Volume-1
October 2016

Technology Bytes

when technology bytes...we bite back

(E- Magazine of Department of Computer Science & Engineering)

Tomorrow's World Through Today's Education

Message

From Vice-Chancellor's Desk

It is good to see that today's generation has not lost its literary roots, despite the perpetual efforts of e-Technology to extinguish the flames of the written word. "Technology Bytes" is an exceptional proof that the literary flame is burning bright within our faculty and students. They have proved that the literary prowess can go hand in hand with technical mastery, thus enabling accomplishment of the department's goal of all-round development of students.

Our slogan is "learn today to lead tomorrow". In order to develop leaders, high quality academic is our top most priority. Our motive is to produce high quality Computer Science and Engineering professionals, adaptable to the changing environment, with all-round managerial capabilities and commitment to the society. Computer Science and Engineering department has produced hundreds of professionals and has established a name for itself in the country. Our students have consistently excelled in the highly competitive industrial environment. I attribute this success to the winning combination of a dedicated faculty that works hard at imparting quality education, a well-planned syllabus and last but not the least, our students. With all the activities taking place in the department, the face of the department has changed considerably. From a number of co-curricular activities to new course offerings, the environment continues to grow and evolve.

My sincere thanks to all my faculty colleagues and my students who have contributed significantly to the success of the department and also in coming up with this edition of "Technology Bytes". I believe our faculties and students would continue to write and contribute for this magazine.

I am hoping that you all enjoy the first edition of the magazine.

- Prof. S. C. Jain

Message

From Pro Vice-Chancellor's Desk

It gives me immense pleasure to learn that the Department of Computer Science and Engineering has come up with the first edition of its bi-annual magazine, "Technology Bytes". I am sure that "Technology Bytes" would, in a most efficient manner, delineate the activities of the department and exhibit the exuberant talent of young minds.

Our goal at Institute of Engineering and Technology is to constantly nurture and develop the personality of young and dynamic minds who would shape the future technological landscape of India. The Department of Computer Science and Engineering has always been instrumental towards achieving this goal.

I take this opportunity to congratulate the editorial team of "Technology Bytes" and faculty members of department of Computer Science & Engineering of for their sincere and dedicated team efforts and hard work. I also congratulate the authors who have contributed by their thought process to make this edition a success.

I would look forward to the subsequent editions of the magazine.

- Brig. (Dr.) P.S. Siwach

Message

From Director's Desk

It is indeed a great pleasure to know that the Department of Computer Science and Engineering is launching its E-magazine entitled 'Technology Bytes' on October 03, 2016. This bi-annual magazine will publish the articles related to recent trends and development in the field of Computer Science and Engineering.

In the field of technical education, the Institute of Engineering and Technology has positioned itself to create a conducive atmosphere for the development of young brains into bright professionals of future.

The global technology scenario is changing rapidly. To remain competitive in this changing environment, there is an urgent need for professionals to be updated with the latest technologies. I am sure that 'Technology Bytes' will contribute significantly in this sphere.

I take this opportunity to congratulate Dr. Vikas Solanki and his entire faculty team of Computer Science and Engineering Department for their sincere and dedicated efforts.

- Prof. Brajesh Chauhan

Volume-1
Technology Bytes
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CONTENTS

Magazine Team

Dr. Vikas Solanki	(Chief Editor)
Ms. Leena Dhruwa	(Editor)
Mr. Vishal Upadhyay	(Editor)
Ms. Pooja Arora	(Design)
Ms. Pallavi	(Design)

From the Editor's Desk...

It gives me great opportunity to present the first issue of **TECHNOLOGY BYTES** – a magazine of Computer science & engineering. The magazine is the initiative by the department of computer science & engineering for the students. It is a platform for the students to exhibit their work and contribute to the sharing knowledge.

I would like to take this opportunity to thank all the faculty member of computer science department and our fellow students for their support throughout the development of the magazine and also our head Dr. Vikas Solanki for their valuable advice. Our hon'ble Vice-Chancellor Professor S. C. Jain has always encouraged us to go beyond the classroom to experiments and collaborate with the technology. I extend my heartfelt attitude to our esteemed director, Professor Brajesh Chauhan for his approachability and constant support.

New technology is bringing opportunities along with new skill requirements and challenges. Globalization is bringing competitiveness in every domain. Engineers have to fit into the requirements of companies that recruit across the globe. The Department of Computer science & engineering is leading the way to meet challenges of future by equipping students with the skill sets that require in the industry. To keep students updated and to provide them with good skill sets along with different labs, various workshops and innovative courses and various other facilities, the concept of e-magazine plays a vital role.

