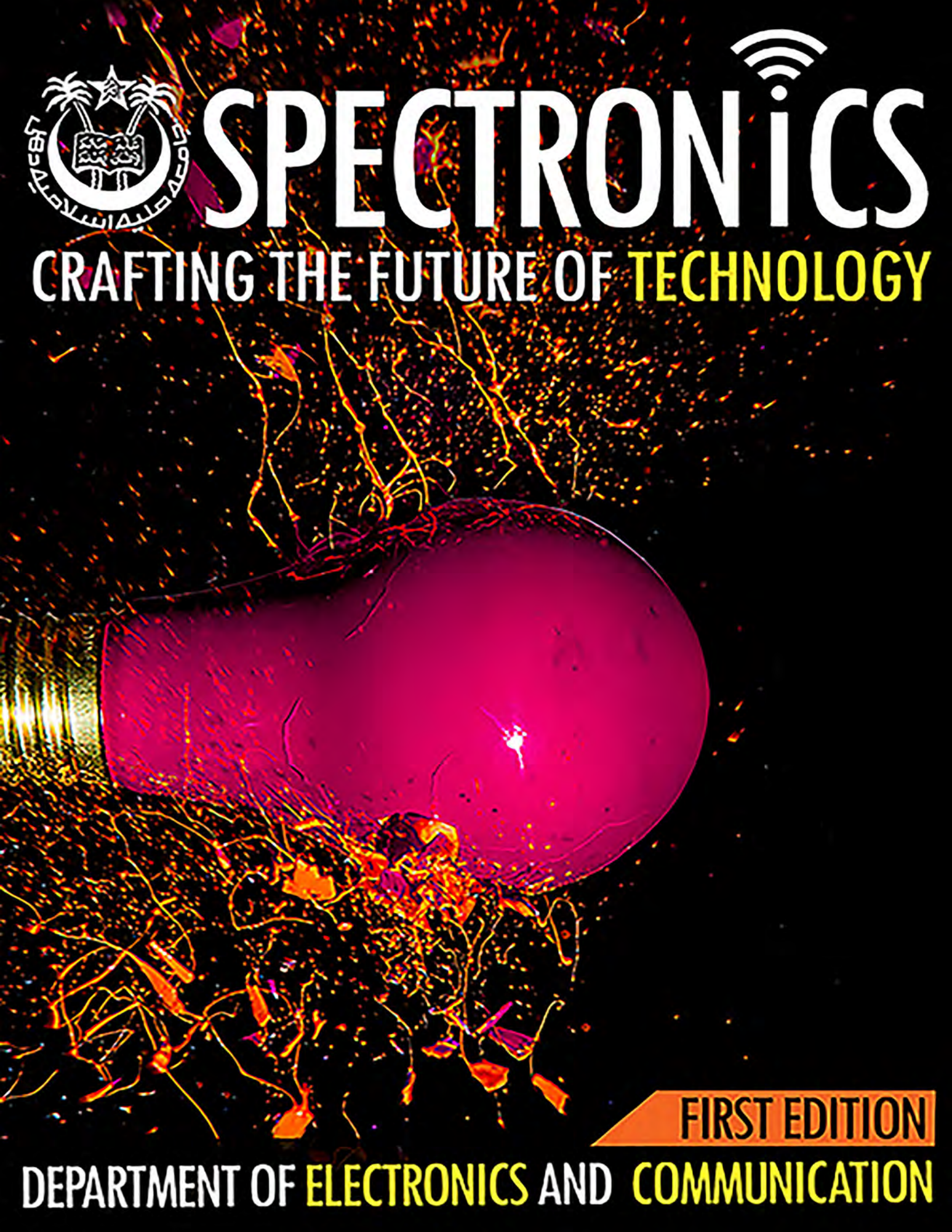
SPECTRONICS
CRAFTING THE FUTURE OF TECHNOLOGY
FIRST EDITION
DEPARTMENT OF ELECTRONICS AND COMMUNICATION

JAMIA MILLIA ISLAMIA
(A Central University by an Act of Parliament)
Maulana Muhammad Ali Jauhar Marg, New Delhi-110025

जामिया मिल्लिया इस्लामिया
(संसदीय अधिनियमानुसार केन्द्रीय विश्वविद्यालय)
मौलाना मुहम्मद अली जौहर मार्ग, नई दिल्ली-११००२५

جامعہ ملیہ اسلامیہ
(پارلیمانی ایکٹ کے تحت ایک مرکزی یونیورسٹی)
مولانا محمد علی جوہر مارگ، نئی دہلی۔۱۱۰۰۲۵

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Professor Talat Ahmad
FNA, FASc., FNASc., J.C. BOSE Fellow
Vice Chancellor

प्रोफेसर तलत अहमद
एफएनए, एफएएससी, एफएनएएससी, जे.सी. बोस फैलो
कुलपति

پروفیسر طلعت احمد
ایف این اے، ایف اے ایس سی، ایف این اے ایس سی، جے سی بوس فیلو
شیخ الجامعہ

(ACCREDITED "A" GRADE BY NAAC)

June 07, 2018

Vice Chancellor's Message

Since the foundation in 1920, Jamia Millia Islamia has grown to become India's flagship, a central university, known for the excellence of its teaching, its research, and its service to local, national and international communities.

As we look to the future one thing is certain – engineers are and will be a key resource within India and around the world. Our challenge is to help generating the ideas that will benefit society, and to educate and train people to work in different fields where they will be valued both for their specialized knowledge, and for their ability to research, communicate and solve problems. To meet these challenges, we need to build on the alliances and collaborative partnerships with business, government, and other research institutions.

I am delighted to know that the department of Electronics and Communication Engineering is bringing out the magazine "***Spectronics***". Hopefully, it will serve as a platform that would aptly record events, technical articles and progress in the field of Electronics and Communication Engineering.

(Prof. Talat Ahmad)

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Prof. Shahid Ashraf
Pro-Vice Chancellor

Message from Pro Vice-Chancellor

Jamia Millia Islamia was established in the year 1920. Today, it spans across nine faculties and several centres which offers several diversified courses.

The Faculty of Engineering and Technology has always been at the helm to carry forward the baton of knowledge. The Department of Electronics and Communication Engineering is a distinguished and highly acclaimed department because of its note-worthy and illustrious research publications and academic achievements in the field of Electronics and Communication Engineering.

I, therefore, feel pleased to acknowledge their effort to commence a departmental magazine "***Spectronics***" to showcase the achievements of the department in terms of technical advancements, co-curricular activities and various accomplishments in the domain of Electronics and Communication Engineering.

I wish them best of luck in all their future endeavours.

Prof. Shahid Ashraf

(Pro Vice-Chancellor and Dean Academics)

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Office of the Dean

June 11, 2018

Message from the Dean's Desk

It is heartening to note that the Department of Electronics and Communication Engineering, Faculty of Engineering and Technology, Jamia Millia Islamia, is launching the first edition of Departmental Magazine "*Spectronics*".

Today's engineering challenges are far more complex than we could have imagined a decade ago. To meet these challenges, engineers from previously distinct areas are now overlapping and partnering with experts in other fields. Faculty of Engineering and Technology is optimally placed to respond to this paradigm shift. Interdisciplinary collaboration and engagement with the real world have been our guiding principle. Faculty of Engineering and Technology always encourages its students to participate in extracurricular activities at Departmental and University level.

Therefore, I hope this Magazine will provide a vibrant platform for the students to exchange their ideas and showcase their skills. I am sure, the students will be greatly benefited by the Magazine.

(Professor Mehtab Alam)
Dean

JAMIA MILLIA ISLAMIA
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(संसदीय अधिनियमानुसार केन्द्रीय विश्वविद्यालय)

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Message from the HOD's Desk

It gives me immense pleasure to announce the first edition of our departmental magazine '***Spectronics***'. The name of the magazine itself validates the mission of our department which intensively focuses on a broad gamut of topics encompassing recent researches in the field of electronics. The department since its inception in 1996 firmly believed in the holistic and comprehensive development of students which eventually instills a sense of responsibility in them to contribute towards the betterment of the society.

The vision of the department is to become a leading Centre of Excellence in higher learning and research. The department has a well-documented and updated syllabus which keeps pace with the current technological trends. The learning is basically imparted through an amalgamation of classroom teaching and hands-on experience in the state-of-the-art laboratories.

The department boasts of very rich and well equipped laboratories such as VLSI lab, Digital Image Processing Lab, Circuit Simulation Lab, Instrumentation & Sensors Lab and Communication Lab which help in developing a pragmatic approach to co-relate the existing technical knowledge with real-time practical applications. The department always encourages its students to participate in paper presentation, workshops and seminars. Cultural activities are also promoted through various clubs and events at the departmental and university level.

Therefore, this magazine perfectly acts as an apt platform to showcase the achievements of the department in terms of research and development activities, student-industry interaction and various cultural activities. It also highlights the accomplishments of the students, teachers and its distinguished alumni.

I finish my message with a quote from an eminent and distinguished visionary *Martin Luther King Jr.*, *"The function of education is to teach one to think intensively and to think critically. Intelligence plus character – that is the goal of true education."*

Prof. Mirza Tariq Beg
Head of the Department
Electronics and Communication Engineering
JamiaMilliaIslamia, New Delhi

JAMIA MILLIA ISLAMIA
(A Central University by an Act of Parliament)

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Coordinator's Message

We are standing in the constantly changing era, where we are poised to adapt with the dynamic scenario. When we talk about the world of Electronics and Communication Engineering, we can remarkably notice the pace of development every hour. The four years of engineering leaves behind a change in the life of student in each and every aspect.

We strive to keep our students busy in technical and learning activities so that they can move with the state of art. The role of university/department is not just to pursue academic excellence but also to empower our students to be lifelong learner and develop abilities so that they have courage face every challenge in career. We believe in teaching by the students in the pattern that they can gain the best knowledge or current demand of present industry.

