavior are mostly reflexive. Stabilization of major body function is the primary task of the neonate and occurs in a definite sequence of the physiologic events from the first day of life. During this period, the neonates are at risk of acquiring many problems. Among these the major health problems are- Jaundice, infection, nutritional deficiency, trauma and regulation of body temperature.

'Life is most vulnerable in the first 28 days of life', when most of the world's child deaths occur ;taking 4 million infants each year and more than 10,000 newborn children die every day worldwide. The neonatal last for 28 days, but it accounts for 38% of deaths of children under 5 years of age. Hence it is important to identify the risk factors of neonatal mortality as well as neonatal morbidity.

2. OBJECTIVES OF THE STUDY

- To assess the associated factors for physiological and pathological Jaundice.
- To find the association between factors affecting neonatal jaundice and serum bilirubin level.
- To assess the growth and development of children affected by Neonatal Jaundice.
- To provide guidelines on Neonatal Jaundice, care and prevention to the mothers, and with special emphasis to the nurses.

3. RESEARCH METHODOLOGY

Research Design: Descriptive design.

Research Approach: Cross sectional Survey approach

Study setting: SNR Government Hospital, Kolar

Target Population: Mother with children less than 3 years who had suffered from neonatal Jaundice.

Sample: 100 mothers with children less than 3 years who had neonatal Jaundice and attending the Outpatient department of SNR Hospital.

Sampling Technique: Purposive sampling technique

Dependent variables: Associated factors affecting Neonatal Jaundice and growth and Development.

Attributed variables: 1. Age, sex, religion of child, 2. Age, education, occupation, income, type of marriage of mother.

4. THE MAJOR FINDINGS

The major findings of the study were the significant factors associated with rise in bilirubin level.

- There is a strong association between infection and nutritional deficiency with the rise in bilirubin level ($P<0.001$)
- The obstetrical history of mother reveals that abortion, still birth, sibling history have significant co relation with high bilirubin level ($P<0.005$)
- There is strong impact on neonatal jaundice, by order of birth, and induction of labor ($P<0.001$)
- Birth asphyxia, cry at birth, meconium passed, stay at hospital was found to be significant and sepsis, breast feeding, was found to be highly significant in producing neonatal jaundice ($P<0.001$)
- ABO and Rh incompatibility are associated with the significant raise in serum bilirubin level ($P<0.001$)
- This study has also proved that, the treatment varies according to the bilirubin level of the children.
- The study has excellently proved that high bilirubin level has an impact on growth and development.

5. CONCLUSION

The Study revealed that the factors such as antenatal, previous obstetrical, natal and neonatal have direct impact on the rise in bilirubin level.

- This study has proved that, the associated factors of mothers have an impact on the rise in bilirubin level.
- This study has proved that, the associated factors of neonates have an impact on the rise in bilirubin level.
- This study has proved that, the treatment varied according to the bilirubin level of the children.
- This study had excellently proved that high bilirubin level has an impact on growth and development.

6. RECOMMENDATIONS

- Mother and child health services are essential for decreasing the morbidity of neonatal jaundice.
- Preventive care should be emphasized at the primary, secondary and tertiary levels.
- The staff nurses, village health nurses, sector health nurses and community health nurses should be given in-service education about the early diagnosis of Neonatal jaundice, management and referral to the appropriate hospital.
- The mass media communication about neonatal jaundice and their impact on the future should be highlighted through TV and Radio and should appear on all channels and quite often.
- A nurse health educator should be posted in the neonatal ward and pediatric outpatient department to teach about the importance of follow-up and importance of growth and development.

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RESEARCH PAPER

EIGEN FACE APPROACH FOR FACE RECOGNITION

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ABSTRACT

Face recognition can be applied for a wide variety of problems like image and film processing, human-computer interaction, criminal identification etc. This has motivated researchers to develop computational models to identify the faces, which are relatively simple and easy to implement. The existing system represents some face space with higher dimensionality and it is not effective too. The important fact which is considered is that although these face images have high dimensionality, in reality they span very low dimensional space. So instead of considering whole face space with high dimensionality, it is better to consider only a subspace with lower dimensionality to represent this face space. The goal is to implement the system (model) for a particular face and distinguish it from a large number of stored faces with some real-time variations as well. The Eigenface approach uses Principal Component Analysis (PCA) algorithm for the recognition of the images. It gives us efficient way to find the lower dimensional space.

Keywords: Eigen faces, Eigen Vectors, Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA).

1. INTRODUCTION

Eigenfaces is probably *one of the simplest face recognition methods* and also rather old, then why worry about it at all? Because, while it is simple it works quite well. And its simplicity also makes it a good way to understand how face recognition/dimensionality reduction etc works. Like almost everything associated with the Human body – The Brain, perceptive abilities, cognition and consciousness, face recognition in humans is a wonder. We are not yet even close to an understanding of how we manage to do it. What is known is that it is that the Temporal Lobe in the brain is partly responsible for this ability. Damage to the temporal lobe can result in the condition in which the concerned person can lose the ability to recognize faces.

2. MOTIVATING PARALLEL

Eigenfaces has a parallel to one of the most fundamental ideas in mathematics and signal processing – The Fourier Series. This parallel is also very helpful to build an intuition to what Eigenfaces (or PCA) sort of does and hence must be exploited. Hence we review the Fourier Series in a few sentences.

Fourier series are named so in the honor of Jean Baptiste Joseph Fourier (Generally Fourier is pronounced as "fore-yay", however the correct French pronunciation is "foor-yay") who made important contributions to their development. Representation of a signal in the form of a linear combination of complex sinusoids is called the Fourier series. What this means is that you can't just split a periodic signal into simple sines and cosines, but you can also approximately reconstruct that signal given you have information how the sines and cosines that make it up are stacked.

More Formally: Put in more formal terms, suppose f(x)**i**s a periodic function with period 2π defined in the interval $c \le x \le c + 2\pi$ and satisfies a set of conditions called the Dirichlet's conditions:

- f(x)is finite, single valued and its integral exists in the interval.
- f(x) has a finite number of discontinuities in the interval.
- f(x) has a finite number of extrema in that interval.

Then f(x) can be represented by the trigonometric series

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos\frac{n\pi x}{L} + b_n \sin\frac{n\pi x}{L} \right) \ldots (1)$$

The above representation of f(x) is called the Fourier series and the coefficients a_0, a_n and b_n are called the fourier coefficients and are determined from f(x) by Euler's formulae. The coefficients are given as:

$$a_n = \frac{1}{\pi}\int_{-\pi}^{\pi} s(x)\cos(nx)\,dx = 0, \quad n \ge 0.$$

$$b_n = \frac{1}{\pi}\int_{-\pi}^{\pi} s(x)\sin(nx)\,dx$$

$$= -\frac{2}{\pi n}\cos(n\pi) + \frac{2}{\pi^2 n^2}\sin(n\pi)$$

$$= \frac{2(-1)^{n+1}}{\pi n}, \quad n \ge 1.$$

An example that illustrates (1) or the Fourier series is:

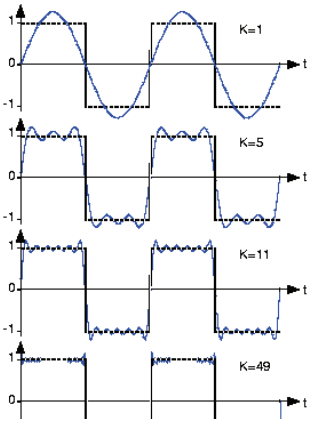

Fig. 1: Square Wave

A square wave (given in black) can be approximated to by using a series of sines and cosines (result of this summation shown in blue). Clearly in the limiting case, we could reconstruct the square wave exactly with simply sines and cosines. Though not exactly the same, the idea behind Eigenfaces is similar. The aim is to represent a face as a linear combination of a set of basis images (in the Fourier series the bases were simply sines and cosines). That is:

$$\phi i = \sum_{j=1}^{K} \text{Wj Uj}$$

Where $\Phi_i$represents the i^{th}face with the mean subtracted from it, $w_j$represent weights and $u_j$the eigenvectors. If this makes somewhat sketchy sense then don't worry. This was just like mentioning at the start what we have to do. The big idea is that you want to find a set of images (called Eigenfaces, which are nothing but Eigenvectors of the training data) that if you weigh and add together should give you back an image that you are interested in (adding images together should give you back an image, Right?). The way you weight these basis images (i.e the weight vector) could be used as a sort of a code for that image-of-interest and could be used as features for recognition.

This can be represented aptly in a figure as:

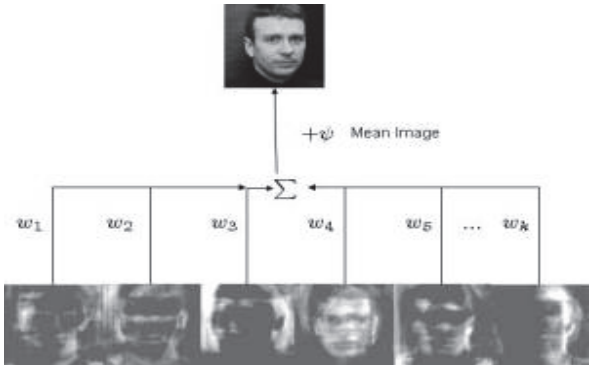

Fig. 2: Eigen faces

In the above figure, a face that was in the training database was reconstructed by taking a weighted summation of all the basis faces and then adding to them the mean face. Please note that in the figure the ghost like basis images (also called as Eigenfaces, we'll see why they are called so) are not in order of their importance. They have just been picked randomly from a pool of 70 by me. These Eigenfaces were prepared using images from the MIT-CBCL database (also I have adjusted the brightness of the Eigenfaces to make them clearer after obtaining them, therefore the brightness of the reconstructed image looks different than those of the basis images).

3. AN INFORMATION THEORY APPROACH

First of all the idea of Eigen faces considers face recognition as a 2-D recognition problem, this is based on the assumption that at the time of recognition, faces will be mostly upright and frontal. Because of this, detailed 3-D information about the face is not needed. This reduces complexity by a significant bit. Before the method for face recognition using Eigen faces was introduced, most of the face recognition literature dealt with local and intuitive features, such as distance between eyes, ears and similar other features. This wasn't very effective. Eigen faces inspired by a method used in an earlier paper was a significant departure from the idea of using only intuitive features. It uses an Theory approach wherein the most relevant face information is encoded in a group of faces that will best distinguish the faces. It transforms the face images in to a set of basis faces, which essentially are the principal components of the face images. The Principal Components (or Eigenvectors) basically seek directions in which it is more efficient to represent the data. This is particularly useful for reducing the computational effort. To understand this, suppose we get 60 such directions, out of these about 40 might be insignificant and only 20 might represent the variation in data significantly, so for calculations it would work quite well to only use the 20 and leave out the rest. This is illustrated by this figure:

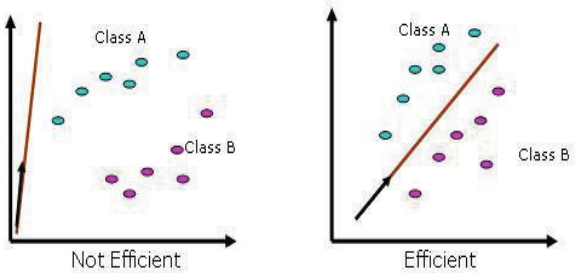

Fig. 3: Classes

Such an information theory approach will encode not only the local features but also the global features. Such features may or may not be intuitively understandable. When we find the principal components or the Eigenvectors of the image set, each Eigenvector has some contribution from each face used in the training set. So the Eigenvectors also have a face like appearance. These look ghost like and are ghost images or Eigen faces. Every image in the training set can be represented as a

weighted linear combination of these basis faces. The number of Eigen faces that we would obtain therefore would be equal to the number of images in the training set. Let us take this number to be M. Like I mentioned one paragraph before, some of these Eigen faces are more important in encoding the variation in face images, thus we could also approximate faces using only the K most significant Eigen faces.

4. ASSUMPTIONS

1. There are M images in the training set.
2. There are K most significant Eigen faces using which we can satisfactorily approximate a face. Needless to say K < M.
3. All images are $N \times N$ matrices, which can be represented as $N^2 \times 1$ dimensional vectors. The same logic would apply to images that are not of equal length and breadths. To take an example: An image of size 112 x 112 can be represented as a vector of dimension 12544 or simply as a point in a 12544 dimensional space.

5. ALGORITHM FOR FINDING EIGENFACES

1. Obtain M training images $I_1, I_2 \ldots I_M$, it is very important that the images are centered.

Fig. 4: Face Dataset

2. Represent each image I_i as a vector Γ_i as discussed above.

$$I_i = \begin{bmatrix} a_{11} & a_{12} & \ldots & a_{1N} \\ a_{21} & a_{22} & \ldots & a_{2N} \\ \vdots & \vdots & \ddots & \vdots \\ a_{N1} & a_{N2} & \ldots & a_{NN} \end{bmatrix}_{N \times N} \xrightarrow{\text{concatenation}} \begin{bmatrix} a_{11} \\ \vdots \\ a_{1N} \\ \vdots \\ a_{2N} \\ \vdots \\ a_{NN} \end{bmatrix}_{N^2 \times 1} = \Gamma_i$$

3. Find the average face vector Ψ.

$$\Psi = \frac{1}{M} \sum_{i=1}^{M} \Gamma_i$$

4. Subtract the mean face from each face vector Γ_i to get a set of vectors Φ_i. The purpose of subtracting the mean image from each image vector is to be left with only the distinguishing features from each face and "removing" in a way information that is common.

$$\Phi_i = \Gamma_i - \Psi$$

5. Find the Covariance matrix C:

$C = AA^T$, where $A = [\Phi_1, \Phi_2 \ldots \Phi_M]$

Note that the Covariance matrix has simply been made by putting one modified image vector obtained in one column each. Also note that C is a $N^2 \times N^2$ matrix and A is a $N^2 \times M$ matrix.

6. We now need to calculate the Eigenvectors u_i of C, However note that C is a $N^2 \times N^2$ matrix and it would return N^2 Eigenvectors each being N^2 dimensional. For an image this number is HUGE. The computations required would easily make your system run out of memory. How do we get around this problem?

7. Instead of the Matrix AA^T consider the matrix A^TA. Remember A is a $N^2 \times M$ matrix, thus A^TA is a $M \times M$ matrix. If we find the Eigenvectors of this matrix, it would return M Eigenvectors, each of Dimension $M \times 1$, let's call these Eigenvectors v_i.

Now from some properties of matrices, it follows that: $u_i = Av_i$. We have found out v_i earlier. This implies that using v_i we can calculate the M largest Eigenvectors of AA^T. Remember that $M \ll N^2$ as M is simply the number of training images.

8. Find the best M Eigenvectors of $C = AA^T$ by using the relation discussed above. That is: $u_i = Av_i$. Also keep in mind that $\|u_i\| = 1$.

Fig. 5: Eigenfaces

Eigen faces for the training set chosen from the MIT-CBCL database, these are not in any order]

9. Select the best K Eigenvectors, the selection of these Eigenvectors is done heuristically.

6. FINDING WEIGHTS

The Eigenvectors found at the end of the previous section, $u_i$when converted to a matrix in a process that is reverse to that in STEP 2, have a face like appearance. Since these are Eigenvectors and have a face like appearance, they are called Eigen faces. Sometimes, they are also called as Ghost Images because of their weird appearance.

Now each face in the training set (minus the mean), Φ_i can be represented as a linear combination of these Eigen vectorsu_i:

$\Phi_i = \sum_{j=1}^{K} w_j u_j$m, where$u_j$'s are Eigen faces.

These weights can be calculated as:

$$w_j = u_j^T \Phi_i$$

Each normalized training image is represented in this basis as

$$\Omega_i = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_k \end{bmatrix}$$

Where i = 1, 2… M. This means we have to calculate such a vector corresponding to every image in the training set and store them as templates.

7. RECOGNITION TASK

Now consider we have found out the Eigen faces for the training images, their associated weights after selecting a set of most relevant Eigen faces and have stored these vectors corresponding to each training image.

If an unknown probe face $\Gamma$is to be recognized then:

1. We normalize the incoming probe Γas$\Phi = \Gamma - \Psi$.

2. We then project this normalized probe onto the Eigen space (the collection of Eigenvectors/faces) and find out the weights.

$$w_i = u_i^T \Phi$$

3. The normalized probe Φcan then simply be represented as:

$$\Omega = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_K \end{bmatrix}$$

After the feature vector (weight vector) for the probe has been found out, we simply need to classify it. For the classification task we could simply use some distance measures or use some classifier like Support Vector Machines. In case we use distance measures, classification is done as:

Find $e_r = min \left\| \Omega - \Omega_i \right\|$. This means we take the weight vector of the probe we have just found out and find its distance with the weight vectors associated with each of the training image.

And if $e_r < \Theta$, where Θ is a threshold chosen heuristically, then we can say that the probe image is recognized as the image with which it gives the lowest score.

If however $e_r > \Theta$ then the probe does not belong to the database. I will come to the point on how the threshold should be chosen.

For distance measures the most commonly used measure is the Euclidean Distance. The other being the Manhattan Distance. The Manhattan distance generally gives superior performance.

8. DISTANCE MEASURES

Euclidean Distance: The Euclidean Distance is probably the most widely used distance metric. It is a special case of a general class of norms and is given as:

$$Euclidean\ Distance = d = \sqrt{\sum_{i=1}^{N} (Xi - Yi)^2}$$

Deciding on the Threshold: Consider for simplicity we have only 5 images in the training set. And a probe that is not in the training set comes up for the recognition task. The score for each of the 5 images will be found out with the incoming probe. And even if an image of the probe is not in the database, it will still say the probe is recognized as the training image with which its score is the lowest. Clearly this is an anomaly that we need to look at. It is for this purpose that we decide the threshold. The threshold $\Theta$is decided heuristically.

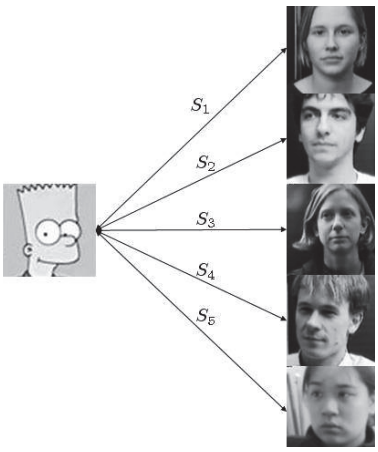

Fig. 6: Threshold Decision

Now to illustrate what I just said, consider a Simpson image as a non-face image, this image will be scored with each of the training images. Let's say S_4 is the lowest score out of all. But the probe image is clearly not belonging to the database. To choose the threshold we choose a large set of random images (both face and non-face), we then calculate the scores for images of people in the database and also for this random set and set the threshold Θ accordingly.

More on the Face Space: To conclude this post, here is a brief discussion on the face space.

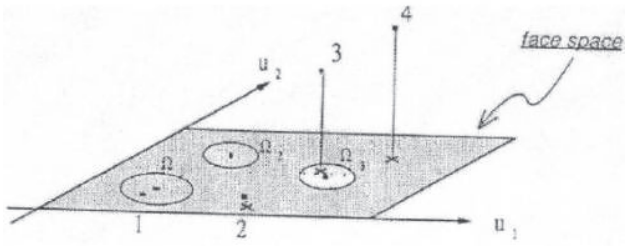

Fig. 7: Face Space

Consider a simplified representation of the face space as shown in the figure above. The images of a face, and in particular the faces in the training set should lie near the face space. Which in general describes images that are face like. The projection distance ϵ_f should be under a threshold Θ as already seen. The images of known individual fall near some face class in the face space. There are four possible combinations on where an input image can lie:

1. Near a face class and near the face space: This is the case when the probe is nothing but the facial image of a known individual (known = image of this person is already in the database).

2. Near face space but away from face class: This is the case when the probe image is of a person (i.e. a facial image), but does not belong to anybody in the database i.e. away from any face class.

3. Distant from face space and near face class: This happens when the probe image is not of a face however it still resembles a particular face class stored in the database.

4. Distant from both the face space and face class: When the probe is not a face image i.e. is away from the face space and is nothing like any face class stored.Out of the four, type 3 is responsible for most false positives. To avoid them, face detection is recommended to be a part of such a system**.**

9. CONCLUSION

The Eigen face approach for Face Recognition process is fast and simple which works well under constrained environment. It is one of the best practical solutions for the problem of face recognition. Many applications which require face recognition do not require perfect identification but just low error rate. So instead of searching large database of faces, it is better to give small set of likely matches. By using Eigen face approach, this small set of likely matches for given images can be easily obtained.

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RESEARCH PAPER

FACE DETECTION USING GABOR FILTERS AND NEURAL NETWORK

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ABSTRACT

This paper proposes a classification-based face detection method using Gabor filter features. Considering the desirable characteristics of spatial locality and orientation selectivities of the Gabor filter, we design filters for extracting facial features from the local image. The feature vector based on Gabor filters is used as the input of the classifier, which is a Feed Forward neural network (FFNN) on a reduced feature subspace learned by an approach simpler than principal component analysis (PCA). The effectiveness of the proposed method is demonstrated by the experimental results on testing a large number of images and the comparison with the state-of-the-art method. The image will be convolved with Gabor filters by multiplying the image by Gabor filters in frequency domain. To save time they have been saved in frequency domain before Features is a cell array contains the result of the convolution of the image with each of the forty Gabor filters. The input vector of the network will have large values, which means a large amount of computation. So we reduce the matrix size to one-third of its original size by deleting some rows and columns. Deleting is not the best way but it save more time compare to other methods like PCA.

Keywords: Face Detection, Gabor Wavelet, Feed Forward Neural Network Classifier, Multilayer Perceptron.

1. INTRODUCTION

Human face detection and recognition is an active area of research spanning several disciplines such as image processing, pattern recognition and computer vision. Face detection and recognition are preliminary steps to a wide range of applications such as personal identity verification, video-surveillance, lip trocking, facial expression extraction, gender classification, advanced human and computer interaction. Most methods are based on neural network approaches, feature extraction, Markov chain, skin color, and others are based on template matching [1]. Pattern localization and classification is the step, which is used to classify face and non- face patterns. Many systems dealing with object classification are based on skin color. In this paper we are interested by the design of an ANN algorithm in order to achieve image classification. This paper is organized as follows: In section II, we give an overview over classification for face detection. Description of our model is discussed in Section III. Section IV deals with the training method. Eigenfaces is probably *one of the simplest face recognition methods* and also rather old, then why worry about it at all? Because, while it is simple it works quite well. And its simplicity also makes it a good way to understand how face recognition / dimensionality reduction etc works. Like almost everything associated with the Human body – The Brain, perceptive abilities, cognition and consciousness, face recognition in humans is a wonder. We are not yet even close to an understanding of how we manage to do it. What is known is that it is that the Temporal Lobe in the brain is partly responsible for this ability. Damage to the temporal lobe can result in the condition in which the concerned person can lose the ability to recognize faces.

2. CLASSIFICATION FOR FACE DETECTION

While numerous methods have been proposed to detect face in a single image of intensity or color images. A related and important problem is how to evaluate the performance of the proposed detection methods [1]. Many recent face detection papers compare the performance of several methods, usually in terms of detection and false alarm rates. It is also worth noticing that many metrics have been adopted to evaluate algorithms, such as learning time, execution time, the number of samples required in training, and the ratio between detection rates and false alarms. In general, detectors can make two types of errors: false negatives in which faces are missed resulting in low detection rates and false positives in which an image is declared to be face.

False negative = Number of Missed Falses÷
Total Number of Actual Faces
False Positive = Number of Incorrect Detected Faces÷
Total Number of Actual Faces

Face detection can be viewed as two-class Recognition problem in which an image region is classified as being a "Face" or "nonFace". Consequently, face detection is one of the few attempts to recognize from images a class of objects for which there is a great deal of within-class variability. Face detection also provide interesting challenges to the underlying pattern classification and learning techniques. The class of face and no face image are decidedly characterized by multimodal distribution function and effective decision boundaries are likely to be nonlinear in the image space. Pattern localization and

classification are CPU time intensive being normally implemented in software, however with lower performance than custom implementations. Custom implementation in hardware allows real-time processing, having higher cost and time-to-market than software implementation. Some works [2,3,4] uses ANN for classification, and the system is implemented in software, resulting in a good performance (10 sec for localization and classification). A similar work is presented in [5], aiming to object localization and classification**.**

We are interested in the implementation of an ANN algorithm& design of a Gabor filter in order to provide better image classification. The MLP (Multi-layer Perceptron) algorithm is used to classify face and non-face patterns before the recognition step.

3. MULTI-LAYERS PERCEPTRON

The MLP neural network [1] has feed forward architecture within input layer, a hidden layer, and an output layer. The input layer of this network has N units for an N dimensional input vector. The input units are fully connected to the *I* hidden layer units, which are in turn, connected to the *J* output layers units, where *J* is the number of output classes. A Multi-Layers Perceptron (MLP) is a particular of artificial neural network [7]. We will assume that we have access to a training dataset of *l* pairs (x_i, yi) where x_i is a vector containing the pattern, while y_i is the class of the corresponding pattern. In our case a 2-class task, y_i can be coded 1 and -1.

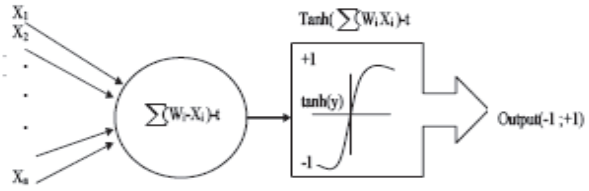

Fig.1:The Neuron of Supervised Training

We considered a MLP (Multi-Layers Perceptron) with a 3 layers, the input layer is a vector constituted by n^2 units of neurons (*n* x *n* pixel input images). The hidden layer has n neurons, and the output layer is a single neuron which is active to 1 if the face is presented and to otherwise.

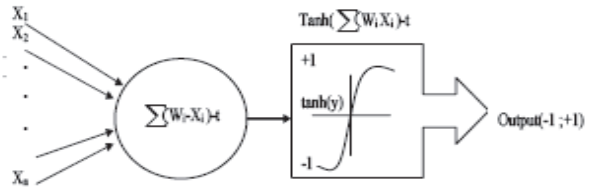

Fig.2: Architecture of Proposed System

We are designing a feed forward neural network with one hundred neurons in the hidden layer and one neuron in the output layer. Prepares images for training phase. All data form both "face" and "non-face" folders will be gathered in a large cell array. Each column will represent the features of an image, which could be a face, or not.

Rows are as follows:

Row 1: File name
Row 2: Desired output of the network corresponded to the feature vector.
Row 3: Prepared vector for the training phase

We will adjust the histogram of the image for better contrast. Then the image will be convolved with Gabor filters by multiplying the image by Gabor filters in frequency domain. . To save time they have been saved in frequency domain before Features is a cell array contains the result of the convolution of the image with each of the forty Gabor filters. These matrices have been concated to form a bif 135x144 matrix of complex numbers. We only need the magnitude of the result. That is why "abs" is used.135x144 has 10,400 pixels. It means that the input vector of the network would have 19,400 values, which means a large amount of computation. So we have reduced the matrix size to one-third of its original size by deleting some rows and columns. Deleting is not the best way but it save more time compare to other methods like PCA. We should optimize this function as possible as we can. First training the neural network and then it will return the trained network. The examples were taken from the Internet database. The MLP will be trained on 500 face and 200 non-face examples.

4. TRAINING METHODOLOGY

The MLP with the training algorithm of feed propagation is universal mappers, which can in theory, approximate any continuous decision region arbitrarily well. Yet the convergence of feed forward algorithms is still an open problem. It is well known that the time cost of feed forward training often exhibits a remarkable variability. It has been demonstrated that, in most cases, rapid restart method can prominently suppress the heavy-tailed nature of training instances and improve efficiency of computation. Multi-Layer Perceptron (MLP) with a feed forward learning algorithms was chosen for the proposed system because of its simplicity and its capability in supervised pattern matching. It has been successfully applied to many pattern classification problems [9]. Our problem has been considered to be suitable with the supervised rule since the pairs of input-output are available. For training the network, we used the classical feed forward algorithm. An example is picked from the training set, the output is computed.

5. ALGORITHM DEVELOPMENT AND RESULTS

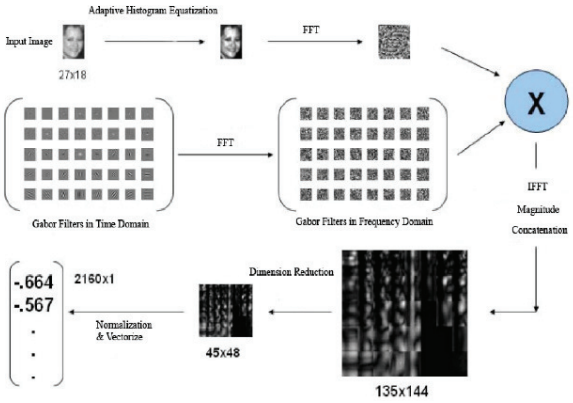

Fig. 4: Steps involved in Feature Extraction

6. 2D GABOR WAVELET REPRESENTATION OF FACES

Since face recognition is not a difficult task for human beings, selection of biologically motivated Gabor filters is well suited to this problem. Gabor filters, modeling the responses of simple cells in the primary visual cortex, are simply plane waves restricted by a Gaussian envelope function [22].

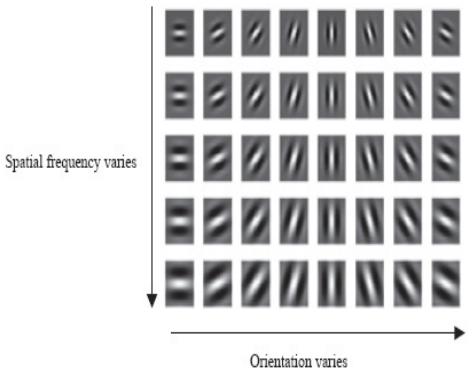

Fig. 5: Gabor Filters Correspond to 5 Spatial Frequencies and 8 Orientation (Gabor Filters in Time Domain)

An image can be represented by the Gabor wavelet transform allowing the description of both the spatial frequency structure and spatial relations. Convolving the image with complex Gabor filters with 5 spatial frequency (v =0,…,4) and 8 orientation (μ = 0,…,7) captures the whole frequency spectrum, both amplitude and phase (Figure 5). In Figure 6, an input face image and the amplitude of the Gabor filter responses are shown below.

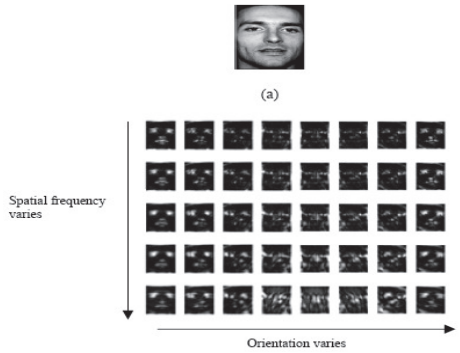

Fig. 6(a&b): Example of a facial image response to above Gabor filters, 6(a) original

face image (from internet database), and b) filter responses. One of the techniques used in the literature for Gabor based face recognition is based on using the response of a grid representing the facial topography for coding the face. [23, 25, 26, 27]. Instead of using the graph nodes, high-energized points can be used in comparisons which form the basis of this work. This approach not only reduces computational complexity, but also improves the performance in the presence of occlusions.