The newly fresh computer magazine named “Technology Bytes” makes a gracious attempt at imparting knowledge to the students of not only computer science department but also to the those who are interested. It provides students to learn and make themselves versed with current technological development. It provides them with the perspective of global advancement happening in computer world and makes their knowledge technically rich. Not only there are technical articles but also, motivational, inspirational and career-oriented article.

The world is moving very fast and new technologies are coming up every week. We need to be proactive and enthusiastic in learning about the new tools, techniques and researches. Wish you all best luck!

Thoughts

Knowledge is limited, imagination encircles the world

- Dushyant Thakur, MCA IX Sem.

Technological innovation is need not only for strengthen country in global front, but more than that on inner dimension of societal structure

- Vishal Upadhyay, Lecturer

Coding is neither art nor science; it's just intuition of conscience

- Abhishek K. Gupta, Assistant Professor

What lies behind you and what lies in front of you, pales in comparison to what lies inside of you

- Ralph Waldo Emerson

The toughest thing about success is that you've got to keep on being a success

- Irving Berlin

The protocol for success in life is only hard working with dedication and consistent, there is no any shortcuts. Those are willing in applying and trying to shortcuts never get success in life.

- Vikas Solanki, Associate Professor

Success needs SWEAT, HARDWORK, and DETERMINATION. Go for it because you posses required things.

- Awadhesh K. Singh, Assistant Professor

Needs and impact on cellular networks of information era

Dr. Vikas Solanki, Associate Professor
Department of Computer Science & Engineering, MU, Aligarh.

Information is the power in this era which helps in taking the decision in order to upliftment of society, betterment of human life, make strong security, compete in business, improve transparency with responsiveness and high level decision etc. But information should be communicated to right person anywhere, any time. Technology is changing the world around us very quickly. Technology and information communication system have made meaningful changes in information flow, leading to high accessibility at anywhere, anytime.

During the information age, the phenomenon is that the digital industry creates a knowledge-based society surrounded by a high-tech global economy that spans over its influence on how the manufacturing throughput and the service sector operate in an efficient and convenient way [1]. Technology helps in empowering the different organisations, banking sectors, health sectors and private as well as government agencies etc., in order to transform into social enterprises. Information and Communication Technology brings you innovative ideas and solutions that provide swift and more quality research for betterment of society and human life. They have brought a huge impact in human life in all aspects of work, social activity, economy and business sectors etc. Today's society has entered in the information era with facilitation of big data and therefore needs to keep in touch and access of information at anywhere, any time. Mobile networks or Wi-Fi connectivity may helps human being in access of information at anywhere, right time. Mobile networks have been deployed very quickly in recent 20 years back to keep the demand up-to-date. Moreover, increase of demand to connect number of users and different kinds of smart devices to access the mobile networks will overwhelm the ability of the existing networks. It is predicted that mobile traffic in 2020 will be reached couple of 100 times than traffic in 2010, which imposes new challenges and requirements for future mobile communication system [2]. This demand creates following challenges to accommodate above predicted needs:

- Networks Performance: With existing networks, the performance of the networks may decreased in order to accommodate the predicted number of users and demand of fast access to a rich variety of information.
- Network Capacity: Traditional communication technologies provide only interpersonal communication. In order to increase in demand of internet accessibility, browsing, downloading and related technologies, more devices to be accessed the networks with increasing in requirements of communication may impose the need of network capacity.
- Resource utilization: With increasing of demand to access more services and connect to number of users, system needs to upgrade the hardware and infrastructure. This approach not only increases the cost but also leads the wastage of limited available resources.

Deploying the femtocell over cellular networks has attracted growing interests in academia, industry,

and research places. Deploying femtocells over cellular networks is an attractive solution in current scenario for improvement of cellular network's services providing better coverage and speed. Femtocell provides attractive indoor coverage with high throughput and promising satisfaction of subscribers. To accommodate the swift growth in wireless data traffic for business/home places outdoor and indoor environment, femtocell promising the better and attractive coverage, capacity with high throughput [3].