"Focus the destination, by following the correct path", if destination is visibly clear there always exists a path that can meet it.

I would like to extend my heartfelt thank to Prof. M.T.Beg, HOD for his continuous support and encouragement.

I also take the opportunity to thank Prof. Mainuddin, Ex- HOD for having confidence in me. Your faith is my driving force.

Let us remain committed to our target by shaping the career of student in the best possible manner as success is not achieved overnight, it is when everyday you get a little better, so this is the message I want to convey through "**Spectronics**".

I would like to end with the words of Albert Einstein – "*Imagination is more important than knowledge, for while knowledge defines all that we currently know and understand, imagination points to all we might yet discover and create.*"

Dinesh Prasad

Dr. Dinesh Prasad
Coordinator

message from the editor

'We need diversity of thought in the world to face the new challenges '-Tim Berners-Lee

The journey of Spectronics 2018 can be best described by the above quote. It gives me immense pleasure to bring out to you the first edition of Spectronics.
In the creativity of its formulation, in the excellence of its writing and graphical presentation ,Spectronics endeavors to reflect the values and the quality of the institution itself. We want it to be entertaining and informative, but above all useful.

To start, let me say that I am a magazine enthusiast, who from my earliest school days has been obsessed with flipping though the pages of magazines, first absorbed in their images and stories, later assigning and editing my own. The past months have been serendipitous, and at times, really, really hard but never have I believed in something so much and not once did I want to quit.
It's been an unstoppable and frankly, emotional roller coaster for us as we reimagined every single page and every single detail.Every tiny aspect of the design represents decision we debated, sweated over and second-guessed until we ran out of time and had to send it off to the printer. But what you see here is not a new formula. It's a beginning,as we aimed to make everything sharper,dynamic and more alive.
I feel extraordinarily proud to be part of such a soulful and heartfelt journey with an absolute zealous team. I take this opportunity to express my hearfelt gratitude to Prof.M.T.Beg,Head of Department(Electronics and Communication) to entrust the responsibility to me to bring out this issue , Dr. Dinesh Prasad , Coordinator Spectronics 2018 for his constant bolstering and all the faculty members for their support throughout the creation of this edition.

It's already been an experience of a lifetime, and there's still so much to do. You're a part of our team now and we look forward to walking the journey with you.
For now, I hope you enjoy reading the first issue, which has been crafted with a whole lot of passion and integrity.

Happy reading!
With warm regards,

javaria salman

Editor in Chief
Spectronics 2018

ELECTRONICS AND COMMUNICATION DEPARTMENT

FACULTY MEMBERS

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Dr. Mainuddin | Professor

Dr. Anwar Ahmad | Professor

Dr. Dinesh Prasad | Professor

Dr. Sajad A Lone | Professor

Dr. Neelofer Afzal | Professor

Dr. Nizamuddin | Associate Professor

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Mohd Ashraf | Assistant Professor (Contractual)

Mohd Zihaib Khan | Assistant Professor (Contractual)

Ms. Zainab Haseeb | Guest Faculty

Ms. Garima | Guest Faculty

Mr Tariq Hussain | Technical Assistant

Mr Abdul Sadir | Laboratory Attendant

Mr Asif Saifi | Technician

Mr Ayaz Taqy | LDC

Obituary

Dr.Syed Akhtar Imam-The Department of Electronics and Communication,deeply mourns the sad and sudden demise of our beloved faculty member, Dr.Syed Akhtar Imam,who left us for his final desitnation, leaving behind beautiful memories.May his soul rest in peace.
We will miss you!

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

[From Bottom Left to Right- Dr. Neelofer Afzal, Ms. Zainab Haseeb, Dr. Dinesh Prasad, Dr. MT Beg , Dr. Anwar Ahmad, Dr. Nizammudin, Mohd Ashraf
From Top Left to Right- Mohd. Adish Irfan(Designer), Mariam Nida Usmani(Content Writer), Javaria Salman(Editor), Nashrah Rahman(Content Writer), Ayush Sharma(Designer)]

EDITORIAL BOARD

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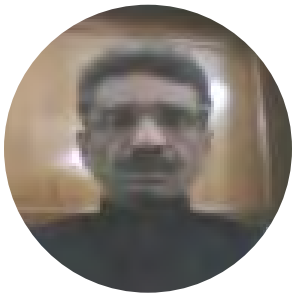
Dr. Mainuddin

Dr. Dinesh Prasad



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ABOUT THE UNIVERSITY

Jamia Millia Islamia came into existence in1920 through the tireless efforts of its founders, such as Shaikhul Hind Maulana Mahmud Hasan, Maulana Muhammad Ali Jauhar, Hakim Ajmal Khan, Dr. Mukhtar Ahmad Ansari, Jenab Abdul Majeed Khwaja and Dr. Zakir Husain. It symbolizes the unflinching and resolute commitment of these great visionaries in bringing about socio-economic transformation of common masses, in general.

Jamia Millia Islamia was founded on 29th of October, 1920. Its foundation stone was laid by the freedom fighter Maulana Mehmud Hasan, in Aligarh. This university stemmed from the persistent efforts of visionaries, and was fuelled by the trend of anti-colonial activism. Jamia Millia Islamia was accorded the status of a Central University by a special Act of Parliament in December, 1988. The motto of this university is, 'Allammal Insaana Maalam Yalam - Taught Man, That Which He Knew Not'.Our university is headed by Dr. Najma A. Heptullah, Hon'ble Governor of Manipur; and Prof. Talat Ahmad, Chancellor and Vice- Chancellor of Jamia Millia Islamia.

Jamia Millia Islamia has nine faculties under which it offers academic and extension programs , i.e. Education, Humanities & Languages, Natural Sciences, Social Sciences. Engineering & Technology and Law.

Besides its Nine faculties, Jamia has a number of centres of learning and research, like AJK-Mass Communication Research Centre (MCRC), Academy of International Studies etc

ABOUT THE DEPARTMENT

The department of Electronics and Communication Engineering came into existence at the Faculty of Engineering and Technology in 1996, by the approval of All India Council of Technical Education (AICTE), to meet the growing requirement of practical design engineers in the country and abroad. Since its commencement, the primary objective of the department has been to impart quality education, training and research at the undergraduate and doctoral levels in various areas of Electronics and Communication Engineering with emphasis on design aspects of Electronics and Communication systems to produce scientists and technologists of highest caliber.

VISION

To become a leading Centre of Excellence in higher learning and reszearch, and to facilitate the transformation of students into good human beings and competent professionals.

MISSION

- Focus on assimilation, generation and dissemination of knowledge in the field of Electronics and Communication Engineering.
- Impart quality teaching-learning experience with state-of-the-art curriculum.
- Increase the visibility of academic programs globally and attract talent at all levels.
- Practice high standards of professional ethics, transparency and accountability.

SMART CITIES

AYUSH SHARMA
B.TECH ECE

We are aiming to be a superpower in a near future, but lets take a moment and first introspect at our condition, it wont be too harsh to say that our cities are I shambles. Of course, you didn't need me to tell you that. Anybody who lives in any sort of urban agglomeration in India already knows that What are they? Why do we need them? How do they affect us in our daily lives?

It is a city with cutting-edge urban planning, smart infrastructure and replete with systems running on the latest information technologies. Smart cities are expected to be catalysts in improving the quality of life and give a major fillip to the real estate in urban locations. While the definitions may vary, one consistent reality is that the technology in smart cities varies immensely based on the needs of that particular city and the budget allocated for such technologies.

Why do we need them ?

By 2050, 66% of the world's population is expected to live in urban areas. The challenge will be to supply these populations with basic resources like safe food, clean water and sufficient energy, while also ensuring overall economic, social and environmental sustainability. Overall it enhances our standard of living.

One of the most helpful aspects of a smart city is using technology to ease traffic and parking woes. Sensors in the street can be used to determine if a parking spot is empty, and anyone who accesses an app on a smartphone can find out in real time the location of the closest parking spot.

Helping drivers find a parking spot more quickly can have a significant impact on traffic patterns. In Barcelona, there are sensors embedded in the city's streets to alert users on where to find open parking spots and traffic has been reduced because there are fewer people circling the block. This naturally helps the environment, because with fewer cars circling the city's streets, there are lower carbon dioxide emissions and less fuel is wasted.

Data shows that 30% of all traffic congestion in cities is the result of drivers looking for a parking space, according to the Intelligent Transportation Society of America. There are sensors in the roads so that you don't need to worry about paying for your parking because the sensors will determine how long you're parking there. Cities will also be able to clear away accidents much more quickly since they won't need to wait for tape measurements. And they can link this information to insurance companies and claims so that they can be processed much more quickly.

Bottom Line

No matter how appealing it is to offer new services, keep in mind that what citizens want is key.

"Smart cities are evolving cities, and smartness is relative—part of the requirement to be a smart city is to understand that change will always be necessary—but the intelligence comes in choosing the best tools that support that city's people and keep its culture vibrant and sustainable," Menon said.

3D SCANNING - A NEW WAY TO DOCUMENT OUR WORLD

By- MARIAM NIDA USMANI
(BTECH ECE)

With improvements in the field of additive manufacturing, 3D scanning has gained steam in recent times. Just like a Xerox machine, it has the capability to save spatial data of a scanned object, which may then be 3D printed.

Collecting 3D data is a tradition dating back to ancient times, with some of the earliest records being the facial structures of the deceased. This was usually done either by using wax or Plaster of Paris. From this, a 'death mask' was fashioned out, especially in the mummification process carried out in Egypt.

