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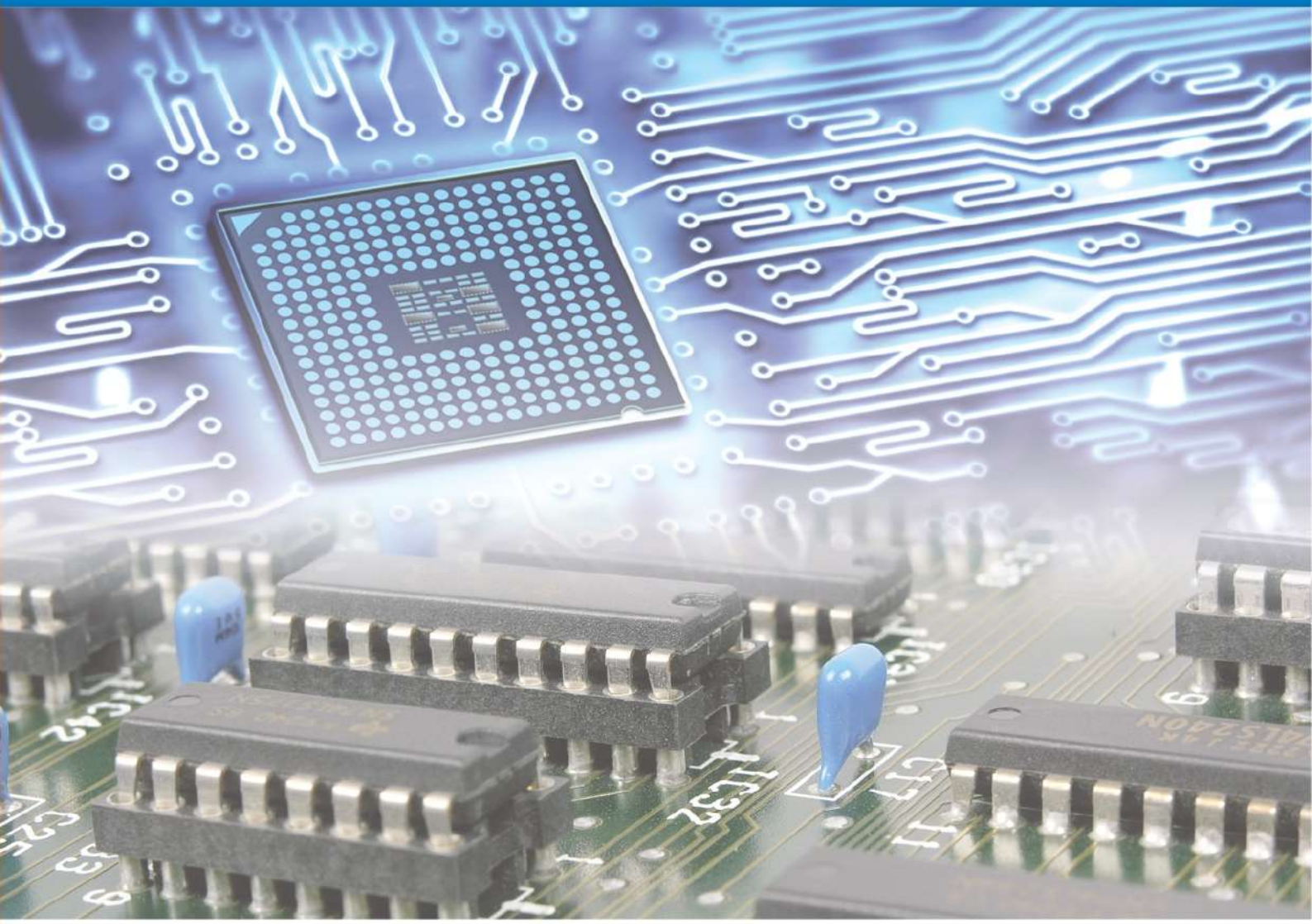

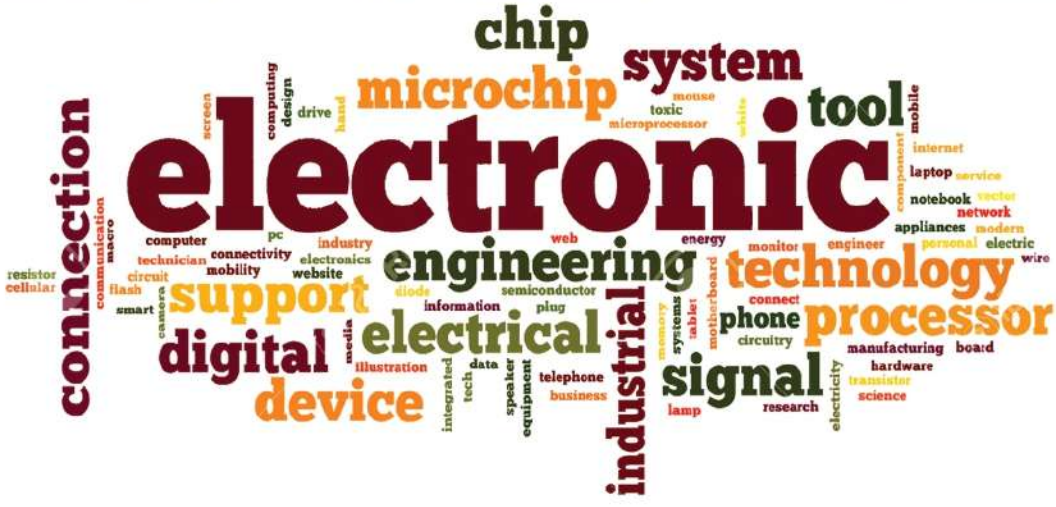

tech niyati wishes all the TCS & WIPRO selects

A Hearty Congratulations

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10	Noorjahan	CSE	42	Phanisree Satyavarapu	EEE
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Tech Niyati

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Editorial

We

From : Editor's Desk - editor@gvpcew.ac.in
Date : 5th Sep, 2017

Dear Reader,

"Do not let engineering life choose you. You choose it, and you better be best at it"

A quick bit of research shows us that the professions that have their own awareness days would help inspire a new generation by making them acquainted with knowledge and importance of that trade. Commemorating and paying tributes to the **Engineer and a noble Scholar Bharat Ratna M. Visvesvaraya** on his birth anniversary -We celebrate Engineers Day in India on September 15th every year.

We'd like to give a call to all the learned readers- Let us strive to end the meme on Indian Engineers, "India is a country where people first become engineers and then decide what they want to become". The notion of awareness days does, however, promote a touch of community integration, and it's pleasing to imagine that this will result in a world where an ***Indian Engineer*** receives a polite comprehension for the endeavours he or she had put up.

On this note, to all the Engineers across the globe, we salute your great ideas and innovations that have truly changed many lives! We would close with a view best expressed, 'Don't make a choice just because engineering is the new benchmark - Pursue Engineering for your passion and not profit'.

In this issue, we have our cover story depicting the ***History of Electronics***, an article speak about the impact of ***Artificial Intelligence*** which today is competing with human intelligence. As the smart phones are going gaga about boasting smarter applications we have come up with an article about ***API management*** which is the crux of Smart Apps. We know that genetics play a major role in future generations, in connection with this; scientists are taking advantage of today's digital technology by carrying out their experiments towards ***Storing DNA Digitally***- Read more about this in our article. This issues' series column ***Know a Scientist*** is about the renowned Engineer M Visvesvaraya his exemplifying works and achievements. All this and our favorite part ***Trending Article, News*** and ***Technology*** articles are verbalized for your ornamental reading.

We eagerly look forward to receive the feedback, contribution, suggestions from our esteemed readers at **editor@gvpcew.ac.in.**

We wish you a Happy Reading

Editorial Team

Prof. D.N.Madhusudhana Rao
Professor & Head, Dept. of ECE

A Brief History of Electronics

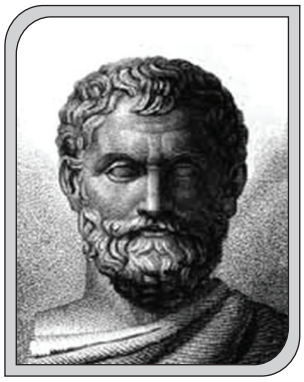
"All science is either Physics or stamp collecting"

The above quote is attributed to Sir Ernst Rutherford considered the father of Nuclear Physics. Notwithstanding the objections from some that computer science and modern biology have little to do with physics, one has to accept that physics is the basis for all scientific disciplines since it provides reasonable explanation of all the observed phenomena. For example, biology can be explained on the chemical principles and chemistry works on the basis of physical laws. Whether it is physics, chemistry, or any other branch of science, there is no denying the fact that Engineering and Technology have evolved from science. Scientific principles applied to practical purposes become technology and the technology used to build machines, instruments etc, which assist us in our daily life is engineering. One such technology developed in the 20th century is Electronics.

That we are able to communicate with anyone anywhere from anywhere instantaneously by audio and video; that we are able to store, exchange huge volumes of data instantaneously in real time; that we are able to send not only instruments but also humans to distant planets and bring them back safely, and are able to control robotic devices there, are all due to the phenomenal developments that have taken place in Electronics and Communication Technology. Electronics and communication technology have penetrated deep into our everyday life. Appliances at home, equipment in hospitals, and systems in factories and industries are all either driven or controlled by electronics. Today the working of systems like a mobile phone in your hands, a computer on your lap or robotic rover Curiosity on Mars, which seems so natural to us now, is actually a culmination of great discoveries and inventions that have taken place over the last two to three centuries. History of science is not a mere catalogue of events that have taken place in the past but is a fascinating account of the pioneering work of men of yore contributing to its growth. The present day and prospective scientists draw inspiration from the history and work towards furtherance of their chosen field.

Everyone accepts that Electronics has its origins in Electrical Engineering, which has its roots in Physics. If Physics is regarded as a pure science, Electronics is an application of this science becoming a technology. While Electrical Engineering deals with devices that depend solely on the motion of electrons in metals (conductors), Electronics is the science and technology of passage of charges (mainly electrons) in a gas, vacuum, or in a semiconductor as well as in metal.

Thales of Miletus (624-546 BC)

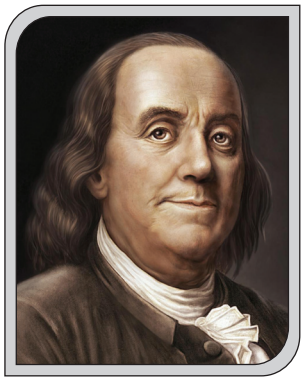


The origins of electrical engineering and electronics can be traced to an unknown ancient man who, as described by Thales of Miletus (624-546 BC), observed that amber when rubbed with a piece of fur attracted feather and straw. It was only 2200 years later, around 1600 AD that a name was given to this property.

William Gilbert (1544-1603)

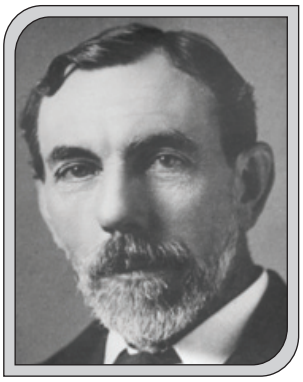
William Gilbert, father of geomagnetism named this property as Electricity or Electric Charge, and showed that this attracting property of materials when rubbed with silk or fur was common to many substances like sulfur, glass and diamond.