Feature Extraction: Feature extraction algorithm for the proposed method has two main steps in (Fig. 8): (1) Feature point localization, (2) Feature vector computation.

7. FEATURE POINT LOCALIZATION -

In this step, feature vectors are extracted from points with high information content on the face image. In most feature-based methods, facial features are assumed to be the eyes, nose and mouth. However, we do not fix the locations and also the number of feature points in this work. The number of feature vectors and their locations can vary in order to better represent diverse facial characteristics of different faces, such as dimples, moles, etc., which are also the features that people might use for recognizing faces (Fig. 7).

Fig. 7: Facial Feature Points Found as the high-energized points of Gabor Wavelet Responses

From the responses of the face image to Gabor filters, peaks are found by searching the locations in a window *W0* of size *WxW* by the following procedure:

A feature point is located at *(x0, y0),* if

$$R_j(x_0, y_0) = \max_{(x,y)\in W_0} (R_j(x, y))$$

$$R_j(x_0, y_0) > \frac{1}{N_1 N_2} \sum_{x=1}^{N_1} \sum_{y=1}^{N_2} R_j(x, y),$$

(3-4)

j=1,…,40

where *Rj* is the response of the face image to the *jth* Gabor filter *N1 N2* is the size of face image, the center of the window, *W0* is at *(x0, y0)*. Window size *W* is one of the important parameters of proposed algorithm, and it must be chosen small enough to capture the important features and large enough to avoid redundancy. Equation (4) is applied in order not to get stuck on a local maximum, instead of finding the peaks of the responses. In our experiments a *9x9* window is used to search feature points on Gabor filter responses. A feature map is constructed for the face by applying above process to each of 40 Gabor filters.

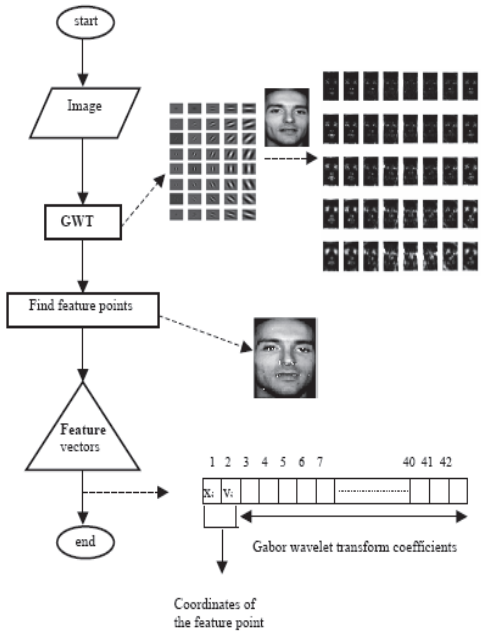

Fig. 8:Flowchart of the Feature Extraction Stage of the FacialImages

Feature vectors are generated at the feature points as a composition of Gabor wavelet transform coefficients. *kth* feature vector of *ith*reference face is defined as,

$$v_{i,k} = \{x_k, y_k, R_{i,j}(x_k, y_k)\ j = 1,\ldots,40\}.$$

(5)

While there are 40 Gabor filters, feature vectors have 42 components. The first two components represent the location of that feature point by storing *(x, y)* coordinates. Since we have no other information about the locations of the feature vectors, the first two components of feature vectors are very important during matching (comparison) process. The remaining 40 components are the samples of the Gabor filter responses at that point. Although one may use some edge information for feature point selection, here it is important to construct feature vectors as the coefficients of Gabor wavelet transform. Feature vectors, as the samples of Gabor wavelet transform at feature points, allow representing both the spatial frequency structure and spatial relations of the local image region around the corresponding feature point.

First Section:

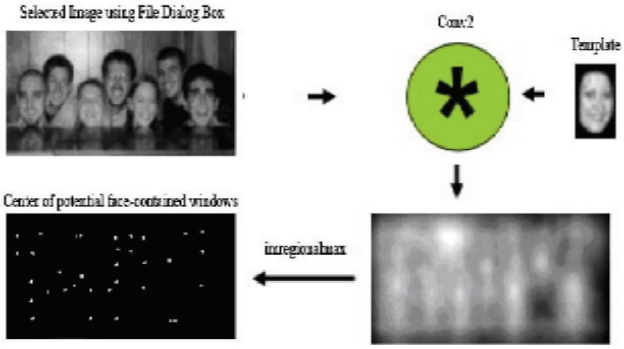

Fig.9: Convolution Operation

Second Section: In this section the algorithm will check all potential face-contained windows and the windows around them using neural network. The result will be the output of the neural network for checked regions.

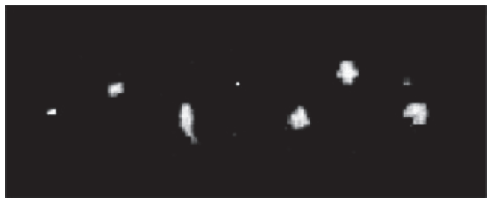

Fig. 10.1: Cell .net

Third Section:

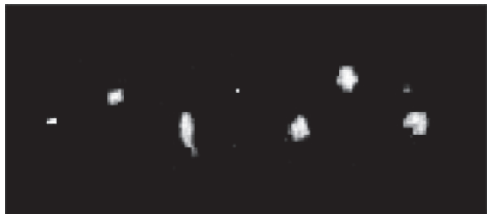

Fig. 10.2: Filtering above pattern for values above threshold (xy_)

Fig10.3: Dilating pattern with a disk structure (xy_)

Fig10.4: Finding the center of each region

Fig. 10.5: Draw a rectangle for each point

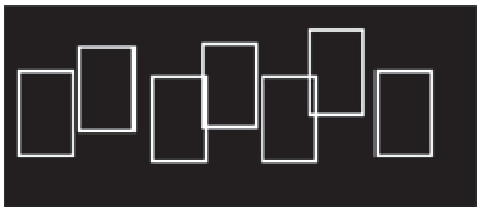

Fig. 10.6: Final Result will be like this

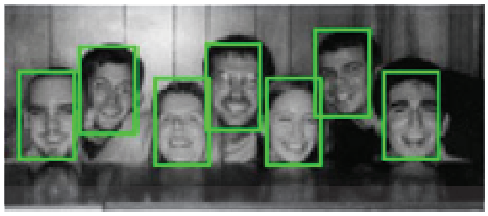

Fig: 10.7: Draw Rectangle

This architecture will be implemented using Matlab in a graphical environment allowing face detection in a database. It will be evaluated using the test data of 500 images containing faces, on this test set we obtained a good detection.

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RESEARCH PAPER

ASSESSMENT OF CARDIORESPIRATORY FITNESS ON THE BASIS OF VO_2 MAX AND BODY COMPOSITION IN THE COLLEGIATE POPULATION OF JAMIA HAMDARD

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ABSTRACT

This study attempted to evaluate the cardiorespiratory fitness on the basis of Body Composition and Vo2 max in the collegiate population of Jamia Hamdard. A sample of healthy subjects was taken for the study. Height and weight were measured by artropometric method, measurement of vo2 max by Queen's college step test and body composition was assessed by body composition analyser in the collegiate population aged 18-25 years. The result was expressed as Mean± Standard deviation. The independent t test was used to compare both the male and female population. Analyses of data reveal normal cardiorespiratory fitness with males having excellent fitness as compared to their female counterparts.

Keywords: Body Composition, vo_2 max, Cardiorespiratory Fitness.

1. INTRODUCTION

Cardiorespiratory fitness (CRF) is a health related component of physical fitness defined as the ability of the circulatory, respiratory and muscular systems to supply oxygen during sustained physical activity.CRF is a measure of functional status of respiratory, cardiovascular and skeletal muscle system.[1]

Coronary heart disease (CHD) is a major cause of disability and premature death throughout the world. Epidemiological studies have demonstrated an inverse association between cardiorespiratory fitness and the incidence of CHD or all cause mortality in healthy or asymptomatic participants. According to a recent World Health Organization (WHO) report, high blood pressure, tobacco use, high blood glucose, physical inactivity, and obesity (in that order) explain 38% of total global deaths. The American Heart Association (AHA) stated that ideal cardiovascular disease (CVD) health, a newly defined concept, comprises of four health behaviors (non-smoking, body mass index [BMI] <25 kg/m^2, physical activity at goal levels, and pursuit of a recommended diet) and three health factors (untreated total cholesterol <200 mg/dL, untreated blood pressure <120/80 mmHg, and fasting blood glucose <100 mg/dL). Scientific evidence shows that such behaviors and factors reported by the WHO and AHA are directly or indirectly associated with CRF.[2]

Maximal oxygen uptake (vo2 max) is the highest rate of oxygen consumption attained during maximal or submaximal exercise.Vo2max is internationally accepted parameter and is the first choice in measuring a person's cardiopulmonary status[3].Low fitness in young adults corresponds due to their sedentary lifestyle, foodhabits, smoking, physicalinactivity, stressetc.4The consequences of decline in physical activity over time are now evident with low level of fitness. The first sign of which is the burgeoning obesity. Therefore the current study has taken up in young collegiate population of Jamia Hamdard who can be targeted for the modifiable factors of CVD. Their Body composition parameters like BMI, Body fat, Muscle mass and water were measured along with their cardiorespiratory fitness indicat (vo2max).so that the youth can be protected from these risk factors.

2. OBJECTIVE

To assess the Cardiorespiratory Fitness on the basis of Vo_2 max, Body Composition in the collegiate population of Jamia Hamdard.

Design: In this prospective, cross sectional study, Body Fat, Muscle mass and Water was measured by body composition Analyze and Queen's college step test was used to measure step test after 5 minutes warm-up. The Data were analyzed to find the overall fitness.

Subjects: a systematic sampling of 100 college students was taken from Jamia Hamdard, New Delhi.

Measurements: subjects were tested for body composition and vo_2 max.

Results: Statistical analysis was done by using SPSS. The mean ± standard deviation of the overall fitness of collegiate population(39.38± 9.22) along with comparison of male and female population using independent t test was done (t=13.41).

3. METHODOLOGY

SAMPLE: A Sample of 100 healthy college students of age 18-25 years, participated in the study.(Mean age 23.100±1.87,BMI 22.40±2.76).All the subject were informed about the nature, purpose and possible risk involved in the study and an informed written consent was taken from them prior to participation. Out of 104 subjects, 4 were dropped out in between the study due to some health issues.

Source of subjects: All the subjects were taken from Jamia Hamdard, New Delhi.

Method of Selecting subjects: The subjects were selected on the basis of inclusion criteria: Age (18-25 years) .male &female (Jamia Hamdard).Exclusion criteria: Major organ surgery following one year, Any health condition that might interfere with the ability to perform physical exertion or in which physical exertion is contraindicated, Patient with Asthma.

Method of Sampling: Systematic sampling

Study Design: Cross sectional design.

Instrumentation:

Measuring tools and equipments: Body composition analyser, Wooden bench 16 .25inch, Metronome, Stopwatch, Weighing machine, Heightscale, Pulseoxymeter.

4. PROCEDURE

Anthropometric Measurement:

HEIGHT

Stature was measured with a measuring tape.

WEIGHT:

Weight was measured using a weighing machine &BMI was calculated.

Measurement of Body Fat, Muscle Mass and Water: Body fat, muscle mass and water measurements were calculated by body composition analyzer.

Queen's college step test:

Procedure: The subjects were asked to perform each stepping cycle to a four-step cadence, up-up-down-down continuously for 3 minutes or until exhaustion. Exhaustion is defined as when the subjects cannot maintain the stepping rate for 15 seconds (Michael &Adams, 1964). . Metronome was used to monitor the stepping cadence, which was set at 88 beats per minute (22 complete steps per minute) for females and 96 beats per minute (24 complete steps per minute) for males. After completion of test, subjects remained standing while pulse rate was measured for 15 seconds, 5 to 20 seconds into recovery. The Heart rate is measured by pulse Oximeter through finger.

5. DATA ANALYSIS

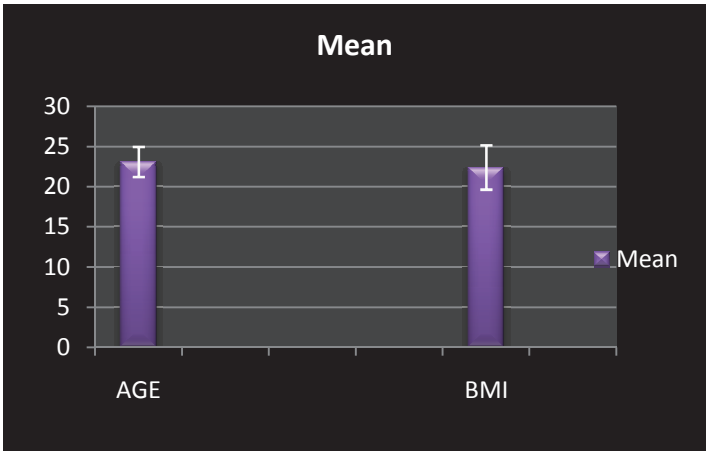
Statistical Analysis was done by using SPSS software version 20.0, The result was expressed as Mean± Standard deviation. The independent t test was used to compare both the male &female population.

6. RESULT

A sample of 104 healthy subjects of age 18 to 25 years, participated in the study. Out of 104 subjects, 4 were dropped out in between the study and the study was completed by remaining 100 subjects. The demographic data has been taken and calculated as shown in table 5.1 (mean age 23.100 ±1.87; BMI 22.40 ± 2.76).

Table 5.1: (showing demographic data) SD *Standard deviation

	Mean	SD
AGE	23.100	1.87
BMI	22.40	2.76



(Demographic data of collegiate population)

Statistical Analysis of Male population: About 43 male subjects were included in the study. The mean and standard deviation of physical characteristics including body fat, muscle mass, water, Vo² max, were given in the table below.

	Mean	SD
BODY FAT (Kg)	11.79	4.85
MUSCLE MASS (Kg)	48.86	7.21
WATER (litre)	39.00	5.23
VO2 MAX	47.89	7.31

Demonstrating physical characteristics of Male population

Statistical analysis of Female population

	Mean	SD
Body Fat (kg)	17.12	4.52
Muscle Mass (kg)	35.78	5.32
Water (liter)	31.22	5.45
VO2max	32.97	3.59

Complete Statistical Analysis: Cardiorespiratory Fitness was assessed on the basis of -Vo² max, Body Composition in the collegiate population. The Table represents the following characteristics of the study population.

	Male	Female	Test T-test	P-value
Body Fat (kg)	11.79±4.85	17.12±4.52	5.65	.000
Muscle Mass(kg)	48.86±7.21	35.78±5.32	10.42	.000
Water (liter)	39.00±5.23	31.22±5.45	7.21	.000
VO2 max	47.89±7.31	32.97±3.59	13.41	.000

Comparison of male and female Physical characteristics

7. CONCLUSION

The present study was aimed at finding out the Cardiorespiratory Fitness level in the collegiate population of Jamia Hamdard University. The result of the study shows that young college students of Jamia Hamdard have normal cardiorespiratory fitness which is shown with -Vo_2 max, Body composition with males having excellent fitness as compared to their female counterparts.

Thus the null hypothesis stands accepted.

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RESEARCH PAPER

BENEFITS AND CHALLENGES OF INTERCHANGE OF ELECTRONIC DATA (IED) IMPLEMENTATION AND APPLICATION AT ALL INDIA INSTITUTE OF MEDICAL SCIENCES COMPUTERIZATION PROJECT

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ABSTRACT

Much government organization is computerizing its activities including Medical & Research Institute like AIIMS. Different areas of hospital are computerised in different parts and that too with use different set of experts and technology. The automation of hospital processes and administration are major part of computerization including EMR, test results, radiology and patient management. Since different areas are computerized with different set of tools as per suitability and knowledge most modules are unless they were part of same unit are disintegrated. They lacked interconnection and sharing of data between each other. It resulted into manual transfer of hard copy data from one unit to other. Interchange of Electronic Data (IED) was implemented with a view to improve operational efficiency, enhance information quality, and achieve reductions in processing time of critically important hospital information. IED today represents an opportunity to improve hospital processes and hospital controls directly even though challenges are expected. It is in light of the opportunities and challenges that this study is done, specifically focusing on the benefits and challenges of implementation and application of IED in AIIMS considering the various modules at different areas of hospital. The study was carried out for the purpose to know the effectiveness and challenges with focus in the areas of Out Patient Department, in patient Department, Medical Record, Emergency Services (Main Emergency and Eye Casualty). The respondents were asked about perceived benefits of IED application and perceived challenges of IED implementation and application. The questionnaires were mainly hand delivered to the respondents. The data collected was analyzed with the use of frequency tables, proportion, percentages, cross tabulations and factor analysis. Majority of the areas that were studied had less than 50 employees with patient foot fall of between 500 - 1000. This study also shows that most of the respondents were working & experienced with the isolated software applications and were part of the process of IED implementation and therefore had the necessary knowledge sought for. From the factor analysis carried out on the variables of the benefits of IED application, the deduction drawn indicates that areas where IED was implemented major benefits have been drawn. Some of the benefits include reduced errors, access to information, enhanced in time information and improved patient care. Despite the benefits of IED application, it was also found that there are several challenges encountered in the implementation of IED. From the factor analysis carried out on the variables of the challenges in the IED implementation, the deduction drawn indicates some of the challenges to be lack of top management support, negative staff attitude, inadequate IT staff training and inadequate non IT staff training. This study also indicated that there were challenges encountered in the application of IED. From the factor analysis carried out on the variables of the challenges of IED application, the deductions drawn indicate some of the challenges to be inadequate non IT staff training, lack of trust of other IED partners, lack of flexibility, lack of maintainability and lack of awareness of benefits of IED.

Keywords: Implementation, Benefits, Challenges, Interchange of Electronic Data.

1. INTRODUCTION

General Background: In the global phenomenon of development Information and Communications Technology (ICT) has contributed significant role with emergence of various process computerization & automation with development of new information and communication applications. One of these applications is Hospital information system and computerization of various medical processes.

There are many areas from medical expert system from automation of medical processes and information management to the complex system of treatment, hospital procedures, keeping medical records EMR, imaging, pathological test, labs, OTs etc.

At AIIMS there are several departments with daily average foot fall of more than 10000 patients. Different departments, hospital processes are computerized to efficiently manage the patient care services. But due to administrative separation & functionality different areas have been computerized in isolation with each other in different phases and using different kind of technology. These were not connected to each other and were not sharing information for one unit to other.

It was felt with increase in use of computers that data from one system, if could be made available to other system for example a patient registered at OPD if linked with in patient admission or Lab reporting and data at one place is available to other system in the format understood by other, would facilitate the working.

It was decided to implement the Interchange of Electronic data (IED) between different systems and start the integration of software application at a centralized server.

But due to complexity of data requirement and diversity as well as complexity of system of medical processes it was started in phases. This study is the part of bigger research and focuses in the area of Out Patient Department, In Patient Department, Emergency Services; Medical Record was taken to implement Interchange of data.

The IED was planned to be done by in house tools to be developed or with up gradation existing module or procurement of new system. The help of external expert on the system was also taken.

2. OBJECTIVE

The objective of IED was to increase efficiency and time saving in providing real time medical information by enabling different applications to share data over LAN and the objective of the study was to support the management in decision making for further computerization process by deducing effectiveness, benefits drawn by implementing IED.

3. RESEARCH STRATEGY

This study concerns the benefits of IED application and the challenges of its implementation in context of various independent isolated software applications. A survey research design was chosen in this study since not much has been done in this area. Also, there was no adequate background information relating this research available for a more advanced research. The

A list of the selected modules and concerned department is provided in Annexure I. The number of person selected was 50. A representative sample should have at least 30 units (Chava and Nachimia, 2003). In view of this, a sample of size 50 was considered adequate.

Primary data was collected from the selected working units at different departments and service location (See Annexure I) with the use of a questionnaire (See Annexure II) addressed to the respondents. The target respondents were users of modules, there supervisor, IT people etc. of each of selected because they had the knowledge sought for the data collected in respect of question 1 & 2 of the questionnaire was analyzed with the use of tables, cross tabulations, frequency, proportion & percentages. The summary of the characteristics of the responding departments/working units are used as it may have implications on benefits and challenges of IED implementation. The responses in respect of question 3 &4 were captured on a Likert scale. Factor analysis was done using the Statistical Package for Social Scientists (SPSS) with the help of Dept of Computer facility. Factor analysis is used because it uncovers the independent sources of data variations. The services of IT and statistical department have been taken in statistical analysis of data.

4. DATA ANALYSIS, FINDINGS AND DISCUSSIONS

A total of 50 questionnaires were distributed targeting different working units where IED was implemented. Out of a total of 50 only 45 responses were received. The response rate was 90% and was considered good for generalization.

The study also captured data on the number of employees in the respondent departments/working. From the research data, most departments/working unit's had10 to 20 employees with work experience of mostly More than 6 Years to 9 Years in same unit. This indicates that most departments/working units have less labour intensive activities and therefore could be relying to some level on automated processes. It may also indicate that most departments/working units are small are acquainted with all the processes. It may also be said that Training on existing system and changes brought by implementation of IED are effectively applied.

Benefits of application of Interchange of Electronic Data: The first objective of the study was to establish the benefits of application IED. From the literature review, the researcher identified following 16 variables that could be used to assess the benefits of IED application in Question no 3 of the questionnaire.

F1 : Reduced paper work
F2 : Reduced errors
F3 : Quick response
F4 : Access to information
F5 : Improved patient care
F6 : Enhanced capacity
F7 : Standardized programs
F8 : Standardized procedures
F9 : Improved cash flow
F10 : Improved inter department relationship
F11: Reduced data entry
F12: Reduced manpower per task
F13: Improved security
F14: Reduced inventory cost
F15: Reduced communication cost
F16: Reduced legal problems
for this study.

The variables were included in the questionnaire and the respondents were asked to state the extent they agreed with the statement in a Likert scale. The variables were analyzed using SPSS and factor analysis was done.

Factor analysis was done by examining the pattern of correlations between observed measures. Measures that were highly correlated (either positively or negatively) were likely to be influenced by the same factors while those that were uncorrelated were likely to be influenced by different factors. Factor analysis done on data on benefits of IED is discussed below:

The data collected indicated the extent to which each of the 16 variables were a benefit of application of IED. There might be some group of variables that were similar to each other, factor analysis was used to identify and

group such variables together in a correlation matrix.

The next output of SPSS was the communalities of the variables. The proportion of variance that each item has in common with other items is Communality. The respective items total variance minus the communality gives the proportion of variance which is unique to each item. Communalities are used to supply initial estimates and which can then be either iteratively improved or not. Table 1 shows the communalities of the variables with extraction method being the principal component analysis.

Table 1: Communalities of Benefits of IED Implementation

	Initial	Extraction
Reduced paper work	1	0.423
Reduced errors	1	0.357
Quick response	1	0.629
Access to information	1	0.523
Improved patient care	1	0.579
Enhanced capacity	1	0.757
Standardized programs	1	0.72
Standardized procedures	1	0.585
Improved cash flow	1	0.865
Improved inter department relationship	1	0.762
Reduced data entry	1	0.622
Reduced manpower per task	1	0.574
Improved security	1	0.738
Reduced inventory cost	1	0.718
Reduced communication cost	1	0.653
Reduced legal problems	1	0.752

Table 2 represents the total original variance of all factors. Principal component analysis was used to extract factors which sum to 16. Eigen values indicate the relative importance of each factor accounting for a particular set and hence those with a small Eigen values were left out. Only four factors were considered significant for analysis.

Table 2: Total variance: Benefits of IED Implementation

Component	Initial Eigen Values			Extraction Sums of Squared Loadings		
	Total	% of Variation	Cumulative %	Total	% of Variation	Cumulative %
1	5.794	36.211	36.211	5.794	36.211	36.211
2	1.720	10.641	46.852	1.720	10.641	46.852
3	1.480	9.247	56.099	1.480	9.247	56.099
4	1.280	8.000	64.099	1.280	8.000	64.099
5	0.990	6.186	70.285			
6	0.835	5.218	75.503			
7	0.679	4.245	79.748			
8	0.619	3.866	83.615			
9	0.557	3.479	87.093			
10	0.483	3.02	90.114			
11	0.403	2.52	92.634			
12	0.349	2.179	94.812			
13	0.278	1.74	96.553			
14	0.235	1.471	98.023			
15	0.171	1.071	99.094			
16	0.145	0.906	100.000			

The next table Table 3 is component matrix of the benefits of the IED implementation which contains the relative Eigen values in respect of each factor. Each factor belongs to one of the four sets of factors extracted. It is determined by the Eigen values of the factors relative to each set.

Table 3

	Component			
	1	2	3	4
Reduced paper work	0.528	0.221		0.307
Reduced errors	0.541		0.229	
Quick response	0.718		-0.31	-0.116

Access to information	0.655	-0.273	-0.119	
Improved patient care	0.619	-0.38	0.154	0.168
Enhanced capacity	0.454	-0.151	0.22	0.693
Standardized programs	0.686	-0.479	0.129	
Standardized procedures	0.701	0.2		-0.228
Improved cash flow		0.668	0.642	
Improved inter department relationship	0.792	-0.151		-0.332
Reduced data entry	0.573	0.288	0.442	0.125
Reduced manpower per task	0.742		0.124	
Improved security	0.574	0.4	-0.499	
Reduced inventory cost	0.544	0.61	-0.178	-0.134
Reduced communication cost	0.765			-0.248
Reduced legal problems	0.103	0.215	-0.562	0.616

Now each variable were then grouped by the extracted factors based on their factor loading on each set. SPPS provided summary of factor loadings as given in Table 4.

Table 4: Summary of the Factor Loadings - Benefits of IED Implementation

Factor	Variables
1	Reduced errors
	Access to information
	Improved patient care
	Enhanced capacity
	Standardized programs
	Improved inter department relationship
	Reduced communication cost
	Reduced manpower per task
2	Quick response
	Improved security
	Reduced inventory cost
3	Improved cash flow
	Reduced data entry
4	Reduced legal /RTI problems

Above Table 4 shows four extracted factors and most variables components are grouped in factors 1, 2 & 3 which were the benefits received by IED implementation. Factor1 is composed of reduced errors, access to information, improved patient care, enhanced capacity, standardized programs, improved inter department relationship, reduced communication cost and reduced manpower per task. Group factor 2 comprises of quick response, improved inter department relationship, improved security, reduced communication cost and reduced inventory cost. Group factor 3 comprises improved cash flow and reduced data entry. Group factor 4 has only one benefit that departments/working units relies and that is reduced legal/RTI problems.

Challenges of IED implementation: The objective was to determine the challenges of IED implementation. Following variables were identified to assess the challenges of implementation:

F1 : It does not include all hospital processes
F2 : It is not adequate as an inter-departmental system
F3 : Inadequate budget support
F4 : Lack of top management support
F5 : Inadequate IT staff training
F6 : Inadequate non IT staff training
F7 : Less cooperation from the interrelated hospital departments
F8 : Data security problems
F9 : Lack of legal framework to handle legal
F10: disputes associated with IED
F11: Lack of flexibility
F12: Lack of maintainability
F13: Lack of awareness of benefits of IED
F14: Lack of trust of other IED departments
F15: Other. Specify

The above variables were included in the questionnaire and the respondents were asked to state the extent they agreed

with the statement in a Likert scale.

Table 5 below shows the communalities of challenges in IED implementation of selected variable.

Table 5

Challenges	Initial	Extraction
It does not include all hospital processes	1.000	0.774
It is not adequate as an inter-departmental system	1.000	0.679
Inadequate budget support	1.000	0.758
Lack of top management support	1.000	0.790
Inadequate IT staff training	1.000	0.789
Inadequate non IT staff training	1.000	0.764
Less cooperation from the interrelated hospital departments	1.000	0.761
Data security problems	1.000	0.591
Lack of legal framework to handle legal disputes associated with IED	1.000	0.653
Lack of flexibility	1.000	0.702
Lack of maintainability	1.000	0.579
Lack of awareness of benefits of IED	1.000	0.736
Lack of trust of other IED departments	1.000	0.600

Table 6 below shows data obtained from SPSS analysis as Total Variance: Challenges of IED implementation

Table 6: Total Variance: Challenges of IED Implementation

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variation	Cumulative %	Total	% of Variation	Cumulative %
1	5.135	39.52	39.502	5.135	39.52	39.502
2	1.682	12.938	52.44	1.682	12.938	52.44
3	1.256	9.665	62.105	1.256	9.665	62.105
4	1.14	8.489	70.594	1.14	8.489	70.594
5	0.792	6.095	76.689			
6	0.741	5.697	82.386			
7	0.618	4.754	87.14			
8	0.506	3.896	91.035			
9	0.435	3.348	94.383			
10	0.308	2.368	96.751			
11	0.18	1.385	98.135			
12	0.154	1.186	99.321			
13	0.888	0.679	100			

Now the it Component Matrix was generated as shown in Table 7 below.

Table 7

	Component			
	1	2	3	4
It does not include all hospital processes	0.24	-0.095	0.622	0.565
It is not adequate as an inter-departmental system	0.434	-0.559	0.118	-0.405
Inadequate budget support	0.584	-0.644	-0.04	-0.029
Lack of top management support	0.673	-0.428	0.39	-0.052
Inadequate IT staff training	0.851	0.072	0.063	0.237
Inadequate non IT staff training	0.819	0.147	0.165	0.213
Less cooperation from the interrelated hospital departments	0.552	-0.024	-0.542	0.402
Data security problems	0.608	-0.011	-0.448	0.146
Lack of legal framework to handle legal disputes associated with IED	0.746	0.244	-0.172	0.09
Lack of flexibility	0.24	0.698	0.381	-0.108
Lack of maintainability	0.649	0.334	-0.021	-0.216
Lack of awareness of benefits of IED	0.795	0.047	-0.018	-0.318
Lack of trust of other IED departments	0.601	0.272	0.012	-0.405

In next Table 8 the Summary of factors loading was analysed.

Table 8

Factor	Variables
1	Inadequate non IT staff training
	Lack of trust of other IED departments
	Lack of flexibility
	Lack of maintainability
	Lack of awareness of benefits of IED
2	Inadequate IT staff training
	Lack of legal framework to handle legal disputes associated with IED
	Data security problems
	Less cooperation from the interrelated hospital departments
3	Lack of top management support
	Inadequate budget support
	It is not adequate as an inter-departmental system
4	It does not include all hospital processes

As shown above Table 8, where four extracted group factors were extracted. Extracted group factors 1 to 3 contain the most of the variable components which are the challenges the departments/working units faced in IED implementation. Group 1 comprises inadequate non IT staff training, lack of trust of departments, lack of flexibility, lack of maintainability and lack of awareness of benefits of IED. Group factor 2 consists of inadequate IT staff training, lack of legal framework to handle legal disputes associated with IED, data security problems and less cooperation from the other department. The 3rd significant group factor 3 consists lack of top management support, inadequate budget support and IED not being adequate as an inter-departmental system. The last Group factor 4 has only IED not including all hospital processes. From the analysis it appears that most of the 13 factors listed in the questionnaire were grouped together by their correlation with each other, and brought down to a total of four main group factors. The most number of Factors elements were in groups 1 to 3 whist only one falling in group 4.