A very popular example of 3D scanning is the use of CT (Computer Tomography) scans to analyze the bones of humans - both living (as in patients) and dead (eg: mummies). The resulting 3D models are generated from a set of 2D slices, creating yet another classification for 3D scans - based on reconstruction methods involved. Other reconstruction methods include the use of point clouds, surface models, and laser scans.

There are two main types of 3D scanners - contact based and non-contact based. This article mainly emphasizes on non-contact 3D scanners, which work by detecting radiation emitted by or reflected from the object or environment to be probed. This radiation may be in the form of light, ultrasound, X-rays etc.

Non-contact 3D scanning may use either of the three techniques - triangulation, time-of-flight, and conoscopic holography. Out of these three, triangulation is the most popular, making use of a laser beam to detect the desired object. This method derives its name from the 'triangle' generated by the laser emitter, the resulting laser dot, and the camera. This technique was first developed by the National Research Council of Canada in 1978.

3D scanning builds on the idea of photogrammetry, a software concept that generates 3D data based on common features detected in the stream of images fed to the computer. It may be thought of as a more advanced version of photogrammetry, since it not only uses software-driven algorithms, but hardware techniques as well, to accomplish its task.

The object is scanned multiple times, in order to obtain information pertaining to all its sides. This is followed by aligning all the scans to a common reference system, a process referred to as 'aligning' or 'registration'. Different viewpoints result in varying types of data, which need to be 'stitched' together into a single mesh using common features identified by the scanner.

The 3D scanner, in this manner, creates a point cloud of the scanned object, from which the object may finally be reconstructed, in the form of a polygonal mesh. This completes the process of digitizing the object in 3D. Additionally, colour may also be added to the object, in case the scanner has colour sensing capabilities.

There are two approaches to capturing an object's colour. The first approach involves integration of colour cameras in the scanning system. While it allows for perfect synchronization of spatial and colour information, it requires a source of constant illumination during the scan process, which may be tough to achieve in large objects.

The second method makes use of images taken independently by a colour camera, and mapped onto the scanned object's surface. While this approach works well for objects with detailed surfaces, it is a more complex system to implement, requiring additional hardware and steps than the previous method.

The implications of 3D scanning are huge. It may be used to scan entire patients, or a part of the patient, to check for physical abnormalities, and his or her unique features. 3D scanners may also be utilized to archive historical artifacts, by creating 3D catalogues of relics, monuments, ancient corpses, or fossils.

In fact, such technology is already being used, in conjunction with image processing, to check for cracks and faults in manufactured items as well as construction sites. In the consumer sphere, some retailers like Volumental and MatchMyFoot have already started experimenting with it, as an attempt to give their customers the best fitting attire, according to their physicality.

At the same time, 3D scanning has a fair share of obstacles to overcome. While it does a good job with scanning homogenously coloured objects and diffusely illuminated textures, it fails to correctly recognize objects with shiny, transparent or mirroring surfaces. This makes it extremely challenging to scan fluids, such as water or clouds.

Its limitations, however, don't seem to be impeding it from its rapid advancements, and its widespread adoption in commercial, medical and historical spheres, to name a few. Who knows, we might also play a role in its development, as engineers!

Technology
Breaking barriers or Creating barriers?

Technology and inventions have been an integral part of human life, right from the invention of wheel to this current era of Information Technology and more recently Artificial Intelligence. In this era of smart phones, instant messaging and driverless cars, it is of little doubt that our lives have been made easier by technology. It has pierced through the barriers of distance, space and time connecting people, businesses,organizations and nations.

Ergo, it is of little wonder that information exchange across has become much easier. 'Google Baba' or 'Google Chacha' and 'Google Guru' seem to be the one stop solution for all problems so much so that it has rendered technicians redundant and born are many DIY cases.

Everyday, new inventions are surfacing throughout the world rendering the previous ones obsolete. Whether it is ISRO recording the launch of 104 satellites in a single space shuttle, cloud seeding for artificial rain in drought hit parts of a country, hack proof Quantum Cryptography by the Chinese for cyber security, driverless taxis in Singapore, amphibious aircrafts or floating solar plants, or more recently Turbo Happy Seeder to curb the air pollution rise in New Delhi caused by left over stubble burning in the neighboring states of Haryana and Punjab, human curiosity never fails to seek out new advancements and technologies.

Be that as it may, coincident with our ushering into Information Age, we have simultaneously garnered into what some say as Hermetical Age. Where once evenings that were lapsed by socializing with a visit to the neighborhood, to relatives or family friends, new apps of 'social' networking have replaced them questioning exactly how the social barriers are being created or overcome. Moreover, cricket and football from parks have moved into mobiles and tablets with computer as a 'friend'.

Speaking of friendship, you can "add" your friend and "un friend" with a click of a mouse or can restrict or totally block out anyone without remorse. With the constant urge display the best part of our lives on our 'timelines' and 'statuses', we are creating our virtual communication strong by neglecting this physical connection. Family values, compassion, face to face communication, are being ignored. As a result social contacts are declining. The over dependence on the social media reflects that younger generation is looking for a refuge from the harsh realities of the world.

Albert Einstein said "I fear the day when technology will suppress human interaction and the world will have a generation of idiots." N ecessity has been and will always be the mother of inventions and technological developments and Technology, since time immemorial has been for the betterment of mankind.

However, any invention or innovation will not be able to bear fruit unless utilized properly in the best interest of human beings. And the most efficient, the most fragile, the most complicated yet the most sophisticated CPU i.e. the human brain can guide us and give directions for proper decision making. Otherwise, this overdependence on technology compromising our innate social idiosyncrasies will only go about creating a bunch of nomophobic zombies who eat, drink and sleep over the gadgets!

NEDA FATIMA
M.TECH ECE

HOW THE INTERNET WORKS: AN INTRODUCTION

We all use internet in our day to day life to such an extent that we can't even imagine our life without it. But do we really know the technicalities behind it or how we access everything at the speed of light! If you don't know well, you are at the right place. So, let's get started!

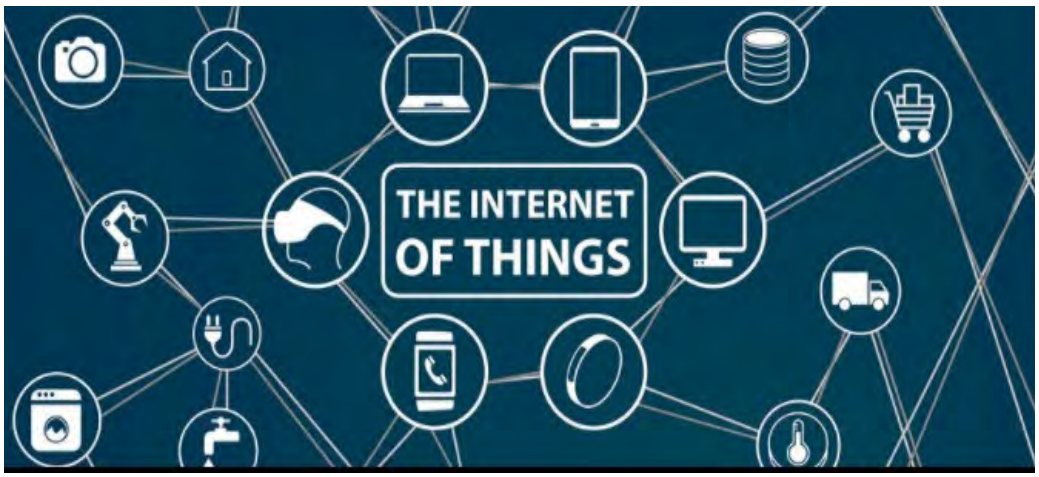
Internet is the name given to the network which is distributed all over the world and can be accessed from anywhere at any time. Every time we connect to the internet the device used to access it gets an IP address. It's a four-decimal number separated by decimal, each ranging from 0-255 and each part represents an 8-bit number.eg 172.64.0.26. The IP address is unique for every device connected on the internet. This address is used to send and receive data from the server. It is analogous to our physical address. If someone wants to communicate to us , he must know our address and vice versa.

Searching on Internet:

In this case we do a "get" request, which means that we want data from the server. For instance, when we search www.facebook.com, the request will be sent by the browser through the IP address to the DNS (Domain Name System) server first. The DNS server will convert the URL into its corresponding IP address, because all the devices on the internet understand IP addresses only, it's for our convenience that we directly type the URL, after all we can't remember the IP address for every site!Now that we have the IP located, a request is sent to the server. The server reads the data packet and sees what all information is to be sent back. The process repeats itself and the data is sent back to the original host IP through the DNS server. The data travels all the way from the website's server to the host through extensive network of cables. But wait, the data is not sent in a single packet, rather it is distributed among different small sized packets through different routes that upon reaching the target reassemble and we are able to see the whole content all at once. All this is done so that speed is not compromised, and we are directed to the website in a few seconds after searching it. All the communication is done through certain protocols which define the way in which data is transmitted. There are many protocols in networking like TCP/IP, UDP, etc. In our case, TCP/IP (Transmission Control Protocol Internet Protocol) is mainly used to communicate.

So next time you browse the internet ,remember you are going through a lot of extensively complex networks that you simply might not be able to notice!

MOHAMMAD ADISH IRFAN
B.TECH ECE



INTERNET OF THINGS

ARIF KHAN (B.TECH ECE)

The term IoT might have been coined not more Technological advancements are trying to fast catch up with what viewers have been promised by sci-fi movies for a while. A potential concept that has gained massive traction and can assist in bringing about enhancements in varied aspects of life using programmed machine intelligence and adaptive learning capability is Internet Of Things(IoT). than a couple decades ago, but interest in endeavouring fields with similar goals have been around for a while.