Benjamin Franklin (1706-1790)



Later came, in the 18th century, people like Benjamin Franklin (lightning rod), Pieter von Musschenbrock (Leyden jar condenser) and Cavendish, whose work helped understanding the phenomenon of electricity.

Henry Cavendish (1731-1810)



Cavendish's comprehensive theory of electricity was developed on the basis of precise quantitative experiments. In 1771 he published an early version of his theory based on an expansive electrical fluid that exerted pressure. He showed that if the intensity of electric force was inversely proportional to distance, then the electric fluid in excess of that needed for electrical neutrality would lie on the outer surface of an electrified sphere. He also verified this experimentally. Cavendish continued work on electricity after this first paper, but did not publish any more. Although Cavendish used to send his work on electricity to the Royal Society, outside world was not aware of it until Maxwell brought it out a century later, in 1879. But by then other scientists were credited with the same results. According to the 1911 edition of Encyclopaedia Britannica, among Cavendish's discoveries were the concept of electric potential (which he called the "degree of electrification"), an early unit of capacitance, the formula for the capacitance of a plate capacitor, the concept of dielectric constant of a material, the relationship between electric potential and current (now called the Ohm's law), laws for the division of current in parallel circuits (now attributed to Wheatstone), and the inverse square law of variation of electric force with distance, now called the Coulomb's law.

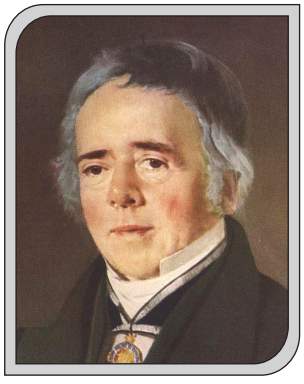
C A de Coulomb (1736-1806)

A M Ampere (1775-1836)

C F Gauss (1777-1855)

The period beginning late 18th century going into 19th century has seen significant progress in the understanding of the behavior of electric charge and its properties. Seminal works of Coulomb, Ampere, Ohm and Gauss gave precise definitions of the laws governing the electric charge, electric field and electric current and whose works are very much familiar to us. While Coulomb and Gauss introduced the concept of Electric Field whose source is electric charge and described its characteristics, Ampere showed that moving charges constitute electric current. These works were followed by discoveries that have changed the course of events to come.

H C Oersted (1777-1851)



Oersted's experiments clearly demonstrated that the source of magnetic field is electric current. During this period Volta invoked the concept of potential difference to explain charge flow in a conductor.

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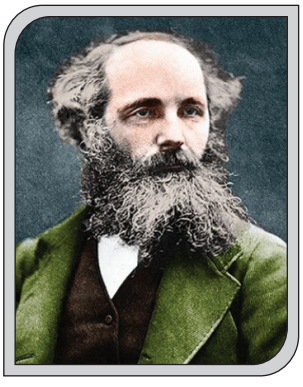
Georg Ohm (1789-1854)

This was further clarified by Ohm who introduced the term conductance/resistance. It is because of this internal resistance present in almost all conductors, charges cannot flow freely unless some potential (energy) is supplied by an external agency to overcome this resistance and the difference in the potential between the two ends of the conductor facilitates the charge motion.

Michael Faraday (1791-1867)

Around this time (1820s) another star began to rise whose work brought in a fundamental change in the understanding of the electric fields and currents, and laid the foundation for electrical engineering. This star was Faraday. He introduced the concept of Electric Lines of Force, Electric Flux or Displacement in order to explain the electric field passage through dielectrics. Faraday's genius lies in the development of Electric Dynamo for power generation. While Oersted proved that a current carrying conductor gives rise to a magnetic field, Faraday showed that a varying magnetic flux generates an Electro Motive Force (EMF) in a conductor in that magnetic field. In 1831 Faraday in England and Henry in United States almost simultaneously and independently discovered electromagnetic induction. But Faraday got the most credit simply because Henry could not publish his results earlier than Faraday. In the same year Faraday made the first transformer. A Russian scientist Lenz carried out many experiments and contributed immensely to the understanding of Faraday' laws.

J C Maxwell (1831-1879)



At this juncture, in the middle of nineteenth century came Maxwell. The greatness of Maxwell is described succinctly in this oft repeated quote that "In the beginning God said Let there be Light. There was Maxwell"! Truly Maxwell shines as one of the brightest stars in the galaxy of scientists. His outstanding work paved the way for the developments in many areas, especially in radio communications. Maxwell, around 1865 gave a unified theory of electromagnetism and set the relationship between dynamic electric and magnetic fields so elegantly in four beautiful equations. His genius lies in the introduction of the so-called 'displacement current' in the Ampere's law applied to dynamical fields which often is hailed as a 'master stroke of Maxwell'. A solution of the Maxwell's equations predicts that time-varying fields produce a wave that could propagate in free space. Nobel laureate Richard Feynman hailed Maxwell's work in the following words: "from a long view of the history of mankind, seen from, say, ten thousand years from now, there can be little doubt that the most significant event of the 19th century will be judged as Maxwell's discovery of the laws of electrodynamics. The American Civil War will pale into provincial insignificance in comparison with this important scientific event of the same decade."

Though it took very long, nearly two decades, it was only a matter of time before the existence of electromagnetic waves predicted by Maxwell was proved experimentally. In 1988 Henry Hertz demonstrated that these 'Electric Waves', as he called them then, can be produced and they can travel in space. Since the speed of these electromagnetic waves was found to be equal to the speed of light in vacuum, it was concluded that light waves are also electromagnetic in nature. While discussing this result Hertz said: "The connection between light and electricity is now established. In the flame, in every luminous particle, we see an electrical process. Thus the domain of electricity extends over the whole nature. It even affects ourselves intimately; we perceive that we possess an electrical organ, the eye". Although there were many claimants, including Popov, Tesla, Bose and Lodge to take credit for using these 'radio waves' for communication, it was Marconi's legendary experiments culminating in successful transatlantic radio transmission in December 1901, that really demonstrated the efficacy of radio waves to carry intelligence over very long distances. The practical utilization of these radio waves for communications, however, had to wait a few more years for the developments in 'electronics technology'.

Historians say that electronics as a subject began as early as 1895 when Lorentz postulated the existence of discrete charges and J J Thomson in 1897 discovered electron. Electron is now recognized as the fundamental charge. In the same year Braun built the first cathode ray tube. Electronics took what we call now, a technological shape in the early 20th century. In 1875 Edison observed that in a vacuum electrons flow from a heated filament towards cooler metal plate which has come to be known as Edison effect. Based on the Edison effect of thermionic emission, in 1904, Fleming constructed a two electrode

device called the vacuum tube diode valve. This two terminal device has a heated cathode emitting thermionic electrons which are then collected at another electrode called anode biased heavily against the cathode. With high conductance towards the anode which is at a higher potential than the cathode and no conductance in the reverse direction, the diode acts as a rectifier. Although people succeeded in transmitting signals using radio waves, their detection was a huge problem because of poor signal strength and large noise levels. A solution for this problem was found in the vacuum tube amplifier. The invention of the vacuum tube amplifier by Robert von Lieben in Austria and Lee de Forest in the USA can be termed a land mark and a turning point in the developmental history of electronics and radio communication. This amplifier is made by introducing a third electrode, called grid, in between the cathode and anode of the Fleming's diode thus making a diode a triode. De Forest called his device an Audion. The audion revolutionized the communication and broadcasting industry. The triode valve, in which a small change in the grid voltage resulted in a large change in the plate (anode) voltage was the first amplifier. The next five years saw improvements in vacuum in triodes and the introduction of oxide coated cathodes for efficient electron emission. The vacuum tube amplifier launched the radio age. The major problem in signal transmission, namely the signal strength solved, broadcasting stations started operations in the year 1911 heralding the era of practical electronics. Subsequent years saw rapid progress in the development of new devices and circuits like, heated cathodes, tetrodes (four electrode devices), pentodes (with five electrodes) and beam power tubes among devices, and cascade amplifiers, oscillators, superheterodyne receiver and AGC (Automatic Gain Control) among circuits. Amplitude Modulation (AM) was developed during First World War. Frequency modulation (FM) was invented by Armstrong in 1933 and Watson Watt invented RADAR during the Second World War years. Automatic Frequency Control (AFC), FM discriminator and limiter, saw-tooth wave generator, synchronization and multiplexing circuits and operational amplifiers came with the Television in 1950s.

By far the most outstanding development in electronics began in late forties and early fifties of the 20th century. This was the period when solid state electronics began to emerge and a road to miniaturization was being laid. Without miniaturization space exploration and satellite communications would not have become possible. The story of solid state devices is also interesting. The earliest attempt at using a solid state device was believed to be by JC Bose. He constructed what can be called the first crystal detector ('cat's whiskers') for his radio communication system using microwaves in 1894. A cat's-whisker detector or a crystal diode consists of a thin wire that lightly touches a crystal of semiconducting material such as galena to make a crude point-contact rectifier. The "unilateral conduction" of crystals, as it was then called, was discovered by Ferdinand Braun, a German physicist in 1874, much before the radio was invented and this was developed as a practical device mainly by G W Pickard in 1906. Crystal radios using these types of detectors were popular in the early years of radio up to 1920s. Later on these were replaced by vacuum tube detectors and amplifiers. The main problem with the crystal detectors was the contact potential developed at the point of contact between the wire and the semiconductor material. Besides being used in radio broadcasting and receiving systems electronic devices also found application in telephone industry. For efficient telephone operations efficient switching and amplifying devices are needed. Vacuum tubes used in the telephone switching networks were found to be not very reliable because of heat and noise they generate and needed frequent replacement. To solve this problem, Bell Telephone Laboratories established the first Solid State Physics group made up of theoretical physicists, a physical chemist and electronic engineer. They also had a metallurgist as a consultant. The group was mandated to obtain "new knowledge that can be used in the development of completely new and improved components and apparatus for communication systems". Developing a solid state amplifier was the first specific goal of this group. In an experiment conducted in December 1947, two closely spaced gold wire probes were pressed into the surface of a germanium crystal and it was found that the voltage output at the collector probe with respect to the germanium base was much greater than the input to the emitter. Thus the first transistor amplifier was born.

Brattain and Bardeen are the names to be remembered for this invention. Soon after, Shockley proposed junction transistor to overcome the shortcomings in the first transsitor devices due to point

contacts. The junction transistors have no point contacts and their operation depends up on diffusion instead of conduction. They have both negatively charged electrons and positively charged holes as charge carriers. Shockley, in fact, in a 1976 paper entitled "The path to conception of the junction transistor" acknowledges the 1938 work of Rudolph Hilsch and Richard Pohl on the "control of electron currents with a three-electrode crystal and of a blocking layer" saying that he had this idea in December 1939 "that an amplifier using semiconductors rather than vacuum is in principle possible".

