

In this edition

**3 Best Articles of
Student Symposium –
2013**

**Light Fidelity
(Li Fi)**

Mobile Computing

**Munich breaks Free
with Open Source
Solutions**

WALL FOR ALL

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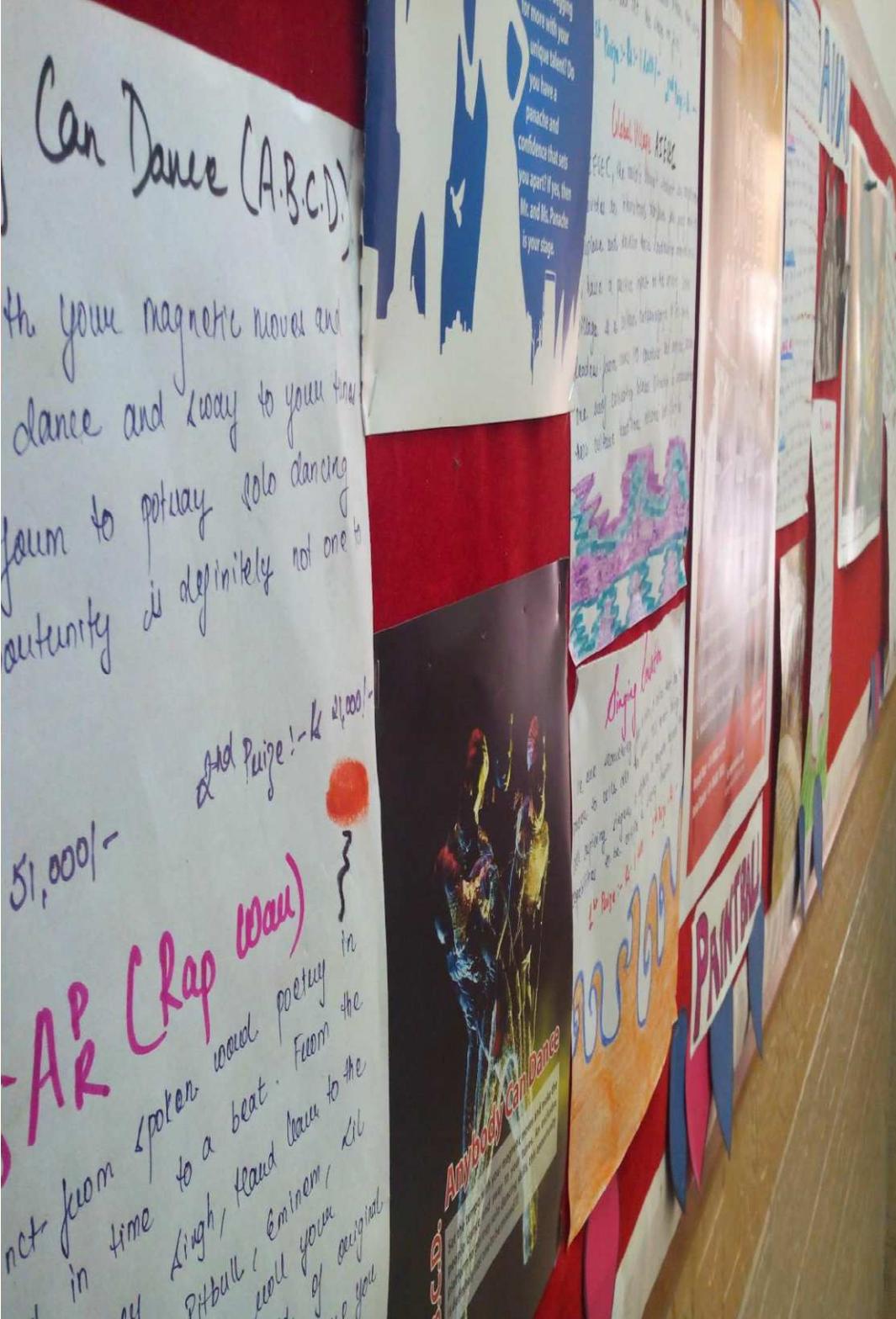
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**DEPARTMENT OF
COMPUTER
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Chitkara University, Punjab

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Student Symposium - 2013

School of Computer Sciences, Department of Computer Applications conducted Student Symposium on Information and Communication Trends in Technology – ICTT 2013 on **12th November 2013**. The Symposium provided an opportunity for students to exchange their ideas in the field of Computer Engineering and Application. It served as a platform for the students to show their ideas in many broad

areas of Web Technologies, Software Engineering, Cloud Computing etc. To guide and motivate the student's dignitaries from CSI Chandigarh Chapter - Chairman, Major General SPS Grewal, Honorable Secretary, Mr.Subhash Chander Jain, and Senior Member Brig S S Sahney along with our vice chancellor Dr. Madhu Chitkara joined this auspicious occasion.



Of the thirty articles that qualified to be presented in the Student Symposium – 2013, the top three articles have been published in this edition of *Wall for All*. The motive behind publishing these articles is to inculcate zest for research amongst the readers. These articles, though not very advanced, are enough to provide the readers with a fairly good idea as to how one can start off with writing articles. After a short stint in writing beginner level articles, one can gradually move up to writing research papers and whitepapers of international level.