5. SUMMARY

The first objective was to establish the benefits of IED implementation. Factor analysis was used to group related benefits. The benefits that were considered by departments/working to a very great extent were reduced errors, access to information, improved patient care, enhanced capacity, standardized programs and improved inter department relationship. Quick response, improved inter department relationship, improved security, reduced communication cost and reduced inventory cost were considered by departments/working as IED implementation benefits to a large extent. Improved cash flow and reduced data entry were considered by departments/working unit as IED benefits to a moderate extent. Reduced legal/RTI problems were considered by departments/working unit as an IED benefit to a small extent.

The second objective was to determine the challenges faced by departments/working while implementing IED. The challenges that were considered by firms to a very great extent were inadequate non IT staff training, lack of trust of other IED department, lack of flexibility, lack of maintainability and lack of awareness of benefits of IED. Inadequate IT staff training, lack of legal framework to handle legal disputes associated with IED, data security problems and less cooperation from the interrelated hospital department was considered by working units as challenges to a large extent. Lack of top management support, inadequate budget support and IED not adequate as an inter-departmental system were considered by departments/working as challenges to a moderate extent. IED does not include all hospital processes were considered by departments/working unit as a challenge to a small extent.

6. CONCLUSION

From the literature review in this study, it is evident that IED implementation provides many benefits to an organization. The technology for IED implementation depends upon the IT installation and software in use and cannot guarantee the success of an interchange of hospital information in electronic format in all conditions. Therefore, a well planned and executed IED implementation and application process is necessary for the successful adoption of IED. The findings from this study also suggest that departments/working units that are applying IED in AIIMS computerization receives benefits from the implementation. From the factor analysis carried out on variables of the benefits of IED implementation, the deduction drawn indicates the benefits as reduced errors, access to information, improved customer service, enhanced competitive capacity, standardized programs and improved inter departmental relationship. Other benefits established in the study include quick response, improved security, reduced communication cost and reduced inventory cost.

Despite the benefits of IED implementation, this study also shows that there are many challenges encountered in the implementation of IED. From the factor analysis carried out on the variables of the challenges in the IED implementation, the deduction drawn indicates the challenges to be lack of top management support, negative staff attitude, inadequate IT staff training and inadequate non IT staff training.

To overcome these challenges, it is essential first to

establish dialogue between all parties involved to discern IED implementation strategies and timelines long before IED implementation. Inherent in the discussions for the partners involved is the joint planning and system specification that will facilitate the process of IED implementation and application.

User participation in planning, analysis, design, construction, and installation is also necessary for project success and this includes the users of inter-departmental. Likewise, encouragement of the constant evaluation, continuous improvement, and ongoing exploration of new opportunities for IED among all departments & other stakeholders is vital. The objectives of this study were therefore accomplished.

7. RECOMMENDATIONS FOR FURTHER RESEARCH

This study was focused on the modules and department computerized in isolation and interchange of data in hospital processes which are computerized only. Whether such results would be consistent in other industries or not, would need to be verified through further research. Many factors were also identified as key challenges to IED implementation. It would be useful as a follow up project to assess the impact of each of the factors on IED implementation.

8. ACKNOWLEDGEMENT

In doing this research many person were part of the research in collection data, SPSS analysis, IED implementation etc. I here specially acknowledge the services of Computer Facility, Dept. of Biotechnology, Academic Section and all selected departments specially the Medical Record Section.

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RESEARCH PAPER

THE ROLE OF ERP SYSTEMS IN INDUSTRIES

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ABSTRACT

The purpose of this article is to provide further insights into the adoption of enterprise resource planning (ERP) systems and the impacts on organizational performance. It aims at challenging existing claims of ERP vendors with regard to the benefits of their products and at providing evidence of the benefits of bundling ERPS with supply chain management systems. A survey was conducted to collect data on several aspects of organizational performance in companies that adopted ERPS and/or SCMS and the respective control groups. Financial key performance indicators were used to measure overall firm performance and the supply-chain operations reference model to operational performance at the business process (supply chain) level. The key results contradict the claims of ERPS vendors insofar as no significant Performance differences were found between ERPS adopters and non-adopters, either at the business process level, or at the overall firm level. While it could be confirmed that the longer the experience of firms with ERPS, the higher their overall performance, no evidence was found of a similar effect on business process (supply chain) performance. Only those ERPS adopters that also adopted SCMS achieved significantly higher performance at the business process level. Despite the small size of the SCMS user sample, the results do provide some important insights into the relationships between ERPS, SCMS and performance which might encourage both researchers and practitioners in that field to critically reflect on the "optimal" mix of modules and software packages within increasingly diverse forms of enterprise systems. Keywords manufacturing resource planning, Supply chain management, Performance appraisal

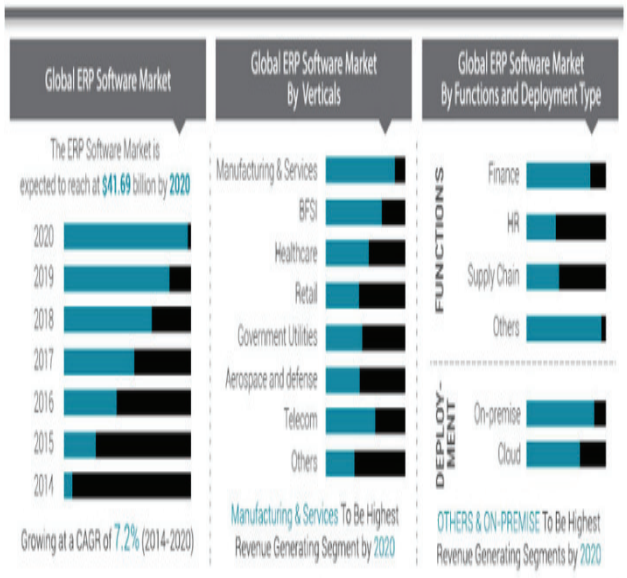
Keywords: ERP, CRM, SCMS,

1. INTRODUCTION

The beginning of organizations, methods were researched to improve business processes. This is when computer systems and databases were introduced to the business world. Creating an information system helps the organization to maintain its data and use its processes. At first, it was a great idea to have a computer performs a process much faster than a human can do. Since ERP systems are lead into Industries, they have been embraced and implemented widely in enterprises. Companies want to learn advanced foreign management philosophy, ideas, and methods via ERP systems introduction to achieve the standardization, institutionalization, modernization of the management and to improve the competitiveness of the enterprise. However, the low success rate of ERP implementation results to a great waste of human, material and financial resources. Because of this, there is space for continuous improvement in the theoretical systems and an application method of ERP.It was also unbelievable to store millions of papers into a drive that is smaller than a human's head. However, when businesses started growing more, the need for computer systems has increased. Then, different systems were introduced. But many problems have arisen. It was in the beginning of the 1990s when the enterprise resource planning (ERP) system was first introduced. From the perspective of the business field, it was a great product. But from the perspective of system developers, it was a challenge to implement. The ERP system is not only about integrating different subsystems into one massive system it is much more than that. It is a system whereby you have an entire electronic organization. However, everything new brings new challenges. ERP has not only brought obstacles to system developers, but to organizations, as well.

2. GLOBAL ERP SOFTWARE MARKET TREND (2013 – 2020)

Size & Forecast



Types of ERP available in Market.

Industry Specific ERP: ERP systems for large corporations are often built from the ground up to suit the

organization's specific and unique needs. For a small business like yours, an off-the-shelf model will work fine. Most are grouped into three categories to service manufacturing, finance or logistics based companies.

Web-Based ERP: ERP programs tend to be complex, requiring high-end computers to run them. However, instead of purchasing the software to run on your computer in your office, many suppliers offer Software as a Service, or SaaS. In this case, you pay a subscription to access the software and your data over the internet. Because the program is running on a remote server, you are free to access it from anywhere you have an Internet connection.

Small Business ERP: Although ERP systems can cover everything from supply chain management to accounting solutions as well as customer relations management, your business may not need to automate all these functions. Therefore, software developer's offer scaled-down models at a lower, more cost-effective price. For instance, your operation may work fine with a system that offers sales and order management, but leaves out the module for warehouse management.

3. BACKGROUND

ERP systems allow for integration between business organizations to be accomplished effectively and without making mistakes. Because of this, a productive ERP system needs the different features of businesses to be connected with one another. As stated above, there are many sections of an ERP System. The manufacturing sector includes the resource and material planning, engineering, bills of material, and the quality of the information being transferred. The financials are in charge of the accounts that are payable as well as received, as well as the cash management. The human resources of ERP Systems take care of the employment, advantages of employees, payroll, and the labor rules. The supply chain management looks over the inventory management, and sales orders taken from the many companies. The last three sectors of the systems are the projects, which is the costing and billing; customer relations, which includes the sales and marketing, commissions, and services; and data warehouse, which contains the information used by the company. The ERP system allows for communication and the exchange of valuable data between departments to be done in a more continuous and orderly fashion. Its main function is to assist the flow of information between all business activities inside the organization and to administer the connections to outsiders. By integrating parts of business and technology into one, ERP allows for effective performance with all departments that are connected.

4. POTENTIAL BENEFITS OF ERP IN INDUSTRIES

Apart from the low cost of ownership and savings achieved by standardizing one application to manage multiple business functions, usage of ERP promises much more. With a successful implementation of an ERP system, top management can have a consolidated view of sales, inventory and receivables at the same time. Due to the centralized nature of ERP systems, organizations can track inventory levels on a daily basis, including inventory in transit and future consignments to be received. This visibility can enable organizations to control their working capital requirements to a great degree. This visibility also enables organizations to run their enterprise in accordance with their strategy, while empowering them to make quick decisions to pursue opportunities.

- Improved reporting: Much of the inefficiency in operational work stems from improper reporting. With an ERP system, this possibility is eliminated as reporting follows an automated template system, allowing various departments to access information seamlessly.
- Scalability: An ERP System is easily scalable. That means adding new functionality to the system as the business needs change is easy. This could mean easy management of new processes, departments, and more.
- Data quality: As compared with manual record-keeping or other traditional approaches, an ERP system improves data quality by improving the underlying processes. As a result, better business decisions can be reached.
- Lower cost of operations: An ERP system introduces fundamental innovations in managing resources, which eliminates delays and thus reduces cost of operations. For instance, use of mobility allows real-time collection of data, which is indispensable to lowering costs.
- Better CRM: A direct benefit of using a good ERP system is improved customer relations as a result of better business processes.
- Business analytics: Having high-quality data allows businesses to use the power of intelligent analytics tools to arrive at better business decisions. In fact, many good **ERP systems** have built-in analytics functionality to allow easier data analysis. Decisions can be reached.
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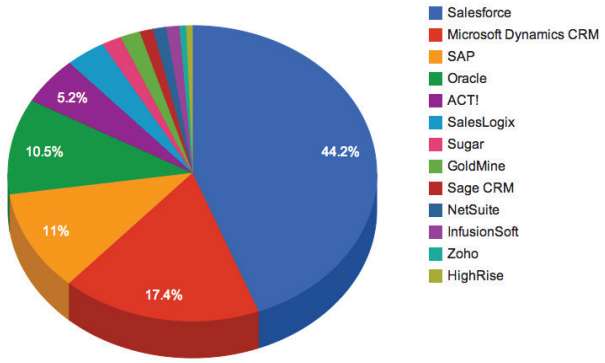
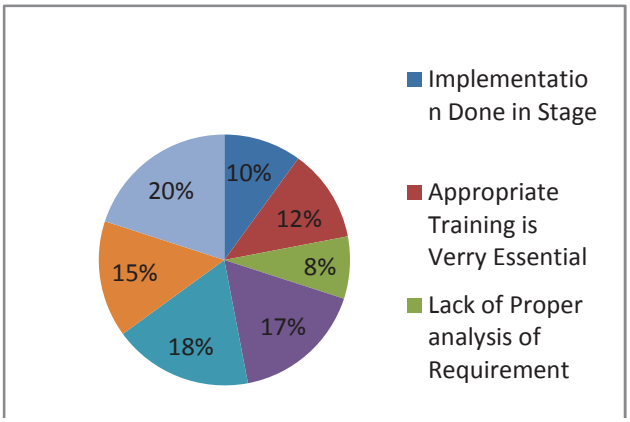
ERP Software Vendors (Key Players)





5. CHALLENGES FACED IN ERP IMPLEMENTATION

Challenges in implementing ERP solutions are quite normal. Though it is not completely a technical job, a lot of planning and proper communication is very much essential to implement ERP across the organization. The common challenges we have noticed companies experience, when ERP Implementation.

- It is very important, that **implementation is done in stages**. Trying to implement everything at once will lead to a lot of confusion and chaos.
- **Appropriate training is very essential** during and after the implementation. The staff should be comfortable in using the application or else, it will backfire, with redundant work and functional inefficiencies.
- **Lack of proper analysis of requirements** will lead to non-availability of certain essential functionalities. This might affect the operations in the long run and reduce the productivity and profitability.
- **Lack of Support from Senior Management** will lead to unnecessary frustrations in work place. Also, it will cause delay in operations and ineffective decisions. So, it is essential to ensure that the Senior Management supports the transformation.
- **Compatibility Issues with ERP Modules** lead to issues in integration of modules. Companies associate different vendors to implement different ERP modules, based on their competency. It is very essential that there is a way to handle compatibility issues.
- **Cost Overheads** will result, if requirements are not properly discussed and decided during the planning phase. So, before execution, a detailed plan with a complete breakdown of requirements should be worked out.
- **Investment in Infrastructure** is very essential. **ERP applications** modules will require good processing speed and adequate storage. Not allocating suitable budget for infrastructure will result in reduced application speed and other software issues. Hardware and Software Security is also equally important.

6. CONCLUSION

This paper reported the results of the effects of ERP systems on the quality of the organization's information system and the use of new management practices. The findings for the quality of the information system provided for strategic and operational planning is in a higher level comparing the integrated systems with the legacy systems, as well as reporting, flexibility and efficiency.

Both ERP and non ERP users report a significant improvement in the quality of information of the new integrated system, results that are in line with the findings of reference study. Moreover, it is concluded that ERP users report higher ratings than non ERP users in all areas.

Also, both ERP and non ERP user's ratings are greater than adequate in all five areas. However, all these differences are not significant. This indicates that the perceptions for the high quality and the benefits of ERP systems exist only when ERP systems are comparing with the legacy systems and not when ERP systems are comparing with other integrated systems. Non- ERP users with integrated systems perceive that they have adopted high quality systems. In addition the findings indicate a very high level of satisfaction from ERP adoption for data collection. The satisfaction of different management tasks is high with all mean ratings between adequate and good. Comparing ERP users and non ERP users it is observed that both have a very high level of satisfaction for data collection. There is still high satisfaction with performance for reporting and analysis. There is noticeably less satisfaction for budgeting tasks for non ERP users than the ERP users. It is concluded that ERP and non ERP users are satisfied with their ERP or similar integrated systems.

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RESEARCH PAPER

A STUDY ON THE IMPACT OF DEMOGRAPHIC VARIABLES IN THE EVALUATION OF BUS TRANSPORTATION SERVICE QUALITY WITH REFERENCE TO KOLKATA CITY

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ABSTRACT

Transportation Service quality is a subjective matter and hence its measurement is usually made from the perspective of passengers. This study attempts to investigate the impact of demographic factors in the evaluation of service quality with reference to bus transportation service quality. The study used the data from a survey conducted in Kolkata city of public and private bus passengers. The results revealed that, among the demographic variables, age, travelling distance (per day), Residential location, Preferred Mode of travelling, average bus fare per day and travelling frequency are influential in the evaluation of service quality. Thus, marketers are well-advised to deliver transportation services based on demographic segments, particularly mode of travelling and bus fare.

Keywords: Age, Mode of travelling, Travelling Distance, Service Quality, Public Bus and Private Bus.

1. INTRODUCTION

Transportation is by nature a service industry and service quality is the key to the satisfaction of passengers and consequently to the success of good transportation. Due to the importance of service quality in the service industry, there were many studies investigating the important attributes and dimensions of service quality. Scholars attempted to develop models to measure and evaluate service quality, e.g. SERVQUAL. In most studies, demographic aspect of service quality was considered and findings were drawn in relation to the demographic factors. An understanding of evaluation of service quality in the context of demographic factors can serve as a major input for policy makers and marketing personnel. This study will investigate the crucial role of demographic variables on service quality evaluation of bus passengers in Kolkata city.

2. REVIEW OF LITERATURE

Service quality may be measured using multiple dimensions and attributes. Studies were conducted to explore and identify major attributes which determine success in offering a service (Parasuraman, et al., 1985). Parasuraman et al. (1988) identified five major dimensions: tangibility, reliability, responsiveness, assurance and empathy. These are the basic dimensions of the well-known SERVQUAL model used to measure service quality and customer satisfaction. SERVQUAL measures service quality by comparing the expectation and perception of service quality as measured in the service dimensions. Another approach in measuring quality is SERVPERF which is an improvement over SERVQUAL; SERVPERF uses absolute measurement of service quality, instead of measuring the quality based on the gap between expectation and perception in the SERVQUAL model (Jusoh, Omain, Majid, Som & Shamsuddin, 2004).

3. OBJECTIVES

- To study the impact of demographic variables in the evaluation of service quality of bus passengers in Kolkata.
- To ensure the association between demographic variables and travel about public bus transportation variables in Kolkata.
- To assess the average bus fare spending per day of the bus passengers.

4. RESEARCH METHODOLOGY

INSTRUMENT	DESCRIPTION
Research Design	Descriptive research
Study Population	Both public and private Bus passengers in Kolkata
Sampling Unit	Bus passengers in Kolkata
Method of Sample	Convenience non- probability sampling
Sample Size	300
Primary Data	The primary data was collected from the respondents (bus passengers) by providing questionnaire through personal interview
Secondary Data	The secondary data has been gathered from the books, journals, magazines, library references and internet sources
Tools Used	Percentage, Chi Square, One Sample t test

5. ANALYSIS AND INTERPRETATION

Table 1: Demographic Profile of the Respondents

Profile	Category	No of Respondents	% To Total
Gender	Male	219	73.0
	Female	81	27.0
Age (In Years)	13 to 19	32	10.7
	20 to 29	120	40.0
	30 to 39	91	30.3
	40 to 49	26	8.7
	60 & above	31	10.3
Marital Status	Unmarried	139	46.3
	Married	161	53.7
Education	Illiterate	19	6.3
	SSC/Diploma	91	30.3
	Degree	140	46.7
	PG & Above	50	16.7
Occupation	Daily Wage Earner	17	5.7
	Student	72	24.0
	Self Employed	28	9.3
	Businessman	31	10.3
	Govt. Service	39	13.0
	Private Service	65	21.7
	Home Maker	22	7.3
	Pensioner	26	8.7
Income (Monthly) in Rupees	NIL	93	31.0
	< 5000	13	4.3
	5000 to 10000	52	17.3
	10001 to 25000	75	25.0
	25001 to 35000	49	16.3
	>35001	18	6.0
Nature of Family	Nuclear Family	228	76.0
	Joint Family	72	24.0
Family Size	Small	224	74.7
	Medium	27	9.0
	Large	49	16.3

Source: Computed Primary data

INTERPRETATION: Table 1 shows the demographic profile of the respondents. 73 percent of the respondents are male category, 40 percent of the respondents are between 20 and 29 years, marital status of the respondents under unmarried category are somewhat equal to married category. Almost 46.7 percent of the respondents have degree qualification, 24 percent of the students use bus transportation as main travel option when compared with daily wage earners. Among monthly income of the respondents 25 percent of the respondents draw between Rs.10,001 to Rs.25,000. Majority of the respondents are from nuclear family system having family size small in nature.

6. HYPOTHESES

- There is no association between Travelling Distance (per day) and Age.
- There is no association between Residential location and Preferred Mode of travelling.
- There is no association between Preferred Mode of travelling and Travelling Frequency.
- There is no significant difference exists between the average Bus fare per day by an individual is not more than Rs. 14.

Table 2: Existence of Association between Selected Variables

		Value	df	Asymp. Sig. (2-sided)
A	Pearson Chi-Square	74.487[a]	16	.000
	Likelihood Ratio	74.470	16	.000
	Linear-by-Linear Association	8.606	1	.003
	N of Valid Cases	300		
B	Pearson Chi-Square	5.337[a]	2	.001
	Likelihood Ratio	4.829	2	.001
	Linear-by-Linear Association	5.163	1	.023
	N of Valid Cases	300		
C	Pearson Chi-Square	6.332[a]	3	.002
	Likelihood Ratio	5.563	3	.001
	Linear-by-Linear Association	1.756	1	.001
	N of Valid Cases	300		

Source: Computed Primary data

Interpretation: Table 2 tested the existence of association between Travelling Distance (per day) and age, residential location and preferred mode of travelling, preferred mode of travelling and travelling frequency. In order to test the association, Chi-Square test has been employed for the contingency table of the Travelling Distance (per day) & age, Residential location and preferred mode of travelling, preferred mode of travelling and travelling frequency. The obtained Pearson Chi-Square value is less than 0.05 ($P < 0.05$) so, null hypothesis has been rejected. It means the selected each two variables got significant association and which permit for the construction of Cross table for the selected variables.

Table 3: Travelling Distance (Per Day) of the Respondents based on Age

AGE (in years)	TRAVELLING DISTANCE (PER DAY)					TOTAL
	< 3 Kms	4 - 10 kms	11- 20 kms	> 21 kms	NIL	
13 - 19	0 (0.0)	3 (1.0)	7 (2.3)	22 (7.3)	0 (0.0)	32 (10.7)
20 - 29	9 (3.0)	11 (3.7)	25 (8.3)	67 (22.3)	8 (2.7)	120 (40.0)
30 – 39	2 (0.7)	3 (1.0)	19 (6.3)	55 (18.3)	12 (4.0)	91 (30.3)
40 - 49	2 (0.7)	1 (0.3)	1 (0.3)	13 (4.3)	9 (3.0)	26 (8.7)

60 & above	3 (1.0)	3 (1.0)	4 (1.3)	4 (1.3)	17 (5.7)	31 (10.3)
TOTAL	16 (5.3)	21 (7.0)	56 (18.7)	161 (53.7)	46 (15.3)	300 (100.0)

Source: Computed Primary data

Interpretation: Table 3 shows relating to travelling distance (per day) of the respondents based on age. Out of 10.7 percent 13 to 19 years of the respondents 7.3 percent respondents are travelling daily more than 21kms and 1 percent respondents travel daily 4 to 10kms, Out of 40 percent 20 to 29 years of the respondents 22.3 percent respondents are travelling daily more than 21kms, Out of 30.3 percent 30 to 39 years of the respondents 18.3 percent respondents are travelling daily more than 21kms, Out of 8.7 percent 40 to 49 years of the respondents 4.3 percent respondents are travelling daily more than 21kms, Out of 10.3 percent 60 and above years of the respondents 5.7 percent of the respondents are not travel by bus on daily basis.

Table 4: Preferred Mode of Travelling of the Respondents based on Residential location

Residential Location	Preferred Mode of Travelling		Total
	Public Bus	Private Bus	
Urban	30 (10.0)	177 (59.0)	207 (69.0)
Semi-urban	12 (4.0)	48 (16.0)	60 (20.0)
Rural	10 (3.3)	23 (7.7)	33 (11.0)
TOTAL	52 (17.3)	248 (82.7)	300 (100.0)

Source: Computed Primary data

Interpretation: Table 4 shows the preferred mode of travelling of the respondents based on residential location. Out of 300 respondents, 69 percent are in urban, 59 percent prefer public bus and 10 percent prefer public bus, out of 20 percent semi-urban respondents, 48 percent prefer public bus and 12 percent prefer public bus, out of 11 percent rural respondents 7.7 percent prefer public bus and 3.3 percent prefer public bus.

Table 5: Preferred Mode of Travelling of the respondents based on Travelling Frequency (Daily)

Preferred Mode of Travelling	Travelling Frequency (Daily)				Total
	NIL	1 - 2 times	3 - 5 times	> 6 times	
Public Bus	7 (2.3)	30 (10.0)	13 (4.3)	2 (.7)	52 (17.3)
Private Bus	40 (13.3)	167 (55.7)	29 (9.7)	12 (4.0)	248 (82.7)
TOTAL	47 (15.7)	197 (65.7)	42 (14.0)	14 (4.7)	300 (100.0)

Source: Computed Primary data

Interpretation: Table 5 shows the preferred mode of travelling of the respondents based on travelling frequency (daily). Out of 300 respondents 82.7 percent prefer private bus and 17.3 percent prefer public bus. 10 percent of the respondents travel in public bus for 1 to 2 times, 4.3 percent of the respondents travel in public bus for 3 to 5 times, 2.3 percent of the respondents prefer to travel in public bus but they are not daily passengers, 55.7 percent of the respondents travel in private bus for 1 to 2 times, 13.3 percent of the respondents prefer private bus for travelling purpose but they are not daily passengers, 9.7 percent of the respondents travel in private bus for 3 to 5 times and 4.7 percent of the respondents travel in private bus for more than 6 times.

Table 6: Daily Amount Spent for travelling based on their Age

Age (in Years)	No. of Respondents	Percentage to Total	Average Bus Fare (in Rupees)
13 – 19	32	10.7	26
20 – 29	120	40.0	21
30 – 39	91	30.3	20
40 – 49	26	8.7	16
60 & above	31	10.3	10
TOTAL	300	100.0	

Source: Computed Primary data

Interpretation: Table 6 shows daily amount spent for travelling based on their age. Respondents between 13 and 19 years spend an average of Rs.26 for their travelling, 20 to 29 years of the respondents spend an average of Rs.21 for their travelling, 30 to 39 years of the respondents spend an average of Rs.20 for their travelling, 40 to 49 years of the respondents forming 8.7 percent are spending an average of Rs.16 for their travelling, 60 & above years of the respondents forming 10.3 percent are spending an average of Rs.10 for their travelling.

Table 7: Opinion about Average Bus Fare Spent

D. Null Hypothesis (Ho): There is no significant difference exists between the average Bus fare per day by an individual is not more than Rs. 14.

Alternative Hypothesis (H1): There is significant difference exists between the average Bus fare per day by an individual is not more than Rs. 14.

Table 7.a

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Payment of Bus fare (per day)	300	20.0500	11.07262	.63928

Source: Computed Primary data

Interpretation: One Sample Statistics provides basic information about the selected variables, Payment of Bus fare per day, including the Sample size (n), Mean, Standard Deviation, & Standard Error Mean. In the above table the mean score for the test among the respondent is Rs.20.

Table 7.b

One-Sample Test

	Test Value = 14					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Payment of Bus fare (per day)	9.464	299	.000	6.05000	4.7919	7.3081

Source: Computed Primary data

Interpretation: One Sample t- test Statistics is 9.46 and P value from this Statistics is .000 and that is less than 0.05 (the level of significance used for the test) such as P value indicates that the average Bus fare of the sampled population is statistically significantly different from 14 rupees. 95 % Confidence Interval estimate for the difference between the population mean bus fare and 14 rupees is (4.7, 7.3).

7. FINDINGS

Majority of the respondents are male category between 20 to 29 years. Unmarried categories are somewhat equal to married category. Most of the students use bus transportation as main travel option when compared with daily wage earners. Among monthly income of the respondents 25 percent of the respondents draw between Rs.10,001 to Rs.25,000. Majority of the respondents are from nuclear family system having family size small in nature.

The Existence of association between Travelling Distance (per day) and Age, Residential location and preferred mode of travelling, preferred mode of travelling and travelling frequency.

It is found that between 20 and 29 years age category respondents' travel per day by bus more than 21 km. Respondents living in urban area prefer private bus as their travelling mode. 55.7 percent private buses are used by the respondents more than 1 to 2 times daily. 40 percent of the respondents from 20 to 29 years spent average rupees 21 for their bus travel per day.

The significant difference exists between the average bus fares per day by an individual in Kolkata city.

8. CONCLUSION

Services delivered to customers and clients are necessary to be evaluated from their perspectives, rather than firm's own perspective. Service quality is an important element in every service marketing programme. Particularly, Transportation services are required to evaluate from the passengers' perspective. This study has investigated the service quality of bus transportation. The findings show that the demographic factor is generally important in the evaluation of service quality. Age, travelling distance (per day), residential location, preferred mode of travelling, average bus fare per day and travelling frequency are influential in the evaluation of service quality. The understanding of the role of demographic variables can guide marketers of transportation to consider more demographic-based segmentation approach and differentiating the services in line with the nature of individual demographic groups.

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RESEARCH PAPER

THE ROLE OF LAW IN SOCIAL DEVELOPMENT : AN ANALYSIS

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ABSTRACT

Due to rapid development for many years, India has become influential world economies. This article examines the role of legal institution and practices in India in order to make an objective evaluation of the function of law in this country's social development. Development is defined by the circumstances of the society in which it is produced. Whether the law can be functional or not is determined by its responsiveness to the social environment. China and India are different from each other. They are also unique as global actors. Therefore, their laws will develop unique, individual characteristics. This article will analyze three functions of law in the course of China and India's peculiar social development: the protection of rights, signaling rights and duties to citizens, and balancing the rights of individuals, groups, and government. Finally, it will be proved that only laws that reflect the essence of a society can be valued in practice. It is indeed true without law we cannot exit.

Keywords: Development, Legislation, Anti-Modernity, Social Effect.

1. INTRODUCTION

India, along with China, Brazil and Russia, form BRIC, a group of rapidly developing emergent economies. As these countries' economies developed, their citizens began to think about the development of other sectors of their societies. They asked, do laws and policy influence the development of the economy? Will economic development lead to social development? China, for example, it has experienced a very special development path over the last one hundred years. Under a highly centralized government, China carried out the strategy of "develop first, regulate later." Because China's legal system developed later than its economy, Chinese legal professionals have committed themselves to establishing a modern legal system. Most Scholars assume that law has not had much influence on the development of Chinese society. In fact, China's neglect of the rule of law has already produced negative impacts on its society. Unlike China, India's legal system is highly esteemed in the world. India's democratic political structure, put in place after it won independence in 1947, provided it with some initial advantages in development; however, India's institutions are complicated, and its social system suffers from chronic illnesses. A failure in the courts frequently cancels out the victory in the legislature. What's more, due to the diversity and disparity in Indian society, including the remnants of the caste system, the effect of legal reform hardly benefits those at lower levels.

In light of the history, India devoted them earnestly to progress as a cure for his social ills. In modern times, the achievement of the West set an example that India have attempted to follow on their path toward development. However, the ability of Western development theory to deliver its promised results in non-Western countries is oftentimes unclear. This is because the path of development is different for every country and must fit local customs and practices. I apply current research in law and development to show the positive impacts of legal reform and government supervision on developing economies, and I outline ways to promote those objectives.

This essay focuses on the legislation of India. I select positive and negative examples with respect to three criteria – the protection of rights, signaling rights and duties to citizens, and balancing the rights of individuals, groups, and government – in order to explore the necessary conditions of each and discover how law influences social development.

2. MODERNITY AND DEVELOPMENT

The discipline of sociology gives three criteria for development: social change, economy, and culture. The focus of these criteria is on progress: society is supposed to develop from a less organized to a more organized state. As an academic project, development studies have focused on social change and evolution in the West from the 16th century. This project asks, why did Europe develop from a feudal society to a capitalist one? From the beginning, development studies assumed progress, defined as development in Western society. One of the three theoretical perspectives on development is the modernization school. In *Economy and Society*, Max Weber studied in the relationship between law and economy. In his opinion, all societies develop in sequence from a lower level to a higher level. The highest point is formal rationality in law and a modern industrial economy. In this sense, if a third world country intends to modernize, it has to absorb a developed legal system and be governed by the rule of law.1 According to this theory of development study; developing countries are in a state

of "backwardness." Once they adopt legal systems similar to western countries, growth in their economies will naturally follow.