One of the significant decisions taken by the Bell Labs then was not to keep their discoveries secret and to disseminate their knowledge. This helped rapid development of transistor technology and industry in the next few years. In 1952 Shockley described the working FET (Field Effect Transistor) that has a reverse biased pn junction as the control gate. The Junction FETs (JFETs) were generally used where high input impedance was required. The insulated-gate FET has an inherent problem of large amount of charge at the dielectric-semiconductor interface. This makes the control effect by the gate less effective. This problem was solved by Atalla and Kahng in 1959. They made the first working FET with oxide as the insulator and a metal gate. Thus the Metal Oxide Semiconductor FET (MOSFET) was born. Earlier, in 1958 Kilby produced the world's first integrated circuit (IC). Almost at the same time Noyce with a more practical approach towards scaling the circuit size, fabricated the first planar Integrated Silicon Circuit, thereby inaugurating the era of microelectronics. Microelectronics saw a phenomenal growth in the following years. These first circuits were a phase shift oscillator and a multivibrator. MOS transistors were rarely used as discrete devices because they get easily damaged by external voltages causing a breakdown of the insulator. MOS transistors potential could be fully realized when many of them were connected to perform functions inside an integrated circuit. The years between 1960 and 1980 saw a tremendous growth in IC technology resulting in Very Large Scale Integrated (VLSI) circuits consisting hundreds of thousands of components, making true of Moore's 1965 prediction that the number of transistors packed in a chip doubling every year. Now we know that a microprocessor has about few tens of millions of transistors and by 2020 it could have nearly five billion. During the same period a wide variety of digital circuits and semiconductor memories were being developed. In 1969, Boyle and Smith invented the CCD (Charge Coupled Device), and in 1977, a 65000 bit CCD memory was produced. We may include in this journey through the history of electronics the invention of LASER (Light Amplification by Stimulated Emission of Radiation) and the new field of Optoelectronics. Since the late 1970s and 80s optical fibre communication gained a wide acceptance. The revolution in IT (Information Technology) and Internet brought about a new phase in communication technology innovations. The need for efficient and fast data transmission systems prompted development of innumerable electronic techniques for signal processing, multiplexing and multiaccessing. Microwave electronics is another branch that has also gained importance in the recent decades, thanks to satellite and cellular mobile communications coming into vogue.

With ever growing demand for increasing the number of active as well as passive components in the integrated circuits the need for newer methods for efficient signal or data transmission within the circuit has increased. Although photonic devices overcome the difficulties encountered in electronic interconnects within the integrated circuits, certain limitations on the size and performance of the photonic devices put restrictions on their utility. In micro-chips the light used is usually around 1500 nm. Then, the minimum width of the 'interconnect' between the components becomes much larger than the size of the components themselves in the integrated circuit. Therefore, finding alternative methods of transmission between various internal stages of the IC has become imperative. Several newer and newer technologies began emerging in the new millennium to address this problem such as nanoelectronics, that uses circuit elements made of nanomaterials (like grapheme). Another such new technique developed in recent years which has many exciting applications is Plasmonics, named as such by a group of scientists at the California Institute of Technology. When light waves impinge at the interface between a conductor such as metal and a dielectric such as air, the free electrons in the metal conductor undergo a resonant interaction with the electromagnetic field of the incident wave. When the oscillation frequency of the electrons at the surface matches the frequency of the

electromagnetic wave a 'density wave' of electrons, called Surface Plasmon will be produced and travels along the interface. The waves are like ripples that spread on the surface of water in a pond when disturbed. By properly designing the conductor-dielectric interface, plasmons with the same frequency of the incident wave can be produced. Such metal-dielectric interconnects can be used in integrated circuits to carry information between segments in computer chips.

Another significant accomplishment in the nanoelectronics research is the making of a new two-terminal device by scientists at Hewlett Packard (HP) laboratories in 2007. This device named memory resistor or Memristor, possesses an "analogue memory property with high endurance". In circuit theory, the three basic two-terminal circuit elements, viz., resistance (R), capacitance (C) and inductance (L), are defined in terms of a relationship between two of the four fundamental circuit variables, namely, the current i, the voltage v, the charge q and the flux Φ. Here, whereas resistance, R is given by the ratio of voltage to current (v/i), capacitance, C by the ratio of charge to voltage (q/v), and inductance, L by the ratio of flux to current (Φ/i), the relationship between flux and charge remained undefined. In 1971, Chua postulated the existence of a fourth basic two-terminal circuit element that is given by the ratio of flux to charge (Φ/q) and it will have memory properties. A properly programmed two-terminal network, such as memristor, can be used in distributed memory, and finds application in neural networks like Mahowald and Mead's retina.

In the last few decades electronics has become all pervading and in one form or the other has penetrated all activities of human life. We find electronics in as diverse areas as industrial process control and health care. In fact we carry electronics with us in the form of mobile phones and wearable devices. Any country which lags behind in electronics and its application will be at a great disadvantage because all modern communications, industrial control and production systems, diagnostic and monitoring tools in health care etc. all are electronic contraptions. Electronics plays a crucial role in country's defense not only in communications, but also in guidance and control of missiles etc.

The history of electronics, as that of any science or technological aspect, is too vast an area to be confined to a few pages. However, an attempt has been made in this article to trace the developments that have taken place over a period of over a couple of centuries that have led electronics becoming a scientific discipline in itself besides a technology.

Puzzle

1. 10-digit Number

Find a 10-digit number where the first digit is how many zeros in the number; the second digit is how many 1s in the number etc. until the tenth digit which is how many 9s in the number.

6. Solution:
The smallest integer that can be written with two digit is not 10 as one may assume. But it is expressed as follows
1/1 , 2/2, 3/3, 4/4 ..... up to 9/9

7. Solution:
People often think of the number 1111 as the biggest number that can be written with four 1's. But there is a number many times greater than this number namely, 1111
1111 = 28531167061 1.

8. Solution:
M = 1000, D=500, C=100, L=50, X=10,VI=6
If we add all these together the result is 1666.

Alumni Article

Shalini Nerella

Customer Engagement Head, Easy StepIn, IT Services Pvt. Ltd. Bangalore

API Management

The glue holding the app economy together

The world is becoming more digital, intelligent and connected — and the driving force behind all of this is APIs, or application programming interfaces. APIs are not a new phenomenon. Developers have been using APIs as a building block for their applications and solutions for years. However, with the inception of things like agile, Internet of Things, mobile and micro services, APIs are becoming more important than ever.

"Certainly the API economy is only just beginning to emerge, and the hype around it is still growing as digital strategies and the pervasive use of the Internet of Things (IoT) unfold. An organization's API strategy underpins its digital strategy — and is a sizable portion of it — so engaging with the API economy is an integral part of any digital strategy," Gartner wrote in its Magic Quadrant for full life cycle API management.

In order to effectively and successfully deploy, manage and run an API program as well as gain value from the API economy, organizations need a proper API management solution.

"APIs have been around forever. It is how all applications have interacted with other services. What has changed is as the app economy has grown, and APIs have become more prevalent in the app economy, the need for how do you secure them, manage them, set policies and control them is becoming more apparent," said Bill Oakes, Director of Product Marketing for CA API management. "The only way you can do that effectively, and that is the keyword is effectively, is through API management."

API Management Poised for Big Growth

The API management market is forecast to be worth $2.665 billion by 2021, according to MarketsandMarkets. That's up from more than $606 million last year, representing a compound annual growth rate of 34.4 percent.

"It is impossible to provide the platform for any digital strategy, and run an effective API program to benefit from the API economy, without full life cycle API management," says Gartner.

Within the API management product category, API security solutions will see the best growth rate between last year and 2021, MarketsandMarkets indicates. It explains that API security solutions do data authentication and authorization, encryption, mediation, perimeter security, protocol translation, scripting, and other threat prevention.

How does an API work ?

An API is a messenger that takes requests and tells the system what you want to do, then returns the response back to you. To explain this better, let us take a familiar example.

Imagine you're sitting at a table in a restaurant with a menu of choices to order from. The kitchen is the part of the "system" that will prepare your order. What is missing is the critical link to communicate your order to the kitchen and deliver your food back to your table. That's where the waiter or API comes in. The waiter is the messenger – or API – that takes your request or order and tells the kitchen – the system – what to do. Then the waiter delivers the response back to you; in this case, it is the food.

Let us apply the above metaphor to a real-life API example. You may be familiar of the process of searching flights online. Just like the restaurant, you have a variety of options to choose from, including different cities, departure and return dates, and more. Let us imagine that you're booking you are flight on an airline website. You choose a departure city and date, a return city and date, cabin class, as well as other variables. In order to book your flight, you interact with the airline's website to access their database and see if any seats are available on those dates and what the costs might be.

However, what if you are not using the airline's website—a channel that has direct access to the information? What if you are using an online travel service, such as Kayak or Expedia, which aggregates information from a number of airline databases?

The travel service, in this case, interacts with the airline's API. The API is the interface that, like your helpful waiter, can be asked by that online travel service to get information from the airline's database to book seats, baggage options, etc. The API then takes the airline's response to your request and delivers it right back to the online travel service, which then shows you the most updated, relevant information.

As you can see, APIs make it possible to use travel sites—and the same goes for all interactions between applications, data, and devices that we have every day. These interactions are all powered by APIs, and that is what ultimately creates connectivity.

The Rising Value of APIs

Data is, in many ways, one of the most valuable assets a business has. A growing number of consumers and businesses are incorporating web and mobile apps into their daily routines, and companies are using data to provide more personalized, tailored experiences to their customers. In addition, companies are analyzing customer and operational behavior to make better decisions.

These are some of the valuable new uses for previously isolated data sources.

In the future, we expect the value of APIs to the enterprise to increase as new ways are discovered to use data. Every industry and every customer touchpoint will find itself interacting with APIs, as developers further implement the orchestration and presentation of valuable data. APIs are transforming modern business, and we are starting to see companies capitalize on the opportunities that they provide.

How APIs are transforming business

IoT

We expect to see interesting Internet of Things use cases come to life, rather than major steps forward in devices themselves. With CES(Consumer Electronic Show) approaching in January, hundreds of new IoT devices will be released, but it won't be the devices themselves that make waves. It will be the clever use of those devices - and their accompanying APIs - to generate value.

Cloud

When it comes to the cloud, enterprises are in an awkward teen stage — somewhere between the old worlds and new. CIOs will continue to adopt cloud applications and seek better ways to connect on-premises systems and the cloud. . There is a big emphasis on APIs to unlock data and capabilities in a reusable way, with many companies looking to run their APIs in the cloud and in the data center. On-premises APIs offer a seamless way to unlock legacy systems and connect them with cloud applications, which is crucial for businesses that want to make a cloud- first strategy a reality

Five Rules for API Management

1. Design

   Make the APIs accessible to different classes of developers and partners. Develop security policies, usage policies, selective access to data and services

2. Documentation

   Make APIs accessible, offer documentation and communication tools to make it easy to create and manage the applications built on the API itself. Twitter did this very well as a young company but has faltered in its developer communications.

3. Analytics

   It is to think about the collection and processing of all the statistics associated with the use of the API, with an eye toward supporting and encouraging effective usage and discouraging/limiting usage that is counter to your business or technology goals. Sam Ramji, vice president of strategy at Apigee, maintains that analytics will help determine how the infrastructure adapts to different data flows. It's a view that reflects how software is replacing hardware and the role that data plays in the way apps are calibrated for us the analytics and all the management things are more like a commodity that we give it for free, just to have more and more distribution and more and more consumption. It's like Google that gives you Google Analytics for free, because it helps AdWords as side effect. We're like an object broker for the cloud computing era. We unify the jungle that the API world is. API consumers have one single API key, consumer console and credit card to consume them all, in the same way.