IoT is about interconnecting devices of physical world within the prevailing internet infrastructure using assorted sensors to manipulate existing robust functioning and extrapolating ways to improve throughput while shortening response time, without human to machine or machine to machine interactions. Many leading entrepreneurs believe that with IoT, physical world is becoming one big information system and it can fundamentally change the way business function.

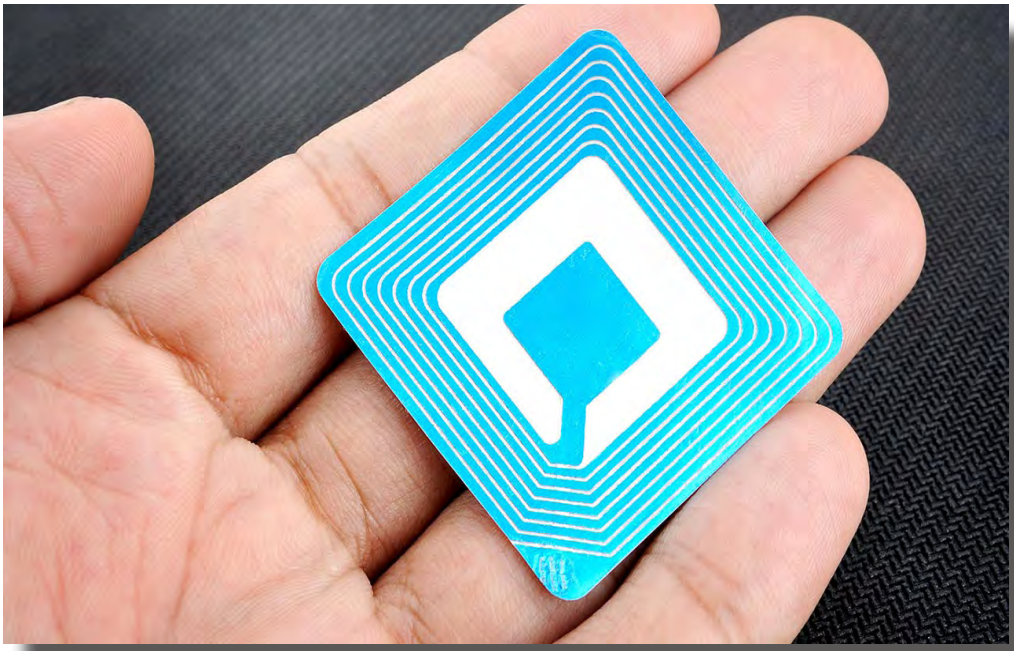
It works by assigning an IPv6 address to all the components of real world(primarily electronic components).In an attempt to broaden the horizons of the concept of IoT, capacity of IP addresses have been increased enormously. The functioning are then monitored using ubiquitous sensing elements present all over the unit. Sensors sends feedback at regular intervals over a secured network to provide real time functioning of that object while also registering anomalies. These data collected over a period of time can then be processed to triangulate methods of enhancing performance. An added benefit of this system is that manufactures can recognise a malfunction in a unit present with a consumer in any part of the city. The particular malfunctioning part can also be meticulously found, and manufacturer can then fabricate that part beforehand and effectively eliminate delays in maintenance.

IoT has the potential to bring about advancements in healthcare sector, construction management and transportation systems and energy efficiency in a manner never seen before.It can also be greatly employed in farming practices to evolve it to the level of precision farming. Data collected over a period can help in determining precise weather conditions for a particular crop to flourish and process this along with meteorological department's predictions to remotely provide all relevant information. A drone can then be employed to perform the task. Determining quantity of water supply, manure and other relevant stuffs will become more sophisticated, timely and precise.

Another important application of the concept is the field of energy management. Every industry works on finding solutions to cutback the excess waste of energy in various phases of production. Use of billions of microsensors to create a mesh to monitor energy requirements of various components of a machinery is a smart solution to the issue.

Building and construction units finds it as a cognitive force that can assist in providing the best combination of structures while planning city layouts based on past experiences. Transportation systems can manipulate real time traffic to help find the rate of expansion of public transport and future constructions of roads to contain the expanding needs.

IoT is inexorably tied to providing efficient methods of evolving things as we know them in all fields by envisioning the future. It is a field of interest for many entrepreneurs and advancements are being pursued in the field.It is one truly technologically enabled network of networks.



RADIO FREQUENCY IDENTIFICATION

Radio frequency identification, popularly known as RFID is the latest hit in the market making lives easier. Though RFID has been used for past 50 years but from 2010 it took on a flight due to decrease in cost of equipments and tags. This caused an increase in performance to a reliability of 99.9% and a stable international standard around UHF passive RFID.

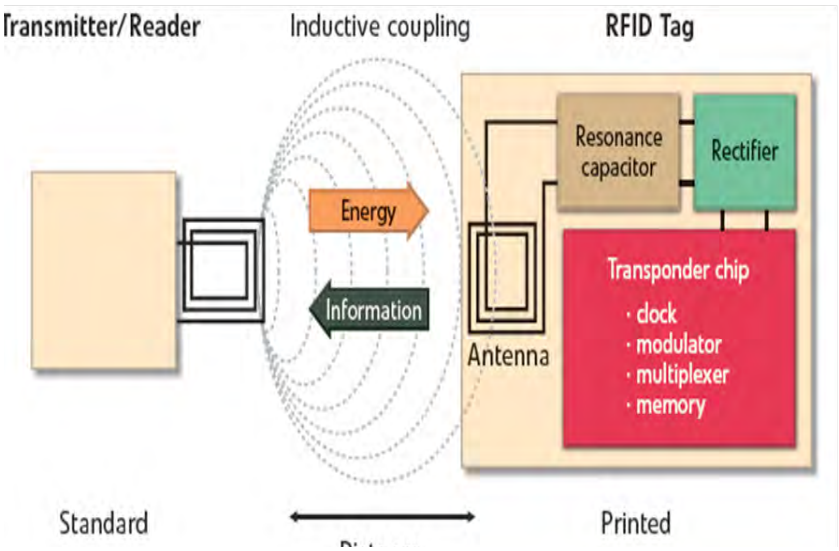
RFID is an automatic identification technology whereby digital data that is encoded in RFID tag or "smart label" is captured by a reader using radio waves. RFID is similar to bar code technology but it uses radio waves to capture data from tags, rather than optically scanning the barcodes on a label. RFID does not require the tag or label to be seen to read its stored data which is a key factor of an RFID system.

RFID consists of a reader and a tag. Reader emits electromagnetic fields to identify and track tags attached to objects. Tags contains electronically stored information. Tags can be passive or active. Passive tags collect energy from the reader and transmits back the signal to the reader with the information of the object. Active tags are battery operated and can work within range of some hundred meters. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object.

RFID tags can be affixed to different objects like food products, groceries, clothes, equipment, books, mobile phones, etc. These tags can be used to track and assess inventory, assets, people etc. RFID tags are better than barcodes as they can be read when they are passed through a reader no matter they are covered or not. Unlike barcode they do not need to be in the line of sight of the reader. All we need is to just pass them through the reader and it will assess all the information regarding the object on which the tag is affixed.

The above-mentioned advantage of RFID tags is exploited nowadays in different ways from retail stores, toll collections and inventory management to medical applications. Today's highly automated manufacturing processes require reliable tracking of materials, parts or goods along the entire supply chain. When the number of goods flowing through the process increases and the processes become more complex, asset identification with a help of RFID technology not only increases efficiency, it becomes the backbone of the whole production line. Manufactured products such as automobiles or garments can be tracked through the factory and through shipping to the customer. Automatic identification with RFID can be used for inventory systems.

RFID have found a wide variety of use in retail stores where items are tagged and these tags can be used for inventory management as well as protection against theft by customers or employees and for a self-checkout process for customers. For example, we bought different items from the store, with tags affixed to them the billing process can be made fast and less hectic. Reader will read out the prices of different products collectively unlike the bar code reader where items has to be checked individually thus making process time consuming. Tags of different types can be physically removed with a special tool or deactivated electronically once items



to be checked individually thus making process time consuming. Tags of different types can be physically removed with a special tool or deactivated electronically once items have been paid for. On leaving the shop customers have to pass near an RFID detector; if they have items with active RFID tags, an alarm sounds, both indicating an unpaid-for item, and identifying what it is.

Most of us have waited for hours in toll plazas to pay toll and pass. RFID based intelligent transportation system has an answer to it. RFID tags can be affixed to the cars and toll plazas and can have just readers installed on them. As a vehicle will pass through the reader the information about the driver can be gathered and the toll can be paid even without stopping the vehicle. This can assure smooth flow of traffic at toll plazas. Similarly, this technology can also be used to monitor traffic flow. RFID readers are deployed at intersections to track E-Z pass tags as a means for monitoring the traffic flow. The data are fed through the broadband wireless infrastructure to the traffic management center to be used in an adaptive traffic control of the traffic lights.

RFID tags can be used for access control to public transport. One of the common example of it is, the metro cards used in various metro systems where cards have RFID tags attached in them and when they pass through the reader at the entrance or exit, information from it regarding the travel is read. RFID chips can be as small as to few millimeters. Because of this advantage, RFID chips can also be implanted on humans containing a unique id number that can be linked to the information contained in an external database such as personal identification, law enforcements, medical history, medication, allergies, and contact information. This information can be used in case of emergency or can also be used to track and assess employee in the workplace. Many other applications of RFID human implantation can be exploited like attendance system, Voting, can replace ID cards etc.

But this all comes with some dangers of its own. Human implantation of RFID can lead to individuals being tracked by carrying an identifier unique to them. This can lead to harming the privacy of individuals and their sensitive data linked to RFID like identity can be hacked and used for malicious purposes.