3. CRITICISM OF DEVELOPMENT STUDY

However, the modernization school of development study has suffered reverses. In many developing countries, after the initial phases of legal reform and development, growth has slowed or stopped in most countries; the legal system transplanted from the West did not bring constitutional government and democracy as wished. In fact, the foreign laws did not work in the new social conditions. In some cases laws have been translated to fit local culture, which distorts the law's original purpose; and some laws were not welcomed so that people found a way to get around them: "In order to realize the development of society and nation, it is necessary to build up an appropriate political system, which are from the facts of the nation, widely accepted, and can present modification to the government and its employee." The proper definition of "development" becomes the prerequisite of legitimacy for research. One thing is certain: the definition of development cannot be decided by the detailed circumstances of Western society's development. There are many terms to describe modernity in the West, such as rationalization, secularization, alienation, universalism, objectivism, mass society, industrial society, and democratization, etc. It is not possible to have a standard definition that can be used in all societies. But one principle is important: the development of society must conform to the moral standards and values of that society. Development cannot come at the cost the human rights or cultural identity. The purpose of development is for the benefit of the people.

In his attempts at legal and social reform in modern times, India has adopted policies of imitation of the West. Large-scale legal transplantation work was carried out. But the so-called "development" theory was frustrated in reality because it was secluded from social circumstances. This is obviously contradicts the view of the sociological school**.** According to the definition by Pound, law is a regime, and a kind of social control, which is of specialized form and implemented in the process of administration and justice by the regulations of authority. The social law school, on the other hand, is against dogmatism and mechanicals, which are separated from social reality. According to the social law school, the life of law is in the application of it. As a social regime law is founded by people, and furthermore it is created with certain intentions. On the one hand, law is experience developed by rationality; on the other hand, it is also rationality proved by experience. Within the theoretical bounds of social law, it is feasible to set a target for law in a social sense. The value of law is then evaluated according to whether or not this target can be achieved. The disadvantages of legal transplantation led to criticism of development study theory. Friedman did not agree with the classification of society into "traditional" and "modern." In his understanding, the core of law is culture, which can be traditional and modern at the same time, and none of them is superior to another.

4. THE ROLE OF LAW IN DEVELOPMENT

Generally speaking, China and India have benefited from the progress of law. From the view of institutional economics, the institution is a determinant in economic development, and law is one of the most important parts. The definition of property rights and enforceable contract law can lower trade costs and create fairness in competition. If the exploiting power of government can be limited, the interest of most enterprises can be assured. And the formation of a market economy can promote justice, fairness, and right in a society. A reasonable separation of rights between citizens and government can be made, and this will form a harmonized citizen society in the end.

As ancient, civilized country, India has formed independent schemes in religion and culture. The transplantation in modern times of Western customs and practices was like a fresh breeze, which brought new thought and institutions in law. At the least, it became easier for India and China to communicate with the rest of the world. Meanwhile, they still faced difficulties finding a way to minimize the shortcomings of legal transplantation. What is exactly the right law for them? And how can they make the law do right by the people and make better lives for them?

5. THE ROLE OF LAW IN INDIA

This is the most fundamental and significant role of law in social development. "Those who have property will have morality" (Mencius). To protect property by law can promote investment and development of the economy. For example, an effective contract law can build up effective transaction orders, as well as lower costs and risk. The law of India is of the social standard. Through the protection of the weak, the law turns towards public interest, and means to realize fairness and justice in society.

Protection of Women: Indian Constitution gives ideas about the equality of rights to person. "Equality before the law and Equal protection of the Law" became the ground rule in Indian legislation too. In traditional Indian society, women had low status. Article 14 and 15of the Constitution emphasizes the equality of men and women and forbids discrimination between sexes in the above Articles. In terms of Hindu laws, the bride's family has to pay a lot for her marriage. In the caste system, if a girl from a lower caste gets married to a man of a higher caste, she has improved her life and her child's. Thus, parents of the low caste girl will pay a premium for such a match. This leads to increased costs for the dowries of high caste girls because their supply of husbands becomes smaller. The dowry custom has caused many social problems. In 1961, the *Dowry Prohibition Act* was passed. But it has produced little effect. The dowry even becomes the channel of income re-distribution. On one hand, this is because the law does not differentiate "dowry" from "present" clearly, so duty cannot be confirmed; on the other hand, and most importantly: Indian society is not ready to give up the dowry custom

yet. Similarly, the matrimonial regime was useless in China in 1900, but very useful 100 years later. Religion is very influential in India. Because of "Parda," it is very hard to let female students study in the same school with male students and teachers. Unlike women in China, women in India are not in habit of working after they get married. These conditions lead to the dependence of women on their family.

Protection of the consumer: Seven years earlier than China, India has passed the *Consumer Protection Act, 1986*(CPA). First, The definition of "consumer" in the CPA is broad. For example, people who bought and used the goods for the purpose of earning his livelihood by means of self-employment can be included in the definition. Some critics say the Indian law has included too many people in the concept "consumer," which occupied a position of prominence then. But the range of protection is decided by different social situations. In India 107 million individuals are trying to form 85 million small businesses. The government has to protect the interest of small business. It rejected the proposal to permit foreign retail sellers to enter the market of India not long before. It is hard to finda supermarket even in the capital of India, Delhi. Many people find their own ways to make a living. And the government has to protect those people. The amendment occurred with reasons. And it seems to benefit the Indian society in fact. Second, at the mention of procedure, Indian laws can benefit the consumers more, because it is cheaper and costs less time. Many individuals are entitled to bring suits including individual consumers, groups who have same interest, any registered voluntary consumer association, or central government or the state government. This is currently important in India. Corruption is the stubborn illness of Indian bureaucracy. The more complicated a procedure is, the more possibility there is of power-seeking rents. In this sense, the design of procedure in the CPA and relevant laws act on the demands of this reality.

For one thing, modern laws should reflect the interests of most people and the needs of the society; for another, law is the manifestation of ideas of government. Ultimately, government is not on the opposite side of its people. It derives its power from the governed – the people. Therefore it is the duty of government to maximize the interest of its people. This is the rational basis of laws and regulations by the government. Those actions that conform to the laws are supported and have a positive effect. From this perspective, laws can be understood as a signal from the government to private citizens regarding their duties toward the state.

Reform Considerations in Contract Law: India introduced contract law from the United Kingdom in 1872 in order to promote the development of a market economy through the modern transaction system supported by the law. The *Indian Contract Act, 1872* learnt achievement of contract law in 19th century. And accordingly it is different from British law in some respects. The principle of consideration is one of them. Indian contract law allows more exceptions than the U.K. version. First, it is signal from the government to encourage transaction. The bottom line is no argument between two parties. It is the role of the government to facilitate transactions. The government attempted to promote the circulation of wealth, which then stimulated the development of a market economy. Second, it reflects the impact of academic research at that time, which criticizes the revivification of consideration. Third, it reflects the view of value of promise. Consideration insists there be an exchange of benefit from both parties. A promise that is not paid back is not going to form a contract. Otherwise, India is such a religious society that promises are highly valued. Indian people consequently decided to admit more promises with legal weight. As the only written contract law in the common law system, the Indian Contract Act has played important role for 100 years.

Statutes concerning castes in the *Constitution:* The caste system is a serious social problem in India. People from low castes are not guaranteed the fundamental rights of life or body. Thus, after independence the government clearly signaled the end of castes by denying them legitimacy in the Constitution. This is also the result of the influence of the equal principle from the British legal system. But the reality is different. Until the 1970s, the population of untouchables was about one billion, which comprised 1/5 of the total population. More than 90% of untouchables live in the rural areas, and 95% of them have no land. They can only be farmers and cleaners. The right of education is not much realized, because 87% of them are illiterate. Besides religious reasons, there are other reasons for the persistence of the untouchable class related to the rural policy of the Indian government and the corruption of the administration. Actually, the particular protections afforded the untouchables in the constitution makes things worse. People from other castes may think that untouchable's protections cause reverse discrimination, which makes them feel greater enmity towards the untouchables. Such emotions have even sparked violence and pushed the untouchables into a sad plight. Thus, it may be time for the government to find another way to resolve the problem.

6. THE ROLE OF HARMONIOUS CONSTRUCTION

In the opinion of Montesquieu, those who have power have the intention to abuse it. People will utilize power until they cannot anymore. As mentioned above, law functions to protect and signal. But the implementation of laws depends on the power of the government. When the government is powerful, it is more likely to deprive citizens of human and property rights. When the rights of private citizens expand too much, they prevent the efficiency of government. One person's right might be at the cost a lot of other people's right. There should be a distinct border between public power and private right. It is the duty of law to achieve balance between two of them. "In a nation where there is government by law, the public power and private right must be in the state of equilibrium. Too much public power means autocracy,

while too much private right means liberalism and anarchism.

The ideology of "Public Interest" inrefrence of Development: While China suffers from the one-party system and other side, India has a headache because of misinterpretation of democracy, which is controversial. The poor condition of India's infrastructure is one reason that keeps the foreign investors away. As one of the largest airports in India, Bombay airport has to postpone its new airport project to 2014, for it cannot acquire the necessary land. Private ownership of land is the rule in India. The government only has 30% ownership of the land, so most of it belongs to private citizens.

Actually, the public interest word came and highlighted in India in case of M.C.Mehta in 1987 by interpretation of Justice Bahwati. From that time to till, this is exit in India as it is.

According to the *Land Acquisition Act* (LAA), the government can acquire land in the name of "the public interest." Seven circumstances are formulated as "public interest" in the 7th clause of Sec.3. Sec. 17 concerns "emergence": for example, when the river changes its route, the railway can use land needed to keep traffic flowing. Modern civil law prefers to limit the autonomy of private law. With the development of society, the basis of private law transferred from the individual to society. LAA provides stipulations about private land right. But the "public interest" principle has actually won some room for social development. This principle has a place in Art.31A, 31B, and 300A of the Constitution, which provides that the court has the right to make judicial review of government contracts. But there are restrictions on its application, which stipulates that if it is not against the public interest, courts have no power to interfere with the conduct of the government but there is need to amend the Land Acquisition Act which is still pending in Rajya Sabha.

Compensation Agreements: As for the Land Acquisition Act, one scholar calls it "one of the most misused civil laws in the country" He believes this law gives unprincipled support to the land inquisitors and the government. As required, the price of land is determined by reference to the market. But in many cases, the sale price is lower than the real value. According to LAA; interested persons have a right to object to the Collector about the compensation. But it has little effect. For the standard of the compensation, on the one hand, if the land loser asks for a big price, he will be forbidden to do so. On behalf of the benefit of all people, it is responsible for the government to use public funds appropriately; on the other hand, reasonable compensation should be paid to the land loser. The best way to make the standard just is to find a third party, who may be professional. By taking all factors into consideration, the appraisal agency will have a neutral and fair plan for compensation, and thus stop endless debate between the land losers and the government. The ownership of property will be ascertained, and the market will make the order in line with objective value. Otherwise, the function of the appraisal agency might be supervised, because in most instances it is big companies who plan to acquire the land. Big companies like TATA are very influential in commerce and social affairs. Some companies will have their own way to work on the government decision and gain their own interest at the cost of land losers.

7. CONCLUSION

As Ellig said, no matter whether it is now or later, the core of legal development is neither about legislation, nor legal research, nor judicial judgment, but the society in which the law lives. And Lawman has opined that it is necessary to connect law and the society together for they depend on each other. Even if a law is carefully devised by a person who is wise and moral; even if, it is logical and the legal spirit within it is noble and sparkling; it is still too early to conclude if it is a good law. The value of a law is decided by its social effect in practice. When the social circumstances change, the result of the law's application will be different. There is no law that can play its proper role outside of its specific social background. This theory is proved bylaw discussed in this article. India has experienced tremendous social changes in last year's. In the end, laws that are functional are those that answer back to those changes. Thus, no matter how a law is created, from a local or foreign system, it can only be valued by its effect. There is an inherent criterion contained in the legal system of each nation. Only by paying respect to it and identifying it, can laws be useful and promote the development of society. In this sense, whatever definition of development is adopted, or route of development is taken, the crucial goal of "law and development" research is to protect the freedom of people to choose their laws. "The purpose of law and development is to cultivate and promote rights of people, and let them freely choose laws, rules and procedures they admit to." This happens to coincide with the view of Amartya Sen: "To regard man as the core, the most valuable standard, is freedom".

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RESEARCH PAPER

A STUDY OF DIALOGUE METHOD ON PUPIL TEACHERS TO MAKE THEM LEARN TO LIVE TOGETHER

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ABSTRACT

UNESCO's report "Learning-The treasure within "highlights the four pillars of learning and it only imparts the message to live with peace or Learn to live together. Present Education system in India aims to develop democratic values with moral, cultural and ethical values. In regards to 'Learning the treasure within' the dissemination of knowledge is to respect and protect each other with peace which is the frame work of a democratic country.

This paper discusses the process of Dialogue in Teacher education with people teachers & draw attention how to achieve peace by learning to live together. The study shows participation, cooperation; problem-solving and respect for differences; in process of Dialogue method of teaching and learning. This framework is based on collective communication (Dialogue) in learning. Keys of Present design are - Personal reflection with shared vision, Individual accountability to create solutions collectively, Supportive and shared environment, Incentive for working effectively together as team. The concept not only facilitate the sharing of knowledge, but have the potential to learn to live together that can be used for the benefit of the community as a whole and/or its individual members

Keywords: Dialogue, Learning to Live Together.

1. INTRODUCTION

A dialogue process is a group of people who share common values and beliefs, are actively engaged in learning together from each other. It can be define as -

Cross (1998) describes a dialogue process as "groups of people engaged in intellectual interaction for the purpose of learning (p. 4).

This concept not only facilitate the sharing of knowledge, but have the potential to create new knowledge that can be used for the benefit of the community as a whole and/or its individual members.

Present research uses the classroom as a platform for sharing, collaborating, exchanging and understanding of knowledge by an open communication, in which students & teachers are engaged in different groups of 6 – 10 members. These groups learn as collaborative teams to achieve common goals linked to the purpose of learning for all. This structure facilitates open communication, shared meaning and understanding through dialogue.

Present research is a way of developing friendly and mutually respectful teacher-pupil relationship, by developing attitudes , behaviour of appreciation, co-operation, belongingness, trust and spirit of learning It makes the learners more open minded and receptive, builds positive outlook inspired with values, ethics, attitudes and knowledge to constitute the social capital necessary to construct healthy societies and socially binding cultures. This focuses the holistic purpose of education which rests on intellectual, physical, emotional and other aspects of the learners and the overriding purpose of all these is to prepare the learners for the purpose of learning to live together.

2. METHODOLOGY

Authors' framework for dialogue process is based upon the Cluster of Educators where Teacher Educators + Pupil Teachers, with each other build a team to go through the process of learning. The process includes Dialogue, Group discussions and activities to Share knowledge. All these actions have a common idea of communication through Dialogue. "Dialogue" here means a process of communication adopted from David Bohm's model. The participants sit in a circle each having a chance of communicating with the group in a fear free environment. This is also being conducted by author(s) in various seminars and workshops. The aim of this method is to share Knowledge, experiences, views & ideas.

The study is a participant-observer case study and included repeated close observations over a fourteen months period (April 2014 to July 2015) within a college with a purposive sample of participants The primary purpose of Author's study was:-

- To know what how pupil teachers learn to live together in the process of dialogue process.

Author(s) followed a variety of data collection and analysis techniques participant-observer method in this study because it allows for in-depth information to be gathered about the case, which provides for thick descriptions[13]. The study will be bounded by time and place. Author(s) spent 14 months period of time describing the context or setting for the case, and used

multiple sources of information to provide the detailed, in-depth picture of the member's actions, interactions, and responses in order to determine the role of their capacities play in creating the dialogue process.

Author(s) conducted individual semi structured interviews. The interview was guided by a list of questions whose wording and order are only loosely determined before the interview. This structure facilitates an investigator's ability to respond appropriately to the situation, to new ideas about the subject, and to the emerging view of the participant.

Author(s) used an inductive approach to data analysis because this orientation enabled them to treat human activity and social action as *text* that may be viewed as a collection of symbols describing layers of meaning. That they used to understand the implementation & process of learning to live together in Dialogue process.

3. PRESENT DIALOGUE PROCESS MODEL

Developing learning communities in an effort to improve educational organizations is a popular strategy within the education community. Dufour (2004) notes "people use this term to describe every possible combination of individuals with an interest in education" (p. 31).Dialogue process is based on "the group of practice," where the group forms around the *sharing of understood knowledge*. Members of each group sit in a circle. Teacher educator causes one member to initiate talk expressing his or her idea about the Topic that is taken up. Starting with the initial talk will lead to know more about the issue. Next step would be response from some other member in circle and there will be a beginning of different reaction from all members one by one. The steps of implementation of the programme were Organizing students and faculty into smaller groups, Focusing faculty and students on Dialogue.

4. MAJOR FINDINGS

Increasing understanding among learners: When people work together which involve them in unused forms of action, differences and even conflicts between individuals tend to pale and sometimes disappear. It develops behaviour of appreciation; co-operation; belongingness; trust and spirit of learning which are the great source of togetherness.

Tolerance, acceptance of others, respect for differences: These can be cultivated through dialogue. Participants know the balancing between deserving and desiring, they develop tolerance and respect for differences, concern and care for others, they help each other in learning and moreover they move from competition to cooperation. Cooperation is the foundation of togetherness what reflects in their behaviour.

Appreciation of interdependence: It enables people to exceed the routines of their knowledge and attach value to what they have in common against what divides them. They appreciate each other and enhance their knowledge, skills and attitude starting with abstraction of knowledge (what teacher educators and pupil teachers contain), generalization of it and to finish with multiplication of their understanding by exchanging it through Dialogue.

A spirit of respect for the values of pluralism: Research shows that the learner understands that differences and diversities are opportunities to know each other& it can be installed through dialogue process. It presents a forum for the explicit discussion with active listening, self-expression, reframing, and assertiveness of knowledge. It enables the ability to think critically about prejudice, Ability to deal with each and every one. It teaches respect for all and appreciation of group work.

Learning to manage conflicts: Democratic dialogue provides the platform to know each other and to listen & reflect at the same time so one can have administration and interactions what comprise responsible behaviour to learn to live together. Face-to-face interaction offers, how well the team is functioning and how to function even better. These are the key factors of managing conflicts.

Mutual understanding and peace: It cultivates tolerance and respect for differences, concern and love for others, and moving from competition to cooperation. The Dialogue in dialogue process uses teaching and learning to promote participation, cooperation, problem-solving and admiration for diversity. These factors grow peace and harmony in learning communities.

Awareness of the similarities and interdependence of all people: Learning communities develops affirmation, positive thinking, kind listening and communication, assertive behaviour, decision-making and critical thinking, etc. It may integrate an understanding of peace, human rights, social justice and global issues throughout the curriculum for the goal of learning to live together. LC's offer this type of environment to learn & understand individuals in group.

Positive interdependence: Learners learn a sense of sink or swim together by dialogue process. Democratic administration and interactions builds the desirable and pleasant ambience to learn to live together. The learner understands that differences and diversities are opportunities to know each other. As it is the only way for elimination of conflict and it develops positive values in learners.

Individual accountability: Moto behind the dialogue process is each of us has to contribute and learn, LC's Demonstrate the principles of equality and non-discrimination in their behaviour which is helpful in Building an effective, integrated personality in individual with positive self-esteem .This is most important to all particularly to the learners to learn to live together.

5. CONCLUSION

"Dialogue brings people more closely together and enables them to learn to reason and think together; on the other hand, we have seen that the dissolution of boundaries and the reframing of old problems can be

deeply threatening and destabilizing" (Isaacs 1994: 2−3).

In order to survive on this planet peacefully every one must learn to together, live in harmony and in a violence free environment. Which includes, tolerance for diversity, respect and love for differences, harmony in human relationships, conflict reconciliation and resolution, love, friendship, unity, mutual understanding, co-operation, brotherhood, democracy, community building, etc. This method Provides opportunity to grow and learn with group, open communication, trust, leadership, and decision making in groups. They promote conflict resolution, peaceful and respectful behaviour in the relationships between all members of the dialogue process. It gives continuous reflection and professional development of all pupil teachers to learn to live together.

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RESEARCH PAPER

MICRO-STRIP ANTENNAS AND COMMUNICATION SYSTEM

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ABSTRACT

In telecommunication, there are several types of micro-strip antennas popular for its attractive features of low profile, lightweight, easy fabrication, and conformability to mounting hosts. In particular applications in telecommunication usually require smaller antenna size in order to meet the miniaturization requirements of mobile units. The need for wireless broadband communications has increased rapidly in recent years with main aim of high-speed networking service for multimedia communication. The modern communication systems require the antennas for different systems and standards with characteristics like compact, broadband, multiple resonant frequencies and moderate gain. Thus, In order to meet the miniaturization requirements of portable communication equipment; researchers have given much attention recently to micro strip antennas.

India roaring to enter into a new era to be reckoned as world leader in manufacturing sector has immense potential in electronics segment.

Keywords: Technology, Micro-Strip Antennas, Communication, Electronics, Make-in-India.

1. INTRODUCTION

An antenna is a device designed to transmit or receive electromagnetic waves. It is used in radio equipment to convert radio waves into electrical currents or electrical currents into radio waves. The only difference between a transmitting antenna and a receiving antenna is the direction the signal is traveling. A micro strip antenna is used to transmit or receive signals in the ultra-high frequency spectrum. These are waves with frequencies between 300 MHz and 3000 MHz (3GHz).

The micro strip concept was first proposed by G.A. Deschamps in 1953. The concept did not become practical to implement until the 1970s, when soft substrate materials, such as plastics, became readily available. At that time, the idea was further developed by Robert E. Munson and John Q. Howell. Research is still being done to improve micro strip antennas. Scientists are especially looking for ways to reduce the size of the micro strip antennas to allow for their use in even smaller electronic devices.

2. OBJECTIVE OF THE STUDY

To understand the micro-strip antenna, its applicability in Communication system and how India sense its opportunity to grow particularly in light of Make-in-India program.

3. METHOD OF STUDY

Primarily literary research methodology has been used for the study. References have been taken from books, articles, websites and journals.

4. MICRO-STRIP ANTENNA

The micro strip antenna is a very thin metallic strip and in general has a conducting patch printed on a grounded microwave substrate separated by a dielectric. Micro strip antennas are widely used in the microwave frequency region because of their simplicity and compatibility with printed-circuit technology, making them easy to manufacture either as stand-alone elements or as elements of arrays. In its simplest form a micro strip antenna consists of a patch of metal, usually rectangular or circular (though other shapes are sometimes used) on top of a grounded substrate. A micro strip antenna operates by resonating at a frequency. Micro strip antennas have a narrowband, and are wide-beam antennas. Size reduction and bandwidth enhancement are becoming major design considerations for practical applications of micro strip antennas.

5. TYPES OF MICRO STRIP ANTENNAS

Broadly Micro strip antennas can be divided into two categories namely:

- Rectangular Micro strip (Patch) Antennas
- Planar Inverted-F Antennas (PIFA)

6. RECTANGULAR MICRO STRIP (PATCH) ANTENNAS

A Micro strip patch antenna is a thin square patch on one side of a dielectric substrate and the other side having a plane to the ground. The simplest Micro strip patch antenna configuration would be the rectangular patch antenna as shown in Fig. 1.

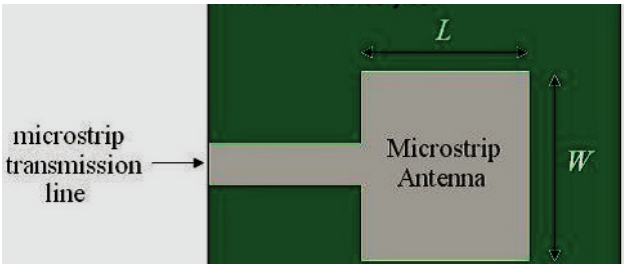

Fig. 1: Micro Strip Patch Antenna

The patch in the antenna is made of a conducting material Cu (Copper) or Au (Gold) and this can be in any shape rectangular, circular, triangular, elliptical or some other common shape. The length of the patch for a rectangular patch antenna normally would be $0.333\lambda < L < 0.5\ \lambda$, λ being the free space wavelength. The thickness of the patch is selected to be in such a way that is $t << \lambda$. The rectangular patch antenna is approximately a one-half wavelength long section of rectangular micro strip transmission line. When air is the antenna substrate, the length of the rectangular micro strip antenna is approximately one-half of a free space wavelength.

7. PLANAR INVERTED-F ANTENNAS (PIFA)

These antennas are derived from a quarter-wave half-patch antenna. The shorting plane of the half-patch is reduced in length which decreases the resonance frequency. Often PIFA antennas have multiple branches to resonate at the various cellular bands. On some phones, grounded parasitic elements are used to enhance the radiation bandwidth characteristics. This antenna resembles an inverted F, which explains the PIFA name. The Planar Inverted-F Antenna is popular because it has a low profile and an omnidirectional pattern. The PIFA is shown from a side view in Fig. 2.

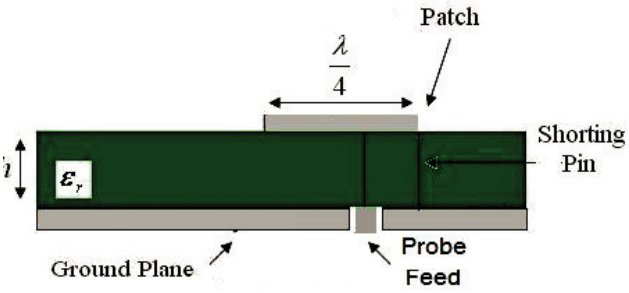

Fig. 2: PIFA

8. MERITS AND DEMERITS OF MICROSTRIP ANTENNA

Micro strip antennas are less in weight, having thin profile configurations which can be made conformal. It has not only low fabrication cost, but these can readily be available by mass production. This requires no cavity backing and is very easy to install as well. Even though Micro strip antennas are favored and preferred over conventional antennas these have some demerits as well. These have low efficiency, low gain, narrow bandwidth, large ohmic loss and poor end radiator. These demerits can be reduced by using several techniques. Modifications like using an inset feed patch antenna with modified ground plane can achieve widest bandwidth. An L-shaped feed rectangular patch antenna modified C-slot on the ground plane influences the bandwidth of the patch antenna.

9. COMMUNICATION SYSTEM AND NEW ADVANCEMENTS

Single layer micro strip antennas have very narrow bandwidth, but using two-layer proximity coupled micro strip antennas higher bandwidth can be achieved. The input impedance of a proximity coupled micro strip antenna is a sensitive function of length and width of the micro strip feed line. Since radiation pattern of a micro strip antenna has wide beam width in one hemisphere, two back-to-back micro strip antennas in the same module can be used to produce nearly omnidirectional radiation pattern required for applications like LAN etc.

Compact micro strip can be designed by embedding suitable slots on the radiating patch. The loading can be varied by varying the length and width of the slot. Slots can be of different shapes. Combination of two slots on the patch can produce dual frequencies. For achieving micro strip antennas with a reduced size at a fixed operating frequency, the use of a high-permittivity substrate is an effective method. Recently, it has been demonstrated that loading the micro strip patch with a shorting pin can also effectively reduce the required patch size for affixed operating frequency.

10.OPPORTUNITY AND INDIA

Prime Minister Narendra Modi launched the Make in India program on 25 September 2014 in a function at the Vigyan Bhavan. This is an initiative aimed at making India a global manufacturing hub. Under the 'Make in India' initiative, the government has, announced several steps to improve the business environment by easing processes to do business in the country, and attract foreign investments. Make in India' aims at increasing the GDP and tax revenues in the country, by producing products that meet high quality standards, and minimizing the impact on the environment. Fostering innovation, protecting intellectual property, and enhancing skill development are the other aims of the program according to the 'Make in India' website. The government has said that it has, so far, received Rs 1,10 lakh crore worth of proposals from various companies that are interested in manufacturing electronics in India. In August 2015, Hindustan Aeronautics Limited (HAL) began talks with Russia's Irkut Corp to transfer technology of 332 components of the Sukhoi Su-30MKI fighter aircraft under the Make in India program. These components, also called line replacement units (LRUs) refer to both critical and non-critical components and fall into four major heads such as Radio and Radar; Electrical & Electronics System; Mechanical System and Instrument System. Companies like Xiaomi, Huawei have already set

up manufacturing units in India, while iPhone, iPad manufacturer Foxconn is expected to open a manufacturing unit soon. Recently, Lenovo also announced that it has started manufacturing Motorola smart phones in a plant near Chennai. Following Japanese Prime Minister Shinzo Abe's visit to India in December 2015, it was announced that Japan would set up a US$12 billion fund for Make in India related projects called the "Japan-India Make-in-India Special Finance Facility". In late December, phone manufacturer Vivo Mobile India began manufacturing smart phones at a plant in Greater Noida. The plant employs 2,200 people.

11.CONCLUSION

Antenna designers are always looking for creative ways to improve performance. The modern wireless communication systems require the antennas for different systems and standards with characteristics like compact, broadband, multiple resonant frequencies and moderate gain. Because of many attractive features, micro strip patch antennas have received considerable attention for wireless communication applications.

India is at present at the threshold of becoming a giant in manufacturing sector. The electronics market is one of the largest in world and is expected to reach US$400 billion by year 2022. Vision 2020 envisaged that India will be a major producer of electronic goods by that year.

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RESEARCH PAPER

CREATIVITY AND INNOVATION IN SCIENCE EDUCATION

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ABSTRACT

The conventional education system in India has been insufficient to create a talent pool with requisite knowledge & skills deemed fit for the growth and development of the economy. To meet the challenges of 21st century, our education system needs creativity led curriculum. Such creativity is recognized as being valuable for personal, social, economical and technological reasons. Through this paper, I have tried to focus on new learning methodology, which will equip students to explore their capabilities and competencies. As Science is discipline of experimentation where students are always engaged in practical learning, which should be investigative in nature. This learning via scientific investigation should involve high level of creativity and innovation.

Keywords: Project Based Learning, Class Room Projects

1. INTRODUCTION

Education in India is also trying to match the global pace of development by keeping itself abreast with the latest developments. With the launch of ambitious policies like Make in India, Digital India and Start up India, the world has started looking at our country as a potential talent pool. As a fact, everyone knows that as every sector requires efficient people and expects finished products, experts feel that it is high time for education in India also to raise its bar to cater to global challenges. As the world is progressing faster and technology entering into every walk of life, the responsibility of education has become decisive in producing competent people who should not only sustain but surpass amid increasing professional pressure.

Education in India is aiming with emphasis on technology and entrepreneurship development. We are being testimony to a paradigm shift in education from theoretical to application based orientation. Our Prime Minister Narendra Modi's 'Make in India' campaign is also oriented at making India the manufacturing hub. To ensure that it happen we need a creativity-led education system rather a curriculum- led. As we know that curriculum is revised on regular intervals, workshops and presentations are also aimed at developing skills, thrusts upon research is made but the situation is still frightening. Critics believe that disintegration of knowledge into separate areas of the curriculum is no longer pertinent to the modern world, whereas interdisciplinary solutions are immediately required to address the 'wicked problems' of inequality, poverty, global, over population and climate change.