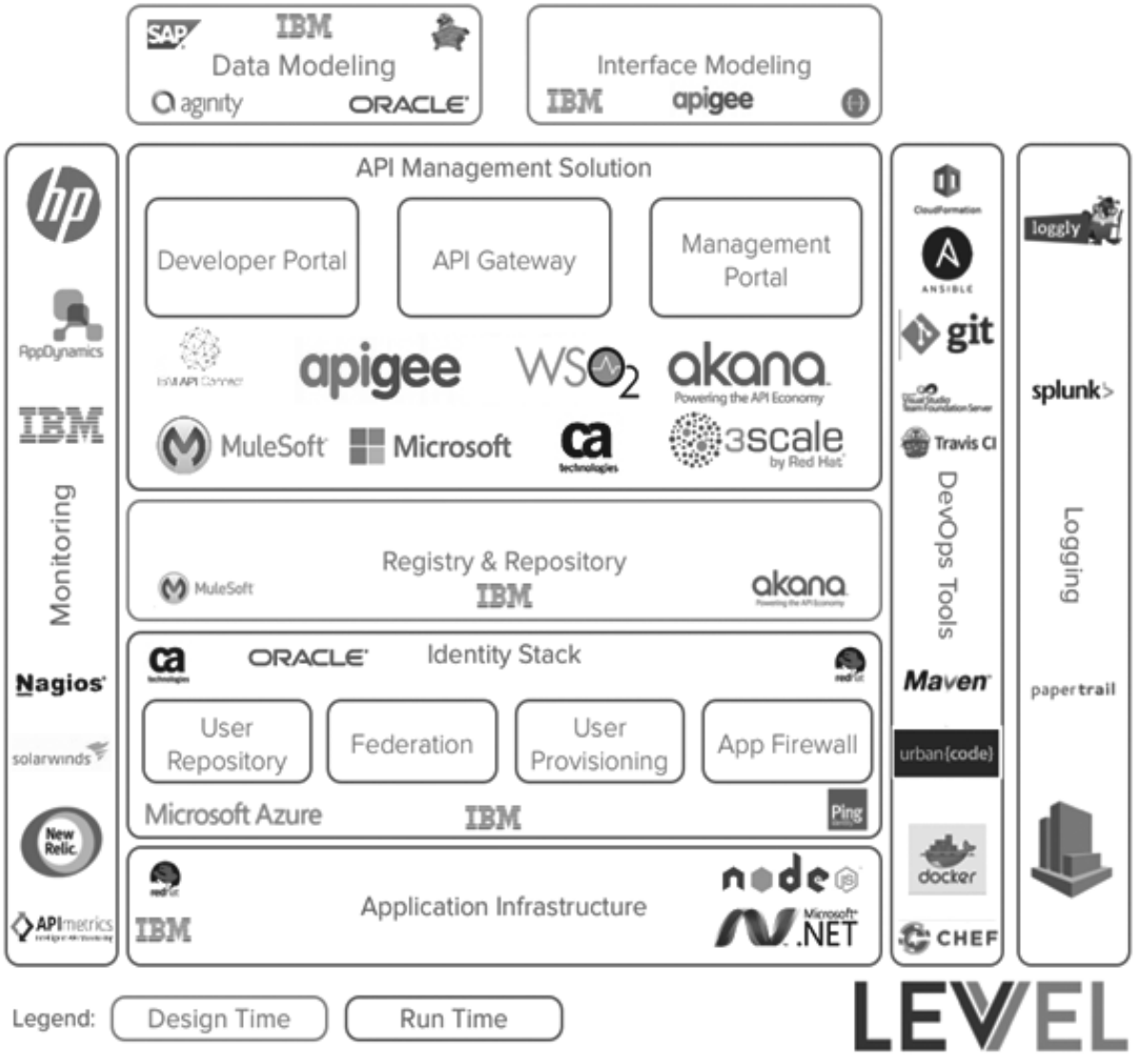
4. Universal Access

   Provide seamless and simple support of the various architectures used by the enterprise, whether public cloud, private cloud, on-premise, or a hybrid of several of these

5. Uptime

   High uptime, easy scalability, and redundancy that handles traffic spikes, works around temporary failures in the enterprise backend, and fails gracefully in the event of a backend outage.

The Tools of API Management — the Full Stack



Puzzle

2. Any Song

A poor woman and a rich woman are talking about music.
The poor woman says she has studied music and can name a song with any name in it.
The rich woman says "OK, if you can find a song with my son's name in it, I will give you a thousand dollars.
His name is Demarcus-Jabari."
The poor woman gives her answer and is instantly $1,000 richer.
What was her answer?

9. Solution: 44, 36
The Odd terms increase by 9 each time and the even terms increase by 7 each time

Article

Dr. P. Srinivasa Rao
Assistant Professor, Dept. of BS&H

Challenges and opportunities for improving Plastic recycling

Abstract

Recycling of packaging materials has seen rapid expansion over the last decades in a number of countries. Advances in technologies and systems for the collection, sorting and reprocessing of recyclable plastics are creating new opportunities for recycling, and with the combined actions of the public, industry and governments it may be possible to divert the majority of plastic waste from landfills to recycling over the next decades. The production of plastics has increased markedly over the last 60 years. However, current levels of their usage and disposal generate several environmental problems Around 4 per cent of world oil and gas production, a non-renewable resource, is used as feedstock for plastics and a further 3–4% is expended to provide energy for their manufacture. A major portion of plastic produced each year is used to make disposable items of packaging or other short-lived products that are discarded within a year of manufacture. These two observations alone indicate that our current use of plastics is not sustainable. In addition, because of the durability of the polymers involved, substantial quantities of discarded end-of-life plastics are accumulating as debris in landfills and in natural habitats worldwide

KEY WORDS:
Plastics Recycling, Environmental Impacts, Chemical Recycling, Waste Management.

Introduction

Government initiatives such as Make in India, Skill India, Digital India, Swachh Bharat Abhiyan, etc are opening up opportunities for even more accelerated growth in this industry. Plastics industry would also contribute in a big way in the success of all such programs. For example, take the Digital India program. Plastics are one of the major components required in the electronic gadgets, which are mostly imported at present in the country. In the next 5 to 10 years, most of the products in the electronics industry are proposed to be made in the country, thus reducing imports from China & other countries and India emerging as a major sourcing hub. "Smart cities, rapid urbanisation, increase in sale of packaged products through retail and e-commerce mode, low per capita consumption, shifting consumer lifestyles, large young population, majority of population of middle income group, many manufacturing segments adopting higher percentage of plastics, etc are contributing towards the growth of plastics industry.

Indian Plastics industry has geared itself to take up the challenges of quantitative and qualitative growth for serving the nation and its citizens. The export of plastics finished goods is expected to nearly double from $ 7.9 billion currently to $15 billion in next 5 years. "It seems that the centre of gravity is rapidly shifting to India due to the opportunities here. India is the world's next plastic destination by virtue of both, its sheer size and tremendous growing domestic demand. The industry is determined to play a significant role in executing government's vision of raising exports to $900 billion by 2020.

Economic Issues relating to Recycling

Two key economic drivers influence the viability of thermoplastics recycling. These are the price of the recycled polymer compared with virgin polymer and the cost of recycling compared with alternative forms of acceptable disposal. There are additional issues associated with variations in the quantity and quality of supply compared with virgin plastics. Lack of information about the availability of recycled plastics, its quality and suitability for specific applications, can also act as a disincentive to use recycled material.

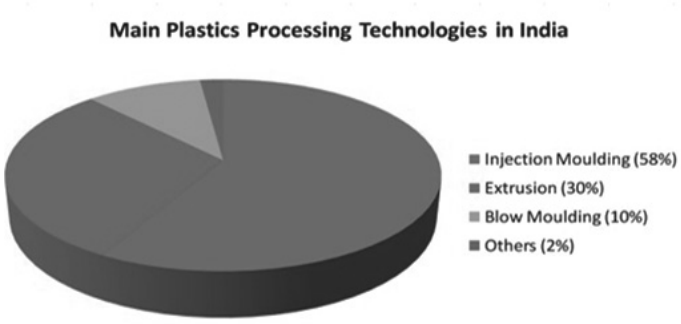
Historically, the primary methods of waste disposal have been by landfill or incineration. Costs of landfill vary considerably among regions according to the

underlying geology and land-use patterns and can influence the viability of recycling as an alternative disposal route. In Japan, for example, the excavation that is necessary for landfill is expensive because of the hard nature of the underlying volcanic bedrock; while in the Netherlands it is costly because of permeability from the sea. High disposal costs are an economic incentive towards either recycling or energy recovery.

Collection of used plastics from households is more economical in suburbs where the population density is sufficiently high to achieve economies of scale. The most efficient collection scheme can vary with locality, type of dwellings (houses or large multi-apartment buildings) and the type of sorting facilities available. In rural areas 'bring schemes' where the public deliver their own waste for recycling, for example when they visit a nearby town, are considered more cost-effective than kerbside collection. Many local authorities and some supermarkets in the UK operate 'bring banks', or even reverse-vending machines. These latter methods can be a good source of relatively pure recyclables, but are ineffective in providing high collection rates of post-consumer waste.

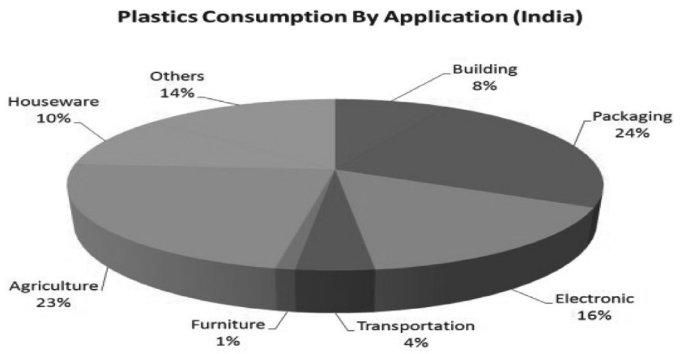
Current trends in plastic Recycling

The growth rate of the Indian plastics industry is one of the highest in the world, with plastics consumption growing at 16% per annum (compared to 10% p.a. in China and around 2.5% p.a. in the UK). With a growing middle class (currently estimated at 50 million) and a low per capita consumption of plastics, currently 8 kg per head, this trend is likely to continue. Despite India having a population of 1.15 billion and a work force of 467 million, plastics companies have reported problems with labour shortages. This has led to increased investment in technology such as automation and conveyor belt systems. Apart from the shortage of a skilled labour, the plastics industry is also facing the problem of a nationwide power deficit. The electricity demand deficit is 12-13 per cent. This provides excellent opportunities for firms offering energy saving solutions, power saving machines and ancillary equipment.