- **Editors**

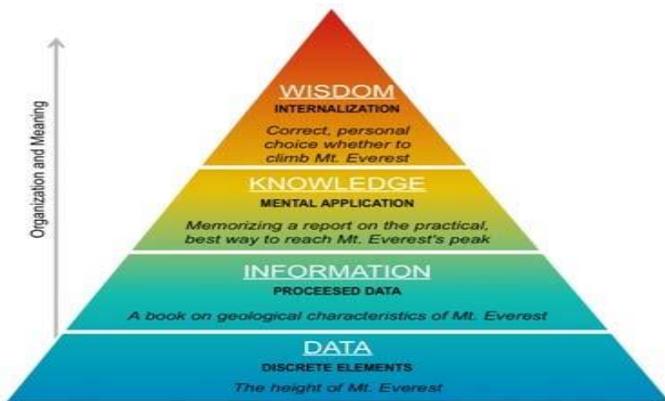
Volcanic Eruptions of Big Data



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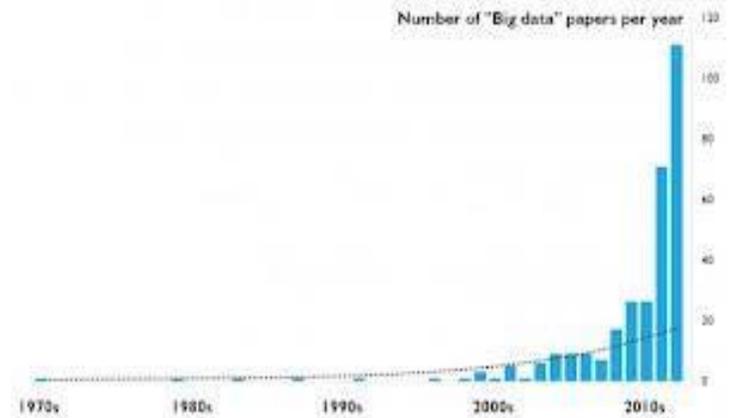
1. ABSTRACT: -

With the rapid development of computer and information technology in its last decades, an enormous amount of data in science and engineering has been and will continuously be generated in massive scale, either being stored in gigantic storage devices or flowing into or out of the systems in the form of data streams. Moreover such data has been widely available. e.g. via internet such tremendous amount of data in the order of terabytes to petabytes has fundamentally changed science and engineering, transforming many disciplines from data-poor to increasing data-rich and even calling new data intensive methods to conduct research in science and engineering.



2. INTRODUCTION: -

As we all are familiar with the era of 60's and 70's the amount of data was huge which was recorded in a bulk of registers, but nowadays we encounter unstructured and sloppily data in a massive amount and to handle that data we need to consider both the pros and cons of it.



The above graphical representation states that from 1970's to 1999's there was consistent uniformity in amount and access of data. But from 2000's till today a huge amount is being generated and as well accessed by the people and will continue in the coming years and emerge as a challenge big data is a new label that is given to diverse data sets and so large that they have become hard to work with effectively.

As per Papers.ssrn.com [1] "Big Data" is an emerging catch-all term that is defined in many ways by many different groups. For media, it's a phenomenon to watch, describe and report on but it also has deep implications for how the information business itself may evolve carrying a strong possibility of creative opportunity as well as disruption.

The wall street journal describes big data as, "meet the new boss: BIG DATA".

And according to the New York Times, "today's age is the age of big data".

The economists, mathematician, physician, physiologists, analysts expect big data to be a **"new race for data of all kinds"**.

3 V's of big data

Volume:-A typical pc might have 10 gigabytes of storage in the era of 2000 but today facebook ingests around 500 terabytes each day. Sensors embedded in the objects will soon result in billions of new and constantly updated data feeds containing environment, location and other information, including videos.

Velocity:-Capturing users behaviour and impressions at millions of events per second high frequency stock trading algorithms reflect market changes within seconds supports millions of concurrent users per second each producing multiple inputs every second

Variety:-Big data isn't just numbers, dates and strings .it contains 3d data audio video and unstructured data including log files and social media. Traditional database systems were designed to store only smaller volumes of unstructured data and operated on single server making increases capacity expensive and finite. Big data technologies such as MongoDB, solve these problems and provide companies with means to create tremendous business value.[2]

data points on its products, resources or customer.

Besides these solutions it also avails many other benefits like:

Improving effectiveness and lowering the cost of existing applications:-big data technologies can replace highly-customizes, expensive legacy systems with a standard solution that runs on commodity hardware and hence, most of the big data software are open source so they can be executed far more cheaply than proprietary technology

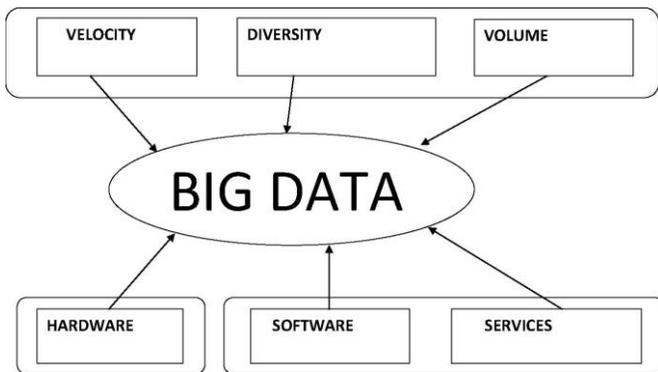
Realize new sources of competitive advantage: - big data can help businesses to act more strategically and allowing them to adapt to the changes faster than their competitors'.

Increase customer loyalty:-A top 5 global insurance provider ,MetLife used MongoDB to quickly consolidate customer information from over 70 different sources and provide it in a single ,rapidly updated view. Hence big data allows rapid adaptation.

3. SELECTING BIG DATA TECHNOLOGY: OPERATIONAL AND ANALYTICAL:-

The big data landscape is dominated by two classes of technology: systems that provide operational capabilities and the others that give analytical help.[3]

WHY TO SWITCH OVER TO BIG DATA?