Among the advantages of deploying wireless technology, femtocells are less-cost self organising plug-and-play, reduced transmission power, backward compatibility with the macro-micro cellular networks, portability of devices, and scalable deployment wireless technology. The advantages of the femto-cellular technology can be examined from multiple points of view, such as the subscribers, the manufacturers, the application developers, the network operators, service and content providers. For example, from the user's perspective, customers typically expect high data-rate wireless access at low cost and with good quality of service (QoS). Of course, the key advantage of the femtocells for subscribers is that there is no need for an expensive dual-mode handset; rather, the same single-mode handset is used to access the Femtocell Access Points and the macro-cellular network. From the wireless operator point of view, the most important advantage of the integrated femto-macro/ micro cellular architecture is the ability to offload a large amount of traffic from the macrocell/ microcell network to the femtocell network. This will not only reduce the investment capital, the maintenance cost, as well as operational costs, but will also improve the reliability of the cellular networks.

At present, research on 5G cellular networks is going on and still in initial stage. It is too early to define this with any certainty. However, it is extensively accepted that in comparison to the 4G network, the 5G network would be achieved 1000 times the system capacity, 10 times the spectral efficiency, energy efficiency and data rate (i.e., peak data rate of 10 Gb/s for low mobility and peak data rate of 1 Gb/s for high mobility), and 25 times the average cell throughput. The main target is to connect the whole world with knowledge economy and achieve seamless and ubiquitous communication at anywhere, any time by any electronic devices or services through wireless networks [4]. This means that 5G networks would be able to support communications for some special scenarios which is not supported by 4G networks. Such as high speed trains can easily reach upto 300 km/h to 500 km/h, while 4G networks can provide the services upto 250 km/h speed only.

In nutshell, we can conclude that femtocell may be the attractive solution in information era in order to improving the cellular network's services providing better coverage and speed. They also help in reduce or offload the cellular networks and promising the better and attractive coverage, capacity with high throughput. While on the other hand, high speed users are seeking towards wireless services by 5G networks as 4G networks can provide the services upto 250 km/h speed. Resource provisioning and optimum utilization of resources can improve the performance of wireless networks as we know that resources (radio frequency band) are limited and cannot catch up with increase of demand. In information era more users have to connect with wireless services and hoping to be communicated large amount of data with high speed. Definitely, meet the demand of communication of large amount of data

with high speed is challenging task for researchers, scientists and service providers in information era.

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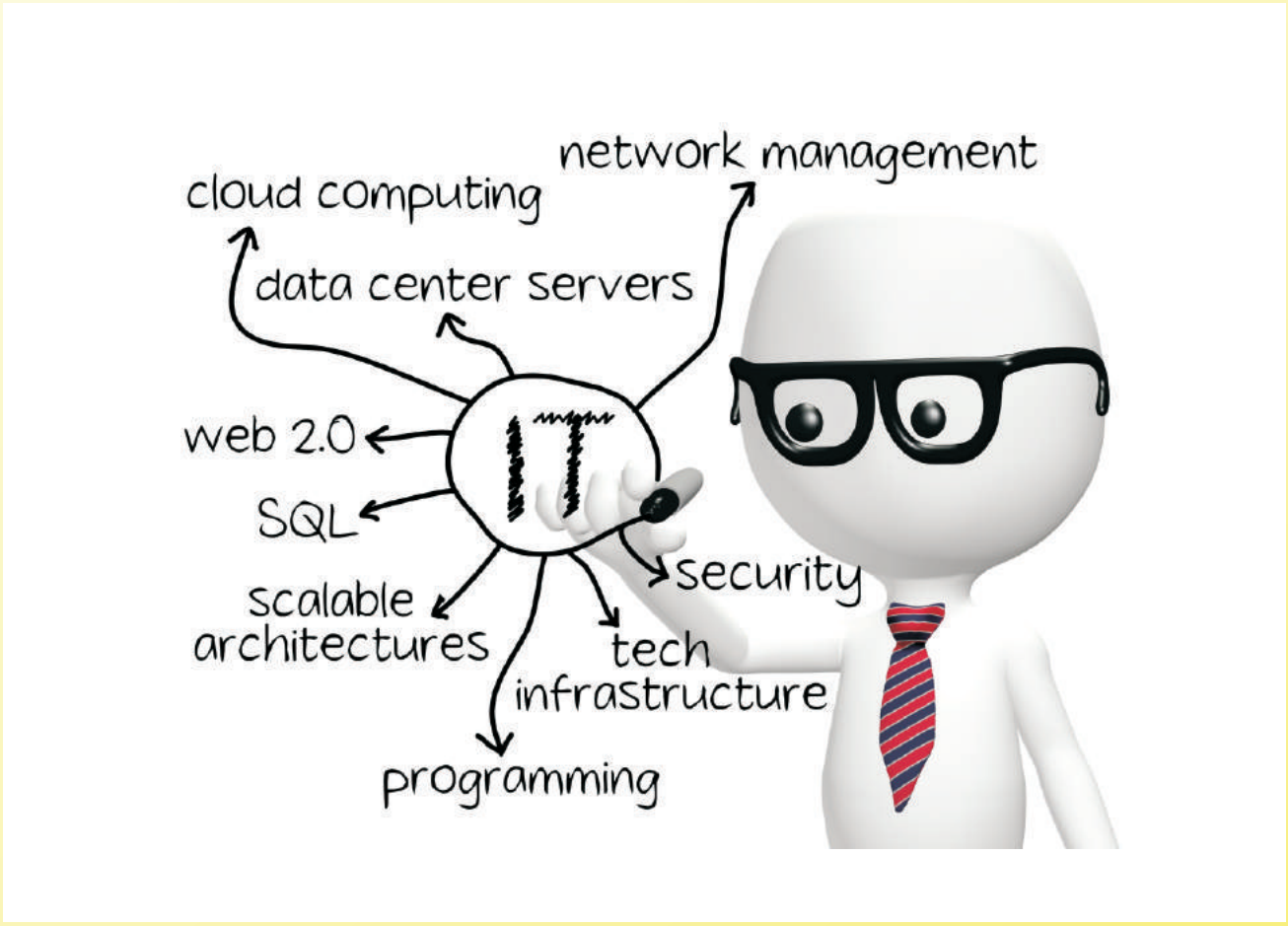