Every technological advancement comes with advantages and disadvantages of its own. So, there may be some drawbacks over the use of RFID but with time, proper usage can be taken care of. RFID is one of the fastest growing technologies in recent times and it is the technology which is also the need of the hour. RFID tags, a technology once limited to tracking cattle, are tracking consumer products worldwide. So, if RFID have the potential of making life easier then its use is justified and we can easily imagine the use of RFID tags in most of the aspects of our life in the coming future. RFID technology is becoming too much a part of our lives -- that is, if we're even aware of all the parts of our lives that it affects.

ABDUL AHAD AKHTAR
B.TECH ECE

PAST, PRESENT AND FUTURE MICROWAVE PHOTONICS

After the invention of laser, some visionaries thought about future high speed communication in 1960s, and saw photonics as a possible alternative to microwaves. For terrestrial telecommunication, it was not clear to the researcher as to which one of these two technologies would prevail. However, it was very much clear at the time;that the two technologies were complementary to one another in many aspects.

So, it was not surprising that these two technologies would overlap and combine to form an interdisciplinary subject called "microwave photonics". Over the years microwave photonics gained technical maturity and evolved significantly. Microwave photonics basically combines technologies that are developed for both optical parts of spectrum and microwave. From a historical point of view, it is seen that ample number of examples of simple optical communications are present since ancient times. These depended on the vision of humans to notice signals, such as the semaphore visual telegraph codes generated by Chappe's optical telegraph created during the French Revolution. Optical communication was suppressed by the subsequent appearance of electrical telegraph almost a century later. Transatlantic telegraph cable was first commercially and successfully installed in 1866. Before the publication by Kao and Hockham, it would take another century to use optical communication techniques.

In the 19th century, in addition to telegraph, research on wireless communication had also begun,despite the invention of the photophone (a telecommunications device that allows transmission of speech on a beam of light) by Alexander Graham Bell and Charles Sumner Tainter in 1880. It was the first demonstration of open space communication linkage, in which the light beam's intensity modulation was done at the transmitter, and the modulated light was converted in RF domain at the receiver end. This technique was employed for telephone transmission.

But eventually, radio techniques for wireless transmission prevailed over the optical techniques, and this domination continued ever since. Chandra Bose in the 1890s recognized the advantage of higher frequencies, and invented the mm-wave transmission. During the 2nd World War, researchers started working in microwave domain, and invented the radar. In satellite communications and radar system, vacuum tubes were an important component of microwave electronics. Now, CMOS technology dominates over microwave circuits. Complex and compact circuits required for satellite navigation receiver and mobile communications are possible because of microwave monolithic integrated circuits development.

In the beginning, researchers working in microwave photonics field were only focused on defense applications. But recently this field has been expanded beyond defense applications, including medical imaging, wireless communication, satellite communication, cellular, optical signal processing, cable television and distributed antenna systems. All these applications require large bandwidth, high speed and increasing value of dynamic range. Simultaneously,low-power and lightweight devices are also required.

MOHD ASHRAF
ASSISTANT PROFFESOR
(CONTRACTUAL)

Student Achievements

Sarthak Bhagat secured first position and was awarded with National Winner, Tarandeep Kaur won the second position- Skimmer Challenge 2016-17 out of 32 regional winner teams in AWIM (A World in Motion) competition, with 3 category awards, organised by SAE and Maruti Suzuki.

Sarah Khan, Anjali Pandey, Nityansh Kumar Maheshwari, Abhay Charan bagged third position in EyantrA 2018 under the theme of Chaser Drone. They received a cash prize of Rs. 8,000

Manish, Kashif, Raghav, Zafaryab bagged first position in EyantrA 2018 under the theme of Collector Bot. Received a cash prize of Rs. 20,000 Manish, Kashif, Raghav, Zafaryab bagged first position in EyantrA 2018 under the theme of Collector Bot. Received a cash prize of Rs. 20,000.

Got selected for INDIAN ACADEMY OF SCIENCE SUMMER RESEARCH FELLOWSHIP PROGRAM (SRPF 2018) .. 400 students are selected from engineering domain out of 32000 applicants from all engineering colleges across the country.

Raif Parwez secured third position in Nationals under Jetttoy challenge in AWIM, a league conducted by SAE International and Maruti.

Got selected for INDIAN ACADEMY OF SCIENCE SUMMER RESEARCH FELLOWSHIP PROGRAM (SRPF 2018) .. 400 students are selected from engineering domain out of 32000 applicants from all engineering colleges across the country.

ECE Team(students of second,third and final year) stood first in Intra-faculty Football match, 2018

Team of ECE stood second in Intra-Faculty Football match, 2017 Team of ECE stood second in Intra-faculty Football match, 2017

Omaid Asad participated in Agra Taj Bike Rally 2018 and secured first position in men category. He has been a consecutive winner since two years. He was awarded with 'OverAll Champion', 'Category Champion', 'Best rider' and ' Consecutive Winner' awards.

Projects of Huzaifa Iftikhar and Abdul Wadood,students of third year are selected in Google Summer of Code, 2018.

ATtiny85 Microprocessor

This tiny yet powerful microprocessor is unassuming, but you can unlock the power within! The ATtiny85 is a RISC (Reduced Instruction Set Computer) based processor, part of a broader family of ATtiny processors. In fact, it's still part of the AVR family, which is also home to the ATmega328p, and other popular processors used in Arduino boards. Obviously right out of the box, an ATtiny85 can't be used like an Arduino. There's no USB port or hardware, you only get the bare DIP8 packaged processor. The major benefit here though is it's tiny size.

When we think of 'basic ICs', we often think of a 555 timer or something similar. This is the same package size as a 555 timer, which is TINY! But don't let its size fool you, this is still quite a beast of a microcontroller, suitable for all sorts of embedded projects. And when you can buy one for just a few dollars, they're cost-effective in all sorts of things.

It can use an internal clock of around 8MHz thanks to an internal RC oscillator, or you can use an external clock source can use an external clock source up to 20MHz (when running above 4.5V) - meaning it can use a 16MHz crystal just like an ATmega328p that you might already have. But if your circuit isn't time-critical, you can omit the external clock and rely on the internal clock, reducing hardware required to run the micro. The Arduino familiarity doesn't stop there though, using the Arduino IDE to programme an ATtiny85 is very easy, with included board manager profiles in the Arduino IDE already (simply search "attiny" in the Board Manager). Of course, with no USB port, you'll need a serial programmer, and may need to build a little circuitry around the system. Then you can compile and load all your standard Arduino compatible software, providing of course, you're within the memory limits of the ATtiny, which are a little smaller than an UNO.

Many instructions are executed in a single clock cycle, meaning the advanced instruction set can execute up to 20MIPS @ 20MHz; that's 20 million instructions per second - that's a lot of instructions!

per second - that's a lot of instructions!

SPI PORT: Full SPI functionality which is a powerful interface, especially for advanced Arduino-compatible modules.

INTERRUPTS: Full support for internal and externally triggered interrupts, which makes handling trigger events much simpler.

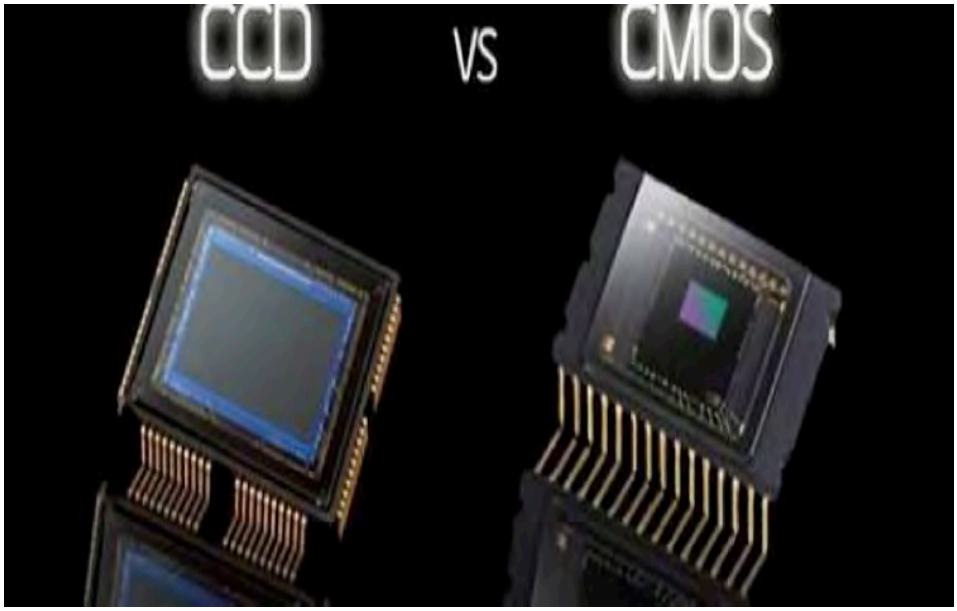
PERIPHERALS An 8-bit timer/ counter with prescaler and two PWM channels

An 8-bit high frequency timer / counter with separate prescaler, with two high frequency PWM outputs with separate output compare registers USI (universal serial interface) with start condition detector 10-bit ADC with 4 channels 2 differential ADC channel pairs with 1x/20x gain, and temperature measurement On-chip analogue comparator.

The size and flexibility of this processor really lends itself to a host of PCB-level projects, which may normally be the domain of a few discrete ICs and components. However with some clever design and lean code, you can add some versatility and flexibility to tiny circuits, with precise digital accuracy of execution.

ATtiny85 Vital Stats: Operating Voltage 2.7-5.5V Clock Speed: 0-20MHz @ 4.5-5.5V (0-10MHz @ 2.7-5.5V) Internal Flash: 8kB EEPROM: 512 bytes SRAM: 512 bytes

NITYANSH MAHESHWARI
B.TECH ECE



CCD & CMOS Sensors

You might have heard a lot about the abbreviation, CCD which is used these days; though it is not the same instead it is Charge-Coupled Device. And CMOS stands for Complementary Metal-Oxide Semiconductor.