DATA (structured and un-structured, logs, social)

HARDWARE (infrastructure (private) cloud networking)

SOFTWARE (marketing (e.g. unica), analytics (tableau), modelling (SAS))

SERVICE (RDBMS, OLAP, messaging)

Big data offers many solutions to the enterprises as where to invest and how much money they can save, grow revenue and achieve many other business objectives, big data might allow companies to collect billions of real time

	OPERATIONAL	ANALYTICAL
Latency	1ms - 100ms	1 min - 100 min
Concurrency	1000 -100,00	1 - 10
Access pattern	Writes and reads	Reads
Queries	Selective	Unselective
Data scope	Operational	Retrospective
End users	Customer	Data scientists
Technology	NoSQL	Mapreduce ,mpp database

The overview of operational big data proves that over past decade massive computations have occurred that run inexpensively and efficiently. And analytical big data works on a criteria of Mapreduce .these are therefore a complementary sources in overcoming traditional techniques that lacked the ability to scale beyond the resources of a single server

NoSQL Origins:

First used in 1998 to mean “No to SQL” Reused in 2009 when it came to mean “Not Only SQL”

4. PERCEPTIVE VIEW BEHIND BIG DATA FOR OBTAINING ITS OBJECTIVE:-

“Critical questions for big data”

The era of big data has begun and computer scientists, political scientists, sociologists and many others are clamouring for access to the massive quantities of information produced by and about people, things and their interactions. Will large scale analysis of DNA help in curing the diseases? Or will it usher in a new wave of medical inequality? Will data analysts help in making people’s access to information more efficient and effective?[4]

“The next frontier for innovation, competition and productivity”

Big data has proved innovative, competitive and productive

Firstly, big data can unlock significant value by making information transparent and usable at much higher frequency.

Secondly, storage of larger transactional data in digital form.

Thirdly, sophisticated analytics can improve decision making.

Fourthly, precise tailoring of product and services to the potential customers.

Lastly, improve the development of next generation of products and services by offering proactive maintenance.[7]

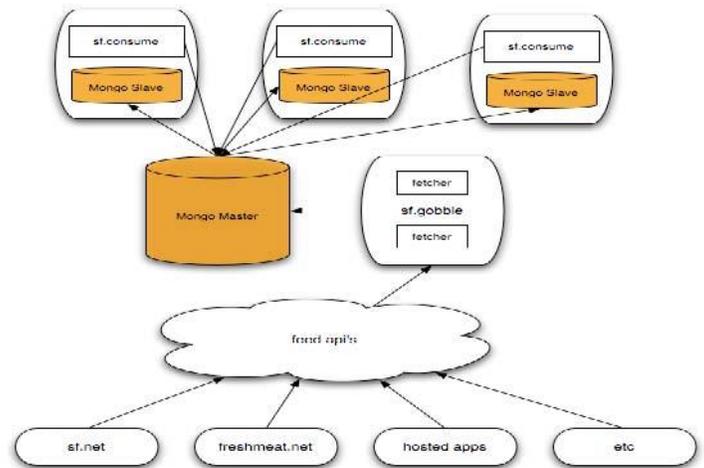
“Aiding the researchers in the field of education, technology and media”

One of the set of challenges are those around the issues of inequality and how may both reinforce and perhaps even eradicate existing social and educational inequalities in a number of ways.

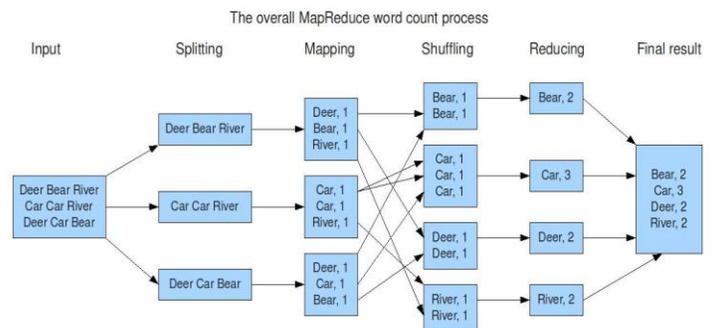
Inequalities revolve around twitter, the blogosphere and the search engine queries. Every data is not undertaken equally by the whole population. Similarly access and use of open data source is unlikely to be equally available to everyone due to the existing unstructured inequalities.[6]

5. FUTURISTIC VIEW OF BIG DATA:-

MongoDB: MongoDB is the leading NoSQL database empowering businesses to be more agile and scalable. Fortune 500 companies and start-ups alike are using MongoDB to create new types of applications, improve customer experience, accelerate time to market and reduce costs. MongoDB is a general purpose, open-source database. Instead of storing data in rows and columns as one would with a relational database, MongoDB stores in the form of binary database. By contrast, MongoDB is an agile database that allows schemas to vary across documents and to change quickly as applications evolve, while still providing the functionality to the developers to expect from relational databases, such as secondary indexes, a full query language and strong consistency. [12]



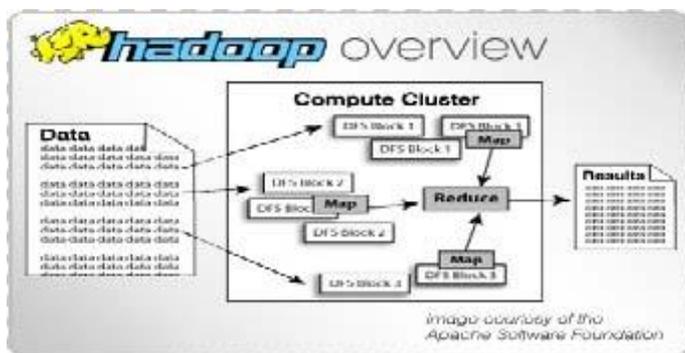
Mapreduce is software that handles big data and the unstructured data is transformed into a proper structure and produces an output that is feasible and unambiguous and understandable.[12]



6. APACHE HADOOP:-

Apache Hadoop is an open source software framework that supports data intensive distributive applications, licensed under the Apache v2 license. It supports the running of applications on large clusters of commodity hardware. Hadoop was derived from Google's Mapreduce and Google file system (GFS) papers.[9]

The Hadoop framework transparently provides both reliability and data motion to applications. Hadoop implements a computational paradigm named Mapreduce where the application is divided into many small fragments of work, each of which may be executed or re-executed on any node in the cluster.



In addition, it provides a distributed file system that stores data on the compute nodes, providing very high aggregate bandwidth across the cluster. It enables applications to work with thousands of computation-independent computers and petabytes of data.