New models of education that enable holistic thinking and creative problem solving approach are urgently required. It will enable youngsters to understand individual's capabilities, competencies and seek fulfilling careers. Creativity-led education system is highly effective in enabling students to discover their passion with interest through which they will imbibe capabilities and skills. This paper presents some new ideas to promote creativity in science education and to make science students innovative and creative.

2. FOSTERING CREATIVITY IN SCIENCE EDUCATION

All inventions like nanoparticles for delivery of drugs, computer software, navigation system and many others were developed in the last few years by high school students under the guidance and encouragement of their science teacher. In future these innovative technologies will improve the quality of human life. We are not saying that all students in a class will come up with these innovations but we can expect with some students to innovate and create new things. In science, opportunity is given to students to create and innovate. In fact science is a discipline, where students do experiments, explore, question and think out of the box. It is important for our students to be engaged in inquiry, creative and innovative in classroom, as they learn best by doing. According to labor department of US by 2018, the two fastest growing sector in coming years will be networking & data communication and bio-medical engineering. Both fields require creative and innovative ideas and are highly dependent on science.

Considering these facts, it is the need of the hour to foster creativity in science classroom. Traditionally; no opportunity was given to science students to think critically and independently. They were not able to make decisions and create something. Even most of the students carried out their practical work unthinkingly.

If science is a creative endeavor then students should be able to recognize this. Being able to "explain the value of imagination and creativity in doing science" is therefore

seen as an important outcome of science education. (Clough, 1998, p.214).

Now the question arises…How would a busy teacher achieve the goal? What opportunities can be given to students to create and innovate something new? Recently many models have been developed to promote creativity in classroom. But firstly we have to understand the concept of creativity.

3. WHAT IS CREATIVITY

In general term, we can say that ability of individual is to produce new and valuable ideas. However different psychologists defined it in their own way. According to Howard Gardner "a creative person is one who regularly solves problems, defines new questions in a domain in a way that is initially considered novel but that ultimately comes to be accepted in a particular cultural setting."(Gardner, 1993.p.35)

In the words of Amiable and her coworkers, 'coming up with fresh ideas for changing products, services and processes so as to achieve the organization's goal in a better way."(Amabileet al.2005)

Torrance and J.P. Guilford recognized defined some cognitive variables such as original ideas, ideational fluency and sensitivity for missing elements in their own way. Guilford described two phases of creative act- Convergent and Divergent thinking. He defined convergent thinking as the capacity to focus on one of the best solution of a problem quickly. In contrast, divergent thinking is the ability to produce many associations to a stimulus or to reach at many solutions of a given problem.

On the basis of above discussed concept there can be two different modes of thought- Analytical and Associative. In the analytical mode, thinking process is more focused and evaluative, analyzing cause and effect relationships. Generally Science teachers associate this analytical mode with the higher domains of Bloom's Taxonomy (analysis, synthesis, and evaluation) while in the associative mode, thinking is intuitive, defocussed and suggestive.

In the words of Sawyer, creativity is not only a property of individual but a property of social group (Sawyer, 2006.p.305)

Osborn also considered group creativity superior to individual creativity that's why he introduced Brain storming method. When an individual shows a single creative act, it may have resulted from multicomponent process like social context and group interactions.

Thus we can say that creativity is not single hard to measure act or property but it requires both convergent and divergent thinking.

4. HOW TO PROMOTE CREATIVITY IN YOUR CLASSROOM

Science is generally taught through lectures, lecture cum demonstration and textbook that are dominated by facts and algorithmic process rather than by principles, concepts, and evidence based ways of thinking. The concept of teaching for creative problem – solving came in to credence in 1960 with the work of Jerome Bruner. He argued that children should be motivated to find out the answer of any task or problem in inventive way, rather than finding it in a book, notes or on blackboard (Bruner, 1965). Since then many programs and instructions are designed by psychologist and educators to promote inventiveness and creativity at each level of education.

It is well known that the scientific processes and investigation involve high level of insight and creativity. Invention and discovery is not always logical. Sometimes it results from sudden illumination and unexpected imagination in which scientist finds the solution to a problem and then verify it. This can be true for students, so teacher should try that these children can apply gained knowledge in novel situation. Innovative and flexible application of knowledge always results in creative solution of a problem. Thus investigation must be a part of science learning and the practical work done in classroom should be investigative in nature. It influences the student's conceptual understanding positively and encourages flexible thinking.

5. ACTIVITIES/ IDEAS TO FOSTER CREATIVITY

- Project Based Learning (PBL) - It is based on learning by doing concept where students learn the things on their own by making effective use of technology and inquiry. They explore the content in creative and innovative manner.
- Exploravision – In this group of 2-4 students along with their teacher imagine future technology. The team selects a technology having importance in daily life and explores its history, current working, why it was invented, and what will happen to it after 15-20 years.
- Some projects are: RegenX (regeneration of limbs), Automatic Correcting Eyeglasses (automatic adjustment to worsening vision)
- These show the vision of students, to see the things beyond their existence. These projects tap into student's curiosity and show their creativity and innovation level. Beside this these are posing question like. "Why can't scientist do that yet?"
- Competition – Sometimes boring topics can be made interested by doing a competition. It is the easiest way to foster creativity as some students are motivated by the reward in any form (money, recognition, scholarship). It has been observed that students respond and complete the task given efficiently if there is a meaningful reason behind it.
- Shifting from "What we know" to "How we come to know"- There is need to develop and nurture inquiry skills and attitude.
- Think Quest International – It consists of library of 7000+ projects "by students and for students". This

interactive website covers large no of topics where students can learn online and their problems are solved by group of students. The solutions are displayed in the library.

- Class Room Projects – Innumerable projects are there which can be conducted in classroom. These projects involve creative and innovative ideas to develop high cognitive skills among students. These type of challenges give hands on experience along with deeper understanding of concept. The projects are designed in such a way, a perfect balance is maintained between constraint and freedom. Some suggested projects are:
    - Design of spacecraft challenge (Based on Newton's law)
    - Air pollution challenge (changes in properties of matter)

These activities not only provide platform for creativity but also train students with scientific method and stimulate their scientific thinking.

6. CONCLUSION

Our education system should reflect innovative and creative thought as there is a need of students who can think creatively and critically. These students will be able to meet the challenges of 21st century by contributing positively to this economic and technological world. It is well said that now our future is tied to human creativity. Nurturing and development of creativity and innovation is essential for today's generation. Educational institutions should foster creativity, flexible & critical thinking and judgment capability. Then only these students will be able to identify problems, make decisions and find solutions. We need skilled future leaders who can formulate solutions to the issues like over population, climate change, shrinking of natural resources and many more.

As we know that role of technology is increasing in our life on daily basis and as it advances we need individuals who can come up with some new and better technology and new ways of its usage. And this future skilled and efficient manpower will be prepared in today's classroom. Science is always credited as a source of discovery and economic development. Thus there is a strong need to address such pedagogies which can stimulate creative and reflective thinking in students.

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RESEARCH PAPER

INFORMATION EXTRACTION SYSTEMS: METHODOLOGIES & APPLICATIONS

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ABSTRACT

As there is an availability of large numbers of applications, the volumes of unstructured and/or semi-structured data has been generated tremendously which leads to the new discipline i.e. Information Extraction (IE). This filed is mainly concerned with the task of automatically extracting the structured information from the unstructured and/or semi-structured text. Information Extraction (IE) is a Natural Language Processing technology based on analyzing the natural dialect in order to extract the useful snippets of information. This paper will covers the various components of IE Systems; different methodologies used for the Information Extraction Systems; prior work in the area of the IE Systems and various applications of IE Systems. In the later sections, the characteristics of different Information Extraction systems will be discussed.

Keywords: Information Extraction (IE), Natural Language Processing (NLP), Natural Language Understanding (NLU), Pattern Discovery.

1. INTRODUCTION

Information Extraction (IE) is an emerging technology that is based on the task of automatically extracting the snippets of information from the structured, unstructured and/or semi-structured documents. This process takes the input in the form of text (as well as speech) and generates the output in the form of fixed-format, unambiguous data. The output of these systems may be stored in a database for future use such as for Data Mining techniques or may be used for indexing purposes in Information Retrieval (IR) applications such as Internet search engines like Google.

A number of IE systems have been designed and developed. These systems basically used the 2 main approaches i.e. (1) The Learning Approach, and (2) The Knowledge Engineering Approach. The *Learning Approach* is only for those who have enough knowledge about the domain and the tasks of the system in order to annotate the text accurately. The *Knowledge Engineering (KE)* approach uses an iterative process and is suitable for system developers, who are familiar with both the requirements of the application domain and the function of the designed IE system [1].

2. DIFFERENT TYPES OF DATA

We can categorize the various IE systems by the type of data that can be used as source [2]:

- *Structured Data:* It refers to information with a high degree of organization. This is relational data (e.g., from databases). Thus, detecting the suitable information and the assignment of a meaning can be eased.
- *Semi-structured Data:* It is data that has not been organized into a specialized repository, such as a database. No semantics can be applied to this kind of data.
- *Unstructured Data:* In order to extract relevant information from the unstructured text, firstly we must understand the text. The lack of structure makes compilation a time and energy-consuming task.

3. COMPONENTS OF INFORMATION EXTRATCION SYSTEMS

An IE system has following main components:

- *Tokenization:* The Tokenization is a process of segmenting the inputted text into linguistic units such as words, punctuation, numbers, alphanumeric, etc. It is the first step in the majority of text processing applications.
- *Lexical and Morphological Processing:* In the lexical analysis the tokens determined by the Tokenization module are looked up in the dictionary in order to determine their possible parts-of-speech and other lexical features that are required for subsequent processing. Handling of proper names is one the main role of this module.
- *Parsing:* Parsing comes from a Latin word which means “a part” [3]. It is also known as Syntactic Analysis. It has the responsibility to identify the syntactic structure of the analyzed document. IE systems are mainly interested in specific types of information in a text and ignore remaining portions of the text, which are not relevant for their task.
- *Co-reference:* Co-reference is the task of finding all expressions that refer to the same entity in a text. The

purpose of this module is simply that application relevant entities will be referred to in many different ways throughout a given text.

- *Domain-Specific Analysis:* The domain-specific analysis is the core module of most IE systems. The prior modules prepare the text for the domain analysis by adding semantic and syntactic features to it. For extracting facts and events, the system needs domain specific extraction patterns. These patterns can be generated manually or automatically.
- *Merging Results***:** Sometimes the output of the above modules is generated in the form in which the information is spread among different sentences. In such type of cases information should be combined before creating the final templates. For this purpose some of the Information Extraction systems use a Merging module. This module uses an algorithm to decide which templates can be merged or which can't be.

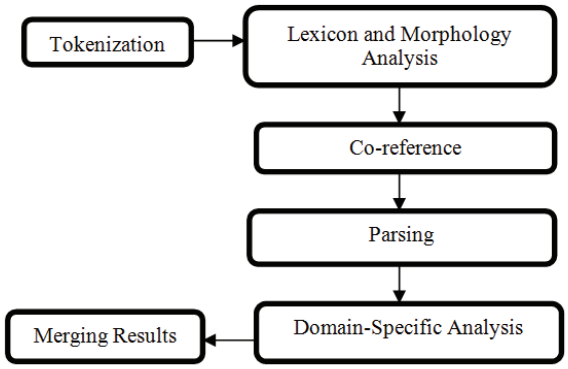

Fig. 1: Essential Components of Information Extraction System

4. LITERATURE REVIEW

In this section we will discuss about the past work on both manual and automatic learning of extraction patterns for IE systems and wrappers. We can categorize the Information Extraction Systems in 4 categories:-

Manual Pattern Discovery in IE Systems: In earlier MUC (Message Understanding Conferences) many IE systems were customized manually to a given task. Some of the systems based on Manual Pattern Discovery are:-

- *FASTUS* is acronym for Finite State Automaton Text Understanding System [4] .It is an IE system based on manual pattern discovery. It is a system for obtaining the information from natural language text for entry into a database and for other applications. FASTUS is cascaded, non-deterministic, very efficient and effective, and has been used successfully in the variety of applications.
- *GE NLTOOLSET* is an IE system using a knowledge-based, domain-independent core of text processing tool. The processing of the toolset is divided into three stages: pre processing; linguistic analysis; post-processing [5].
- *PLUM* is an acronym for Probabilistic Language Understanding Model [6] as it used in MUC-4 &generally applies manually generated rules. The PLUM system architecture contains a preprocessing module, a morphological analysis module, a parsing module, a semantic interpreter, a discourse processing module, and a template generation module.

Automatic Pattern Discovery in IE Systems: Due to the inconvenient and time-consuming manual generation of extraction rules, it leads to the development of the Automatic Pattern Discovery IE Systems. Two main approaches can be applied in these systems: (1) supervised learning approach, and (2) unsupervised learning approach.

- ***Supervised*** learning approach is that in which a large set of training data is required to learn the rules using Machine Learning techniques. Thereby, almost no knowledge about the domain is necessary in this case. Some of the typical examples of such systems are:
- *Auto Slog* was the dictionary construction system that creates the patterns of extraction automatically by using the heuristic rules. It was the first system to learn text extraction rules from training examples. These systems need an answer key or the text as an input in which the noun phrases that should be extracted have been labeled with domain-specific tags [7].
- *CRYSTAL* system takes texts, which are processed by a syntactic parser. It needs training documents annotated by a domain expert, as well as a semantic hierarchy. CRYSTAL starts learning by creating the extraction rules for each instance of the target event in the training data.
- *GATE* is a framework and graphical development environment which enables users to develop and deploy language engineering components and resources [8]. GATE provides easy-to-use and extendable facilities for text annotation to annotate required training data for NLP algorithms.
- ***Unsupervised*** learning approach is that in which rules are learned by a small set of seed rules and an annotated corpus using bootstrapping methods. These systems reduce the burden of the user to require only a statement of the required information. No extraction patterns are given in advance by the user.
- *EXDISCO* is an unsupervised automatic pattern discovery IE system which applies a mutual bootstrapping strategy. It is based on the assumption that the presence of relevant documents indicates good patterns and good patterns can also find relevant documents [9].
- *Snowball* The Snowball IE system is based on Dual Iterative Pattern Expansion (DIPRE) algorithm. DIPRE is similar to that of co-training and works well on the data with two distinct features, each of which can independently distinguish the class of instances from the other.
- *QDIE* The Query-Driven Information Extraction (QDIE) framework is also an unsupervised automatic pattern discovery system. This IE system tries to

minimize human intervention by using a set of keywords as input. It uses Sub-tree model, a generalization of the Predicate-Argument model and the Chain model [10].

Semi-Automatic Wrapper Generation: In semi-automatic wrapper generation IE systems Machine Learning approaches are applied. In this case, various tools support the design of the wrapper. Some approaches offer a declarative interface where the user shows the system what information to extract. Some of the examples of this category are:-

- *WIEN* (Wrapper Induction Environment) is designed for automatically learning of Web pages [11]. It basically works on structured text containing tabular information. WIEN system looks for uniform delimiters in order to identify the beginning and ending of each slot and for delimiters that separate the tabular information from the remaining text. For the purpose of automatic labeling, a set of techniques have been developed. Bottom-up induction algorithm is used for the Wrapper Induction, which takes a set of labeled pages as input.
- *STALKER*[12] is a hierarchical wrapper induction algorithm. In the case of complex documents, it transforms the documents into a series of simpler extraction tasks handling both missing data and permutations of values. It handles only single-slot extraction, but also requires a fewer set of training examples than other algorithms.

Automatic Wrapper Generation: These techniques generate wrapper automatically without any human intervention. These tools use unsupervised learning techniques. Therefore, no training sets are required. Some typical examples are:-

- *Road Runner* is based on an unsupervised learning algorithm [13]. Its main aim is to extract data from Web sources automatically by exploiting similarities in page structure across multiple pages. Road Runner works very well on data-intensive sites. In the Road Runner, the system compares the HTML codes of the pages and ascertains a common structure and a wrapper. These are used to extract the source dataset.
- *IEPAD* is an acronym for Information Extraction based on Pattern Discovery. These systems process semi-structured texts by the means of unsupervised inductive learning. It is more expressive than WIEN and discovers extraction patterns from Web pages without user-labeled examples. In this system, the extraction rules are pattern-based instead of delimiter-based and it can also handle exceptions such as missing attributes, multiple attribute values, and variant attribute permutations[14].

Table 1: Comparison between Different IE Systems

Sr. No.	On the Basis of	Categorization	Examples
1	Manual Pattern Discovery	-	PROTEUS, FASTUS, PLUM, GE NLTOOLS-ET
2	Automatic Pattern Discovery	Supervised	AutoSlog, CRYSTAL , GATE, PALKA , LIEP
		Unsupervised	AutoSlog-TS, EXDISCO, Snowball, QDIE
3	Semi-Automatic Wrapper Generation	-	WIEN, STALKER, Lixto, SoftMealy
4	Automatic Wrapper Generation	-	IEPAD, Road Runner, Shop Bot

5. APPLICATIONS OF IE SYSTEMS

In this section we will analyze a large number of applications that are strictly interdependent with the Information Extraction tasks. Some of the major applications are:

- *Enterprise Applications*: These types of applications have commercial scope. Context-aware advertising , Business Intelligence and Competitive Intelligence, Customer Care Support, Software Engineering, Comparison shopping, Web accessibility, Database building, Main content extraction etc. are the major examples of Enterprise applications [15].
- *Information Extraction in Digital Libraries:* IE is also used in Digital Libraries (DL) for producing the metadata automatically which is the structured data that helps the user in order to find and process the documents and images. Citeseer, a popular scientific literature digital library is the example of IE in DL.
- *Social Media Applications:* Social Media is one of most popular platform that is built around users, and allowing them to create a web of links between people, to share thoughts, ideas, opinions, photos, travel tips, etc. Nowadays, a number of social media applications use Information Extraction Systems in order to extract the pieces of information from social web platforms.
- *Information Extraction from Emails:* We can also implement the Information Extraction technologies to emails for extracting email data as email is one of the most popular means of communication via text [16].Email data can contain various types of information such as headers, signatures, quotations, and text content (program codes, lists, and paragraphs) etc.

6. CONCLUSION

In this paper we present a short review on Information Extraction Systems and its most emerging tools that are basically used for the extraction of information from the text documents, web pages, and web sites. The tools and techniques mentioned above can generate the wrapper either semi-automatically or automatically. Some tools

are also presented here that are based on manual pattern discovery and automatic pattern discovery. There are a series of current and future applications where information extraction techniques can fully exploit their power such as Person Profile Extraction, Web archiving etc.

In the future, more research is required to develop the systems based on automatic learning which will be capable to handle a massive amount of dynamic data whereby, systems need to be more flexible and scalable.

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RESEARCH PAPER

XAMARIN FOR MOBILE APP DEVELOPMENT

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ABSTRACT

Most of the App Development IDEs are targeted to only one type of mobile OS, where you can develop any (but not all) of the Android, IOS or Windows phone apps. That means it is required to code thrice, once each for Android, IOS and Windows phone. Xamarin Staudio is a modern, sophisticated IDE with many features for creating iOS, Windows (with VS) and Android Apps. It includes a rich text editor, debugging, native platform integration with iOS and Android. Efficiency of Xamarin can be defined as the extent of the code shared or reused across all the platforms [4].

Keywords: Apple Store Deployment, Visual Studio, Android, IoS.

1. INTRODUCTION

Xamarin offers two products, MonoTouch and Mono for Android, also known as Xamarin. iOSamd Xamarin. Android, respectively. Both are built on the top of Mono, an open-source version of .NET Framework.

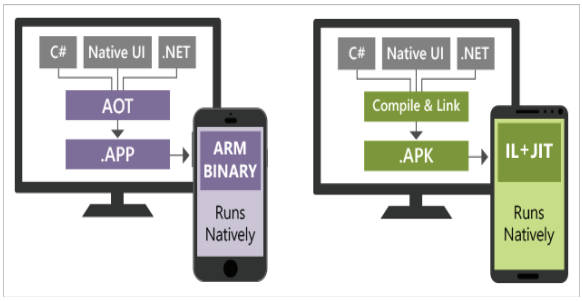

Fig. 1: Code Once Deploy Thrice

2. FEATURES OF XAMARIN

- Google Play and Apple Store Deployment[1].
- Windows Store deployment possible with VS 2015 integration.
- Push Notifications
- \Custom and remote wen content loading
- Beacons Technology and real life signal processing
- Any kind of Imaginable UI.
- Code reuse and sharing
- Automated testing using Calabash
- Video Streaming
- Remote REST API consuming
- Social Media Integration
- Embedded SQLite
- Phone and Tablet Deployment

3. MONOFRAMEWORK INTEGRATION

Mono is an open source version of .NET framework. This allows us to use C#, Linq, Lists, Generics, and other features with the libraries of .NET.

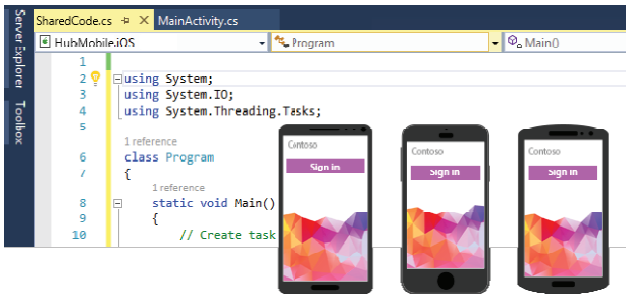

Fig. 2: C# Code

4. MOCROSOFT'S SUPPORT

Xamarin has integrated its cross-platform development tools with Microsoft's Visual Studio Community 2015 (preview), allowing developers to build native Android and iOS apps for free.

The integration between Visual Studio Community and Xamarin's Starter edition is now available. Xamarin is also doubling the size limit on apps that can be created with Starter, so that developers can build even more capable apps for free[2].

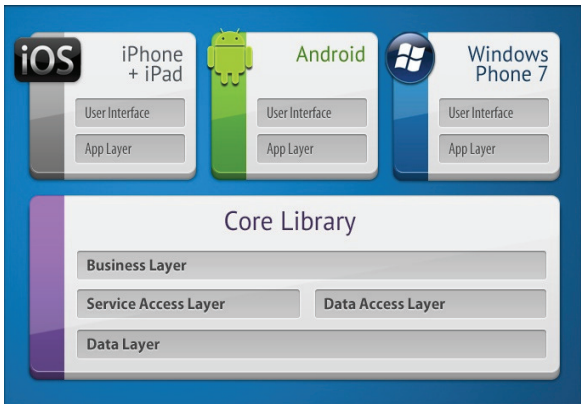

Fig. 3: Courtseyblog.xamarin.com

Microsoft also released an open-source version of the server-side parts of its .Net framework and revealed a project to port the runtime software to Linux and Mac OS, as well.

The company also upgraded Visual Studio Online with devops-friendly features to automate and manage application releases, and provision and configure development, test and production environments on Azure.

5. OTHER COMPETERORS

Phone Gapp: PhoneGap takes a different approach to cross-platform development than Xamarin by requiring that apps run within the platform web browser[3].

It is difficult to build large apps with JavaScript than with strongly typed languages such as Java or C# because of JavaScript's global scoping and library incompatibilities.

Given that there is a layer of indirection at runtime via the browser, performance and the UI suffer compared to a native app[3].

Appcelerator Titanium: Titanium is something of a mix of the development environments provided by Xamarin or PhoneGap. Apps are written in JavaScript but must utilize custom XML and Appcelerator's API. No HTML5 or CSS is used.

Only supports UI features that are common across all platforms.

It has the same deficiencies for producing large apps since it depends on JavaScript.

Developers must learn the Titanium API.

There is a small delay at app startup due to library loading.

It requires hefty licensing fees for deployed apps.

6. AZURE SUPPORT

Xamarin with VS integration allows Apps to have full access to Visual Studio capabilities that allow quick integration and configuration with Azure mobile services. Apps seamlessly add various services, like data storage in the cloud, customer authentication, push notifications or offline sync, preparing to scale to millions of devices.

7. CONCLUSION AND HIGHLIGHTS

- Xamarin gives near native performance
- Code sharing between iOS, Android, various windows flavors.
- It provides an easy and cost effective entry into iOS and Android for .Net/ C# developers.
- Xamarin has Visual Studio Integration and Microsoft support
- Advantage of .Net Mono Framework

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RESEARCH PAPER

PROTECTING ADVANCE TECHNOLOGIES' PRIVACY THROUGH OPEN SOURCES

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ABSTRACT

It's worth considering the two models of software development, the proprietary model for example is driven by company roadmap and their own corporate requirements, it's tends to be developed by in-house staff or subcontractors. The purpose is generally to trade intellectual property in the company sometimes protected by patents. Due to this development strategy, the focus on security is weak and hence gives invites to hackers and governments authorities to violate the individual's right to privacy. The open source development model has slightly different it's tends to be driven by need, interest or opportunity either of an individual or community of individuals that contributes back to the program it's downloadable as source and its licensing is very open, giving you the opportunity to take the source, re-contribute to it. This freedom of openness establishes a new level of security in integrated systems. In this paper we discuss the purpose and use of open source technology and connect its practical significance to the society

Keywords: Software Development, Open Source, Privacy, Web Security.

1. INTRODUCTION

Advance Technologies with capability to connect with internet is growing and have impacted the world profoundly. Use of handheld devices like Smartphone and tablets are common everywhere, people take these technologies for granted and using these devices without any second thoughts regarding the model of security on which they are established. Over the few decades, the continued development of technologies will provide major benefits to society. They will also pose significant and unprecedented risks, including the threat to privacy. If these technologies is widely accessible would give terrorist groups to destroy an individual's life to a whole nation within seconds. If we compares this scenario with the current picture of technology it might seems extreme right now. But they are widely recognised as significant by experts in the revenant field.

Threats to data privacy are surging.

In 2011, more than 500 data breaches involving 30.4 million sensitive records were reported, including some of the largest individual breaches on record.[1] when these intrusions results in leak of sensitive data, a large number of people suffers. Some of them losses their jobs, some loses a valuable relationship and others will live in fear for the rest of their lives. Having all these facts in mind how can one prevent himself from such a scam, according to recent studies in data security one can be save itself from this risk by rethinking about the risks they are taking with using such technologies?

So where does that leave us? How can organisations safeguard privacy in an age of technology? The answer lies more in governance than regulation, in innovation more than compliance.[2] Now is the right time for us to rethink the data privacy, There are many solution to this problem but one can think of a solution which does not take time and was easy for everyone to use and also easy to integrate into the present technology.

2. WHAT IS OPEN SOURCE

The "open source" label was created at a strategy session held on February 3rd, 1998 in Palo Alto, California, shortly after the announcement of the release of the Netscape source code. The strategy session grew from a realisation that the attention around the Netscape announcement had created an opportunity to educate and advocate for the superiority of an open development process.[3] The ultimate goal is to promote developers all around the world to collaborate and produce cost effective and reliable systems as compared to a high cost commercial product. In the laymen's term open source or open source product refers to the computer program or piece of software developed by the independent developers in which the source code of the program or software is widely available to the general public for use or to modify it as per their own requirements. Source code is a part of program or software that most users never see. It's the code that developers and programmers manipulate to change or build the aesthetics of the software's.

The idea behind open source is so outstanding that many huge formal institutions are developing and deploying their software licenses to open source platform. Most people understand that open source software is software copied for free, what less understood is how the potential chaos of all these copies can be transformed to a collaborative whole.

Let's break down how the open source platform works, When someone writes and publishes an original version of open source software, they put rules called licensees in place so that others can use and change the code they've written as long as they follows the author's license. In software this departure from the original code is called a branch. This gives contributors a starting point to then branch out and makes changes called patches. Some request their changes to be upstreamed to merge their new version with the original version. If the maintainer decides to incorporate the changes it becomes the part of the main branch and will be maintained by the community even if the contributors stop being involved in the projects. Sometimes software's takes other directions that we know will not be incorporated back to the original version, this kind of permanent split is called a fork.

Open source has the potential to be complicated because it's created by communities of people. These ways of working manages this community making it possible to benefit from new version form an authoritative source the maintainer.

Actual product based on open source can be made up dozens even hundreds of independent developers which is why having a discipline way of manages changes is so important. In open source the possibilities are endless, but we need the rules and roles to keep thing organised.

3. BENEFITS OF USING OPEN SOURCE SOFTWARES

The most important question very commonly asked by a software vendor is - Why would I introduce open source software in my business model? Or why would anyone want to use it in development of their own proprietary software product? The answer to both of these question may vary there are certain risks associated as well as tremendous benefits of going open source.

- **COST -** There is a misleading truth about cost of the open source software's, such software are not always free. A proprietor of the software i.e. the owner of the copyright can choose the software available without charge or choose to charge those who attain copies of the software. Most open source software is available to everyone without any charge. There is world of free software that we can take, use it as a component in our own software or we can use in internally as a tool. In conclusion open source is generally much more cost effective than a proprietary solution.
- **ACCESSIBILITY -** Often time it is the best software available for the task in hand, so much open source software is subject to a community effort to continue the process of upgrading, enhancing, improving an expanding the functionality the is simply the best in the industry and that's why we use it.
- **RELIABILITY -**software reliability is defined as "the probability of failure free software operation for a specified period of time in a specified environment". Informally reliability is defined as a measure of how closely a system matches its stated specifications.[4] The open source model effectively balances the reliability of the product by continues bug tracking and actively delivering the patch to a bug in an reasonable amount of time.
- **FLEXIBILITY AND FREEDOM -** IT leaders must fundamentally provide flexibility and agility for their enterprise. If you can't compete on agility, you're going to get left behind by the competition. Open source enables technology agility, typically offering multiple ways to solve problems.
- **STABILITY -** In any modern business environment the role of software is huge, without consistent stability the business may fall. The vendors need a stable revenue stream to be able to keep their business going whilst their customers have not the slightest desire to change or upgrade any product that is working well enough to suit their needs. An open source developer community is enhancing the customer support infrastructure by:
    - Structured documentations
    - Automated tests
    - Issue trackers
    - Active mailing list

4. SECURITY IN OPEN SOURCE

Technology runs almost every aspect of our lives on a daily basis from Smartphone keeping track of email, appointments to databases tracking sensitive information in global businesses. We have to safeguard against outside attacks on sensitive information. Software applications run businesses. But no matter the size, location or type of business you have your software is under attack not only the cyber criminal but also the government officials who what to know the inside track of each and every person. These government authorities can easily get access to your software process with the help of vendor that created these software's. Popular cyber security analysts have found that the majority of these data breaches are due to security flaws in software's products. Proprietary software forces the user to accept the level of security that the software vendor is willing to deliver and to accept the rate that patches and updates are released. Open-source software security is the measure of assurance or guarantee in the freedom from danger and risk inherent to an open-source software system.[5]

The trustworthiness of any software, either open source or closed source, depends on certain key aspects of the product design and development. Once the open source software is made available to public, anyone and everyone interested in the product could review the source code to assess its quality and reliability. As this allows more users and experts around the world to go through the source code, the bugs could be discovered and fixed early. However, open source software would be benefited by this peer review process only when the people reviewing the source code were qualified enough and they reviewed it with the intention of discovering vulnerabilities for the good of society[6]. An open source system can be more secure if it uses a hierarchical structure of security in which the development period is divided in two levels - from design to testing the product

is in its development phase. Once the initial phase is finished the role of security can be concerned. A continues analysis of the source code by the maintainer as well as other contributors can reduce the risks of privacy invasion and data breaches.