A Charge-Coupled Device is an electronic device which deals with the flow of charge that is mainly seen inside a conductor to an area where it can be manipulated.

Each frame of a CCD consists of millions of photosites or photodiodes which are commonly known as Pixels nowadays. These photosites are found beneath the bare patterns which are present on its surface. The pixels are passive in nature. The processes inside the sensor are charge conversion, charge accumulation,voltage generation and finally amplification. These processes are common between both, CCD and CMOS but the difference lies between the sequences in both.

When light falls over the sensor, the pixels covert the light to charge. The charge is then accumulated in pixels. This charge is then transferred using the horizontal shift register and simultaneously then transferred using a vertical shift register. In this shift register, one by one each charge is converted to voltage and then followed by its amplification via an amplifier. This procedure is carried out until each charge collected in pixels has been amplified; then the output is converted to digital from analog. In this technology, it is not possible to integrate the peripheral components like timers and ADCs into the main sensor. The speed can be increased by using multiple shift registers.

Coming to the working of the CMOS Sensor, its fabrication is similar to that of the ICs. Here the charge to voltage conversion and voltage amplification is carried out in pixel itself. Its processing speed is much higher than that of CCD; as in CCD sensor the conversion was carried out in a line by line manner. In this sensor, each row is each row is activated by the pixel select switch. It connects these to the output of column select switch. We can read the data by activating it each by each. It is possible to have a system or a camera on the chip as its fabrication is similar to the integrated circuits. Its speed can be increased by using multiple column select lines (Parallel Processing).

Its size is smaller than that of CCD sensor. Main advantage of using CMOS sensor over CCD sensor is, its power consumption is less. And the advantage of using CCD is that less noise is produced in it and it has higher Quantum Efficiency (QE) compared with CMOS sensor.

Image Distortion:

When we expose a CCD sensor to light for a longer time we see an effect called Blooming. A vertical smear line is observed or saturation occurs in an image, when exposed to bright light. To overcome this we can use anti-blooming techniques.

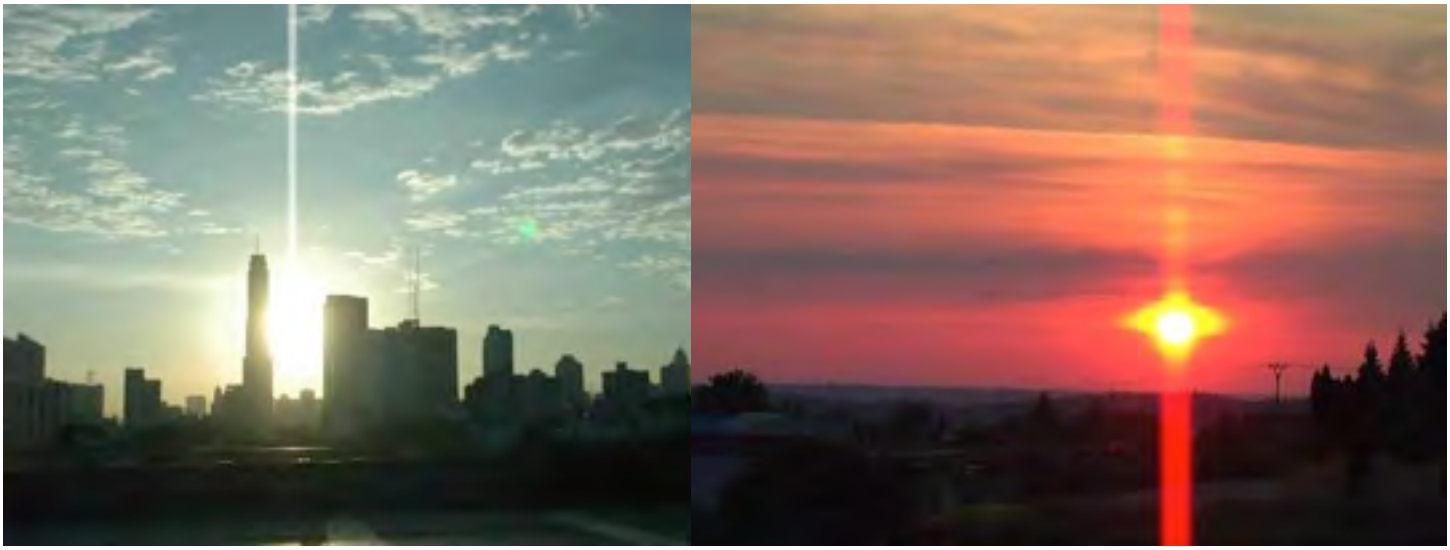
While in CMOS, Rolling Shutter is the most common image distortion seen. This is not observed in CCD sensors as there

as there the photodiodes are exposed to light for equal amount of time. So, to overcome this effect in CMOS, each photodiode should be exposed to equal amount of time, which is known as Global Shutter.

Application:

CCD sensors are used for high dynamic range and low amount of noise like in space applications, astronomy, particle detection, and certain imaging tasks. CMOS is preferred when we require fast processing speed and low power consumption. It is used in surgical imaging, microscopy, machine vision and broadcasting applications.

BLOOMING EFFECT:



ROLLING SHUTTER EFFECT:

NASHRAH RAHMAN
B.TECH ECE

A TECHNICAL REVIEW ON: What Lies Beyond Moore's Law

In today's world, electronic gadgets have become an integral part of our day-to- day activities. The enormous amount of information we have at our disposal also demands more compact and computationally advanced electronic devices. An important key factor which dictates our needs is the requirement of more affordable and economical devices which can broaden the horizon of technological advancements even to the weakest and down-trodden sections of the society. The current scenario demands to process huge amount of data which eventually make our devices more power-hungry. The notion of miniaturization and more densely packed electronic devices got real impetus in the year 1965. The theory postulated by Intel co-founder Gordon Moore states that the electronic transistors will be doubled on a single semiconductor die/chip in every 18 to 24 months. This eventually reduced the cost of fabrication of transistors on integrated circuit boards by nearly fifty percent and added more teeth to the computational power of hand-held electronic devices. The method employed for geometrical scaling of transistors was given by Robert H. Dennard. Initially, the law was given only for MOSFETs. It stated that even when the transistor sizes are reduced, their power density remains constant. This is done so that the power usage is in accordance with the chip area used.

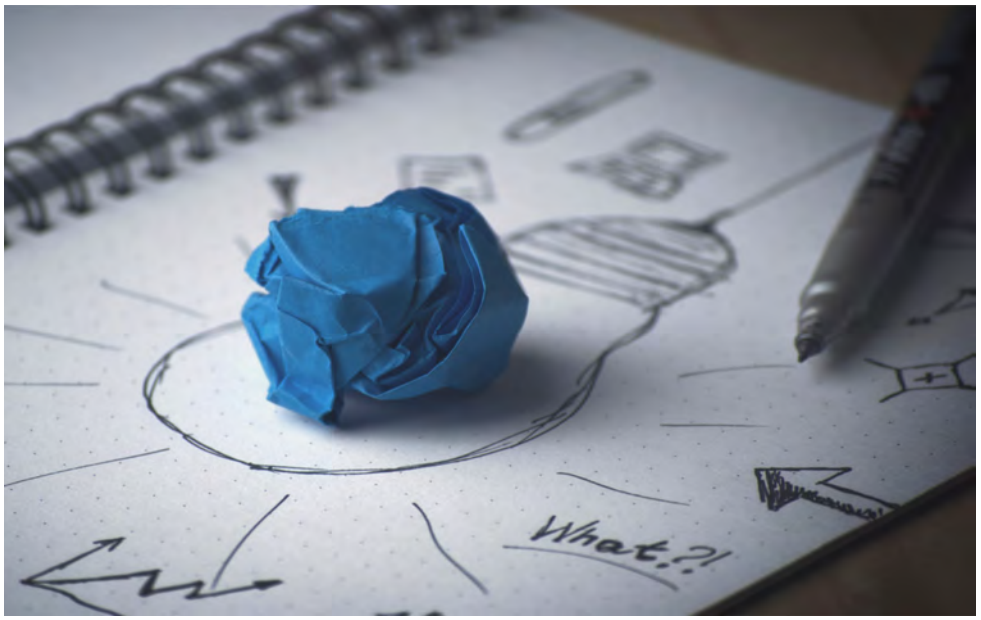
The semiconductor industry has been able to somehow sustain the Moore's law predictions. The company which is taking the lead is Intel Corporation. Various semiconductor companies have devised new methods to keep adding the extra transistors so as to keep in line with the Moore's law. The current state of the art technology node is as low as 7 nm. A technology node may be defined as the smallest "half-pitch" between identical features on a chip. Owing to this fact, Intel has decided to delay its upgrade to a new technology to be utilized for chip fabrication and integrated circuit manufacturing. This clearly indicates the requirement of novel approaches for the perpetually evolving semiconductor industry.

A crisp example of powerful processors is the latest Epyc processor by AMD which is a 32 core processor housing 19.2 billion transistors based on 14 nm technology node consuming a chip area of only 768 mm 2 . Another example is that of Intel's latest Broadwell architecture based chips which are manufactured using 14 nm process technology. Several other prominent foundries like GlobalFoundries and Samsung have already started fabrication on a 7 nm technology node. GlobalFoundries has planned to fabricate chips in large volumes on 7 nm technology node which will certainly infuse tremendous computational power in electronic systems.