Raw material supply and Demand

Reliance Industries, India's largest private sector conglomerate company, stated in January that India's polyolefin's market is expected to grow 12 percent to about 7.5 million metric tons in 2011 with double-digit growth in consumption of both polypropylene and polyethylene. Polypropylene will account for the largest growth at 18% (with consumption growing from 2.2 million metric tonnes to 2.6 million metric tonnes). It is estimated that between 75-80% of Polypropylene demand in India is met by Reliance Industries with around 20% coming from four Government run companies Indian Oil Corporation Ltd (IOCL), Haldia Petrochemicals, Bharat Petroleum Corporation LTD (BPCL) and the Gas Authority of India Ltd (GAIL). Partially due to the growth of the Indian construction industry (which is growing at approx. 20% p.a.) the demand for PVC is exceptionally high with domestic production barely meeting 50% of the demand. Again, of the domestic suppliers, Reliance is the largest followed by Chemplast and Finoflex (with the latter two accounting for about 5% of demand)



EVA is also in high demand, with barely 10% of the demand being met by domestic supply, in this case by Relene (a division of Reliance). Despite the fact that India has one of the highest plastics recycling rates in the world (an estimated 47% of all plastics is recycled) the demand for recycled plastics is huge, especially for commodity plastics such as PP, PET, PS, LDPE and HDPE.

Automotive Market

India is the second faster growing consumer market for Automobiles in the world (after China) and the seventh largest producer, with over 2.6 million motor vehicles being manufactured in India in 2009. According to forecasts, automobile manufacturing in India is set to rise 7% year on year until 2015. Car manufacturers in India have reported significant increases in output over the last 12 months, specifically Tata Motors reporting a 32% increase in sales, Toyota Kirloska Motor at 26% and Ford India, a staggering 22% - due, in large part to the highly successful Ford Figo model.

Challenges and opportunities For improving plastic recycling

Effective recycling of mixed plastics waste is the next major challenge for the plastics recycling sector. The advantage is the ability to recycle a larger proportion of the plastic waste stream by expanding post-consumer collection of plastic packaging to cover a wider variety of materials and pack types. Product design for recycling has strong potential to assist in such recycling efforts. A study carried out in the UK found that the amount of packaging in a regular shopping basket that, even if collected, cannot be effectively recycled, ranged from 21 to 40 % Hence, wider implementation of policies to promote the use of environmental design principles by industry could have a large impact on recycling performance, increasing the proportion of packaging that can economically be collected and diverted from landfill. The same logic applies to durable consumer goods designing for disassembly, recycling and specifications for use of recycled resins are key actions to increase recycling.

Most post-consumer collection schemes are for rigid packaging as flexible packaging tends to be problematic during the collection and sorting stages. Most current material recovery facilities have difficulty handling flexible plastic packaging because of the different handling characteristics of rigid packaging. The low weight-to-volume ratio of films and plastic bags also makes it less economically viable to invest in the necessary collection and sorting facilities. However, plastic films are currently recycled from sources including secondary packaging such as shrink-wrap of pallets and boxes and some agricultural films, so this is feasible under the right conditions. Approaches to increasing the recycling of films and flexible packaging could include separate collection, or investment in extra sorting and processing facilities at recovery facilities for handling mixed plastic wastes. In order to have successful recycling of mixed plastics, high-performance sorting of the input materials needs to be performed to ensure that plastic types are separated to high levels of purity; there is, however, a need for the further development of end markets for each polymer recycled stream.

The effectiveness of post-consumer packaging recycling could be dramatically increased if the diversity of materials were to be rationalized to a subset of current usage. For example, if rigid plastic containers ranging from bottles, jars to trays were all PET, HDPE and PP, without clear PVC or PS, which are problematic to sort from co-mingled recyclables, then all rigid plastic packaging could be collected and sorted to make recycled resins with minimal cross-contamination. The losses of rejected material and the value of the recycled resins would be enhanced. In addition, labels and adhesive materials should be selected to maximize recycling performance. Improvements in sorting/separation within recycling plants give further potential for both higher recycling volumes, and better eco-efficiency by decreasing waste fractions, energy and water use . The goals should be to maximize both the volume and quality of recycled resins.

Conclusions

In summary, recycling is one strategy for end-of-life waste management of plastic products. It makes increasing sense economically as well as environmentally and recent trends demonstrate a substantial increase in the rate of recovery and recycling of plastic wastes. These trends are likely to continue, but some significant challenges still exist from both technological factors and from economic or social behaviour issues relating to the collection of recyclable wastes, and substitution for virgin material.

Recycling of a wider range of post-consumer plastic packaging, together with waste plastics from consumer goods and ELVs will further enable improvement in recovery rates of plastic waste and diversion from landfills. Coupled with efforts to increase the use and specification of recycled grades as replacement of virgin plastic, recycling of waste plastics is an effective way to improve the environmental performance of the polymer industry.

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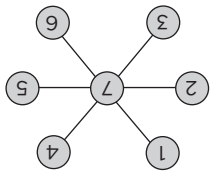
Puzzle

3. A Unique Number

What is unique about 8549176320 ?

4. Three Rooms

A criminal gets to pick his punishment by choosing among three rooms.
The first is full of burning fires, the second is full of assassins with loaded guns, and the third is full of lions that haven't eaten in 3 years.
Which room is the safest choice?



11. Solution

2. Solution: "Happy Birthday"

Mr. SATYNARAYANA V V V
Assistant Professor, BS & H

Wifi based Client Server Communication between Nodemcu & Android Phone

This weekend hobby project establishes the WiFi Client – Server communication between ESP 12E NODEMCU board acting as Server cum Access point and an Android phone acting as a client. This communication takes place through http requests. The entire project is divided into two parts. Part one includes hardware control through NodeMcu through software programming in Arduino IDE. Part two includes the application building for android phone **using MIT app inventor.**

At first, the NODEMCU is to be set in access point cum server mode. Appropriate decisions can be made using GPIO pins on the NODEMCU through http request by client. As an example the code uses digital pin D4 with attached onboard LED. A http request by client (Android Phone) can control the LED. The same can be extended to any number of available pins on NODEMCU. The following code is to be compiled in the Arduino IDE with board NODEMCU ESP12E.

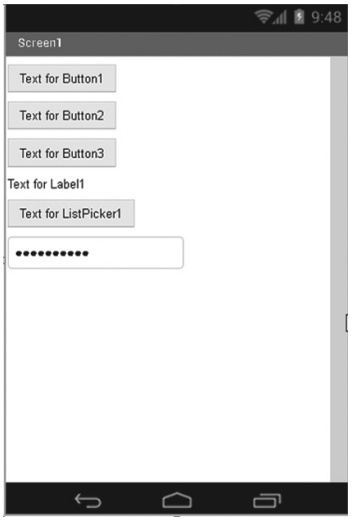
```
#include <ESP8266WiFi.h>
#include <WiFiClient.h>
#include <ESP8266WebServer.h>
#include <ESP8266mDNS.h>
MDNSResponder mdns;
/* multicast domain name system(mdns) running with name“mdns”
 this keeps the record of frequently visited ip addresses for quick response*/
const char* ssid = "GVPCEW";
//  ACCESS POINT NAME, SET BY NODEMCU
const char* password = "";
/* NO PASSWORD..,
IF REQUIRED KEEP AT LEAST 8 CHAR*/
ESP8266WebServer server(80);
/*SERVER RUNNING ON PORT 80 WITH NAME "server"*/
String response = "";
// a blank string
void setup(){
WiFi.disconnect();
// disconnect existing wifi connections
WiFi.mode(WIFI_OFF);
//TURN WIFI OFF FOR A WHILE
delay(4000);//WAIT FOR FOUR SECONDS
Serial.begin(115200);
// SERIAL BAUD OF 115200
WiFi.softAP(ssid, password);
// start the access point
// PRINT THE ACCESS POINT IP ADDRESS
// if desired ip is say 10.12.5.1 then //IPAddress apip(10,12,5,1);
IPAddress apip = WiFi.softAPIP();
//BY DEFAULT IT WILL BE 192.168.4.1
Serial.println();
Serial.println(apip);
// preparing GPIOs
//PIN DECLARATIONS. PIN 4 IS USED,
//SET ALL DESIRED PINS AS OUTPUTS
pinMode(D4, OUTPUT);
digitalWrite(D4, LOW);
// START MDNS RESPONDER
if (mdns.begin("esp8266", WiFi.localIP())) {
Serial.println("MDNS responder started");
}
/* SERVER RESPONSES
basic structure of response is
 if a http request is made by client to server with query named“label”
        server.on("/label", [](){
        server.send(response_code, "response_type", “response_content”);
//action to be taken ,say pin D4 high
        digitalWrite(D4, HIGH);
        delay(300);});*/
////////////////////////////////////////*
legend:
label : it is the text sent through http request by client to the server
response_code: usually 200 for success and 404 for not found
response_type: usually “text/html” if html code is sent otherwise “text/plain” for general alphanumeric responses
response_content: string sent to the client by server*/
////////////////////////////////////
server.on("/D4On", [](){
server.send(200, "text/html", "sw_on" );
//sends a response sw_on to client
digitalWrite(D4, LOW);
delay(300);
});
server.on("/D4Off", [](){
server.send(200, "text/html", "sw_off");
//sends a response sw_off to client
digitalWrite(D4, LOW);
delay(300);
});
/* ADD SUCH /D4On LIKE CLIENT REQUESTS TO THE ABOVE TO PERFORM REQUIRED ACTIONS
*/
server.begin();// starts http server
Serial.println("HTTP server started");
}
void loop(void){
server.handleClient();
//server keeps communication with client
}
```

The above program is the basic structure for setting up the access point with SSID GVPCEW as open network that processes a client request with label "D4On". One can add many more desired requests with different labels to the above program and control devices.

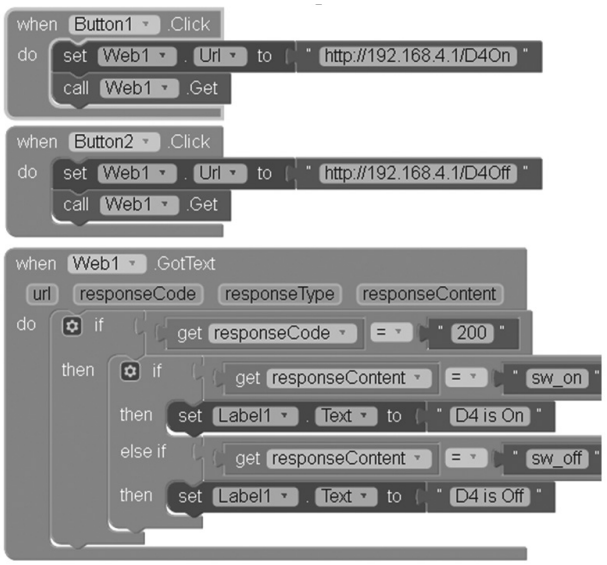
The second part of the project deals with the building of android app. One can visit ai2.appinventor.mit.edu/ to start building App. Google user ID (Gmail) is required for logging into the above said web service.