The figure above describe the various levels of security that can used in development of open source software's to minimise the threat of security and surveillance.

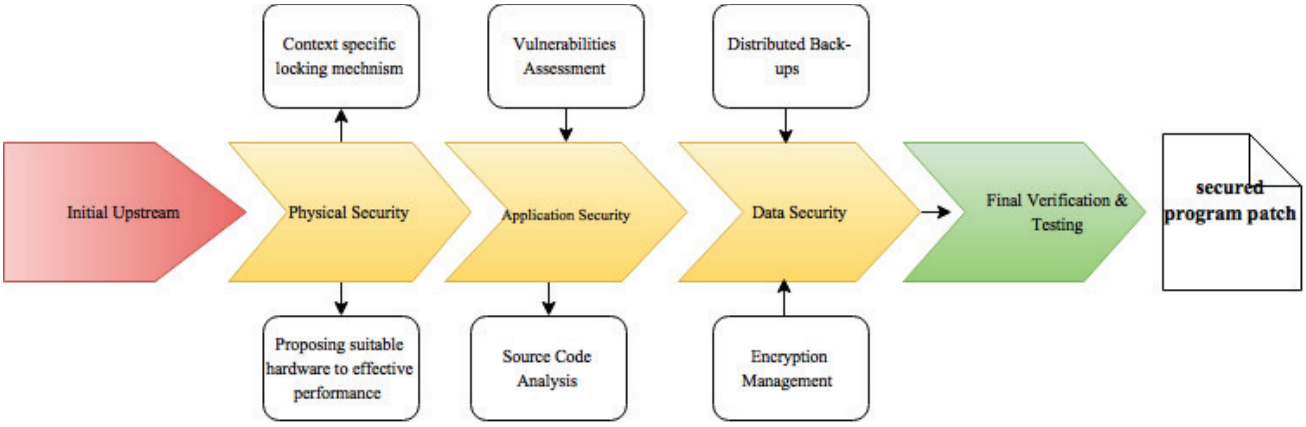

Fig: Delivering Secure Patches

5. OPEN SOURCE FOR ENTERPRISE

Back in the early 19th century, Businesses actually had strategies like electricity. Where were we going to get it or should we produce our own. Now they don't have any electricity strategy because it's now becomes the part of the landscape. I believe the open source software is the same way; it was worth thinking about as a really discrete confusing complicating thing in the '90s. These days most businesses touch open source in fundamental ways.

Open source solution for the enterprise are based on open source and community source technologies that helps in increasing productivity while keeping development cost low, open source software also eliminates licensing fees and puts an end to vendor lock-in and offers a great amount of control and flexibility. Open source in business world helps in reducing operational expenditures while simultaneous increasing the level of security and software capabilities. Open source software, which uses an open development process, is proliferating across the globe given the advantages it offers over traditional forms of software. Open source solutions can be modified and adapted to fit the needs of various companies - something that's often not possible with proprietary software.[7] Here we'll give plenty of free open source high quality tools available without any problem of copyrights and licensing [8] :

Accounting (Front Accounting, osfincancials, FriFinans) : These financial packages provide open sources alternatives to commercial packages such as Quicken, Sage or QuickBooks.

Business Intelligence (OpenI, Pentaho, RapidMiner) : Such tools are specific application software to retrieve , analyse , transform and report data for business intelligence.

Business Suites (opentaps, Plazma ERP + CRM ,ADempiere ERP Business Suite) : Enterprise resource planning (ERP) software is complex and can be very costly. But open source alternatives to SAP or Microsoft Dynamics exist.

Content Management System (Magnolia, Liferay, Joomla) : Content management systems power websites — and many of the world's largest sites use an cross-platform, open source CMS.

Customer Relationship Management (SugarCRM, openCRX, OrangeLeap): Commercial customer relationship management (CRM) software is available from niche vendors, software as a service provider such as Salesforce.com and large software vendors such as Oracle.

Data Warehouse (LucidDB, DataCleaner, KETL) : Data warehouse is a unified database that holds all the business information an organisation and makes it accessible all across the company. such services are highly maintained by many open source alternatives.

E-Commerce (Magento, Zen Cart, Order Portal) :E-commerce software packages, such as the three cross-platform products listed above, include everything from product presentation to shopping carts, checkout and payment processing.

Human Resource Management (Orange HRM, Latrix, Open Applicant) : HRM makes it easy to track employee information, attendance, leave, benefits, and recruitment. Add-ons, customisation, support, and hosted service.

Project Management (OpenProj, GanttProject, DotProject) : such software takes care of all the attributes form initiating to planning, executing to controlling and also closing the work of team to achieve specific success criteria.

6. OPEN SOURCE FOR EVERYONE

An improved open-source paradigm requires constant improvement in design and development methodology and a coherent change in current architecture of today's technologies. Such change does not append overnight but takes considerable amount of time and patience. So how we protect our privacy with the current implementation of technologies?

Protecting privacy has become a very crucial issue in this era of information technology. Everything is now stored online in an distributed data storage facility thousandof miles away and we have very less amount of control over it. People often argue that they don't require privacy but the truth is somewhat different. Care or not privacy matters to everyone as the former NSA contractor Edward Snowden said *"Arguing that you don't care about the right to privacy because you have nothing to hide is no different than saying you don't care about free speech because you have nothing to say."*. The big Question arises is how an individual who happens to have a very little knowledge about these technologies protect his private interests. To helping such individuals below is the list of tool they may consider to use in future.

Tools that helps protect individual privacy [9]:

Anonymous Browsers (Tor, Firefox) : most of the people uses default browsers like IE, Safari. Such companies do not share there code with everyone but the government and helps the authority to track and trace out activities. In order to surf independently do not use vendor specific browsers but uses the one with a open source tag on it.

Privacy Add on's (Disconnect, uBlock Origin, Random agent spoofer, HTTPS Everywhere etc): such tool are always helpful for solving little but too obvious privacy problems. keep in mind that some add-on's require interaction from the users to get things working and still some sites will not properly until you configure all the required settings.

Privacy conscious emails (ghostmail.com, openmailbox.org, protonmail.ch, etc): works exactly the same as regular emails but are highly encrypted with custom encryption algorithms to protect from sniffing and others hacking activities.

Email clients (Thunderbird, Claws mail) : Both clients provides maximum amount of privacy and suggest to set up a high level of security to prevent other to sneak into your private mails.

Email alternatives (Bit message, i2p-Bote, Pond-Experimental) : Sometimes it's more safe to avoid the use of emails for such purposes use the above alternatives.

Protected Search Engines (privatesearch.io, duckduckgo.com, search.disconnect.me): Searching on google it never been safe it's stores your search result and maintain a user based profile to share with it's advertisers. Use privacy respecting search engine with no data store policies.

Encrypted instant messengers (ChatSecure, Signal,Cryptocat) : If you are currently using an instant messenger like whatsApp, Viber, Line or Threema choose an alternative.

Encrypted video and voice messengers (Signal, Linphone, Jitsi) : If you are currently using an Video & Voice Messenger like Skype, Viber or Google Hangouts you should pick one from the above.

Encrypted cloud storage (Seafile, ownCloud, Least authority S4) : Data stored in the cloud for longer than 6 months is considered abandoned and may be accessed by intelligence agencies without a warrant. If you are currently using a Cloud Storage Services like Dropbox, Google Drive, Microsoft OneDrive or Apple iCloud you should pick an alternative form the above.

Self hosted cloud storage (Seafile, Pydio, Tahoe-LAFS) : Self hosted Cloud is the best way to protect your data online as long as its encrypted with a well defined algorithm.

Password managers (Master Password, KeePass, Encryptr cloud based) : Generates a unique set of custom, high quality, cryptographic-strength password strings which are safe for you to use.

File encryptions (VeraCrypt, GNU Privacy Guard, PeaZip) : choose a good quality AES encryption capable open source encryption technology to protect your sensitive data.

Self contained networks (I2P Anonymous Network, GNU net Framework, The Free net project) : If you are currently browsing the Clear net and you want to access the Deep Web these tools are for you.

Decentralised social networks (diaspora, Friendica, GNU social) : To avoid privacy related issue on popular social networks like Facebook , google+, Twitter etc.

Open source operating systems (BSD Unix, Linux) : Operating system like windows are always easy to hack and after giving huge amount to updates everyday they still fail to protect the users privacy and data. In conclusion don't use windows it's a privacy nightmare instead use systems like Linux and Unix which are specifically designed to protect the users privacy.

7. CONCLUSION & SUGGESTION

In this paper we established technical and non-technical issue regarding the use of open source technology in this era of modernisation which is new to most people to implement and integrate into their businesses and lives. Using such software one can protect itself from attacks related to privacy and security in the open internet. With open source software the danger of data misuse is greatly reduced by constant source code lookups by millions of people in the community and hence makes the software

more customers friendly and safe to use. I encourage every reader to change the way they use technology and try to replace their software with open source versions.

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RESEARCH PAPER

EFFECTS OF 4 WEEKS OF NEUROMUSCULAR TRAINING VS FUNCTIONAL BALANCE TRAINING ON DYNAMIC BALANCES IN THOSE WITH CHRONIC ANKLE INSTABILITY

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ABSTRACT

Purpose and Background: The purpose was to make training adaptations more specific and applicable for FAI. The primary purpose of this study was to determine which training (Neuromuscular training or Functional Balance Training) is better when training balance for functional ankle instability. ***Design:*** Pre-test post- test experimental design. ***Method:*** 30 subjects with self-reported CAI (18-25 years) were recruited according to the inclusion and exclusion criteria. 15 subjects with CAI (8 males and 7 females, age= 23.6±1.54yr.) in NMT and 15 subjects with CAI (8 males and 7 females, age= 23.33±1.58yr.) participated in this study. ***Outcomes:*** Dynamic balance on lower limb. Before and after the intervention, all the subjects completed the Y-Balance Test for dynamic balance. ***Results*:** Result of this study showed a significant improvement in static balance in both the groups but the dynamic balance was marginally better in Neuromuscular Training Group as compared to Functional Balance Training Group. ***Conclusion*** The results of this study demonstrate that regardless of different training protocol (NMT and FBT), statistically significant improvements in balance were achieved by both the groups. Following the training the mSEBT or Y-BT composite score, significantly improved in the both the training group. Though statistically non-significant but there was marginally better improvement in dynamic balance in NMT group as compared to FBT group as assessed on anterior, posteromedial, and posterolateral direction of Y-Balance Test. Thus we can say that neuromuscular training can give better results in improving dynamic balance.

Keywords: Neuromuscular Training, Functional Balance Training, Functional Ankle Instability, Y-Balance Test, Dynamic Balance.

1. INTRODUCTION

With increasing amounts of leisure time and the current emphasis on physical fitness, the incidence of sports injuries has increased dramatically. The ankle joint is the second most common injured body site in sport with lateral ankle sprains being the most common type of ankle injury.[1] Ankle sprains, account for between 3% and 5% of all Emergency Department attendances in the UK, with about 5,600 incidences per day.[2] It has been estimated that an ankle injury occurs every day per 10,000 of the population.[3] In the acute phase, ankle sprains are associated with pain and loss of function, and one quarter of all injured people are unable to attend school or work for more than seven days.[5] Ankle injuries account for five percent of all sports injuries and two billion dollars in medical costs annually.[6] In addition to its financial costs, ankle sprain can result in significant sequel, including time lost to injury and long-term disability in up to 50% of cases.[7] Yet an estimate 55 % of people who experience an ankle sprain will not seek professional treatment.[8] This is unfortunate since most of these individuals are young athletes with good rehabilitation potential.

Functional ankle instability (FAI) is defined as recurrent or the subjective feeling of "giving way".[9]Tropp et.al, described FAI as joint motion beyond voluntary control not necessarily exceeding physiological range of motion and MAI as ankle joint motion that exceeds the physiologic range.[10] Clinical diagnosis of FAI is predicted on the patient's self-reported episode of "giving way". Some authors reported symptoms of functional instability in the absence of mechanical instability.[11]Vaes recently reported only 35% of 117 functionally unstable ankle demonstrated mechanical instability.[12] Several studies support the notion that mechanical instability alone is of little clinical significance. However the combinations of mechanical instability and decreased neuromuscular control resulting from deficits in joint proprioception may result in functional instability of the ankle joint.

Functional training is the science of training the body to meet the specific demands of life and sports.[14] Both static and dynamic movement patterns are trained simultaneously in Functional balance training (FBT). Therefore, we can say that functional training incorporates many types of training, including functional balance training, and further—and importantly—the broad umbrella of "functional training" trains movement specific to sport, recreation, and daily life. Postural stability improved after subjects performed functional balance training programs, both with or without exercise sandals. Training with exercise sandals might not be any

more effective in improving postural stability than performing functional balance training without exercise sandals.[15]

Neuromuscular training (NMT) is defined as training enhancing unconscious motor responses by stimulating both afferent signals and central mechanisms responsible for dynamic joint control.[16] Neuromuscular training programs are designed to reduce injury risk, and include interventions that focus on increased control of the center of mass. As the center of mass moves away from the base of support, there is an increased potential for biomechanical deviations to occur in the lower extremity. An improved ability to control this movement has the potential to decrease excessive forces on the lower extremity and ultimately decrease injury risk.[17] Several studies support the use of interventions such as neuromuscular training programs (NMT) to reduce the incidence of lower extremity injuries.[18] Acute lateral ligament injuries of the ankle are best treated nonsurgical, with peroneal strengthening and neuromuscular training.[13] The 6-week dynamic neuromuscular training program improved parameters of ankle joint sensorimotor control in an athlete with chronic ankle instability.[19]

Over the past 4 decades --- hundreds of articles dealing with lateral ankle sprains and ankle instability, yet epidemiological evidence shows no reduction in injury rates. Research showing the improvement in both static and/or dynamic balance ability independently is widely available, yet little or no research has directly examined the relationship between neuromuscular training and functional balance training. An understanding of the differences in the two different training groups (NMT and FBT), will allows the clinician to establish a comprehensive and effective rehabilitation for the athletes.

2. OBJECTIVE MATTER

To find the effects of 4 weeks of neuromuscular training v/s functional balance training on dynamic balance in those with chronic ankle instability.

Research Methodology Matter

Subjects: Thirty subjects were selected by simple random sampling for study after signing the informed consent according to the inclusion and exclusion criterion and were randomly assigned to two groups (NMT and FBT). The subjects in each group were similar in terms of age, and height. It consisted of both male and female participants. All the subjects were recruited with self-reported CAI from various universities, and colleges in Delhi and NCR region. Inclusion criteria were a history of more than one ankle sprain and residual symptoms, including subsequent episodes of the ankle giving way. Also included were self-reported symptoms of disability due to ankle sprains qualified by a score of 90% or less on the Foot and Ankle Disability Index (FADI) and the FADI Sport surveys.[20] All subjects had no history of lower extremity injury, including ankle sprain, within the past 6wk, no history of lower-extremity surgery, and no balance disorders, neuropathies, diabetes, or other conditions known to affect balance. If a subject reported bilateral ankle instability, the self-reported worse limb was used for analysis and training. The subjects were excluded if history of head injury (concussion) is present within the previous 12 weeks.[21]

The randomization was concealed and prepared by an independent investigator. The NMT group consisted of 8 males and 7 females (age=23.6±1.54, lower limb length=85.46±7.10), and the FBT group consisted of 7 males and 8 females (age=23.33±1.58, lower limb length=86.66±8.23).

Variables: The independent variables were neuromuscular training, and functional balance training programme. Independent variables were dynamic balance in lower limb.

Procedure: The potential volunteered candidates were explained the nature and the purpose of study and those agreed to participate were given the screening questionnaire (FADI score), to judge their suitability for the study. Eligible candidates underwent consent taking. Descriptive variables of all subjects, such as age, height, and sex were recorded. Subjects performed 1 practice session to familiarize themselves. The entire process consists of three phases of Pretest, Intervention and Posttest.

Exercise Protocol

Neuromuscular Training Group: The neuromuscular group was participated in triweekly training sessions for a total of 12 sessions. It consists of lower extremity strength training, and core stability training, in which subject had performed one core stability exercise with all the lower limb exercises. The core stability component was divided into 5 phases of progressive exercises. 2 or 3 days were spent on each phase. 5 phases of core stability component were Swiss ball back hyperextension, Swiss ball back hyperextension with ball reach. Swiss ball hyperextensions with back fly, Swiss ball hyperextensions with ball reach lateral and Swiss ball hyperextensions with lateral ball catch.

The lower extremity strengthening program consists of following exercises. These exercises were squats (3 sets × 5 reps), Gluteal/hamstring raises (3 sets × 5 reps), Band ankle inversion/eversion (3 sets × 5 reps), 30-cm box lateral step-down (heel-touch) (3 sets × 5 reps), Lateral lunges (3 sets × 5 reps), and Walking lunges (3 sets × 5 reps).

Functional balance training group: The functional balance group was participated in tri-weekly training sessions for a total of 12 sessions. Exercises performed by these training groups included the Achilles stretching (3 sets × 20 sec), Short-foot concept contractions (3 sets × 60 sec), High knee walking (10 m), Lateral side step (10 m), Walking exercises (forward and backward) (10 m), Lunges (3 sets × 5 reps), and Squats (3 sets × 5 reps)

All training sessions began and ended with Achilles stretching. Subjects then practiced the short-foot

maneuver before performing functional balance training exercises. The short-foot position was achieved 3 times, and each contraction was held for 60 seconds. During these contractions, subjects were instructed to pull the arch of the foot up by shortening the length and narrowing the width of the foot without flexing the toes.

3. DATA ANALYSIS

All data were analyzed using statistical tests, which were performed using SPSS 19.00 software package. Demographic data of subjects including age and gender, involved and dominant leg were descriptively summarized to project the results. The dependents variables for the statistical analysis were analyzed using parametric tests like Independent T-Test and Paired T-Test. The data was analyzed both between and within the groups. A 0.05 level of significance was used for all comparisons.

4. EXPERIMENTAL RESULTS

Demographic data: 30 patients were recruited for the study and assigned to group1 (NMT) and group2 (FBT) with 15 in each group. Mean and standard deviation of age and limb length (LL) in NMT group was 23.6±1.54 and 85.46±7.10 respectively, and for FBT group was 23.33±1.58 and 86.66±8.23 respectively.

After analysis it was found that there was no statistically significant difference between the NMT and FBT group with respect to age and LL (t=0.465, p=0.645 and t=0.427, p=0.672 respectively). Subjects were equally distributed between NMT and FBT groups in terms of age and RLL.

Between group comparison of components of YBT: Mean and SD of components of YBT (anterior, posteromedial, posterolateral) pretest scores of right leg in NMT group was 73.7±7.14, 82.2±11.2, and 91.53±9.65 respectively, and in FBT group was 74.1±9.07, 77.7±10.6 and 89.0±13.02 respectively. After analysis it was found that there was no significant difference between the groups for the components of YBT (anterior, posteromedial, posterolateral) pretest scores of right leg (t=0.145, p=0.88, t=1.113, p=0.27, and t=0.605, p=0.55 respectively).

Mean and SD of components of YBT (anterior, posteromedial, posterolateral) pretest scores of left leg in NMT group was 72.8±6.8, 82.73±11.44 , and 89.7±9.51 respectively, and in FBT group was 74.4±9.79, 77.1±11.27 and 84.3±11.31 respectively. After analysis it was found that there was no significant difference between the groups for the components of YBT (anterior, posteromedial, posterolateral) pretest scores of right leg (t=0.519, p=0.61, t=1.358, p=0.18, and t=1.39, p=0.17 respectively).

Mean and SD of components of YBT (anterior, posteromedial, posterolateral) posttest scores of right leg in NMT group was 78.33±8.32, 88.1±9.93, and 97.26±10.9 respectively, and in FBT group was 74.1±9.07, 77.7±10.6 and 89.0±13.02 respectively. After analysis it was found that there was no significant difference between the groups for the components of YBT (anterior, posteromedial, posterolateral) posttest scores of right leg (t=0.699, p=0.49, t=1.376, p=0.18, and t=0.666, p=0.51 respectively).

Mean and SD of components of YBT (anterior, posteromedial, posterolateral) posttest scores of left leg in NMT group was 76.36±7.84, 88.1±9.93, and 96.03±10.19 respectively, and in FBT group was 76.53±10.05, 82.8±11.12 and 89.91±13.24 respectively. After analysis it was found that there was no significant difference between the groups for the components of YBT (anterior, posteromedial, posterolateral) posttest scores of left leg (t=0.051, p=0.96, t=1.376, p=0.11, and t=1.419, p=0.16 respectively).

Table 1

	Group1 Mean±SD	Group2 Mean±SD	't' value	p value
LA0	72.8±6.8	74.4±9.79	0.519	0.608
LA4	76.36±7.84	76.53±10.05	0.051	0.960
LPM0	82.73±11.44	77.10±11.27	1.358	0.185
LPM4	88.1±9.93	82.8±11.12	1.376	0.111
LPL0	89.7±9.51	84.3±11.31	1.39	.174
LPL4	96.03±10.19	89.91±13.24	1.419	.167
RA0	73.7±7.14	74.1±9.07	0.145	0.886
RA4	78.33±8.32	76.10±9.16	0.699	0.491
RPM0	82.2±11.2	77.7±10.6	1.113	0.275
RPM4	88.1±9.93	82.8±11.12	1.376	0.180
RPL0	91.53±9.65	89.0±13.02	0.605	0.550
RPL4	97.26±10.9	94.4±12.54	0.666	0.511

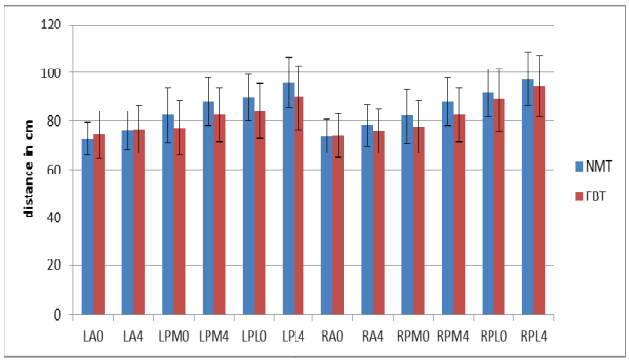

Fig. 1

Between group comparison of composite score of YBT: Mean and SD of pretest composite YBT score of right leg and left leg in NMT group was 0.96±.08 and 0.95±.08 respectively, and in FBT group was 0.92±.09 and 0.91±.10 respectively. After analysis it was found that there was no significant difference between the groups for the pretest composite YBT score of right leg and left leg (t=1.19, p=0.24 and t=1.15, p=0.25 respectively).

Mean and SD of posttest composite YBT score of right leg and left leg in NMT group was 1.02 ±.09 and1.01±.08

respectively, and in FBT group was 0.97±.09 and 0.96±.10 respectively. After analysis it was found that there was no significant difference between the groups for the posttest composite YBT score of right leg and left leg (t=1.15, p=0.18 and t=1.55, p=0.13 respectively).

Table 2

	Group1 Mean±SD	Group2 Mean±SD	't' value	p value
YBTRC0	.96±.08	.92±.09	1.191	0.244
YBTRC4	1.02 ±.09	.97±.09	1.559	0.180
YBTLC0	.95±.08	.91±.10	1.153	0.259
YBTLC4	1.01±.08	.96±.10	1.554	0.131

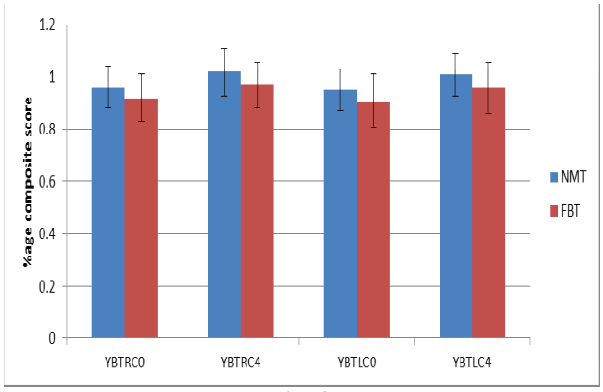

Fig. 2

Within group comparison of components of YBT in Group 1: Mean and SD of pretest and posttest Anterior reach scores of right leg in NMT group was 73.7±7.14 and78.33±8.32 respectively, and in left leg was 72.8±6.82 and 76.36±7.84 respectively. Within group analysis for group1 showed highly significant difference between the pre and posttest anterior reach scores of both right and left leg (t=4.081, p=.001 and t=5.250, p=0.0001 respectively).

Mean and SD of pretest and posttest posteromedial reach scores of right leg in NMT group was 82.20±11.20 and 88.1±9.93 respectively, and in left leg was 82.7±11.44 and 88.26±9.72 respectively. Within group analysis for group1 showed highly significant difference between the pre and posttest posteromedial reach scores of both right and left leg (t=7.629, p=.0001 and t=5.478, p=0.0001 respectively).

Mean and SD of pretest and posttest posterolateral reach scores of right leg in NMT group was 91.53±9.65 and 97.26±10.97respectively, and in left leg was 89.7±9.51 and 96.03±10.19respectively. Within group analysis for group1 showed highly significant difference between the pre and posttest posterolateral reach scores of both right and left leg (t=6.143, p=.0001 and t=7.048, p=0.0001 respectively).

Table 3

	Pretest Mean±SD	Posttest Mean±SD	't' value	p value
LA	72.8±6.82	76.36±7.84	5.250	.0001
LPM	82.7±11.44	88.26±9.72	5.478	.0001
LPL	89.7±9.51	96.03±10.19	7.084	.0001
RA	73.7±7.14	78.33±8.32	4.081	.001
RPM	82.20±11.20	88.1±9.93	7.629	.0001
RPL	91.53±9.65	97.26±10.97	6.143	.0001

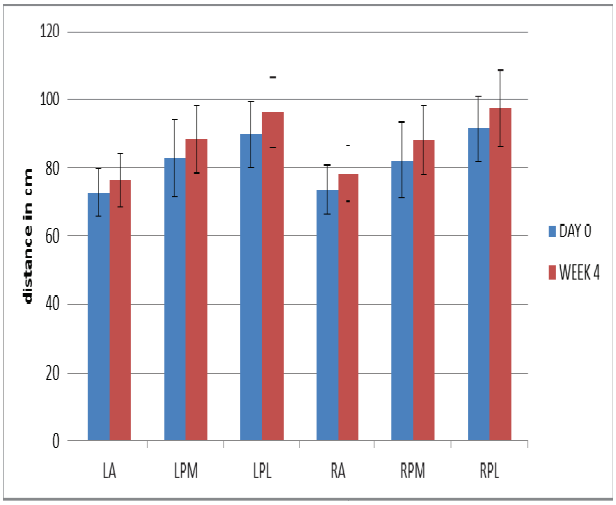

Fig. 3

Within group comparison of composite score of YBT in Group 1: Mean and SD of pretest and posttest composite scores of YBT of right leg in NMT group was 0.96±.084 and 1.02±.091 respectively, and in left leg was 0.95±.08 and 1.01±.08 respectively. Within group analysis for group1 showed highly significant difference between the pre and posttest composite scores of YBT of both right and left leg (t=7.749, p=0.0001 and t=6.375, p=0.0001 respectively).

Table 4

	Pretest Mean±SD	Posttest Mean±SD	't' value	p value
YBTRC	.96±.084	1.02±.091	7.749	.0001
YBTLC	.95±.08	1.01±.08	6.375	.0001

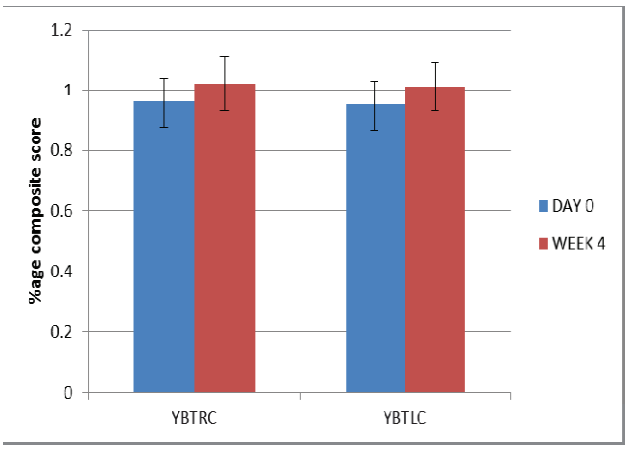

Fig. 4

Within group comparison of components of YBT in Group 2: Mean and SD of pretest and posttest Anterior reach scores of right leg in FBT group was 74.13±9.07 and 76.10±9.16 respectively, and in left leg was 74.4±9.79 and 76.53±10.05 respectively. Within group analysis for group2 showed highly significant difference between the pre and posttest anterior reach scores of both right and left leg (t=3.000, p=.010 and t=3.16, p=0.007 respectively).

Mean and SD of pretest and posttest posteromedial reach scores of right leg in FBT group was 77.7±10.6 and 82.8±11.12 respectively, and in left leg was 77.1±11.27 and 81.86±11.5 respectively. Within group analysis for group2 showed highly significant difference between the pre and posttest posteromedial reach scores of both right and left leg (t=5.288, p=.0001 and t=7.034, p=0.0001 respectively).

Mean and SD of pretest and posttest posterolateral reach scores of right leg in FBT group was 89.0±13.02 and 94.4±12.54 respectively, and in left leg was 84.38±11.31 and 89.91±13.23 respectively. Within group analysis for group2 showed highly significant difference between the pre and posttest posterolateral reach scores of both right and left leg (t=6.214, p=.0001 and t=6.219, p=0.0001 respectively).

Table 5

	Pretest Mean±SD	Posttest Mean±SD	't' value	p value
LA	74.4±9.79	76.53±10.05	3.16	.007
LPM	77.1±11.27	81.86±11.5	7.034	.0001
LPL	84.38±11.31	89.91±13.23	6.219	.0001
RA	74.13±9.07	76.10±9.16	3.000	.010
RPM	77.7±10.6	82.8±11.12	5.288	.0001
RPL	89.0±13.02	94.4±12.54	6.214	.0001

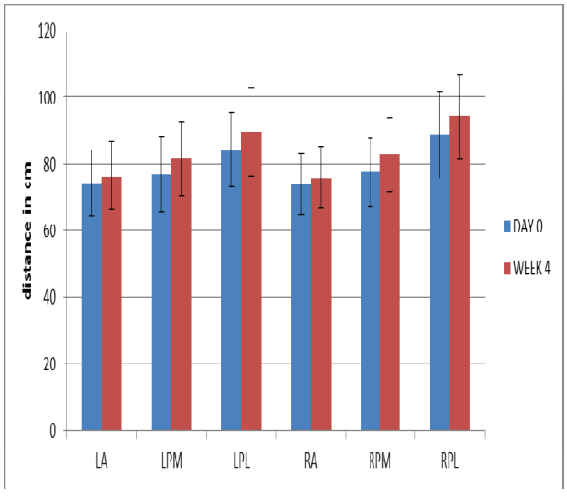

Fig. 5

Within group comparison of composite score of YBT in Group 2: Mean and SD of pretest and posttest composite scores of YBT of right leg in FBT group was 0.92 ±.09 and 0.97±.09 respectively, and in left leg was 0.91±.10 and 0.96±.10 respectively. Within group analysis for group2 showed highly significant difference between the pre and posttest composite scores of YBT of both right and left leg (t=5.557, p=0.0001 and t=7.014, p=0.0001 respectively).