Infinite or A well soughed web!!

Mr. Arpit Tabelabux Assistant Professor
Department of Computer Science & Engineering, MU, Aligarh

The question in this article persists, what is infinite? And even most interesting fact is how closely we know about the Infinite. Well a best quoted phrase by the famous mathematician *Kronecker* is "God made the natural numbers; all else is the work of man". Since, apart from the quarrel of man and woman the fact is that if real numbers are the creator of man then man should be bigger creature than the God. And probably it may be true if computing would not be constrained by the Turing hypothesis.

In my opinion "God glanced the real number; else are the peculations of man". This is because only we can't identify the things at infinite. Or in more technical terms one to one mapping of a set of real numbers with the set of the symbols (names) can't be performed. Peculations only because we all know the behaviour of only some infinite set at infinite. But due to the absence of mapping we can't generalize on the other set of infinite objects. For example, after every rational number there is irrational number even though given a set of real numbers its neighbour set is open.

The most interesting fact although very different from the infinite is non determinism. Long trial of the finite set of the choices may give metrics to the non determinism. But technically this long trial must be infinite and must converge to a single metric. Else we simply say undetermined. And at this point if the set of choices are finite then we can provide the metric else again loop as previous. Here the point is that the non determinism which can be resolved by providing the metric can be mapped to the real numbers. Else other nondeterministic set are same as the set of the infinite objects different form real numbers.

If we conclude this article then we can say infinite can also be categorized into several categories. And the attempt is to be made in the direction of providing one to one mapping between elements of the categories. In the well soughed way this can be the new line of the research for the theoreticians…

Some people make IMPERFECTION their WEAKNESS, while others make their STRENGTH

- Abhishek Kushwah, B. Tech. VII Sem.

Security using image processing

Ms. Leena Dhruwa, Assistant Professor
Department of Computer Science & Engineering, MU, Aligarh

Current scenario of the world says that everything that can be thought off can be done with the help of the internet, right from shopping for clothes to buying a house. The transactions are all done using personal information, credit card numbers etc. With the amount of internet users growing up day by day, everything that is transmitted over the internet is under threat by some malicious mischief of another person. In order to provide security to the data that is being send across the system network security is not enough. With the growing technology the hackers have also kept themselves updated with technology and ways to hack it. In order to provide security to the data the only way would be not letting the hackers/cyber thefts know about the presence of important information in your transaction. Many techniques have been developed to do so like digital watermarking, visual cryptography were used before image steganography. Researchers have also developed techniques that embed data or another image within the image. There are various methods for data hiding like the spatial domain, frequency domain, compressed data domain.