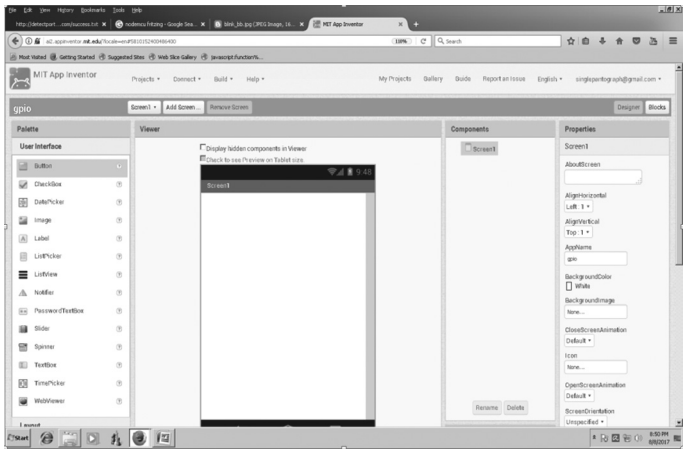
App building with this tool is user friendly and do not require any programming skills. One can follow the steps described to build the app.

1. Log in to MIT app inventor.
2. For new user the dash board will be empty. From Projects menu, one can select Start new project.
3. On the screen1, a Button can be chosen from user interface palette. Button is to be dragged on to the screen.
4. One can drag as many buttons as one wishes to the screen. On the right hand side of the dash board Components and their properties menu are available.



5. Labels, list pickers, password boxes etc. tools can be dropped into the app interface in the same manner if desired.
6. From the Connectivity palette box one has to choose WEB connectivity. It has to be dragged on to the app interface screen, but remains as invisible component.
7. This completes app interface in the front end. One has to select the Blocks button to go into bricks building mode.
8. One may build the bricks from the blocks palette as shown in the following fig.





9. Each block has specified action. "When Button1 Click" specifies the action to be taken when the button1 on the interface is pressed. It sets the web1 url to the NodeMcu's ip address, i.e. 192.168.4.1 and attaches a http request "D4On".

   http://192.168.4.1/D4On

   Similarly when button 2 is pressed it sets http://192.168.4.1/D4Off

   The next block "call web1 get" sends the http request which was previously set.
10. After reception of request by Access point cum Server (NODEMCU) the http response will be sent back to client. For successful http request the response code will be 200. As per code written in Arduino IDE the request "D4On" to server returns to client with response "sw_on". Similarly for "D4Off" it will be "sw_off".

11. The block "web1 got text" describes the action to be taken after getting the response from server.At first it checks whether the response code is 200 or not. After this confirmation it further checks for the response content. If response content is "sw_on", A text "D4 is On" will be set on the label1. Else it checks the response content with "sw_off" and sets the label to "D4 is off" if satisfied. If any of both are not received, the label remains unchanged with earlier displayed text.
12. To get the apk file for the app, one has to press the tab build/save .apk to my computer. After successful building of app, it gets stored at the default downloads folder of PC. One has to install this on an Android mobile.
13. After programming the NODEMCU through Arduino IDE, one can easily link both Android mobile and NODEMCU. When NODEMCU is powered by DC source, it sets up an access point with SSID GVPCEW. One can connect the android mobile to this access point. By running the app on the mobile one can observe the expected changes of LED.

    Same can be controlled through any other mobiles connected to this wifi access point. The maximum number of devices is 6. Instead of using this app one can simply connect the mobile to this access point and type address (http://192.168.4.1/D4On) in the browser to see the same effects.

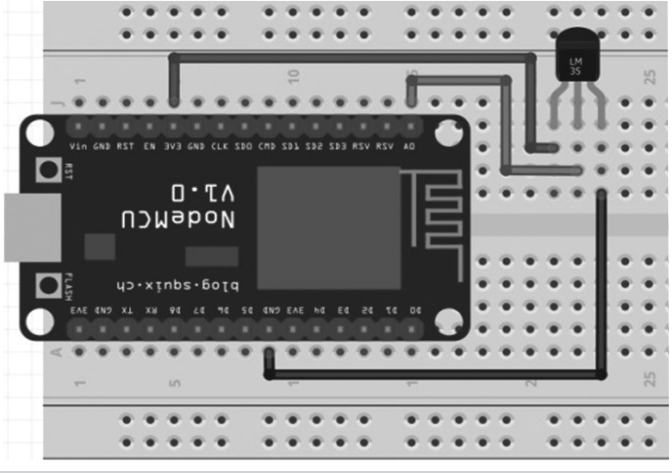
Android app based temperature measurement With nodemcu and lm35

This part is an extension to the WiFi client – server communication. The communication part of previous article applies here too. The app or web page makes similar request to the NODEMCU, in return the NodeMcu makes measurement and sends the data through http response. To get some data from NodeMcu and display on the Android app, the following procedure is to be adopted.

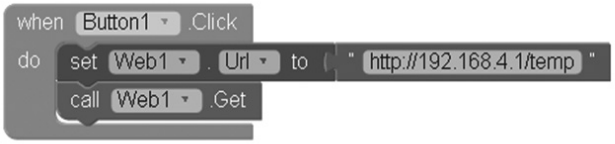
1. Modification is to be made to the Client – Server program of previous article. The following code is to be added under the server responses head.

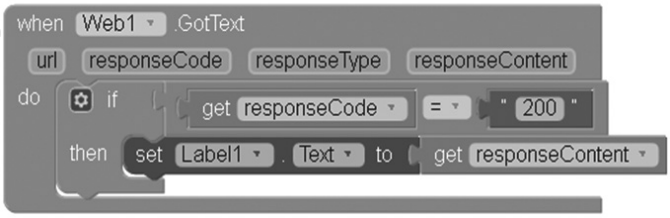
```
server.on("/temp",[](){
int val =analogRead(A0);
float t = val*330/1024;
String response = t;
server.send(200,"text/html",response );
delay(300);
```

2. An LM35 chip is to be connected in the following way. Pin1 to 3.3V, pin2 to A0 and pin3 to Gnd.



3. This completes set up on NodeMcu side. The http request made from android app should be with a tag "temp" instead of "D4On". This change must be made in the blocks part of app inventor. Unwanted switches labels are to be removed from dash board. Only label1 is to be retained along with button1. The blocks part will appear like:





4. App can be built and installed in the above said manner. NodeMcu with above mentioned connections when paired with the app will deliver the temperature of the location where the NodeMcu along with LM35 is placed on the mobile screen.

Android App based rover

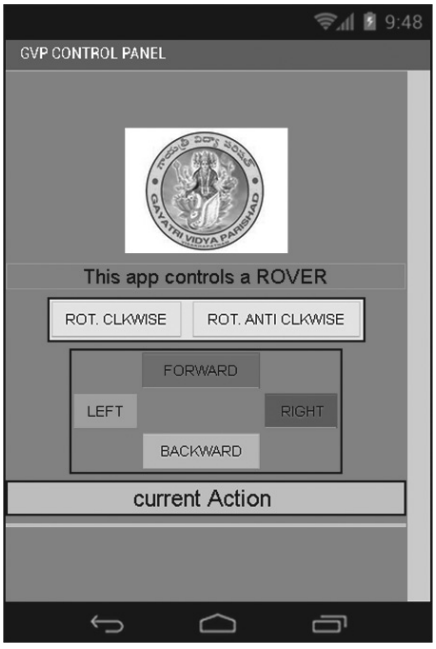
This part deals with control of an L298N or L293D (H BRIDGE) based rover.This part assumes a four wheel rover with four DC drive geared motors.The pair of motors on left hand side is controlled by channel one of H Bridge and similarly the pair on right hand side by channel two of H Bridge. Pins D0, D1 will control left channel and D2, D3 control the right.

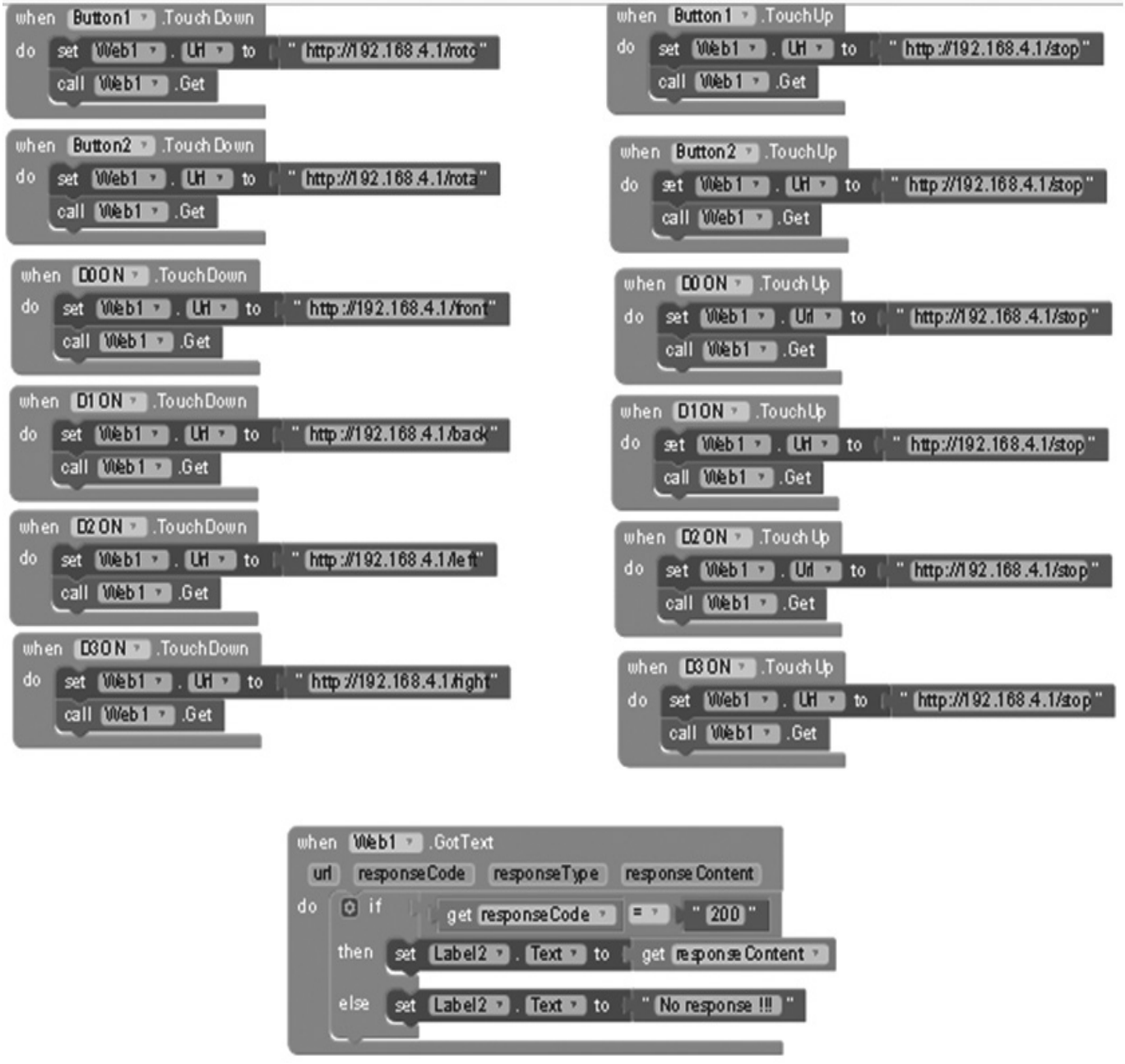
Modifications to the existing code: In setup part the following are included.

```
pinMode(D0, OUTPUT);pinMode(D1, OUTPUT); pinMode(D2, OUTPUT);pinMode(D3,OUTPUT);
      digitalWrite(D0, LOW);digitalWrite(D1, LOW);digitalWrite(D2, LOW);digitalWrite(D3,LOW);
```