Table 6

	Pretest Mean±SD	Posttest Mean±SD	't' value	p value
YBTRC	.92 ±.09	.97±.09	5.557	.0001
YBTLC	.91±.10	.96±.10	7.014	.0001

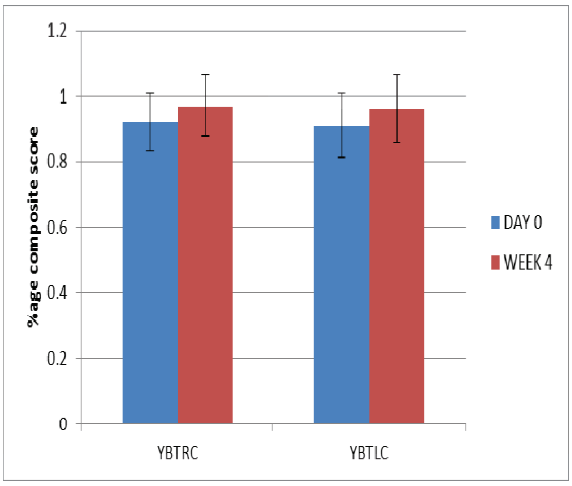

Fig. 6

5. DISCUSSION

The results of this study demonstrate that regardless of different training protocol (NMT and FBT), statistically significant improvements in balance were achieved by both the groups. Following the training the mSEBT or YBT composite score, and SLST time significantly improved in the both the training group. Various reasons can be attributed to the improvement in static and dynamic balance within each group. It has been discovered that the plantar surface of the foot plays a critical role in providing sensory input to central nervous system for balance and postural control. There are different types of mechanoreceptors present on the sole of the foot, which are responsible for sending somatosensory inputs to the brain by sensing pressure and stretching motion in the tissues that surround them. These plantar inputs are the dominant sensory information for balance when the body is standing still on a fixed firm surface or moving through the environment. Weight bearing exercises also stimulate joint mechanoreceptors leading to improved proprioceptive inputs and hence proprioception.

Our subjects might have developed new long-term muscle activation patterns after functional balance training. Muscle activity has improved after coordination training with static and semi-dynamic exercises.52,56 Osborne et al56 reported decreased onset latency of the tibialis anterior muscle after ankle disk training in subjects with FAI. In addition, Eils and Rosenbaum57 suggested that co-activation of ankle muscles increased in subjects with FAI after coordination training. This improved co-activation might have been responsible for improving postural stability in subjects with FAI. Based

on the results of these studies, we contend that postural stability improvements might have resulted from improved foot and ankle muscle activity after 4 weeks of training. This improved muscle activation likely occurred while subjects were performing the exercises with the short-foot technique, as well as while subjects performed single-limb testing without the use of the short-foot position. Subjects might have increased activation in muscles responsible for performing the short-foot maneuver without actually shortening the A-P plane of the foot and narrowing the M-L plane of the foot during single-limb stance tests.

We had our subjects performed functional balance exercises while using the short-foot position for 12 sessions over 4 weeks, which might have allowed our subjects more time to learn new muscle activation patterns associated with this technique. In addition, our subjects were instructed not to shorten and narrow the arch of the foot during single-limb stance tests, allowing them to concentrate on remaining as motionless as possible during the tests. The design of our study did not allow us to determine the effectiveness of the short-foot maneuver, as our results indicate that the functional balance exercises were responsible for postural stability improvements. In addition, neither subjects with stable ankles nor those with FAI had previous experience performing these exercises with the short-foot position. All subjects, regardless of ankle stability, might have responded to functional balance training similarly as a result of being introduced to these new movements and muscle activations for the first time.

The main findings of this study is in accordance with the conclusion of Thomas B. Michell et al.22 They reported that Postural stability improved after subjects performed functional balance training programs, both with and without Exercise Sandals. However, findings of this study were not in accordance with conclusion of Rothermel et al.22,25 They reported that 4 weeks (12 sessions) of single limb balance training with the short-foot maneuver did not improve single-limb postural stability in healthy subjects, whereas training without the use of the short-foot position did improve single-limb postural stability in healthy subjects. Rothermel et al.22,25 speculated that the short-foot technique might have caused their subjects to focus on muscle contractions instead of remaining as motionless as possible during single-limb stance tests.

We found that dynamic postural stability also improved after our functional balance training program, as the dynamic movement associated with our program challenged the postural control system more than a standard coordination training program. On detailed analysis we found that there were discrepancies between groups, though statistically non-significant. Marginally better improvements in NMT group can be explained on the basis that NMT incorporates lower limb exercises as well as core stability exercises with Swiss ball as a part of training. The unstable characteristics of these balls provide an environment to stimulate more motor units. The greater the instability, the greater the muscle recruitment is because of stabilization requirement. Core stability and strength are required for trunk rotation and postural control while standing or moving, and has significant importance for daily life activities, athletic performance, and the rehabilitation and protection from LBP. The Canadian Society for Exercise Physiology (CSEP) recommended to instability resistance exercise to train core muscles for athletes and sedentary people.

In a study it was established an isokinetic profile of trunk rotation strength in 109 elite male and female tennis players aged 11–54 years. The men had symmetrical strength between the forehand and backhand directions, and the women had only small (4–8%) differences in strength between these directions. The authors suggested that core-stabilization programs should focus on both directions of trunk rotation to enhance muscle strength and balance.26 Our program incorporated various medicine ball exercises to improve core strength and stability.

Strength gains can be achieved not only by resistance training but also by neuromuscular training (Behm& Anderson, 2006).[26] Instability resistance training can load extra stress on the neuromuscular system.

The improvement in dynamic balance can also be explained on the basis of increase flexibility of the lower limb, especially in the hip and knee flexion. Robinson and Gribble27 suggested that improvements in the SEBT were not due to strength or core stability but, rather, to increased knee and hip flexion on the stance limb. Their study consisted of 20 participants from a university setting who did not undergo any intervention program. Stepwise regression revealed that hip flexion and knee flexion, separately and in combination, accounted for 62% to 95% of the variance in reach distances.

Although both the groups improved significantly on dynamic as well as on static balance, but the pattern of improvement across the time period of 4 weeks differed in two groups. NMT group showed better improvement in anterior direction as compared to FBT group as assessed by Y-Balance test. While in other two directions i.e. posterolateral and posteromedial, both groups exhibited almost similar pattern of improvement after 4 weeks. According to Earl and Hertel,28 to perform the anterior excursion, subjects leaned backwards extending the trunk to maintain their balance. There is a backward shift of gravity (COG) which accentuates instability. This possesses a greater amount of challenge in front of subjects. Training in NMT group instils better control of COG, as core muscles were also trained.

Within group improvements for anterior direction in both the groups could be explained on the basis of fact that vastusmedialisobliqus could have been weak on day 0 because of proximal muscle changes associated with ankle sprain. So reach distance improved as the muscle strengthened during 4 weeks of training. Earl and Hertel28 shows that during anterior excursion vastusmedialis activity was significantly greater on SEBT than during any other direction.

Improvement in the composite score of dynamic Y-Balance test in the both the groups was mainly based on the improvement of posteromedial and posterolateral direction. Improvements in the posterolateral and posteromedial direction are likely the result of improved neuromuscular control and dynamic balance, and less related to lower extremity strength, as was suggested by Thorpe and Ebersole.17,29

In Y-Balance test, composite score for two groups were statistically significant between the two groups at the end of 4 weeks of balance training, where NMT group registered marginally better improvement than FBT group. Composite score only provides a very gross picture, so it has not been discussed in much detail.

On Single Limb Stance Test, static balance improved in both the groups in almost similar pattern in both the groups. No differences existed between the two groups when measured on SLST. The inability to maintain quiet stance during SLST has been consistently been shown to be associated with ankle instability. Greater improvements were registered in static balance scores as compared to Y-Balance test. This can be accounted to the reason that lesser demands are placed on lower extremity musculature when balancing on single leg as compared to dynamic tasks. One important observation of this study was that significant improvement occurred from day 0 to week 4. These findings suggest that 4 weeks of training is sufficient time to promote reflex muscular activation patterns necessary for the maintenance of posture and balance.30

In our study 73.33% subjects suffered from functional ankle instability in their dominant leg. Ekstrand and Gillquist[31] found that the dominant leg sustained significantly more ankle injuries than the non-dominant side in male soccer players. But, Beynnon et al6 found no influence of limb dominance on ankle sprains in the study of collegiate soccer, field hockey, and lacrosse athletes.

6. CLINICAL RELEVANCE

Sports physiotherapist, sports trainers, coaches and others in situation where they are unable to decide which type of training is more beneficial for their athletes, they should be aware of the impact that Neuromuscular training and Functional balance training are almost equally effective in improving static and dynamic balance. But still we can say that neuromuscular training can give better results in improving static and dynamic balance. Functional balance training is easier to perform as compared to neuromuscular training, thus it can be used for older or weaker people for improving balance.

7. LIMITATIONS

Larger sample size would have brought in more clarity in observed trends. Due to lack of funds and infrastructure, many of the resources like EMG Force plate, and Biofeedback could not be used to make the results more clear. The various activities of the subjects during the course of study were not completely under control. Though the subjects were instructed to continue only with their regular activity and were asked to report participation in any new activity.

8. FUTURE SCOPE

Generalizability of the results should be increased by carrying the study on large sample size. Studies can be done for longer durations (8 to 12 weeks), to make the picture of results more clear.

9. CONCLUSION

The results of this study demonstrate that regardless of different training protocol (NMT and FBT), statistically significant improvements in balance were achieved by both the groups. Following the training the mSEBT or YBT composite score, and SLST time significantly improved in the both the training group. Though statistically non-significant but there was marginally better improvement in dynamic balance in NMT group as compared to FBT group as assessed on anterior, posteromedial, and posterolateral direction of Y-Balance Test. Thus we can say that neuromuscular training can give better results in improving static and dynamic balance.

10.ACKNOWLEDGMENT

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Conflict of interest: None

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RESEARCH PAPER

ACOUSTIC FEATURE EXTRACTION IN HINDI SPEECH USING HIDDEN MARKOV MODEL TOOL KIT (IN NOISY ENVIRONMENT)

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ABSTRACT

Speech recognition process has a complex structure which consists of not only the transmission of voice but also the gestures, the language, the subject and the capability of the destination. In this research Mel-frequency cepstral coefficients (MFCC), Perceptual linear prediction (PLP) coefficients along with modified hybrid features are used for isolated Hindi digits recognition. Two modified hybrid features Bark frequency cepstral coefficients (BFCC) and revised perceptual linear prediction (RPLP) coefficients were obtained from combination of MFCC and PLP. Experiments were performed on noisy data. In this experiment four different noises: Car noise, F16 noise, Factory noise and Speech noise, clean Hindi digits database at different SNR levels to get noisy database. The recognition performance with BFCC features was better than that with MFCC features. RPLP features have shown best recognition performance as compared to all other features for both noisy and clean databases. The aim of research on automatic speech recognition (ASR) is to build machines that are indistinguishable from humans in the ability to communicate in natural spoken language. In this way, speech recognition is not a mature science but an important one.

Keywords: ASR, Hindi Speech Recognition, MFCC, PLP, Hybrid Features, HTK.

1. INTRODUCTION

Speech is the primary way of communication. It is a mode of sharing facts, thoughts and emotions and also a way of transferring human intelligence from one person to another [1] the human voice has long been an accepted feature in science, a machine that can recognize these features. In his book 'The Road Ahead', Bill Gates (co-founder of Microsoft Corp.) hails speech recognition as one of the most important innovations for future computer operating systems. Speech recognition is always looked upon as a fascinating field in human computer interaction. Speech recognition is the process of converting an acoustic signal, captured by a microphone or a telephone, to a set of words. The recognized words can be the final results, as for applications such as commands and control, data entry, and document preparation.Speech recognition has been a goal of research for more than four decades but the desired goal is yet to be achieved, namely, a machine that can understand spoken discourse on any subject by all speakers in all environments [2-3]. Classification and recognition both involves by Human perception. The arrival of language is perhaps a good example of the human disposition to classify inherently and recognize patterns. Discovering and recognizing patterns t in the speech signal is most difficult task for the pattern recognition machine.

AUTOMATIC SPEECH RECOGNITION (ASR) SYSTEM: processing. Speech recognition systems are commercially available with limited capabilities since last few decades. The performance of these systems varies as a function of the transducer (microphone to telephone), vocabulary (small to medium size), speaker (speaker dependent to speaker independent) and operating environment (clean to noisy conditions). The basic task of automatic speech recognition (ASR) is to derive a sequence of words from a stream of acoustic information.

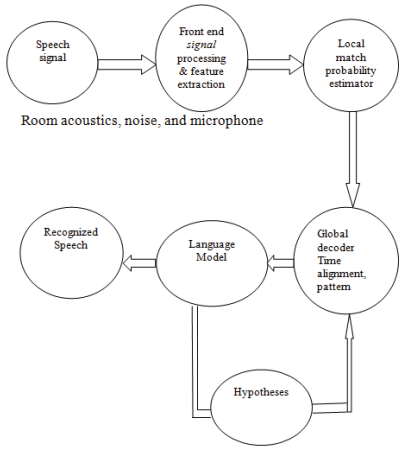

Fig. 1.1: Block diagram for Speech Recognition

To understand automatic speech recognition that has the extraction of meaning (for instance, a query to a database) or producing actions for speech. ASR systems consist of some major components that as shown in Figure 1.1, first

block consists of the acoustic environment plus the transduction equipment such as microphone, preamplifier, anti-aliasing filter, sample-and-hold, A/D converter etc. The second block is the feature extraction subsystem also called the front end signal. It derives acoustic representations. The next two blocks in Figure 1.1 illustrate the core acoustic pattern matching [4] operations of speech recognition. In nearly all ASR systems, a representation of speech [5], such as a spectral or cepstral representation is computed over successive intervals. These representations of speech frames are then compared to the spectra or cepstra for speech that were used for training. Speech is produced by the vibration of the vocal cords when breath is exhaled from the lungs. We can get the variety of speech sounds due to the variation in mass and length of the vocal cords and the articulators of the vocal tract function. Men's vocal cords length is 17 - 24 mm and an average fundamental frequency of 125 Hz, while women's vocal cords are length 13 - 17 mm and an average fundamental frequency of 200 Hz. Although it is not clear how the brain interprets speech signals, it is well known that the human ears sensitivity to speech is non-linear. A non-uniform Mel scale defined as one thousandth of the pitch of a 1000 Hz tone [6] is usually used to simulate this non uniform sensitivity of the ear for the purpose of speech feature extraction.

INSPIRATION: Speech recognition is always looked on as a fascinating field in human computer interaction [7]. A speech recognition system basically consist of a collection of algorithms from a variety of disciplines, such as statistical pattern recognition, communication theory, signal processing, combinatorial mathematics, linguistic etc. Different recognizers provide or relied different degrees. The man-machine interface is basic or primary focus for research in speech processing. One of the most difficult aspects of performing research in speech recognition by machine is it's inter disciplinary nature and the tendency of most researcher to apply a monolithic approach to individual problem.

A major and motivational part for choosing Hindi as the language for our recognition system comes from its local relevance because this is our mother tongue language. Out of India a people in several other countries like Nepal, Mauritius, Singapore, Fiji, Guyana, Suriname, Trinidad, UAE, etc. can easily understand and even speak it.

PREVIOUS WORK: Now-a-days research work is being carried out for Hindi Digits. Some speech recognition systems have been proposed for the isolated digit recognition in the Hindi language. Previous I had proposed hybrid features for speaker independent Hindi speech recognition system. In this paper Mel-frequency cepstral coefficients (MFCC), Perceptual linear prediction (PLP) coefficients along with two newly modified hybrid features are used for isolated Hindi digits recognition. Two modified hybrid features Bark frequency cepstral coefficients (BFCC) and Revised perceptual linear prediction (RPLP) coefficients were obtained from combination of MFCC and PLP. Experiments were performed for both clean as well as on noisy data. In this experiment six different noises: Car noise, F16 noise, Factory noise, Speech noise, LYNX noise and Operation room noise have been added to clean Hindi digits database at different SNR levels to get noisy database. The recognition performance with BFCC features was better than that with MFCC features. RPLP features have shown best recognition performance as compared to all other features for both noisy and clean databases.[8].

Mishra et al. proposed a connected Hindi digit recognition system using robust features such as Mel Frequency Perceptual Linear Prediction (MF-PLP), Bark Frequency Cepstral Coefficient (BFCC) and Revised Perceptual Linear Prediction (RPLP). A success of 99% was achieved using the MF-PLP feature extraction and training Hidden Markov Models (HMMs). Pre-defined 36 sets of 7 connected digits uttered by 35 speakers was used in training and the 5 other speakers for testing. The performance for this system might be high as predefined sets are used with a fix number of known digits in each set.[9]

2. DATA BASE PREPARATION

It is a noisy isolated Hindi digits database of forty speakers. WavePad and Cool software were used for preparation of Hindi digits database. A database of forty speakers, seventeen males and twenty three females for a total of ten Hindi digits ('Shoonya', 'Ek', 'Do', 'Teen', 'Chaar', 'Paanch', 'Che' 'Saath', 'Aath' and 'Nou') was prepared with sampling frequency 16 kHz and 16 bits per sample. Speakers were chosen from different geographical areas of India, different social classes and of different age groups (18-26 years). Every speaker was asked to repeat each digit ten times with short inter-digit pauses. Further, all ten repetitions of each digit were segmented manually. The database consists of 10 samples of each Hindi digit of each speaker, i.e., total 4000 speech samples (for 40 speakers), 100 samples (for each speaker). This database was prepared in two different phases at Raj Kumar Goel Institute of Technology, Aligarh Muslim University, Aligarh and Birla Institute of Technology, Mesra, Ranchi, India. The age group of 18-26 years was chosen as students of different dialects in this age group were easily available. Artificial noisy database was prepared for ten Hindi digits by adding different types of noises from NOISEX-92 database to clean Hindi digits database. To generate noisy database, car noise, F16 noise, factory noise and speech noise were artificially added to clean speech at different signal-to-noise ratios (SNRs) in the range 30dB to10dB. [10]

3. FEATURE EXTRACTION

Initially the database was divided into two parts: training data and testing data. The 40 speakers were divided into a training corpus with 35 persons and a testing corpus with 5 persons. In the testing corpus there were three female and two male speakers. Six different types of noises (car noise, F16 noise, factory noise, speech noise and

operation room noise) were injected into the clean signal to achieve Hindi digits samples at 10dB and 30dB SNRs levels. Training and testing was done without language model in the following manner. It uses Viterbi alignment for segmenting training observations and then pools the vectors in each segment to re-compute the parameters.

Algorithm: If we have a hidden Markov model with state space S, initial probabilities π_{iof} being in state I and transition probabilities a_i,j of transitioning from state i to state j.

Then observed outputs $\mathbf{y_1}.....\mathbf{y_t}$. The most likely state sequence $\mathbf{x_1}.....\mathbf{x_t}$ that produces the observations is given by the recurrence relations:[10]

$$V_{1,k} = P(y_1/k).\pi_k \quad \ldots (1)$$

$$V_{t,k} = \text{Max}\ \varkappa_{es}\,(P(y_1/k).\ a_{x,k}.V_{t-1,x}) \quad \ldots (2)$$

Here $V_{t,k}$ is the probability of the most probable state sequence $P(\boldsymbol{x_1}.....\boldsymbol{x_t}, \boldsymbol{y_1}.....\boldsymbol{y_t})$ responsible for the first t observations that have k as its final state.[11]

Grammer: In HTK, the task grammar is written in a text file, containing a set of rewrite rules based on Extended Backus-Naur Form (EBNF). A task dictionary is also defined which informs the system as to which HMM does each of the grammar variables correspond to. The HParse tool compiles the task grammar to give us the task network. In Table 1.1 Isolated Hindi digits are showing.

Table 1.1: Isolated Hindi Digits

Isolated Hindi Speech Digits									
shunya	ek	do	teen	char	panch	chah	saat	aath	nau

HTK feature extraction block does not support PLP, BFCC & RPLP feature extraction techniques. These features are extracted using MATLAB7.0. Then the features were saved in HTK format using functions from the voice-box toolkit. The same procedure was followed to create HMM models for all Hindi digits as explained for MFCC. Hindi digits database of total five speakers is used for testing. For recognition of unknown digit the feature vectors of unknown digit are taken as the observation sequence. The probability of occurrence of that observation sequence is computed for each digit model. The digit whose model gave the highest probability was taken as the recognized digit.

4. EXPERIMENTAL SETUP AND RESULTS

ASR performance is taken out in terms of recognition rate. The above system is tested on the prepared database Here we have taken 35 training corpus and 5 testing corpus The performance have been taken using HTK toolkit's HResult. Tool. The percentage number of correct labels recognized by using given formula.

Where C and T are the number of correct labels and total labels respectively with recognition rate,

%Recognition rate=C/T*100

For the experiment we are taking first speech signal in noisy environment then it is passing through Pre-processing after this Feature Extraction then signal is passing through the HTK tool kit. Recognized Digits come as the final results. Experimental set up for the above isolated Hindi digits in noisy environment is given in fig 1.2

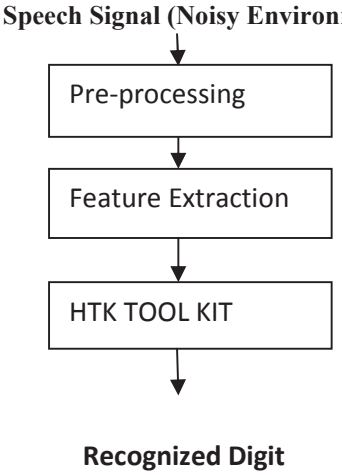

Fig. 1.2: Experimental Setup

Table1.2 Results

Recognition Rate for Noisy Isolated Hindi Digits					
Noise	**SNR LEVEL**	**% RECOGITION RATE OF FEATURES**			
		MFCC	**PLP**	**RPLP**	**BFCC**
car noise,	**10db**	87	91.1	94	87
	30db	90	95.4	97.2	92.8
F16 noise,	**10db**	60	76	75	68.2
	30db	83.4	91	92.4	86
factory noise	**10db**	63	71.1	76	68
	30db	89	91.4	92	87.1
Speech noise	**10db**	65	74	79	78
	30db	86.2	90	92	87.1

5. CONCLUSION

In this Paper experimental setup and evaluation results for acoustic features is described. First of all description of preparation of databases is mentioned. Database of isolated digits prepared in noisy environment.. It is observed that proposed method is giving better recognition efficiency than most of the conventional method

6. ACKNOWLEDGMENT

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REVIEW PAPER

A REVIEW ON CALL DROPS

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ABSTRACT

Now a day's life without mobile phone can't be imagined. Call drop is a biggest villain for mobile phone users and getting randomly cut off in the middle of an important conversation is a very frequent phenomena majority of people are facing. In many cities, mobile users have to rush from one room to another or drive around neighborhoods to find better signals and better voice quality. As per TRAI not more than 2% call drops by operators are allowed.

Keywords: MSC, NSS, OSS, BTS, CDR.

1. INTRODUCTION

In our daily life mobile phone is very important accessory, every minute of life is living with mobile phone because of its various basic and new features like voice calling, video calling, internet calling, SMS, chatting, What Sapp, Facebook etc. some of features can be in the category of value added services.

Now a day we are used to of mobiles but generally we use it for verbal conversation. There are situations when in middle of important conversation connection is break down which is called as call drop, There are various reasons for call drop few of them are like weak signals, coverage area, lack of sufficient towers, users press wrong due to not have enough understanding about mobile handset they are using or weak battery at the time of conversation etc.

Call drop is getting increased day by day and impacting users every day, considering increase in new mobile connections as urge to use mobile in growing in India. Rural areas are worst impacted due to call drop where people are running for one place to other place to get some signal to maintain their ongoing call or get good coverage area and they might be heard to say only " hello hello hello……." but no response from other party.

I have reviewed many research papers related to call drop mitigation but no one has talked about much from user's perspective .How much subscribers are financially and emotionally impacted by this issue and how much telecomm companies do benefits from call drop?

According to leading Indian newspaper Indiaexpress.com" depends on tariff plan, if it's measured in seconds, the telecom company gains nothing- no matter how many times the connection snaps, billing resumes at the same rate. But if it's measured in minutes, or if the plan contains features such as certain number of free calls in every billing cycle, call drop hurt the customer and reduce the trust on telephone network.

2. HOW CALL ESTABLISHED

Global System for Mobile Communication (GSM) has now been adopted worldwide as common standard for mobile communication.

Our geographical area is divided into cells of specific size. Each cell has one mobile base station it is also called tower and its signal shows in our phone's screen. When mobile phone is switched on, it keeps on sending signals to nearest base station via microwave transmission. Mobile base station keeps record of that SIM and related information into network computers. Now your mobile is in coverage area.

When anyone dialed the number of anybody in another cell of network, the mobile number data is encoded and constantly send to network computer of nearest base station (tower) of caller.

After verification of caller, network computer tries to scan the person to whom you are calling via nearest base station. When called party is traced by nearest base station of his base station, the corresponding ring is rung on called party's phone. When phone has picked up, both towers establish the unique channel for communication between them.

When a mobile user moves from one area of coverage or cell to another cell within call's duration the call should be transferred to new cell's base station to maintain the communication i.e. hand-off management. But if the channels are not free in new cell, this impact on your

conversation and your call will be drop.

GSM architecture[1] is divided into four parts-

1. Mobile Station (MS): MS OR ME or cell is the part of GSM architecture that the user sees and operates. It has mainly two parts- (a) Hardware (b) SIM-Subscriber Identity Module is removal smart card that stores user information.

2. Base Station Subsystem (BSS): BSS consists of a BSC and one or more BTS. Each BTS defines a single cell (area) and includes radio antenna, radio transceiver and link to BSC. BSC is responsible for reserving radio frequencies; manage hand-off of mobile phone from one cell to another within BSS.

3. Network and Switching Subsystem (NSS): It provides a link between cellular network and PSTN. It controls hands-off between cells in different BSS. And authenticate user and validate account and enables worldwide roaming of mobile users. The most important part of NSS is MSC (Mobile switching center) which performs functions such as call set-up, release, and routing. It also connects mobile user to PSTN or other network.

4. Operation and Support Subsystem (OSS): used to control and monitor the overall GSM network and it is also used to control the traffic load of the BSS.

3. CALL DROP RATIO (CDR)

CDR is the ratio of abnormal disconnect of calls to total calls established. The benchmark set by TRAI (Telecom Regulatory Authority of India) for CDR is less than 2%.

TRAI conducts the independent drive test (IDT) to monitor the different network performance in some areas like Delhi, Mumbai, Pune, Kolkata, Bhubaneswar, and Surat from 23rd June 2015 to 19th Sep. 2015 and analyze the causes of call drop and got the result that the most of the telecom operators failed to meet benchmark of network related parameters. They failed to achieve benchmark due to high block call rate, high drop call rate, low call setup success rate and Rx quality samples.

4. REASONS FOR CALL DROP

There are many reasons which can be blamed for call drop. Following are few factors.

1. Network Congestion: While new customers are added rapidly by telecom service provider, less focus on scaling up of infrastructure is being made hence making existing infrastructure operating at threshold level and leading to call drops in terms of reduction of customer experience.

2. High Call Volumes: Call volumes grows phenomenally during festival occasion or any events during which high call volumes are made can add more congestion into network and may result into call drop as existing system will be overrunning .

3. Cells Overlap: A cells overlap is also a contribution factor for Call drop. This usually happens because various cells of different coverage areas overlap with each other and impacts smooth call handover when users moves from one cell to adjacent cell .

4. Weak Signals: There are some areas where signal strength is not strong (intensity of connection between mobile and network) e.g. tunnels, high mountains, in-building areas .Impacted users more often purchase boosters that are not band specific to their service provider and boosts the complete GSM band (including all TSPs), resulting in interference of the signals. As per TRAI in Delhi alone there are more than 250 identified illegal boosters operating in the network.

5. User is Roaming: When mobile user is roaming with high speed from one place to other place then call passes through various cells having strong or weak signal strength can interrupt the call where bad signal/coverage is found.

6. Hardware Related Issues: Due to fault in underline infrastructure or network also cause. Call drops could also be because of hardware related issues including equipment failure. At the receivers' end, calls may be dropped if a mobile phone loses battery power and abruptly stops transmitting.

7. Call handover: Smooth call handover doesn't happen when user is moving from one network cell to other cell. As per TRAI one possible reason for such occurrences is traffic imbalance between two cell sites when the new cell site is at capacity and cannot accept additional traffic from the cell trying to "hand in".

5. RECOMMENDATIONS TO REDUCE CALL DROP

There are following steps which can be followed by telecom operators to reduce call drop.

1. Incorporating Prioritization Scheme: Telecomm operators can incorporate handover prioritization schemes, auxiliary stations, guard channels, call admission control protocol, smart antennas, in-building solutions and handoff queuing to reduce call drop as per TRAI.

2. Deploying Time Division Multiple Access (TDMA): Telecomm operators can deploying Time Division Multiple Access (TDMA) based dynamic channel allocation in heavy load conditions is one of the methods adopted by various service providers to reduce the call drop probability in their networks.

3. Establish Alternate Call Route: When network is highly congested to mitigate call drop issues telecoms operator can look for solutions to switch to alternative route when one channel is busy or congested then divert call to less congested route.

4. Add More Mobile Towers For Signal

Strengthening: Mobile towers do not have an unlimited capacity for handling the current network load. Thus telecoms should increase the number of the towers so as to cater to the demands of a growing subscriber base and reduce call drops.

5. Deploy Signal Booster: The building walls can block or reduce the signal strength inside the home or office. Many underground areas, such as tunnels or high areas as mountains do not have good signal. To overcome this situation, specifically tuned cell phone signal booster for each TSP or an in-building solution would increase the cell phone signal in such places, reducing or eliminating the number of dropped calls.

6. Redesign Existing Cells: Implementing efficient handover management system would eliminate call drops to do so redesign existing cells into smaller cells for swift and smooth call handover while moving into different cell.

7. Improvement in existing infrastructure this can be done as below:

- Installing good quality in-building signal boosters or implementing dedicated in-building coverage.
- Implementing Distributed Antenna System, where spatially separated antennas are connected by a common source and provide wireless service.

6. WHAT GOVERNMENT CAN DO

- Offer more spectrums by releasing some from the defense services.
- 2. Unused spectrum should be sold at lower cost to telecom so that they can use this for better services.
- States should start following uniform policies for tower installation approval and maintenance policies.
- Free up the roofs of government buildings to install towers.
- Promotion and encourage should be made by Government to improve tower design and make them more compact and highly sophisticated to handle high call volumes in an efficient manner.

7. CONCLUSION

As discussed above this paper talks about basic terminology of GSM architecture, various reason for call drops, initiative taken by TRAI and how this problem can be reduced or eliminated. One prominent solution can be increasing infrastructure and installing more towers in urban areas by making people aware that towers would be not causes health issues as installing towers are being opposed by various resident welfare associations.