[10]

7. CONCLUSIONS:-

“Data everywhere and not the time to think!” Science and engineering are the fertile lands for data mining. In the last two decades science and engineering have evolved to a stage that gigantic amounts of data are constantly being generated and collected and hence knowledge discovery becomes the essential scientific discovery process.

We have now preceded to the age of data science and data engineering .and the volcanic field of “big data” aims at performing effective data mining, knowledge -guided intelligent human computer interactions based on knowledge extracted from data.

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Call for Articles

At Chitkara University, the endeavor has been to hone the skills of the learners. Keeping in line with this tradition, an e-magazine titled **Wall For All** was proposed. The students as well as faculty members are encouraged to contribute articles of interest for the magazine. The articles must be original in nature, and if adapted, due credit must be extended towards that source. The students may forward the articles through their respective advisors, while the teachers may send the same directly to the editors of **Wall For All**.

Network Security in Collaboration with SQL Injection Attack



Ashima Mehta. Prof. Anuj Gupta

1. INTRODUCTION: -

Network Security consists of the policies adopted by the network administrator to protect the network and network accessible resources from unauthorized access and consistent and continuous monitoring and measurement of its effectiveness combined together. Though present day security systems offer a good level of protection, they are incapable of providing a “trust worthy” environment and are vulnerable to unexpected attacks. Tersely quoting some security ditherers – Eavesdropping, Hacking, Hijacking, Mapping, Packet Sniffing, Spoofing, DoS & DDoS attacks, etc. We would discuss the advance technical combats that have been devised all through the way. . This paper covers the ADVANCED technical combats that have been devised all through the way, thus giving birth to the notion of “NETWORK -SECURITY”.

2. OBJECTIVES: -

The objective of this paper is to focus the professional security community on the techniques that can be used to take advantage of a web application that is vulnerable to injection, and to make clear the correct mechanisms that should be put in place to protect against SQL injection and input validation problems in general.

3. METHODOLOGY:-

SQL injection is a code injection technique, used to attack data driven applications, in which malicious SQL statements are inserted into an entry field for execution (e.g. to dump the database contents to the attacker).SQL injection must exploit a security vulnerability in an application's software.

(a) Testing for Vulnerability

Intuitively, an SQL Injection Attack (SQLIA) occurs

when an attacker changes the intended effect of an SQL query by inserting new SQL keywords or operators into the query.

Developers and development teams can be awfully inconsistent. The programmer who designed ScriptA might have had nothing to do with the development of Script B, so where one might be immune to SQL injection, the other might be ripe for abuse. In fact, the programmer who worked on Function A in Script A might have nothing to do with Function B in Script A, so while one parameter in one script might be vulnerable, another might not. Even if an entire web application is conceived, designed, coded and tested by one programmer, one vulnerable parameter might be overlooked.

(b) Authorization bypass Attack

The simplest SQL injection technique is bypassing logon forms. Consider the following web application code:

```
SQL Query = "SELECT Username FROM Users
WHERE Username = '\" & strUsername & '\"
AND Password = '\" & strPassword & '\"
strAuthCheck =
GetQueryResult (SQLQuery)

If strAuthCheck = ""
Then boolAuthenticated = False Else

boolAuthenticated = True

End If
```

Here's what happens when a user submits a username and password. The query will go through the Users table to see if there is a row where the username and password in the row match those supplied by the user. If such a row is found, the username is stored in the variable strAuthCheck which indicates that the user should be authenticated. If there is no row that the user-supplied

data matches, strAuthCheck will be empty and the user will not be authenticated.

Let's say a user fills out the logon form like this:

Login: 'OR ''='

Password: 'OR ''='

This will give SQL Query the following value:

```
SELECT Username FROM Users WHERE
Username = ''OR ''=''AND Password =
''OR ''=''
```

Instead of comparing the user-supplied data with that present in the Users table, the query compares a quotation mark (nothing) to another quotation mark (nothing). This, of course, will always return true. (Please note that nothing is different from null.) Since all of the qualifying conditions in the clause are now met, the application will WHERE select the username from the first row in the table that is searched. It will pass this username to, which will ensure our validation.

Solution to protect against SQL Injection Attack

Data Sanitization

All client-supplied data needs to be cleansed of any characters or strings that could possibly be used maliciously. This should be done for all applications, not just those that use SQL queries. Stripping quotes or putting backslashes in front of them is nowhere near enough. The best way to filter your data is with a default-deny regular expression. Make it so that you include only the type of characters that you want. For instance, the following regular expression will return only letters and numbers:

```
s/[^0-9a-zA-Z]/\
```

Make your filter narrow and specific. Whenever possible, use only numbers. After that, numbers and letters only. If you need to include symbols or punctuation of any kind, make absolutely sure to convert them to HTML substitutes, such as or. For & quote; & gt; instance, if the user is submitting an e-mail address, allow only the "at" sign, underscore, period, and hyphen in addition to numbers and letters, and allow them only after those characters have been converted to their HTML substitutes.

4. CONCLUSION: -

Though we have studied many approaches to provide

security to networks but still there are still many open challenges which are yet to be resolved. Many of the techniques have problems handling attacks that take advantage of poorly-coded stored procedures and cannot handle attacks that disguise themselves using alternate encodings. The key for building a secure network is to define what security means to your organization. Once that has been defined, everything that goes on with the network can be evaluated with respect to that policy. Projects and systems can then be broken down into their components, and it becomes much simpler to decide whether what is proposed will conflict with your security policies and practices.