Under server responses the following changes are to be made.

```
server.on("/front",[](){
    digitalWrite(D0,HIGH);
    digitalWrite(D2,HIGH);
    server.send(200,"text/html","Forward");
   delay(300);
 });
 server.on("/back",[](){
  server.send(200,"text/html","BACKWARD");
  digitalWrite(D1,HIGH);
    digitalWrite(D3,HIGH);
   delay(300);
 });
 server.on("/left",[](){
  server.send(200,"text/html","LEFT");
   //digitalWrite(D0,HIGH);
    digitalWrite(D2,HIGH);
   delay(300);
 });
server.on("/right",[](){
  server.send(200,"text/html","RIGHT");
  digitalWrite(D0,HIGH);
  // digitalWrite(D2,HIGH);
   delay(300);
 });
server.on("/rotc",[](){
  server.send(200,"text/html","Whirl right");
  digitalWrite(D0,HIGH);
  digitalWrite(D3,HIGH);
   delay(300);
 });
 server.on("/rota",[](){
  server.send(200,"text/html","Whirl left");
  digitalWrite(D1,HIGH);
  digitalWrite(D2,HIGH);
   delay(300);
 });
   server.on("/stop",[](){
   webPage="stopped";
  server.send(200,"text/html","stopped");
  digitalWrite(D0,LOW);
  digitalWrite(D1,LOW);
  digitalWrite(D3,LOW);
  digitalWrite(D2,LOW);
   delay(200);
 });
```





Applications:

Measurements like intensity of light, humidity, noise level, air quality (gas sensors) at a location can be done using the simply built apps with the help of appropriate sensors interfaced to NodeMcu.

Similar principles can be employed for smart irrigation. Remote control through mobile makes device access restricted only to specific authorized persons through a password.

Electronic door locks can be made with the same procedure.

Entire home can be automated through Android mobile with all switches controlled by it.

In gaming, rovers, drones etc. can be controlled in a similar way.

Student Article

Bhaikar Melavi Devi
IV B.Tech. CSE

Artificial intelligence - Behavioral Myths

"Everything we love about civilization is a product of intelligence, so amplifying our human intelligence with artificial intelligence has the potential of helping civilization flourish like never before – as long as we manage to keep the technology beneficial"

- ***Max Tegmark,*** President of the Future of Life Institute

WHAT IS AI?

From SIRI to self-driving cars, artificial intelligence (AI) is progressing rapidly. While science fiction often portrays AI as robots with human-like characteristics, AI can encompass anything from Google's search algorithms to IBM's Watson to autonomous weapons.

Artificial intelligence today is properly known as narrow AI (or weak AI), in that it is designed to perform a narrow task (e.g. only facial recognition or only internet searches or only driving a car). However, the long-term goal of many researchers is to create general AI (AGI or strong AI). While narrow AI may outperform humans at whatever its specific task is, like playing chess or solving equations, AGI would outperform humans at nearly every cognitive task.

WHY THE RECENT INTEREST IN AI SAFETY

Stephen Hawking, Elon Musk, Steve Wozniak, Bill Gates, and many other big names in science and technology have recently expressed concern in the media and via open letters about the risks posed by AI, joined by many leading AI researchers. Why is the subject suddenly in the headlines?

The idea that the quest for strong AI would ultimately succeed was long thought of as science fiction, centuries or more away. However, thanks to recent breakthroughs, many AI milestones, which experts viewed as decades away merely five years ago, have now been reached, making many experts take seriously the possibility of super intelligence in our lifetime. While some experts still guess that human-level AI is centuries away, most AI researches at the 2015 Puerto Rico Conference guessed that it would happen before 2060. Since it may take decades to complete the required safety research, it is prudent to start it now.

Because AI has the potential to become more intelligent than any human, we have no surefire way of predicting how it will behave. We can't use past technological developments as much of a basis because we've never created anything that has the ability to, wittingly or unwittingly, outsmart us. The best example of what we could face may be our own evolution. People now control the planet, not because we're the strongest, fastest or biggest, but because we're the smartest. If we're no longer the smartest, are we assured to remain in control?

THE TOP MYTHS ABOUT ADVANCED AI

A captivating conversation is taking place about the future of artificial intelligence and what it will/should mean for humanity. There are fascinating controversies where the world's leading experts disagree, such as: AI's future impact on the job market; if/when human-level AI will be developed; whether this will lead to an intelligence explosion; and whether this is something we should welcome or fear. But there are also many examples of boring pseudo-controversies caused by people misunderstanding and talking past each other. To help ourselves focus on the interesting controversies and open questions — and not on the misunderstandings — let's clear up some of the most common myths.

TIMELINE MYTHS

The first myth regards the timeline: how long will it take until machines greatly supersede human-level intelligence? A common misconception is that we know the answer with great certainly.

One popular myth is that we know we'll get superhuman AI this century. In fact, history is full of technological over-hyping. Where are those fusion power plants and flying cars we were promised we'd have by now? AI has also been repeatedly over-hyped in the past, even by some of the founders of the field. On the other hand, a popular counter-myth is that we know we won't get superhuman AI this century. Researchers have made a wide range of estimates for how far we are from superhuman AI, but we certainly can't say with great confidence that the probability is zero this century, given the dismal track record of such techno-skeptic predictions. There's also a related myth that people who worry about AI think it's only a few years away. In fact, most people on record worrying about superhuman AI guess it's still at least decades away. But they argue that as long as we're not 100% sure that it won't happen this century, it's smart to start safety research now to prepare for the eventuality.

Many of the safety problems associated with human-level AI are so hard that they may take decades to solve. So it's prudent to start researching them now rather than the night before some programmers drinking Red Bull decide to switch one on.

Controversy Myths

Another common misconception is that the only people harboring concerns about AI and advocating AI safety research are luddites who don't know much about AI. When Stuart Russell, author of the standard AI textbook, mentioned this during his Puerto Rico talk, the audience laughed loudly. A related misconception is that supporting AI safety research is hugely controversial. In fact, to support a modest investment in AI safety research, people don't need to be convinced that risks are high, merely non-negligible — just as a modest investment in home insurance is justified by a non-negligible probability of the home burning down.

It may be that media have made the AI safety debate seem more controversial than it really is. After all, fear sells, and articles using out-of-context quotes to proclaim imminent doom can generate more clicks than nuanced and balanced ones. As a result, two people who only know about each other's positions from media quotes are likely to think they disagree more than they really do.

Myths about the risks of super Human AI

Many AI researchers roll their eyes when seeing this headline: "Stephen Hawking warns that rise of robots may be disastrous for mankind." And as many have lost count of how many similar articles they've seen. Typically, these articles are accompanied by an evil-looking robot carrying a weapon, and they suggest we should worry about robots rising up and killing us because they've become conscious and/or evil. On a lighter note, such articles are actually rather impressive, because they succinctly summarize the scenario that AI researchers don't worry about. That scenario combines as many as three separate misconceptions: concern about consciousness, evil, and robots.

If you drive down the road, you have a subjective experience of colors, sounds, etc. But does a self-driving car have a subjective experience? Does it feel like anything at all to be a self-driving car? Although this mystery of consciousness is interesting in its own right, it's irrelevant to AI risk. If you get struck by a driverless car, it makes no difference to you whether it subjectively feels conscious. In the same way, what will affect us humans is what super intelligent AI does, not how it subjectively feels.

The consciousness misconception is related to the myth that machines can't have goals. Machines can obviously have goals in the narrow sense of exhibiting goal-oriented behavior: the behavior of a heat-seeking missile is most economically explained as a goal to hit a target. If you feel threatened by a machine whose goals are misaligned with yours, then it is precisely its goals in this narrow sense that troubles you, not whether the machine is conscious and experiences a sense of purpose. If that heat-seeking missile were chasing you, you probably wouldn't exclaim: "I'm not worried, because machines can't have goals!"

The robot misconception is related to the myth that machines can't control humans. Intelligence enables control: humans control tigers not because we are stronger, but because we are smarter. This means that if we cede our position as smartest on our planet, it's possible that we might also cede control.

The interesting controversies

Not wasting time on the above-mentioned misconceptions lets us focus on true and interesting controversies where even the experts disagree. What sort of future do you want? Should we develop lethal autonomous weapons? What would you like to happen with job automation? What career advice would you give today's kids? Do you prefer new jobs replacing the old ones, or a jobless society where everyone enjoys a life of leisure and machine-produced wealth? Further down the road, would you like us to create super intelligent life and spread it through our cosmos? Will we control intelligent machines or will they control us? Will intelligent machines replace us, coexist with us, or merge with us? What will it mean to be human in the age of artificial intelligence? What would you like it to mean, and how can we make the future be that way?

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Student Article

Reduchintala Abhinaya, III B.Tech. CSE
Vedantam Sai Manasa, III B.Tech. CSE

DNA- DATA Storage

Introduction

In the present world, data storage and access are of great importance. The torrent of information we have, may soon outstrip the ability of hard drives to capture it. Rapid growth of information generated all around the world needs to be stored for extended period of time. **The identified failures of existing storage medium are,** they are prone to damage from high temperatures, moistures and magnetic fields and they subject to decay over long period of time and also uses more energy and releases high amounts of heat energy.

Here is where DNA data storage comes into light. *WHAT IS DNA (deoxyribo nucleic acid)?*

DNA is a molecule that encodes genetic instructions and is well suited for biological information storage. DNA molecules are double stranded helices. DNA contains a nucleic acid sequence which is a succession of letters A,G,T,C indicating the order of nucleotides in DNA where A,G,T,C stands for Adenine, Guanine, Thymine and Cytosine respectively.

Why to store DATA in DNA?

We use DNA as a storage medium because of its high data storage density & capacity, high memory space and can also withstand high environmental conditions. It is secure since it is invisible to human eye. It can store data for long periods of time because it protects from

O2 and H2O(Oxygen &Water respectively).

What is DNA DATA Storage?

DNA data storage is any process to store digital data in the base sequence of DNA. It **is a technology in which we use strands of DNA for storing & retrieving data**. It uses artificial DNA using commercially available Oligo nucleotide synthesis machines for storage and DNA sequencing machines for retrieval. This type of storage system is more compact than current storage systems due to the data density of the DNA. Now, researchers report that they've come up with a new way to encode digital data in DNA to create the highest-density large-scale data storage scheme which is capable of storing **215 petabytes** in a **single gram** of DNA.

The idea behind DNA DATA Storage

As DNA is a universal and fundamental data storage mechanism in biology, it stores every bit of datum ever recorded by humans using better store and retrieval techniques.

Following is a picture that shows how information is stored in DNA

- **ENCODING TABLE→ Quarternary number system → DNA SEQUENCE → COMPRESSION**
- **Codes for encoding:-**

1. **Huffman code**
2. **Comma code**
3. **Alternate code**
4. **Perfect genetic code**
5. **Improved Huffman code**
6. **Comma free code**

DNA storage styles

1. Surface based approach.
2. Soluble based approach
3. Steganography technique using DNA hybridization.
4. Chromosomes DNA indexing.

Example for coding of information

if we are trying to store some information, say VVIT. First, we should use numbers to represent the letters in ASCII code. From the ASCII table, we have: V=86, I=73, T=84. Now, we change them to quaternary numbers i.e.