I have explored many journals, articles and newspapers to dig out the reasons for call drop and how this can be reduced. Hope this will be helpful for those looking for crisp and precise document on call drop.

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REVIEW PAPER

MICROSTRIP PATCH ANTENNA AND APPLICATIONS

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ABSTRACT

This review paper presents an overview of microstrip patch antennas (also known as printed antennas). Basically, a microstrip patch antenna is a low profile antenna and can be mounted on any surface for desired object. It made out of a hint of copper or some other metal like gold of different shape on one side of a substrate. This review focus on introduction of Microstrip patch antenna, types, different feeding methods and various applications.

Keywords: Microstrip; Patch Antenna; Bandwidth.

1. INTRODUCTION

Microstrip antenna was invented by Bob Munson in 1972 [1-2]. The conventional structure of a Microstrip Patch antenna comprises of a metallic radiating patch element, embedded into a grounded dielectric substrate. The shape of the conducting patch can be of any geometrical form among which rectangular and circular are the most common. The rectangular and circular Microstrip patch antennas are used as simple and for the extensive and most demanding applications as they easily provide with feed line flexibility, multiple frequency operation, linear and circular polarizations, frequency agility, good bandwidth etc.

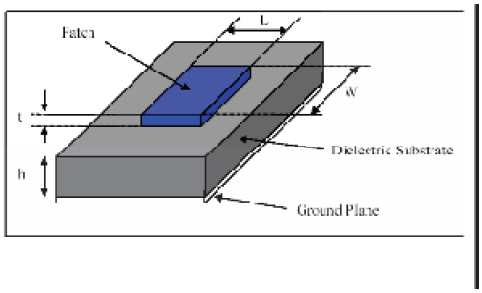

Fig. 1: A basic structural model of microstrip patch antenna [3]

The patch antennas are very useful because of their; low weight, ability to conform to any geometrical shape, easy integration and low fabrication cost. Their major drawback is their narrow bandwidth which makes them unsuitable for modern-day wireless communication technologies. Through extensive studies in the last few decades on antenna performance improvement, various techniques have been developed to enhance the bandwidth. The current research focus is on the reconfigurable antennas. These can provide wide bandwidth performance; multi-band functionality; the frequencies and bandwidths can be reconfigured as well. The microstrip antennas are widely used in military, industrial and commercial sectors [4]. There are three types of losses in microstrip patch antennas that reduce the gain of microstrip patch antennas namely surface wave, dielectric and conductor losses. In microstrip patch antennas metal patch is on the top of dielectric substrate and when antenna is energized it radiates EM waves in the all directions and the EM waves that travel in the substrate is known as surface waves and loss due to these surface wave is known as surface wave losses [5]

2. TYPES

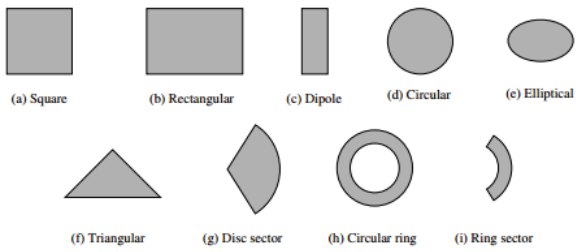

Fig. 2: Different shapes of microstrip patch elements[6]

The basic form of a microstrip patch antenna consists of an arbitrary shaped copper or any other metal trace on one side of a PCB substrate with other side grounded. The metal trace can have the shape of a rectangle, square, circle, triangle, dipole, or any other geometry as shown in Fig. 2. Among these shapes, square, rectangle, dipole, and circle are most famous for ease in design, analysis and fabrication, and having appealing radiation characteristics especially low cross polarization. The dipole shape is appealing for possessing larger bandwidth and occupying less space. This property makes microstrip dipoles desirable for the antenna arrays [6]

3. DIFFERENT FEEDING METHODS

This antenna can be fed using coaxial probe feed, micro

strip line feed, proximity-coupling and aperture-coupling feed methods.

Coaxial probe feed

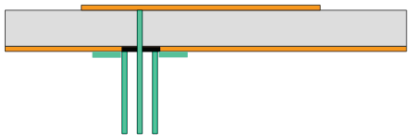

Fig. 3: Coaxial Probe Feed

Coaxial feeding is feeding method in which that the inner conductor of the coaxial is attached to the radiation patch of the antenna while the outer conductor is connected to the ground plane [7].

Advantages

- Easy of fabrication
- Easy to match
- Low spurious radiation

Disadvantages

- Narrow bandwidth
- Difficult to model specially for thick substrate
- Possess inherent asymmetries which generate higher order modes which produce cross-polarization radiation.

Microstrip line feed

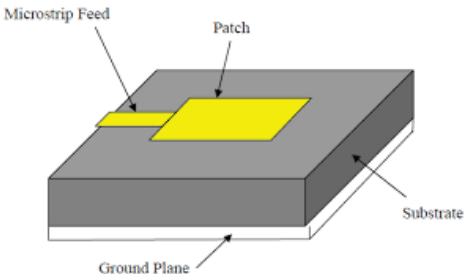

Fig. 4: Microstrip line feed

Microstrip line feed is one of the easier methods to fabricate as it is a just conducting strip connecting to the patch and therefore can be consider as extension of patch. It is simple to model and easy to match by controlling the inset position. However the disadvantage of this method is that as substrate thickness increases, surface wave and spurious feed radiation increases which limit the bandwidth [7].

Proximity-coupling

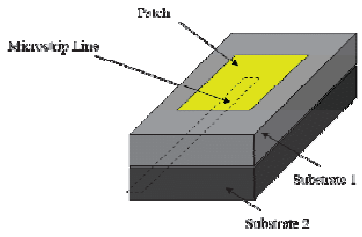

Fig. 5: Proximity Coupling

Proximity coupling has the largest bandwidth, has low spurious radiation. However fabrication is difficult. Length of feeding stub and width-to-length ratio of patch is used to control the match [7].

Aperture-coupling feed

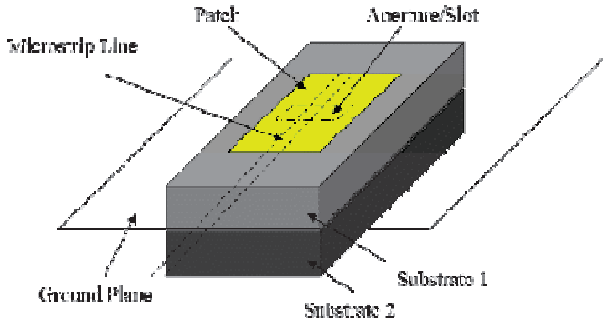

Fig. 6: Aperture coupling feed

Aperture coupling consist of two different substrate separated by a ground plane. On the bottom side of lower substrate there is a microstrip feed line whose energy is coupled to the patch through a slot on the ground plane separating two substrates. This arrangement allows independent optimization of the feed mechanism and the radiating element. Normally top substrate uses a thick low dielectric constant substrate while for the bottom substrate; it is the high dielectric substrate. The ground plane, which is in the middle, isolates the feed from radiation element and minimizes interference of spurious radiation for pattern formation and polarization purity [7].

4. APPLICATIONS

The television, radio, mobile phones, global positioning system (GPS), radio frequency identification (RFID), multiple input multiple output (MIMO), collision avoidance, satellites, surveillance, radars, medical imaging and guidance of missiles are few examples of the military, civilian and industrial applications of microstrip patch antennas [8].

5. CONCLUSION

This article presents a survey on microstrip patch antenna, feeding techniques and its application. Due to small size and easily conformable on any types of geometry the microstrip patch antenna become very popular. The main issue is to minimize return loss and improve the bandwidth for modern wireless applications.

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REVIEW PAPER

REVIEW ON PERFORMANCE AND EMISSION ANALYSIS OF HYDROGEN BLENDED COMPRESSED NATURAL GAS ON A BI-FUEL ENGINE

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ABSTRACT

Considering the forsaken circumstance of rising fossil fuel costs combined with constrained accessibility and environment corruption created by routine fills, it is not shocking that the world has turned its thoughtfulness regarding utilization of option energizes. The continually expanding interest for biologically benevolent vehicles must be met by utilization of ultra clean energizes like Compressed Natural Gas (CNG) and Hydrogen (H2). Lower carbon to hydrogen proportion of CNG makes it a cleaner fuel, because of this CNG is picking up prevalence as an inward ignition (IC) motor fuel in transport division. Hydrogen fuel for IC motors is likewise being considered as a future fuel because of its straightforward carbon less structure. Be that as it may, a few impediments must be overcome before commercialization of H2 as an IC motor fuel for transport area. The hydrogen enhanced CNG fuel alluded to as HCNG can possibly lower emanations and is thought to be the initial move towards advancement of a Hydrogen economy.

Keywords: Lean Burning, Excess Air Ratios, Wide Open Throttle, Higher Flame Velocity.

1. INTRODUCTION

HCNG is a vehicle fuel which compressed natural gas enriched with hydrogen, typically 5-20% hydrogen by volume fraction. Indian Oil HCNG testing facility has confirmed the fuel's potential to reduce nitrous oxide (NO_x), carbon dioxide (CO_2), and carbon monoxide (CO) vehicle emissions compared to baseline CNG.Resources are deteriorating at a tremendous rate on the contrary energy demands are skyrocketing. Many factors are responsible but one of the major factors affecting this demand is availability of fuels.

Mineral fuels are categorised as solid (coal), liquid (gasoline, diesel, etc.) and gas (natural gas) and these contain two principal combustible elements: Carbon (C) and hydrogen (H) and of the two hydrogen is more efficient.

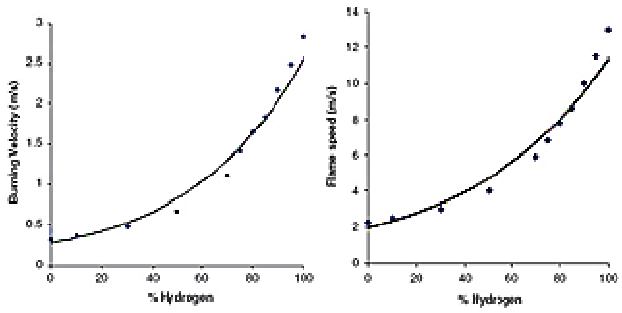


Figure 1: Burning velocities and flame speed for different percentages of hydrogen in methane (φ = 1.0) [13].

Fuel gets its efficiency from the Calorific value it contains. The calorific value of pure Carbon is 3.56521 kcal and that of pure Hydrogen is 15.50793 kcal which clearly underlines the dominance of the latter in this field.

Many researchers have studied the effect of the blending of hydrogen to natural gas on performances and emissions on dedicated or retro fitted SI and CI engines, whereas less work has been carried out in Bi-Fuel SI engines, thereby resulting in limited knowledge on this area. This survey contains major works done by highly reputed research scientists on their respective state of the art experimental setup:

Bauer and Forest piloted an investigational study on natural gas–hydrogen combustion in a CFR engine [11] and found astonishing performance and emission results that triggered major research work in this field.

Karim et al [12] in theory studied the addition of hydrogen on methane combustion characteristics at different spark timings. The theoretical outcomes displayed that the addition of hydrogen to natural gas could decrease the ignition delay and combustion duration at the same equivalence ratio. It specified that the addition of hydrogen could upsurge the flame propagation velocity, thus stabilizing the ignition progression, particularly the lean combustion process.

Ilbas et al. [13] experimentally calculated the laminar burning velocities of hydrogen–air and hydrogen–methane–air mixtures. They concluded that progressing the hydrogen percentage in the hydrogen–methane

mixture caused an increase in the subsequent burning velocity and produced broadening of the flammability limit (Figure 6).

Their outcomes proved that the ignition system attained higher thermal efficiency due to higher flame propagation velocity and lesser emissions. An increase in the amount of pre-mixed hydrogen steadies the combustion route to lessen HC and CO exhaust emission, and increases the degree of constant volume combustion and NOx exhaust emission. The growth in NOx emission can be retained at a lower side with retarded ignition timing minus the reduction in the elevated thermal efficiency.

Jungsoo Park et al[14] studied that Mass Fraction Burned (MFB) improved with H_{vf} (Hydrogen volume

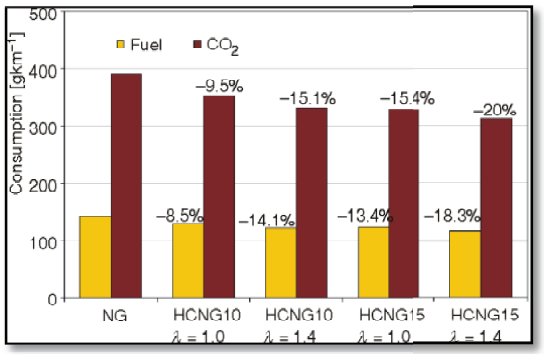


Figure 2: Fuel Consumption and CO_2 emissions at different Hydrogen volume fractions

fraction), at Excess Air Ratio (EAR) of 1.5 the addition had a drastic effect on mass fraction burned. Also saw that NO_x usually increased with addition of H_2 under lean burn conditions and that better *de-NO_x* efficiency can be obtained under these conditions where in-cylinder temperature decreases.

RejiMathai et al [15] stated that Brake Specific Fuel Consumption is lesser in HCNG in comparing with CNG due to high Calorific Value and improved combustion efficiency. At 18% HCNG the flame speed stabilizes and accelerates the combustion process thus enabling the degree of Constant Volume of Combustion (CVC). At same H-to-CNG ratio: CO and HC drastically decrease whereas NO_x increases as compared to CNG.

M. Ayoub et al[16]at Excess Air Ratio, CO decreases and if hydrogen percentage increases then we can see progressive decrease in NO_x formation down to complete cancellation on pure H_2.

Raman et al[17] carried out an experimental study on Spark-Ignition engines fuelled with HCNG blends in a V8 engine. The authors observed a reduction in NOx emissions using specific ratio of hydrogen blends with some increase in HC emissions as a result of ultra-lean combustion.

Ma and Wang[18], experimentally examined the delay of the lean operation limit over hydrogen addition in a Spark-Ignited engine which was piloted on a six-cylinder throttle body injection natural gas engine. Four levels of hydrogen enhancement were used for comparison purposes: 0%, 10%, 30% and 50% by volume. Their results exposed that the engine's lean operation limit could be stretched by adding hydrogen and growing load level (intake manifold pressure). The outcome of engine speed on lean operation limit is less significant. At a low load level an upsurge in engine speed is advantageous in extending the lean operation limit but this is not correct at high load level. The effects of engine speed are even weaker when the engine is converted to hydrogen enriched fuel. Spark timing also impacts the lean operation limit and both over-retarded and over-advanced spark timing are not logical.

Genovese et al[19] performed road test on urban transport buses, associating energy ingesting and exhaust productions for NG and HCNG blends with hydrogen content between 5% and 25% in volume fraction. The authors established that average engine efficiency through

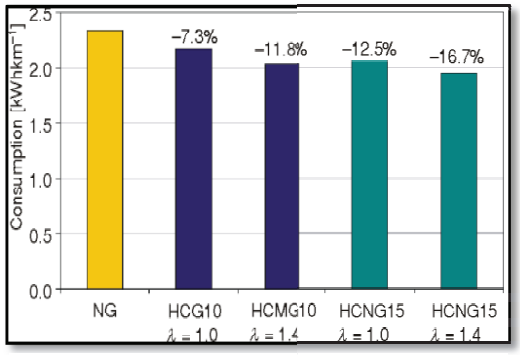


Figure 3: Fuel consumption at different Hydrogen Volume Ratios

the driving cycle rises with Hydrogen content and NOx emissions were higher for blends with 20% and 25% of hydrogen, despite the lean comparative air fuel ratios (AFR) and delayed ignition timings implemented.

Zuo-yu Sun et al [20]proved that the emissions (NO_x, CO and HC) decreases with increase of Ignition Advanced Angle and increases with increase in Manifold Absolute Pressure (MAP). Adding Hydrogen will decrease NO_x and CO greatly at lean combustion condition. ϕ (Equivalence Ratio), Ignition timing and Mass Fraction Burned (MFB) greatly affect NOx emission in HCNG engine. Process of Exhaust Gas Recirculation (EGR) introduction decreases NO_x significantly and when EGR increases and Thermal Efficiency (η_{et}) first increases and then decreases, both NO_x and BMEP (Brake Mean Effective Pressure) decreases continuously and decrease of NO_x is more at higher Hydrogen Volume Fraction.At WideOpen Throttle (WOT) with higher Hydrogen Volume Fraction; as the value of λ (Air-Fuel ratio) increases both maximal heat release rate and maximal cylinder pressure decreases and both early flame development period and flame propagation duration are extended. As ϕ increases both the Ignition Advanced Angle at MBT (Maximum Brake Torque) and Thermal Efficiency (η_{et}) decreases, but NO_x increases.

Table 1: Comparison of properties of hydrogen, CNG, and HCNG 5 with gasoline [6]

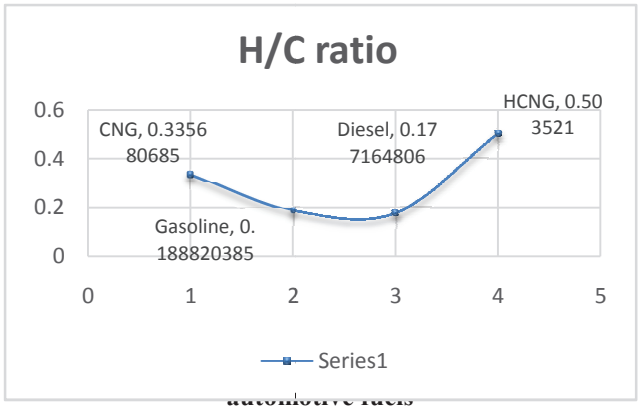
PROPERTIES	UNITS	H2	HCNG 5	CH4	GASOLINE
Limits of flammability in air,	*vol.%*	4-75	**5-35**	5-15	1.0 -7.6
Stoichiometric composition in air,	*vol.%*	29.53	**22.8**	9.48	1.76
Minimum energy for ignition in air,	*mJ*	0.02	**0.21**	0.29	0.24
Auto ignition temperature,	*K*	858	**825**	813	501-744
Flame temperature in air	*K*	2318	**2210**	2148	2470
Flame velocity in NTP[1] air,	*m/s*	3.25	**1.10**	0.45	0.37-0.43
Quenching distance in NTP[3] air,	*Mm*	0.64	**1.52**	2.03	2.0
Normalized flame emissivity		1.0	**1.5**	1.7	1.7
Equivalence ratio flammability limit in NTP air		0.1-7.1	**0.5-5.4**	0.7-4	0.7-3.8

Cheolwoong Park et al[21]investigation stated at $\lambda = 1$ and MBT spark timing during H_2 addition decreases the combustion duration as there is increase in flame propagation. η_{et} attains maximum value at low percentage of Hydrogen addition whereas η_{et} decreases with the increase in Hydrogen percentage due to increased cooling loss.

Significant difference in cooling loss between CNG and HCNG induced a decrease in η_{et}. THC emissions decreases drastically but NO_x increases expressively with Hydrogen addition resulted by faster burning speed of Hydrogen. The suggestion was made to retard spark timing with respect to MBT spark timing while keeping other points identical to the peak efficiency conditions

Fanhua Ma et al verified that Indicated Thermal Efficiency (ITE) increases at lean value of excess air ratio, the heat loss to the wall is 25% whereas at stoichiometric ratio the heat loss to the wall is 45% in an H_2 fueled engine. Thereby validating that lean burn can reduce heat loss and improve indicated thermal efficiency.

Yusuf M.J. et al[22] measured all engine-to-fuel configurations performed similarly over normal operating ranges. An important distinction occurred with rich mixtures. In addition, the blending of Hydrogen to



automotive fuels

Compressed natural gas at 20:80 ratio showed a small but noteworthy decrease in BSCO output.

Zheng J et al[23], stated that NOx emission increases with increasing hydrogen fraction when the hydrogen fraction is less than 10%, and it decreases with the increase of hydrogen fraction when the hydrogen fraction is larger than 10% at various injection timings. HC emission decreases with the increase of hydrogen fraction. This is because the quench distance of the fuel blends is decreased and the lean flammability limit of the natural gas-hydrogen fuel blends is extended with hydrogen addition. Furthermore, the C/H ratio decreases with increasing hydrogen fraction and this also contributes to the decrease of brake HC emission with the increase of hydrogen fraction. CO emission decreases with increasing hydrogen fraction. As overall excess air ratio in the cylinder increases with hydrogen addition, and CO is strongly related to the air-fuel ratio, the sufficiency of oxygen in the cylinder makes the CO emission low.

With majority of the literature survey based on dedicated gaseous fuel SI engines, limited work is been done on conventional SI engines with least or no modifications. So there exists a research gap on evaluation of HCNG on the engines that are used only for gasoline fuels, this dissertation report focuses on the tests done on a Bi-Fuel engine that for gasoline operation by design and not retrofitted for HCNG and accordingly interprets the performance and emission results of Gasoline with Hydrogen Blended Compressed Natural gas.

2. HYDROGEN BLENDED COMPRESSED NATURAL GAS (HCNG)

HCNG is a vehicle fuel which is a blend of natural gas andHydrogen in various proportions; typically 8-50 % volume Introduction to Hydrogen blended Compressed Natural Gas (HCNG).

HCNG is a vehicle fuel which is a blend of natural gas and hydrogen in various proportions, typically 8-50 % volume hydrogen. Mixtures at 20% are referred to as Hythane™ [8]. HCNG is can bridge the gap between traditional liquid fuels and hydrogen. By using HCNG as a transition fuel and taking advantage of the CNG prevailing substructure, there is a potential to initiate building a hydrogen infrastructure at a minimum cost,

[1] NTP denotes normal temperature (293.15 K) and pressure (1atm)

even though dedicated hydrogen vehicles, on a large scale. Besides the benefit as a transition fuel, HCNG has its own specific advantages in terms of pernicious emissions and, if in addition, the hydrogen is produced from renewable resources, HCNG could also contribute to reduced GHG emissions [8].

In relation to climate change [2], sustainable growth, and policy valuation, sinking energy/fuel ingestion and carbon dioxide (CO2) emissions remain the most vital challenges confronted by the policy makers, along with the automobile and petroleum industry. In this framework, it is important to analyze and forecast the efficiency of the policies that aim to shrink fuel consumption, accordingly resulting in CO2 emissions reduction. Either Hydrogen or methane, taken separately, is a well characterized combustible gas. The blend of Hydrogen and methane (the principle constituent of regular gas) to shape Hythane is in a few ways self-evident: two combustible, non-dangerous gasses remain so when blended. Other properties of Hythane are not self-evident. This paper presents the present comprehension of the impacts of weaken centralizations of Hydrogen on the properties of common gas, including impacts on materials. The advantageous impacts for ignition motors are expanded warm productivity and lessening of NOx and HC by incitement of normal gas burning close to as far as possible (lean burn or broad fumes gas reuse). Lamentably, the expansion of Hydrogen to regular gas lessens vitality stockpiling thickness by 1) lower volumetric vitality thickness and 2) expanded super-compressibility element. Hydrogen shortly costs more than common gas also, accessibility of Hydrogen is restricted. Therefore, the goal of Hythane is to expand the advantage per unit of Hydrogen vitality

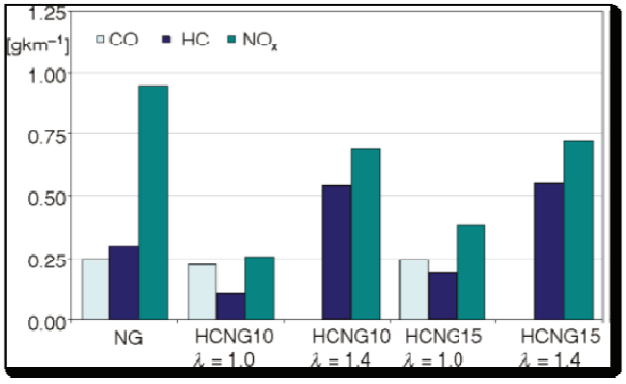


Figure 6: Fuel Consumption with CO, HC and NOx emissions at different Hydrogen volume fractions

devoured (expense viability).

The motivation behind Hythane is to upgrade and supplement characteristic gas—not to supplant it as we make our first strides toward Hydrogen vitality future reference pointing these scrutinizes, as the reference in contrast to which the other scenarios are compared. Hence, the requisite of considering a baseline scenario that reflects accurately current trends in technical progress, public behavior, energy markets, and regulatory policies.

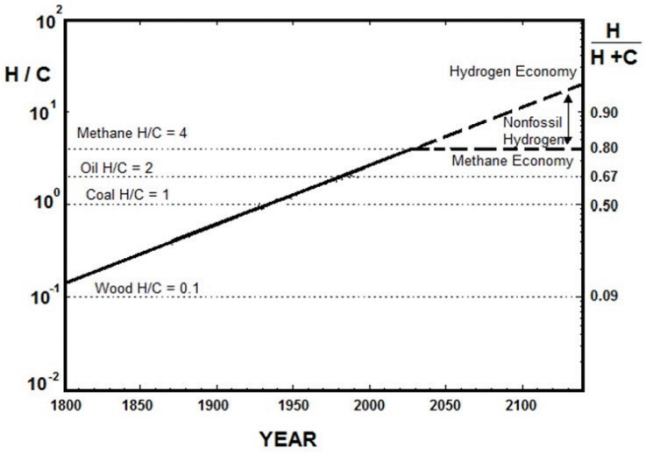


Figure 5: Decarbonization: Evolution of the Ratio of Hydrogen (H) to Carbon (C) in the World Primary Fuel Mix [24]

Furthermore, one major field of survey is the Hydrogen to Carbon (H/C) ratios, these ratios have greater impact factor than other fuel properties has led to the development of H-CNG as the new alternative fuel. Which has comparatively best H/C ratio thereby imparting superior fuel quality.

Since the volumetric vitality thickness for air-Hydrogen blends is lower than air-methane blends at stoichiometry, no doubt safe to expect that Hythane blends would likewise have lower vitality thickness than methane, in extent to the Hydrogen content. Nonetheless, the air-fuel blend vitality thickness bend is definitely not direct with creation, as demonstrated in Fig. 2. At lower Hydrogen rates, the vitality thickness of a motor's admission blend is not really influenced there is an immaterial

0.45% hypothetical force misfortune for a stoichiometric motor utilizing Hythane (20% Hydrogen by volume) versus an unadulterated methane motor. Thus, little doubt remains safe to expect that air-Hydrogen blends will dependably have lower vitality densities than air-methane blends, even at air/fuel proportions leaner than stoichiometry. Shockingly, this suspicion is likewise false. In spite of the fact that methane creates more vitality per mole of fuel than Hydrogen, Hydrogen delivers more warmth than methane per unit of oxygen devoured, and at fuel/air proportionality proportions beneath around 0.7, this impact starts to rule the blend vitality thickness.

With majority of the research based on dedicated gaseous fuel SI engines, limited work is been done on conventional SI engines with least or no modifications. So there exists a research gap on evaluation of HCNG on the engines that are used only for gasoline fuels, this dissertation report focuses on the tests done on a Bi-Fuel engine that for gasoline operation by design and not retrofitted for HCNG and accordingly interprets the performance and emission results of Gasoline with Hydrogen Blended Compressed Natural gas. Substantial work being done on dedicated CNG or retrofitted engines. Also CNG in dual fuel mode has also been

explored.

3. HCNG HAS SHOWN VARIOUS ADVANTAGES

From the review of literature available in the field of HCNG usage, many advantages are noticeable. The following are some of the benefits of using HCNG as fuel:

- It is usable with the existing CNG infrastructure. It requires only small hydrogen storage and a column for the mixing of hydrogen with natural gas.
- Safety properties are similar to CNG. HCNG is safer to handle than hydrogen, because of lower risk due to very low energy content from hydrogen (only up to 30 vol.%).
- It extends the lean misfire limit of CNG.
- Minor modifications are required in the engine due the moderate concentration of hydro-gen in the fuel mixture; the excellent anti-knock characteristics of CNG are not under-mined.
- The phenomenon of hydrogen embrittlement does not occur with respect to the engine components. Hence, no major change is anticipated in the fuel system and engine components.
- Hydrogen addition to natural gas can decrease engine's unburned hydrocarbons and NOx emissions (by lean burn) and speed up the combustion process.
- It improves the engine efficiency and lowers fuel consumption.

4. HOWEVER THERE ARE CHALLENGES OF HCNG

From the review of literature available in the field of HCNG usage, many challenges are noticeable. The following are some of the arguments of using HCNG as fuel:

- HCNG storage and supply infrastructure.
- Efforts to be concentrated on countering to fuel system performance, material compatibility.
- Emission analysis with more varieties of hydrogen in HCNG blends
- Continuous obtainability of HCNG needs to be guaranteed before boarding on its major use in IC engines.
- Continued engine performance, emissions and durability testing in variety of engine types and sizes need to be developed to increase consumer and manufacturer's confidence [23].
- Development of less expensive quality tests

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6. CONCLUSION

Future examination of the hydrogen enhanced packed characteristic gas fuel incorporate constant change on execution and discharges, particularly to decrease the hydrocarbon outflows (counting methane if vital) which are at present not intensely controlled but rather will most likely be all the more firmly directed later on:

- A definitive objective of hydrogen economy is to dislodge fossil powers with clean burning hydrogen and CNG is the best course to guarantee the early presentation of hydrogen fuel into the energy demanding field.
- The incline burning capacity and fire vehement velocity of the natural gas engine is enhanced by mixing it with quick burning high velocity fuel, hydrogen.
- Dedicated HCNG engine are better than CNG engines from fuel economy, Power, and Torque perspective because of better ignition.
- The HCNG motor enhances control by 3 - 4 % and torque by around 2 - 3 % contrasted with the CNG motor. The HCNG motor works on the leaner side than the CNG motor which decreases fuel utilization by around 4% contrasted with CNG motor.
- The HCNG fuel decreases CO outflows and NOx discharges more than the pure CNG operation. Henceforth making the HCNG fuel is all the more environmentally friendly.
- Compression ratio and equivalence ratio have a significant effect on both the performance and emission characteristics of the engine and have to be carefully designed to achieve the best engine performance characteristics.
- Higher engine rotational speeds can be used in lean mixtures to increase the power output of an engine operating on hydrogen while maintaining high efficiency and pre-ignition free operation.
- The expansion of hydrogen to methane gives a decent option fuel to hydrocarbon fills as it gives great fire security, wide combustible areas and generally higher smoldering speed.

In spite of the fact that the exhaust outflows from hydrogen-improved natural gas are as of now low, assist refinement must be done so as to further decrease discharges and to accomplish Enhanced Environmentally Friendly Vehicle (EEV) norms. In this manner discovering the ideal mix of hydrogen fraction, ignition timing and excess air proportion alongside different parameters that can be streamlined is surely a widespread obstacle. It is not just a test to find the perfect blend of hydrogen part, ignition timing, and overabundance air

proportion, yet it can likewise be a huge test to control these parameters. In conclusion there is potential for execution changes with an increment in the pressure ratio [24]. Thus, today are confronted with natural issues, tomorrow hydrogen will tackle every single ecological issue because of street transports: Natural gas-hydrogen mixes may be a potential extension from today to tomorrow [30].

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