In **spatial domain,** the image pixels are arranged in order to incorporate the data to be embedded. This technique is simple and provides a high hiding capacity. In **Frequency domain data hiding,** images are first converted into frequency domain and then data embedding is done by modifying the transformed coefficients of the frequency domain. In **Compressed domain data hiding,** the data that is transmitted over the network in the compressed form, this information is used in for embedding the data in compressed domain where the compressed data coefficients are manipulated to embed data. In **Visual cryptography,** encryption could be done as a mechanical operation without the use of any computer.

Cryptography protects the contents of the message whereas steganography protects both messages and the communicating parties.

Using image stitching and image steganography security can be provided to any image which has to be sent over the network or transferred using any electronic mode. There is a message and a secret image that has to be sent. The secret image is divided into parts. The first phase is the Encrypting Phase, which deals with the process of converting the actual secret message into ciphertext using the AES algorithm. In the second phase which is the Embedding Phase, the cipher text is embedded into any part of the secret image that is to be sent. Third phase is the Hiding Phase, where steganography is performed on the output image of Embedding Phase and other parts of the image where the parts are camouflaged by another image using least significant bit replacement. These individual parts are sent to the concerned receiver. At the receivers end decryption of Hiding phase and Embedding phase takes place respectively. The parts obtained are stitched together using k nearest method.

In today's world of growing technology security is of utmost concern. With the increase in cyber crime, providing only network security is not sufficient. Security provided to images like blue print of company

projects, secret images of concern to the army or of company's interest, using image steganography and stitching is beneficial. As the text message is encrypted using AES algorithm and embedded in a part of the image the text message is difficult to find. More over since the secret image is broken down into parts and then sent to the receiver. This makes it difficult for the trespassers to get access to all the parts of the images at once. Thus, increasing the security to a much needed higher level. This becomes highly difficult for the intruder to detect and decode the document. There is no limitation on the image format right from bmp to a giff, image can be used. Also, the images can be grey scale or coloured images.

This is a new system which combines text cryptography and image steganography which could be a highly secured method for data transactions in the near future.

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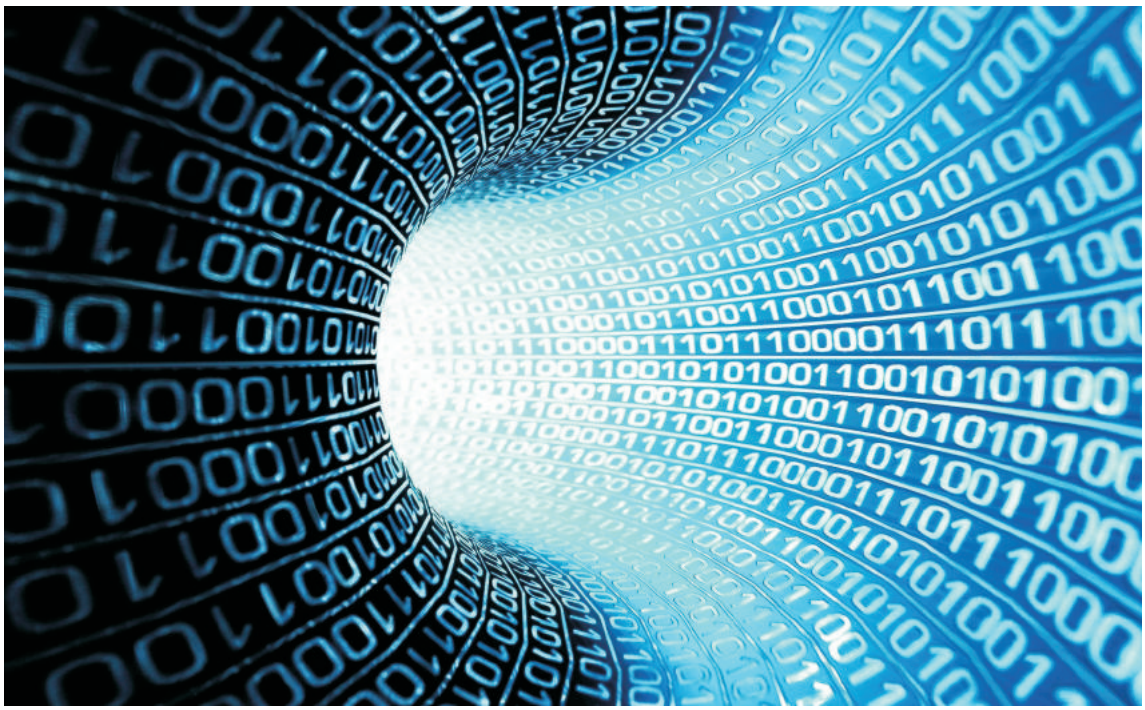

Thoughts

Computer technology gives path to express your logic in terms of codes

- Megha Agrawal, B. Tech. VII Sem.