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Natural Processing Language

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3rd
Position

1. INTRODUCTION: -

There have been high hopes for Natural Language Processing. Natural Language Processing, also known simply as NLP, is part of the broader field of Artificial Intelligence, the effort towards making machines think. Computers may appear intelligent as they crunch numbers and process information with blazing speed. In truth, computers are nothing but dumb slaves who only understand on or off and are limited to exact instructions. But since the invention of the computer, scientists have been attempting to make computers not only appear intelligent but are intelligent. A truly intelligent computer would not be limited to rigid computer language commands, but instead be able to process and understand the English language. This is the concept behind Natural Language Processing. The phases a message would go through during NLP would consist of message, syntax, semantics, pragmatics, and intended meaning. (M. A. Fischer, 1987) Syntax is the grammatical structure. Semantics is the literal meaning. Pragmatics is world knowledge, knowledge of the context, and a model of the sender. Alan Turing predicted of NLP in 1950 (Daniel Crevier, 1994, page 9): "I believe that in about fifty years' time it will be possible to program computers to make them play the imitation game so well that an average interrogator will not have more than 70 per cent chance of making the right identification after five minutes of questioning." But in 1950, the current computer technology was limited. Because of these limitations, NLP programs of that day focused on exploiting the strengths the computers did have. For example, a program called SYNTHEX tried to determine the meaning of sentences by looking up each word in its encyclopedia.

2. OBJECTIVES: -

The goal of the Natural Language Processing (NLP) group is to design and build software that will analyze, understand, and generate languages that humans use naturally, so that eventually you will be able to address your computer as though you were addressing another person. This goal is not easy to reach.

"Understanding" language means, among other things, knowing what concepts a word or phrase stands for and knowing how to link those concepts together in a meaningful way. It's ironic that natural language, the symbol system that is easiest for humans to learn and use, is hardest for a computer to master.

Long after machines have proven capable of inverting large matrices with speed and grace, they still fail to master the basics of our spoken and written languages.

3. INSTRUCTIONAL OBJECTIVE:-

How an intelligent system can be developed. First step that student must understand is the necessity and Ambiguities in NLP processing, understanding difference between natural and formal language and processing the former, steps involved in natural language understanding, required information i.e., syntax, semantics, world-knowledge, phonology, morphology and Basic language operation such as semantics processing, knowledge representation, parts-of-speech tagging, Morphology analysis.

4. METHODOLOGY:-

Medical language processing (MLP) systems that codify information in textual patient reports have been developed to help solve the data entry problem. Some systems have been evaluated in order to assess performance, but there has been little evaluation of the underlying technology. Various methodologies are used by the different MLP systems but a comparison of the methods has not been performed although evaluations of MLP methodologies would be extremely beneficial to the field. This paper describes a study that evaluates different techniques. To accomplish this task an existing MLP system Med LEE was modified and results from a previous study were used. Based on confidence intervals and differences in sensitivity and specificity between each technique and all the others combined, the results showed that the two methods based on obtaining the largest well-formed segment within a sentence had significantly higher sensitivity than the others by 5% and 6%. The method based on recognizing a complete sentence had a

significantly worse sensitivity than the others by 7% and a better specificity by .2%. None of the methods had significantly worse specificity.

5. MAJOR TASKS IN NLP:-

Following is a list of NLP task some of which has direct real-world application, and some are used to aid in solving larger tasks. These tasks are different from other potential and actual NLP task because of the volume of research devoted to these tasks, problem setting, standard metric, corpora to evaluate task and competition devoted are defined for each specific task.

Automatic summarization
Coreference resolution
Discourse, Sentiment analysis
Named entity, Speech, Optical character recognition
Natural language understanding, generation etc

6. THE FUTURE IN NLP:-

Human-level natural language processing is an AI-complete problem. That is, it is equivalent to solving the central artificial intelligence problem—making computers as intelligent as people, or strong AI. NLP's future is therefore tied closely to the development of AI in general.

As natural language understanding improves, computers will be able to learn from the information online and apply what they learned in the real world. Combined with natural language generation, computers will become more and more capable of receiving and giving instructions.

7. CONCLUSION:

This goal is not easy to reach. "Understanding" language means, among other things, knowing what concepts a word or phrase stands for and knowing how to link those concepts together in a meaningful way. It's ironic that natural language, the symbol system that is easiest for humans to learn and use, is hardest for a computer to master. Long after machines have proven capable of inverting large matrices with speed and grace, they still fail to master the basics of our spoken and written languages.

The challenges we face stem from the highly ambiguous nature of natural language. As an English speaker you effortlessly understand a sentence like "Flying planes can be dangerous". Yet this sentence presents difficulties to a software program that lacks both your knowledge of the world and your experience with linguistic structures. Is

the more plausible interpretation that the pilot is at risk, or that the danger is to people on the ground? Should "can" be analyzed as a verb or as a noun? Which of the many possible meanings of "plane" is relevant? Depending on context, "plane" could refer to, among other things, an airplane, a geometric object, or a woodworking tool. How much and what sort of context needs to be brought to bear on these questions in order to adequately disambiguate the sentence?

We address these problems using a mix of knowledge-engineered and statistical/machine-learning techniques to disambiguate and respond to natural language input. Our work has implications for applications like text critiquing, information retrieval, question answering, summarization, gaming, and translation. The grammar checkers in Office for English, French, German, and Spanish are outgrowths of our research; Encarta uses our technology to retrieve answers to user questions; Intellishrink uses natural language technology to compress cellphone messages; Microsoft Product Support uses our machine translation software to translate the Microsoft Knowledge Base into other languages. As our work evolves, we expect it to enable any area where human users can benefit by communicating with their computers in a natural way.