All the examples cited here clearly indicates that the technology node for chip fabrication is on a constant decline. If we consider a limit of physical barrier for further shrinkage, the critical feature size within the transistors are approaching the size of atoms. A very evident example is Intel Broadwell series where the insulating layer of the gate has been shrunk to a size of just 0.5 nm. Such a miniscule size is only a little larger than a couple of silicon atoms. Under such conditions, the leakage problem would be evidently pronounced. Therefore, at such microscopic dimensions, quantum and thermodynamic effects will also come into play. The road ahead lies in adopting new device architectures which have three dimensional conducting channels rendering it shape of a fence (or fin). The nomenclature usually used for such devices is the tri-gate transistor (also generically known as FinFET). This will substantially reduce the leakage problems. Further, advanced processes such as extreme ultra-violet lithography (EUV) and multiple patterning are mulled over to push the envelope further. It is therefore, foreseen, that silicon has to give way to the use of devices based on gallium arsenide (GaAs) and materials with higher electron mobility for example graphene.

In real sense, Moore's law was nothing more than an economic paradigm that transformed itself into a self-fulfilling prophecy about process engineering. Moore's law was essentially a way of streamlining manufacturing targets rather than a means to prognosticate the performance of future processors.

MOHD. ZIHAIB KHAN
ASSISTANT PROFESSOR
(CONTRACTUAL)



FRUGAL INNOVATION

You must have heard of the term, “Frugal Innovation” or “Frugal Innovators” in the media. In the recent years, Indians have been recognized as frugal innovators around the world. To understand why this has happened, it is imperative to answer the question, “ What is Frugal Innovation? ” The term frugal innovation has come forward in the recent years and fundamentally means to develop an economically viable solution to a given problem. Among the various qualities of a frugal innovator, the most important is the ability to‘think outside the box’ ,as this is commonly referred as ‘ Jugaad’ in India, which describes the unique approach of people towards solving their day-to-day poblems.

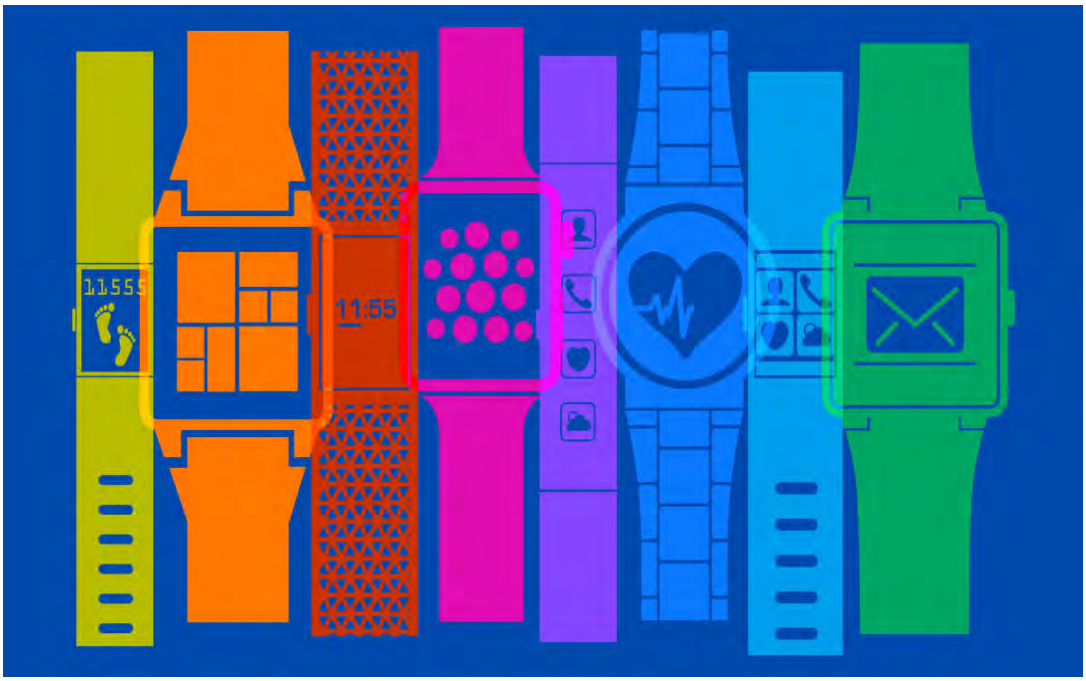
A similar approach is widely used by different companies of the economic strata to make their business lucrative. Frugal innovation often, is the result of inventing under constraints such as money, material, etc.To the contrary, sometimes they are born out of sheer necessity, for example- the invention of edible cutlery as a feasible alternative to the old traditional plastic cutlery by the duo Narayana Peesapaty and Pradnya Keskar.

Edible Cutlery is made up of a mixture of jowar(Sorghum), rice and wheat which makes it 100% natural, biodegradable and vegetarian. Initially, their project was focused on ground water conservation by increasing the market for millet,thereby; reducing the cultivation of rice which consumes 6000 percent more water than millet.

They share the believe that something as basic as edible cutlery will have an impact on one’s conscience and thus reduce the propensity for plastic cutlery. Conservation of natural resources can be facilitated by encouraging frugal innovation in various industries, thus contributing to achieve sustainable development.

As a result, a number of projects are being undertaken nationwide aime d at providing solutions to some of the biggest challenges of today, frugal innovation.

ISHAN HUSSAIN
B.TECH ECE



The Future of Wearable Technology: Moving Beyond the Watch

From the early primitive tools of the Stone Age to emotion reflecting sweaters and Gogle Glass, it has been a long ambitious journey towards cultural, social and technological advancement. We have now entered into one of the most important eras in the history of computing-Wearable Technology. Wearable technology is arguably the most exciting field of technology at the moment and it's not just about smartwatches and fitness trackers; tech companies are competing to create new wearable experiences with the widest possible appeal. Wearable technology includes FitBit trackers, Apple smart watches, and other devices meant to be worn continually and monitor some type of activity such as steps, exercise, sleep, or nutrition.

While there's a growing demand for smartwatches, this technology is far from perfect and is still in its infancy. Nevertheless, recent developments make the future look promising. The potential convenience, greater range of features and new innovations like augmented reality seem to hint that a brighter future for wearable devices may be just around the corner. Three trends to watch in the coming years will be the expansion of activities monitored, growth of service types offered, and security of the wearable tech gadget.

Industry Trends and Stats

Wearables will become the world's best-selling consumer electronics product after smart phones, as reported by CNBC. These wearables are projected to exceed 305 million units in 2020, with a compound annual growth rate of 55 percent. In the middle of 2016, International Data Corporation estimated a 173 percent increase in wearable devices for 2016 from 2015. Basic wearables represent much of the expected short-term growth, with smart wearables providing more long-term growth. Vendors like FitBit and Xiaomi have helped propel the market with their sub-$100 bands, and it is expected that this momentum will continue. Smart wearables like the Apple Watch Microsoft's HoloLens also indicate an upcoming change in computing.

APPLICATIONS

FITNESS

It has been projected that fitness devices will continue to dominate the wearables market until 2018, when smart watches will become more popular. By 2018, fitness wearables in use will nearly triple from the 19 million devices in use for 2014.

Wearable technology offers the fitness world several types of devices and applications. Consumers can choose from a multitude of tracking devices, sensors, software apps and wearable apparel technology to gain more insight into their fitness goals and progress.

For instance, a California-based start-up GOQii, is pioneering a wearable fitness band paired with remote personalized coaching.

HEALTHCARE

The healthcare sector has already witnessed solutions for wearable technology, for sky's the limit when it comes to wearable tech in healthcare. We're already seeing sensors that improve quality of life, enable home diagnostics, make virtual health and remote monitoring possible, and that's just the tip of the iceberg.

SAFER

SAFER is an app-enabled smart necklace for women safety. If the pendant is pressed twice, it sends SOS messages to emergency contacts and has a GPS location using which the location can be tracked accurately. The app also helps in navigating to the nearest hospital or police station. The firm is still in its early stages; however, the team has set itself a goal to sell 1 million pieces by the end of 2018.

SMART CLOTHING

This is still in its nascent stage, and much underdeveloped compared to smart wrist wear and smart jewellery. There are some startups who have ventured into this area.

Broadcast Wearables is one such startup that has come up with smart sports clothing that does the job of a fitness tracker. Another startup is Lechal that has released soles which can turn any footwear into smart footwear.

While it is premature to predict specific features or form factors that will prevail in the future, wearable technology presents a fascinating field to study. Never before has computing been small enough to be worn relatively comfortably around the clock on the body, presenting opportunities for breakthrough medical advancements, and unfortunately marketing nuisances.

With innovations on the horizon as cited above, we're moving closer to making possible products that are useful, usable and desirable for people.

JAVARIA SALMAN
B.TECH ECE

Why Technical Education Is Lagging Behind

What are you doing now a days?" a vendor in my colony asked . I am pursuing B.tech in ECE from Jamia Millia Islamia", I replied. "Oh! So you argoing fix mobiles and sell them?" he asked. "ECE is not about selling mobiles, it's muchmorethanthat",Iexplained.

"Okay, that means you will earn 5-10K in the near future. Where are you going to open your shop?" he asked again. Hearing this, I just went away in anger. This is an example of the reality of what people think about Electronics and Communication Engineering in India. According to the HRD Ministry , " Technical education plays a vital role in human resource development of the country by creating skilled manpower, enhancing industrial productivity and improving the quality of lives of its people "; to the contrary instead of developing the useful skill sets of the students, technical education has become a classroom study of various theories and principles of engineering, making it highly impracticable.