Knowledge is waste if you are unable to express your ideas. So be expressive!!

Love Mittal, Assistant Professor

Computer science is the operating system for all new innovations

- Tarun Kumar, B. Tech. VII Sem

Success doesn't come to you, you go to it

- Dushyant Thakur, MCA IX Sem.

Do not PAIN for those, who INSULT you,
Use your PAIN to PUSH yourself,
Use your PAIN to EARN success

- Abhishek Kushwah, B. Tech. VII Sem.

If you are TRUE to yourself,
You don't need to prove it to others

- Leena Dhruwa, Assistant Professor

Volume-1
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Quantum Cryptography

Mr. Vishal Upadhyay, Lecturer
Department of Computer Science & Engineering, MU, Aligarh

Quantum cryptography is the science of exploiting quantum mechanical properties to perform cryptographic tasks. Based on the principles of physics, quantum cryptography makes it impossible to eavesdrop on transmitted information. The best known example of quantum cryptography is quantum key distribution which offers an information-theoretically secure solution to the key exchange problem. Currently used popular public-key encryption and signature schemes (e.g., RSA and ElGamal) can be broken by quantum adversaries. It is attracting considerable attention as a replacement for other contemporary cryptographic methods, which are based on computational security. Elements of the Quantum Theory are - **Light waves are propagated as discrete quanta called photons, they are mass less and have energy, momentum and angular momentum called spin, Spin carries the polarization, if on its way we put a polarization filter a photon may pass through it or may not. Also we can use a detector to check of a photon has passed through a filter.**

Quantum cryptographic communications encodes the 0s and 1s of a digital signal on individual particles of light called photons. By contrast, modern optical communications expresses the 0s and 1s of the digital signal as the strength and weakness of light respectively. Because the strong and weak light are made up of tens of thousands of photons which each carry the same information, if several photons are stolen (i.e., the signal is eavesdropped on) during transmission, it is not noticed. However, in the case of quantum cryptography, if a third party observes (eavesdrops on) the signal, the information on the photons is instantaneously transformed, meaning both that it is immediately obvious that eavesdropping has occurred and that the third party is unable to decrypt the information.

The advantage of quantum cryptography lies in the fact that it allows the completion of various cryptographic tasks that are proven or conjectured to be impossible using only classical (i.e. non-quantum) communication. For example, it is impossible to copy data encoded in a quantum state and the very act of reading data encoded in a quantum state changes the state. This is used to detect eavesdropping in quantum key distribution.

Quantum cryptography makes use of the Heisenberg uncertainty principle, which states that when an object is observed, its state is affected by the act of observation.

E-Commerce: Success based on supply chain management

Mr. Abhishek Kumar Gupta, Assistant Professor
Department of Computer Science & Engineering, MU, Aligarh

"Supply chain" today it emerged as a buzzword. It affects in our daily life if it is not happening in smooth way around us. From our daily bed tea to last dessert of night closely need better supply chain management. That is why professionals associated with SCM see the world through a different lens than most. Where others see products on the shelf, SCM professionals think of the containers on a ship, fleet of trucks running over the highway full of the products and the optimized shipping lanes.

Our daily observance of deliveries in our nearby or distant store or restaurant, most of us think of the procurement process, delivery routing was an "easy run." But behind it there were complex economic analytical methods such as cost-benefit analysis or cost-utility analysis had been implemented.

When we received our online shopping packet from online website carts, we think about the decisions considering the present and future market conditions. They comply the structural blueprint of SCM. After the layout is prepared, the assigned tasks and duties of each individual is followed accordingly.

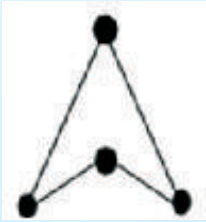
Supply chain principles are not easy to see by a layman in daily basis. We had developed our own shopping patterns without thinking about the concept of inventory. Generally we have a set time to shop, typically around two to three trips to the general store or weekend evening rush to the shopping mall. Some of us even rely fully on e-commerce to replenish our groceries and apparel, and also for other daily needs. This seven days cyclic period is considered as our **reorder period**.