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New Age Communication - *Light Fidelity* (Li Fi)

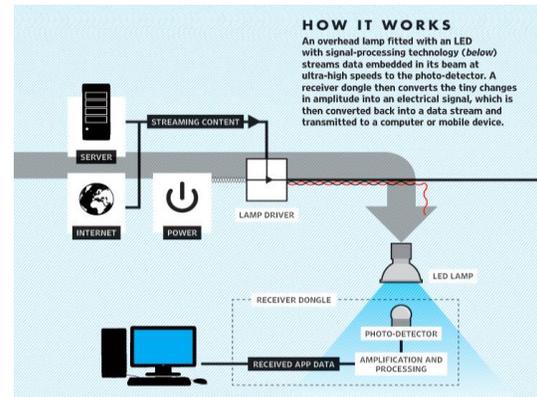
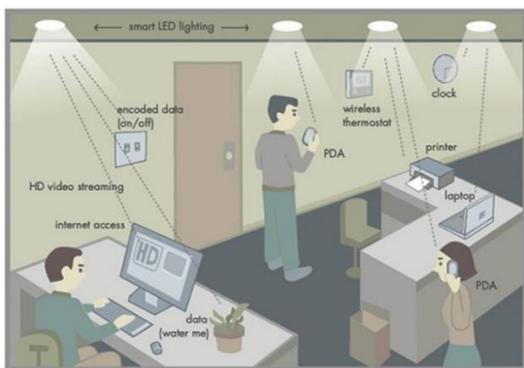
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Li-Fi refers to wireless communication systems using light as a medium instead of traditional radio frequencies, as in technology using the trademark Wi-Fi. Li-Fi has the advantage of being able to be used in electromagnetic sensitive areas such as in aircraft or nuclear power plants, without causing interference. However, the light waves used cannot penetrate walls which makes Li-Fi more secure relative to Wi-Fi.

How does Li-Fi work?

When a constant current is applied to an LED light bulb a constant stream of photons are emitted from the bulb which is observed as visible light. If the current is varied slowly the output intensity of the light dims up and down. Because LED bulbs are semi-conductor devices, the current, and hence the optical output, can be modulated at extremely high speeds which can be detected by a photo-detector device and converted back to electrical current. The intensity modulation is imperceptible to the human eye, and thus communication is just as seamless as RF. Using this technique, high speed information can be transmitted from an LED light bulb.



Radio frequency communication requires radio circuits, antennas and complex receivers, whereas Li-Fi is much simpler and uses direct modulation methods similar to those used in low-cost infra-red communications devices such as remote control units. Infra-red communication is limited in power due to eye safety requirements, whereas LED light bulbs have high intensities and can achieve very large data rates.

Features

Li-Fi offers a number of key benefits over Wi-Fi but is inherently a complementary technology.

Capacity

Bandwidth: The visible light spectrum is plentiful (10,000 more than RF spectrum), unlicensed and free to use.

Data Density: Li-Fi can achieve about 1000 times the data density of Wi-Fi because visible light can be well contained in a tight illumination area whereas RF tends to spread out and cause interference.

High speed: Very high data rates can be achieved due to low interference, high device bandwidths and high intensity optical output. Planning: Capacity planning is simple since there tends to be illumination infrastructure where people wish to communicate, and good signal

strength can literally be seen.

Efficiency

Low cost: Requires fewer components than radio technology.

Energy: LED illumination is already efficient and the data transmission requires negligible additional power.

Environment: RF transmission and propagation in water is extremely difficult but Li-Fi works well in this environment.

Safety

Safe: Life on earth has evolved through exposure to visible light. There are no known safety or health concerns for this technology.

Non-hazardous: The transmission of light avoids the use of radio frequencies which can dangerously interfere with electronic circuitry in certain environments.

Security

Containment: It is difficult to eavesdrop on Li-Fi signals since the signal is confined to a closely defined illumination area and will not travel through walls.

Control: Data may be directed from one device to another and the user can see where the data is going; there is no need for additional security such as pairing for RF interconnections such as Bluetooth.

Li-Fi versus Wi-Fi

Applications of Li-Fi

The dramatic growth in the use of LEDs (Light Emitting Diodes) for lighting provides the opportunity to incorporate Li-Fi technology into a plethora of LED environments.

Li-Fi is particularly suitable for many popular internet “content consumption” applications such as video and audio downloads, live streaming, etc. These applications place heavy demands on the downlink bandwidth, but require minimal uplink capacity. In this way, the majority of the internet traffic is off-loaded from existing RF channels, thus also extending cellular and Wi-Fi

capacities.

There are many applications for Li-Fi. These include:

- **RF Spectrum Relief:** Excess capacity demands of cellular networks can be off-loaded to Li-Fi networks where available. This is especially effective on the downlink where bottlenecks tend to occur.
- **Smart Lighting:** Any private or public lighting including street lamps can be used to provide Li-Fi hotspots and the same communications and sensor infrastructure can be used to monitor and control lighting and data.
- **Mobile Connectivity:** Laptops, smart phones, tablets and other mobile devices can interconnect directly using VLC. Short range links give very high data rates and also provides security.
- **Hazardous Environments:** VLC provides a safe alternative to electromagnetic interference from radio frequency communications in environments such as mines and petrochemical plants.
- **Hospital & Healthcare:** VLC emits no electromagnetic interference and so does not interfere with medical instruments, nor is it interfered with by MRI scanners.
- **Aviation:** Li-Fi can be used to reduce weight and cabling and add flexibility to seating layouts in aircraft passenger cabins where LED lights are already deployed. In-flight entertainment (IFE) systems can also be supported and integrated with passengers’ own mobile devices.
- **Underwater Communications:** Due to strong signal absorption in water, RF use is impractical. Acoustic waves have extremely low bandwidth and disturb marine life. Li-Fi provides a solution for short-range communications.
- **Vehicles & Transportation:** LED

headlights and tail-lights are being introduced. Street lamps, signage and traffic signals are also moving to LED. This can be used for vehicle-to-vehicle & vehicle-to-roadside communications. This can be applied for road safety and traffic management.

- **RF Avoidance:** Some people claim they are hypersensitive to radio frequencies and are looking for an alternative. Li-Fi is a good solution to this problem.
- **Location Based Services (LBS):** Highly accurate location-specific information services such as advertising and navigation that enables the recipient to receive appropriate, pertinent information in a timely manner and location.
- **Toys:** Many toys incorporate LED lights and these can be used to enable extremely low-cost communication between interactive toys.