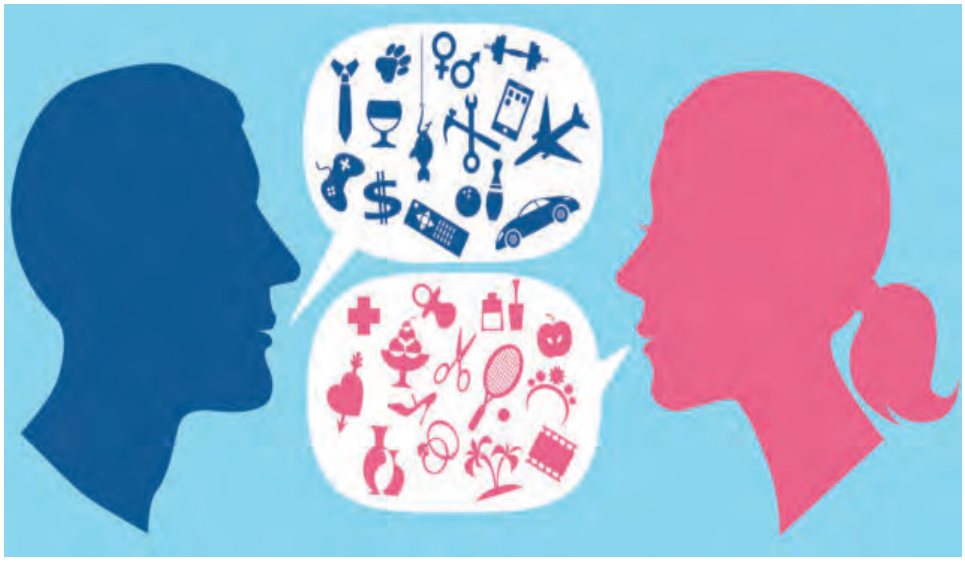
When I joined college, I realized that many students join engineering either because of peer pressure or as a consequence of strict parents who impose their decisions. I randomly chose my branch, Electronics and Comm. I thought it was only me who didn't know which field of study should be joined beforehand. But, later as I interacted with other students, I realized that hardly anyone had given serious thought, choose the right branch. I started liking my branch or had been provided with proper counsel to choose the right branch.I started liking my branch when it occurred to me that electronics engineers make our lives comfortable by designing devices such as televisions, radios, computers, mobiles, etc.But my perspective for Electronics and Comm. Engineering changed as soon as I became a sophomore.

The course pattern involves such a theoretical approach that most of the students who could have genuinely developed an interest in the subject, lose their enthusiasm. They mug up their friend's class notes to obtain a good score in examinations, which barely tests anything other than their rote skills. Students who wish to learn the application of science and technology or those who want to venture further with any specific discipline have to work on their own.

For them, the sources of knowledge becometh internet, their personal contacts and everything else that lies outside the classrooms of their engineering college. While subjects like Microprocessors do cover the fundamentals with books that are informative, we never get to work on the latest Microprocessors. While the course designed by the AICTE (a statutory body for technical education under Department of Higher Education, MHRD) is revised every third year, it is important that some demanding changes be made soon to make the course befitting for engineers, and to make them skilled enough to survive in this competitive industry. Instead of focusing more on theories, the curriculum should implement a skill-oriented education system to make institutes more aligned with the industries, hopefully bridging the skill mismatch. The grading system should be such that practical applications are given more weightage than theoretical knowledge.

While some institutes have already started doing their bit by organising industrial visits for students to acquaint them with industrial standards, it is also necessary that vocational training and internships become compulsory to technical education, such that there is uniformity across different colleges in India. Moreover, research and development should be encouraged among engineering students which will facilitate them in furthering innovation. All in all, the real challenge is to devise a strong yet flexible method that will really help engineering students acclimate to the rapidly changing pace in the field of technology. This way, the engineers of today will be more prepared for the industry of tomorrow.

ASIM ASRAR
B.TECH ECE



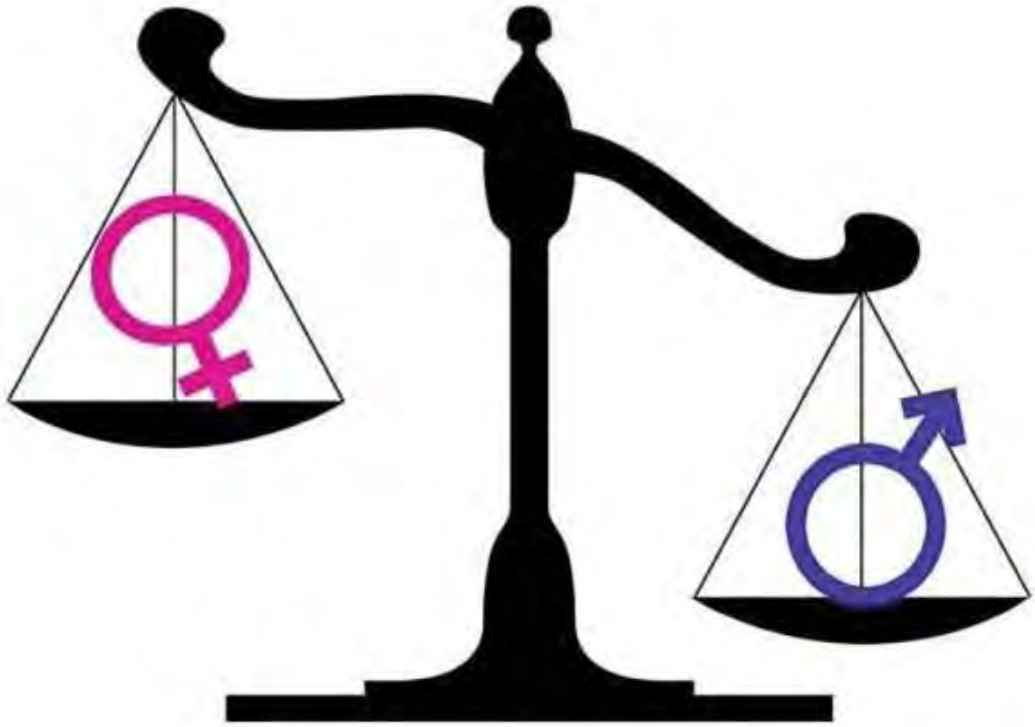
A BIASING GONE WRONG

It is true that the first human being created by God was a man, the first human to walk on the moon was a man, the first to climb Everest was also a man and thus the firsts of many things has always been a man, so do these facts tend to pluck a very subtle string of predisposition that weaves around our society? Do these facts stir our thoughts and imaginations, no matter how progressive as a society we have become, to a direction where the scale of masculinity consistently outweighs its feminine counterparts? As a matter of fact, yes it does.

Our society has always treated and acknowledged its females as second-class citizens, no matter what height they rose to, how much knowledge they summoned and how far they had reached, our society always bore a tendency to look down upon them. We are taught, since the inception of time that God created every 'Man' the same, which seems as a fundamental principle of an Utopia that everyone wishes to create. But if we try to read between the lines, we may decipher the hidden patriarchal tone associated to it. Does it seem fair enough to use the word 'Man' in it? And a more pressing question that we should be asking ourselves to critically analyse the situation is, are we equally comfortable to read the above sentence by just replacing man with woman? Reading in that way would obviously be like swallowing an uncooked meal, something which is hard to digest! It is not our fault, but we must share the collective blame. The way our society has moulded us into its gender biased element is at fault, the way we have been observing things since childhood is the key to such instillations.

It wasn't hard for me to spot the examples of gender biasing prevalent in my surrounding and as a matter of fact the very first example was a system prevalent in the building where I live. It is a general norm for Indian kids to use the salutation 'Uncle and Aunty' for elders who are not in their relation, but the younger ones in my building went a step further by establishing a norm to address all the 'Aunties' by adding the respective prefixes of their husband's name, henceforth the lady staying in the apartment adjacent to us became 'Azim Aunty'. It may look a funny little instance at first but we cannot ignore the grave patriarchal stance that lays the foundation for such puerile norms. The worst part was yet to hit me regarding the above example. How come these children, who were insulated from the convoluted nature of society tend to show such patriarchal features? As a matter of fact they were doing nothing but mirroring the individualistic and collective tendencies of their home and their society respectively. It is true that children are like blank slates and they depict what they see, even a small act of preferential treatment with respect to gender may trigger the above mentioned responses in them. A son getting to eat the last chocolate or drinking the last glass of milk is a palpable amount of emotional trigger which serves the purpose here.

To augment the idea of our above discussion, an example which is a very common practice



which is a very common practice in many cultures across India is of a system in which men of the house are served first, followed by women, thriving on the leftovers of their so called 'Pati Parmeshwars'. These examples serve as the foundation for the sky scraping patriarchal tendencies of our society. Be it the biased treatment of women in their workspaces, which includes differential wages being paid to them owing to their gender or be it the usual heckling and eve-teasing activities meted out to them which are firmly etched in our society as a result of which we feel shaky to let our daughters and sisters travel alone or for that matter prepone their in-times at home, which in itself is nothing but a clear cut case of gender biasing. The latter half of the above example is a direct outcome of what is known as the objectification of women.

The practice of gender biasing starts even before the birth. As suggested by a study conducted by the Asian Centre for Human Rights (ACHR), India ranks 4th in the female foeticide across the globe, closely followed by other South Asian countries i.e. Pakistan and China. The want of a son over a daughter by a family often pressurises the mother, thus forcing her to undergo multiple frequent pregnancies which in turn jeopardises the health of both mother and child. In India, this thing is as common as finding a neem tree along a roadside. Be it the dowry system in South Asia, which makes daughters an 'unaffordable economic burden' or be it the craze of extending the family name/lineage with the birth of a baby boy, the reasons given for the above preferences are both imbecile and archaic and hint towards a multifaceted set of problems all emanating from a central issue which is education.

From Stone Age to the Silicon Age and from rock inscriptions to the digital tabloids, it's true that as a society we have come a long way, but why is it that we are still not able to completely acknowledge the true essence of gender diversity and thus see each gender element as a piece of an incomplete puzzle; you hide one, the other automatically becomes meaningless and only by bringing them side by side the picture gets completed.

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