To understand professionals indulge in supply chain and big businesses use these concepts to optimize their inventory, the famous concept of economic order quantity was derived. EOQ is the road map for the success for e commerce companies. This tells us how to manage in our stock so that customer satisfaction meets at desired level.

A Novel Extensible Multiprocessor Network

Mr. Sharad Pratap Singh, Assistant Professor
Department of Computer Science & Engineering, MU, Aligarh

Recently thirst for higher and higher computing power is increasing day by day, user don't miss an opportunity to use even there smaller and smaller laptop for this purpose to get their requirement full filled . As a first attempt /version of 4 node multiprocessor architecture has been proposed in compact form connected to fulfil the properties of multiprocessor network .It has been found that the architecture is linearly extensible and its performance can be compared with the existing commercial multiprocessor architecture. The proposed 4 node multiprocessor network performs equally well as compare to the existing our reported multiprocessor network .This economical compact multiprocessor can be used for higher computation purposes.



The main idea of research is to design a multiprocessor network (interconnection) network with lesser no of node having better characteristics then the existing network .Lesser no of node means economical. The other important characteristics of a multiprocessor network a diameter, connectivity, extensibility, fall tolerance, etc. Scheduling schemes will be implemented to check its performance with other similar network the success of multiprocessor system depends upon the effective utilization of nodes with uniform load distribution. The load distribution is optimal when all nodes have equal nodes.

Application of Eye Tracking Technology in Human Life

Mr. Chandan Singh, Assistant Professor
Department of Computer Science & Engineering, MU, Aligarh

Image and video processing has been an intensive field of research for last two decades. Human Computer Interaction is one of the important domains that come under image and vision processing. In present scenario Human Computer Interaction involves challenging research areas like Data Gloves, Motion Trackers, Head Trackers, 3D Controllers, Eye Tracker, etc. Eye tracking is a method to track the movement of the eyes to understand where the viewer is looking and to measure the time duration i.e. fixation. Eye movements are monitored for eye gaze position, saccade, fixation, and fixation durations. **Fixation** is the time duration for processing a particular image by fovea. **Saccade** is the time duration between two fixations.

In present time there are many online courses are running by IITS, NPTEL, Course era and others sources to enhance the skill of students and teachers. To evaluate the learning of course they conduct quizzes, programming assignments, mid-term examination and final examinations. These sources have no efficient way to stop the coping of contents of candidates in these examinations. Eye tracking technology can be used to stop the copy of content among the candidates. There can be developed to subscribe the physical disabled people, applications/software can run through the movement of eyes. Eye tracking technology is used to find the interest of people on web so that content of web can place respectively.

Eye tracking technology is emerging area of in field of human computer interaction. It can be used to assist the physically disabled people to use the computer, to monitor the coping behaviour of candidates.

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Thoughts

Education is that first step of life which builds other steps to make us move forward

- Sonam Garg, B. Tech. VII Sem.

Do your BEST, Leave the REST

- Chandan Singh, Assistant Professor

People think that computer science is the art of geniuses but the actual reality is just opposite, many people do things that is built on each other like a wall of mini stones.

- Akansha Singh, B. Tech. VII Sem.

Feeling confident – or pretending that you feel confident – is necessary to reach for opportunities. It's a cliché, but opportunity are rarely offered; they seized

- Sheryl Sandberg

Computers are known for its intelligence. So, they should have their own world to live in it

- Jolly Singh, B. Tech. VII Sem.

About department

The Department of Computer Science & Engineering was established in the year 2007. Currently this Department is functioning under Institute of Engineering and Technology in Mangalayatan University, Aligarh. It instils confidence among the students to make themselves experts in the field of computers. It also enables them to occupy a place of prominence in IT industries across the globe. The students ought to do a project on or off-campus in the final year with an option to choose their platform and thus they are exposed to the real time computer problems which will mould them to conquer the challenging IT world.

The department tends to organised various workshop, conferences, seminars, faculty development programs, short terms courses etc. It also posses a club named CSESA (Computer Science Engineering Students Association) which is run by the students of computer science & engineering. This club provides a platform to the students to excel their knowledge and perform in different curricular as well extra-curricular activities.

MU Campus
Extended NCR 33rd Milestone Mathura -Aligarh Highway. Beswan. Aligarh (UP)-202145
PH: 05713528592/3
website- www.mangalayatan.edu.in

CALL: 18002744000