CONCLUSION

The possibilities are numerous and can be explored further. If this technology can be put into practical use, every bulb can be used something like a Wi-Fi hotspot to transmit wireless data and we will proceed toward the cleaner, greener, safer and brighter future. The concept of Li-Fi is currently attracting a great deal of interest, not least because it may offer a genuine and very efficient alternative to radio-based wireless. As a growing number of people and their many devices access wireless internet, the airwaves are becoming increasingly clogged, making it more and more difficult to get a reliable, high - speed signal. This may solve issues such as the shortage of radio frequency bandwidth and also allow internet where traditional radio based wireless isn't allowed such as aircraft or hospitals. One of the shortcomings however is that it only work in direct line of sight.

Li-Fi / Wi-Fi comparison

Parameter	Li-Fi	Wi-Fi
Speed	***	***
Range	*	**
Data density	***	*
Security	***	**
Reliability	**	**
Power available	***	*
Transmit/receive power	***	**
Ecological impact	*	**
Device-to-device connectivity	***	***
Obstacle interference	***	*
Bill of materials	***	**
Market maturity	*	***

* low ** medium *** high

Mobile Computing - An Emerging Field

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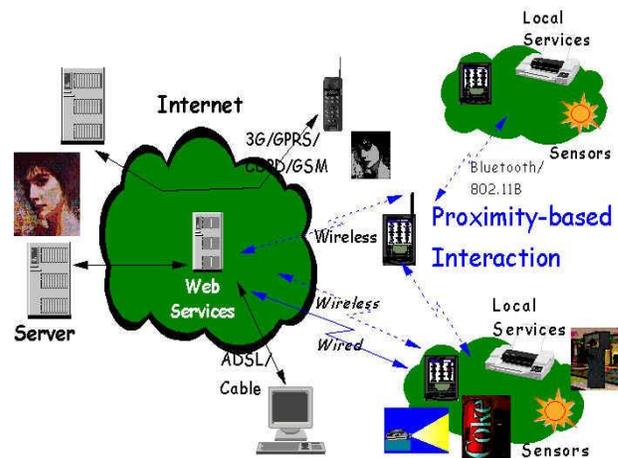
Mobile computing is human-computer interaction by which a computer is expected to be transported during normal usage. It deals with the process of utilizing computer technology to complete the task when the user is on move. Mobile computing has fulfilled the dream of providing computing services to a mobile user "Anytime-Anywhere". Mobile computing involves mobile communication, mobile hardware & mobile software. By definition - **"Mobile computing: being able to use a computing device even when being mobile and therefore changing location. Portability is one aspect of mobile computing."**

Now the user is not required to be on fixed location to get the computing services. User can continue his/her computing work on mobile device without bothering of whether he/she is traveling somewhere or sitting in some different location. Mobile communication is provided with the help of fixed or mobile infrastructure. Till today mobile computing is enriched with various sophisticated communication mechanisms to provide an uninterrupted and consistent service to the users and in future also new technology will continue its enhancement in the existing mechanism. Numerous mobile application are available that can run on mobile platforms specially made for mobile devices. Android has already emerged as one of the popular operating system platform for mobile devices among Apple IOS and window OS.

Mobile Computing requires wireless network to support outdoor mobility and handoff from one

network to the next at a pedestrian or vehicular speed. Traveler in car using laptop connected with GSM phone – engaged in mobile computing. Ubiquitous computing or pervasive computing refers to access to computer network all the time at any location by any person. This cannot be realized unless mobile computing matures.

Mobile Computing Architecture – The network centric mobile computing architecture uses three-tier architecture. In this, the first layer is the User Interface or Presentation Tier. This layer deals with the user facing device handling & rendering.



At this tier all the user services such as session, text input, dialog and display management reside. The second tier is the Process Management or the Application Tier. This layer is for application programs or process management where business logic and rules are executed. Process management tier also controls transactions & asynchronous queuing

just to ensure reliable completion of the transaction. The third tier is the Database Management or Data Tier. This layer is for database access & management. This layer is best suited for the client/server architecture. It provides performance, flexibility, maintainability & scalability. It also hides the complexities from the user.

- a) **Advantages of Mobile Computing** - Mobile Computing has changed the complete landscape of human life. Following are the advantages of it
- b) **Location Flexibility** - This has enabled to work from anywhere, anytime as long as the connection is established. The user is not supposed to be on fixed location.
- c) **Saves Time** - The time consumed for travelling between different places or offices is slashed. One can access the documents or related work on their mobile devices as if they are using the same on their computer.
- d) **Enhanced Productivity** - The productivity has increased as the user can now work from any location which is suitable for him.
- e) **Ease of Research** - Research has been made easier as the user can now search for the content as and when needed and can store the same in his device which has the enough capacity to store it.
- f) **Entertainment** - Video and audio streaming is possible on the go with the help of mobile computing.
- g) **Streamlining of Business Process** - Business process are now available through secure connections. Many transactions are taking place through these secured channels.

Career Options in the field of Mobile Computing

- System Engineer
- Mobile Application Developer (Android,

iOS, Blackberry, Windows).

- Game Developer
- Mobile Architect
- Customer Care Officer
- Mobile Technical Expert
- Mobile Application Tester
- Security Expert

Impact of Mobile Computing on ICT - Mobile computing has truly emerged as the leader in the ICT today and has changed the world. The rise of the mobile phone has been one of the most stunning changes in the developing world over the past decade. The proliferation of powerful, internet-connected mobile computing devices from Apple, Samsung, Nokia based on Android & Windows OS has changed the user's thinking and usage. Now user can access the information more easily and at any time. As per records in 2010, more Smartphone were sold in comparison to personal computers. Reflecting this dynamic and rapidly evolving nature of the area, the industrial lead position has been passed on several times within only a decade, from Palm to Nokia to Apple, and is most likely to be passed on again in the future. More and more touch devices are manufactured by big giants. Google is creating Google glass – a computer in the glass. A wrist watch has already been created to enable user to do computing. Even though these devices have been created but we are still in the early or emerging stage.

So mobile computing has changed the world and becoming more and more popular. 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 Smartphone.

Munich breaks **FREE** with Open Source Solutions

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We've grown up working on Microsoft Windows and its allied application software suite such as MS-Office, Internet Explorer, etc. Even the development environment for most of us has been Microsoft oriented with ample dependency on Visual Studio. Breaking up with Microsoft is hard to do. However, in recent past, there has been a wave against the Microsoft camp from various quarters that favor open-source and free software. This growing tendency against Microsoft has seen an exponential growth in the past decade with many organizations preferring the open-source operating system Linux over the Microsoft Windows. Among the many such establishments is the City of Munich that ditch Windows and Office in favor of open source alternatives.

The project that took close to a decade to complete, has seen the city struggling with legal uncertainties over discontinuing the Microsoft products. Moreover, Munich also turned a deaf ears on the pleas of Microsoft CEO Steve Ballmer who had paid a special visit to Munich to avert this crisis situation for Microsoft, and went ahead with the implementation of the project. According to Munich, the action of moving to open-source software has resulted in saving over €10 million. However, Microsoft

argues against this assertion. Nevertheless, Peter Hofmann, who headed the project, argues that the point of making the switch was never about money, but about freedom, and becoming independent meant that Munich freed itself from proprietary software, more specifically the Microsoft Windows NT operating system and the Microsoft Office suite, and a host of other locked-down technologies the city relied on in 2002.

The story behind the decision to initiate the project to phase out Microsoft is all the more interesting. Actually, the decision to ditch Microsoft was a mere necessity. In 2002, the council of the City of Munich was well aware that the official support for the then used MS-Windows NT operating system would be discontinued soon. Since there were over 14,000 staff machines at the council that used MS-Windows NT operating system, the council deemed it fit to explore other options, and initiated a program to investigate the merits of switching to MS-Windows XP and MS-Office versus a GNU/Linux OS, OpenOffice and other free software. The study revealed that free software was the better choice, primarily because it would free the council from reliance on a specific vendor. The free software also ensured that the council's technology was

future-proof due to availability of open protocols, interfaces and data formats.

The prospect of such a high profile loss, and other organizations following Munich's lead, spurred Microsoft to mount a last minute campaign to since it was under no circumstances willing to lose against Linux. Steve Ballmer, CEO of Microsoft, personally paid a visit to Munich to make a revised offer in March 2003, wherein Microsoft knocked millions of Euros off the price for continuing with Windows and Office. However, all efforts by Microsoft went futile, and in June 2004 the council signaled the commencement of migration from NT and Office 97/2000 to a Linux-based OS, a custom-version of OpenOffice, as well as a variety of free software, such as the Mozilla Firefox browser, Mozilla Thunderbird e-mail client and the Gimp photo editing software. This suite was termed as the LiMux project.

Originally planned as a soft roll out that would be complete by 2011, the project was extended when it became clear that the migration to free software would be more challenging than what the planners had thought of. The complexity appeared due to the manner in which IT was managed by the Munich council's office. Hofmann considered it all a big zoo because the council had 22 different units with their own IT, with heterogeneous systems for the networking, operating and user directories. There was no detailed overview of the hardware each user relied upon or the software they needed to do their job. Without a clear picture of its IT domain, Munich observed that it was taking too long to deal with unexpected problems that cropped up when rolling out LiMux. This led to standardizing the processes for capturing each department's

infrastructure and requirements and for testing and release management, at the cost of adding several years to the project's completion date.

There was yet another big problem that Munich council faced. Large chunks of the software used by the council were built using Microsoft technologies. For example, a sizeable proportion of Microsoft Office macros were written in Microsoft's programming language Visual Basic, while other departments were tied to Internet Explorer by a dependence on ActiveX. This was handled by forming a team of developers that would churn out the equivalent software in open source and help migrate from Microsoft environment to LiMux.

A team of just 25 people at Munich develop, roll out and provide final support for the Ubuntu-based LiMux client. Munich has found the community way of support to be quite effective. The model is allowing the council to help develop the software that suits all the needs of the council's various departments. The same staff who develop LiMux are also responsible for the last level of support, Hofmann said, adding the authority prizes the freedom it has to work out how to resolve problems on its own.

Now that the migration to LiMux is complete, Munich plans to continue developing LiMux. The next version is due out in summer 2014. Munich is on a path to freeing itself from proprietary ties, and it sees no compelling reason to ever go back. Munich hopes to see other organizations to follow suit when they study its model and find that it is indeed possible to switch to free software and, while it is a difficult and time-consuming process, making it happen doesn't mean shutting down your IT.

Convocation @ Chitkara

The 8th Convocation was organized by Chitkara University on November 30, 2013. Mr. Anil Walia, Global Head, SAP presided over as the chief guest on the occasion. The much-awaited ceremony was graced by the presence of Dr. Ashok Chitkara (Chancellor, Chitkara University), Dr. Madhu Chitkara (Vice Chancellor, Chitkara University) and Dr. S.C. Sharma (Registrar, Chitkara University).

In an impressive function held at the auditorium of Chitkara International School, Chandigarh, degrees were conferred upon more than 700 graduates of the university. Chinky Mehta and Surbhi Sharma of MCA were awarded the Gold and Silver medals respectively in recognition of their meritorious student career. Similarly,

Manvir Kaur and Sakshi Gupta of BCA were also awarded Gold and Silver medals respectively. From BCA (GBC), the Gold medal was awarded to Siddharth Chadha and the Silver medal was awarded to Jasnur Gill.

Speaking on the occasion, Dr. Madhu Chitkara congratulated the graduates and wished them success in their careers. She stressed upon the students to believe in themselves and take the path of honesty, truthfulness and hard work.

As the convocation ceremony was declared closed by the Hon'ble Chief Guest Mr. Anil Walia, the students expressed their delight by tossing the convocation caps up in the air. It was a moment that the students shall cherish throughout their lives.



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