86=1112

73=1021

84=1110

Now, we use "A,T,C,G" to represent the numbers 0,1,2,3 respectively.

VVIT = 111211121021 1110. Instead of synthesising one long string of DNA, we can code entire information by breaking it to smaller fragments. This A,C,G,T sequence avoids any reading errors. This method provides 100% accuracy.

Advantages

1. DNA computing consumes significantly less energy than the electronic computers.
2. It is ultra compact, and it can last hundreds of thousands of years if kept in a cool, dry place.
3. It won't degrade over time like cassette tapes and CDs, and it won't become obsolete.

Disadvantages

1. DNA needs to be sequenced to use it for data storage, which makes it a slow process.
2. Expensive
3. Rewriting is not possible.
4. High equipped laboratories required.
5. Difficulty in understanding

Applications

Used in national security for hiding purposes and stenography

Preserves data at nuclear catastrophe

Enhancements

"Good bye silicon, hello DNA the future of data storage device"

It can be used in:

DNA computing

DNA nanotechnology

Conclusion

The longer you want to store information, then, the more attractive DNA becomes and the cost of synthesizing DNA is falling fast. Unlike other high-density approaches, such as "manipulating individual atoms on a surface", new technologies can write and read large amounts of DNA at a time, allowing it to be scaled up. We can't get obsessed with the fact that it may not be practical today but if we strive hard within 5-10 years into the future you see that it is in the sweet spot.

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Puzzle

5. How Old is Granny

Tom asked his Granny how old she was. Rather than giving him a straight answer, she replied:
"I have 6 children, and there are 4 years between each one and the next. I had my first child (your Uncle Peter) when I was 19. Now the youngest one (Your Auntie Jane) is 19 herself. That's all I'm telling you!"

How old is Tom's Granny?

3.Solution:
It is the digits 0 to 9 in alphabetical order.

4.Solution:
The Third Room. The Lions will be dead by now (we should punish whoever was supposed to look after them! Luckily this is just a puzzle and not real)

Sir Mokshagundam Visweswaraya

An Excellent Statesman & Eminent Engineer

Sir M Visvesvaraya, popularly known as Sir MV, was an eminent engineer, statesman, and a scholar. Mokshagundam Visvesvaraya was born on 15th September 1861 to a Telugu Brahmin family in Muddenahalli village in Chikkaballapur District. September 15th is celebrated as Engineers day, in his loving memory

Sir M Visvesvaraya -An Art Student turned Engineer

In 1881, after receiving a bachelor's degree in Arts from the Central College in Bangalore, affiliated to the Madras University, he pursued civil engineer from the reputed College of Engineering, Pune. He was even involved in the founding of the first Engineering College – Government Engineering College, Bangalore 1917 (currently University Visvesvaraya College of Engineering)

Sir MV was patented for designing automatic barrier water floodgates. These floodgates were initially installed at the Khadakvasla Reservoir near Pune in 1903. Later with successful implementation, the similar floodgates were designed and installed at Tigra Dam and Krishna Raja Sagara Dam. Sir MV was privileged enough to be sent to Aden to study the various techniques in water supply and the drainage system during the year 1906-07. Later he became societal for his impeccable contribution to make Hyderabad city flood free. His ideas helped the city of Vishakhapatnam port to be saved from sea erosion. Even at the age of 90, he undertook work on designing and advising in the building of dams across rivers.

A successful career line

After successful completion of civil engineering Sir MV, joined the PWD department, of Mumbai. Later he joined the Indian irrigation commission, where he carried out some effective irrigation techniques in the Deccan area.

Sir M Visvesvaraya's tenure as Diwan of Mysore

Sir M.V retired in 1908 and Sri Krishnarajendra Wodeyar, Maharaja of Mysore, was eager to secure the services of Visvesvaraya to serve Mysore. He joined as Chief Engineer in Mysore because he wanted challenging opportunities. Before serving as Diwan of Mysore, Sir MV served as the Nizam of Hyderabad and did some eminent services for the state. Sir MV served as the Diwan of Mysore during the period of 1912-1918. In 1955, he was honoured with Bharat Ratna. For his contributions to the public goodness, he was bestowed as Knight Commander, by King George V, during the British Indian Empire. Sir M.V. had earned a reputation for his honesty, integrity, ability and intelligence. He had introduced compulsory education in the State which later was embodied as a fundamental right in the Constitution of independent India.

During his service as the Diwan of Mysore, he was founded eminent institution such as Mysore Soap Factory, Bangalore Agricultural University, and Parasitoid Library,

State Bank of Mysore and Mysore Iron and Steel Works. During his tenure, the outlook of the Mysore had changed and many industries and public sectors came up providing good opportunities to people during his tenure as the Diwan. Sir MV was known for his timeliness, intricate ideas, dedication etc. Sir MV also played a vital role in promoting the Kannada language. Sir CM had designed the layout of Jayanagar in the South Bangalore and is supposed to be the best locality to be designed ever in Asia.

A few office held by Sir MV

1. Assistant Engineer, Bombay Government Service [in 1884]
2. Chief Engineer, Hyderabad State [he served only for 7 months starting April 15, 1909]
3. Chief Engineer in Mysore State [Nov 15, 1909]. He was also Secretary to the Railways.
4. President of Education and Industrial Development committees in Mysore State
5. Diwan of Mysore. [for six years starting 1912]
6. Chairman, Bhadravati Iron Works
7. Member of the Governing Council of the Indian Institute of Science, Bangalore
8. Member of the Governing Council of Tata Iron and Steel Company [TISCO]
9. Member of Back Bay enquiry committee, London
10. Member of a committee constituted in 1917 to make recommendations regarding the future of Indian States

Sir MV–A visionary who spearheaded development

To name few of the many things he was responsible for:

1. The architect of the Krishnarajasagara dam – or KRS or Brindavan gardens. One of the biggest dams in India which irrigate a hundred and twenty thousand acres of land. This was built at a cost of Rs 2.5 crore. It changed a barren Mandya district into rice granary, provides drinking water to Mysore and Bangalore.
2. Bhadravati Iron and Steel Works – as its Chairman he rescued it from becoming extinct.
3. Mysore Sandal Oil Factory and the Mysore soap factory
4. Mysore University – Sir M.V.'s question was "If Australia and Canada could have universities of their own for less than a million population, cannot Mysore with a population of not less that 60 lakhs have a University of its own?"
5. State Bank of Mysore (it was first named as 'The Bank of Mysore')
6. Public libraries in Mysore and Bangalore
7. Encouraging girls to attend school.
8. Mysore Chambers of Commerce
9. Kannada Sahitya Parishad or the Kannada Literary Academy
10. Sri Jayachamarajendra Occupational Institute, Bangalore – funded by the ENTIRE money [Rs 200,000] he earned from rescuing Bhadravati Iron Works.
11. In 1912 he set up Hebbal Agricultural School, now University of Agricultural Sciences.
12. In 1903 he designed automatic, weir water floodgates, installed at Khadakvasla reservoir.
13. He implemented irrigation system in Karnataka.
14. Sri Jayachamarajendra Polytechnic Institute.
15. The Bangalore Agricultural University (University of Agricultural Sciences).
16. The Century Club
17. Visvesvaraya College of Engineering, Bengaluru

Sir M Visvesvaraya's Memorable Persona

There is no dearth of interesting anecdotes about Sir MV. Some of these revolve around him being a stickler for punctuality and a strict disciplinarian; there are others that dwell on his sense of honesty, integrity, and professionalism. The fact that he was always impeccably dressed has also been well-documented.

When Sir MV was offered the position of Diwan of Mysore State, it is said that he invited his relatives for dinner. He told them that he would take up the offer on one condition: that they (the relatives) should not come and ask him to use his position as Dewan to help them get their personal work done.

Books authored and contributed by Sir MV

1. Planned Economy for India, 1861-1962, Bangalore, Bangalore Press, 1934
2. Memoirs of my Working Life, Bangalore (1954)
3. Unemployment in India: Its causes and cure, Bangalore City, Bangalore Press, 1932
4. Prosperity through Industry Move towards rapid industrialization (Second edition), Bombay, All-India Manufacturer's Organization, 1943
5. Post-War Reconstruction in India (Address at the quarterly meeting of the Central Committee, September 2, 1943), All-India Manufacturer's Organization
6. Nation building: a five-year plan for the provinces, Bangalore City, Bangalore Press, 1937
7. District development scheme: Economic progress by forced marches, Bangalore, 1940
8. A Brief Memoir of my Complete Working Life, Bangalore, 1960

Sir M Visvesvaraya's final years

Sir MV's extraordinary feats resulted in the government of India bestowing him with the Bharat Ratna award in the year 1955. The centenary of the birth of Sir MV was celebrated in Lalbagh in Bangalore. Prime Minister Nehru flew down to Bangalore by a special plane to honor the greatest son of India. Sir M.V. died on April 12, 1962, at the age of 102 years, 6 months and 8 days. As per his wish, he was cremated in his birthplace, Muddanahalli.

Puzzle

6. Smallest Integer

Can you name the smallest integer that can be written with two digits?

7. Biggest number

Can you name the biggest number that can be written with four 1s?

8. Read out the figure

A London monument is marked as follows MDCLXVI
What year does it represent?

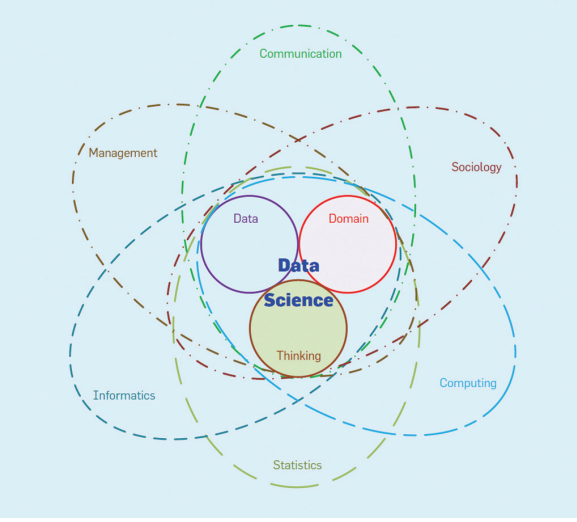
10. Solution:
This is the only number that is a sum of two cubes in two different ways
Ex: 103 + 93 = 1729 123 + 13 = 1729
This is popularly known as Ramanujan's Number

Data science: Challeges and Directions

Excerpt from Communication of the ACM,Vol. 60. No.8 Aug 2017

Data Science promises new opportunities for Scientific research, addressing, say, "What can I do now but could not do before, as when processing large scale data?";"What can I do before that does not work now, as in methods that view data objects as independent and identifically distributed variables (IID)?";What problems have not solved well previously are becoming even more complex behavioural data?";and "What could I not do before, as in deep analytics and learning?"

Definition: Data Science is a new trans-disciplinary field that builds on and synthesizes a number of relevant disciplines and bodies of knowledge, including statistics, information, computing, communication management, and sociology, to stud data following "data science thinking"



Transdisciplinary Data Science

Image Source : Communications of the ACM,Vl.60 No.8, Pg 59-68, Aug 2017

X-intelligence in Data Science

Data Science is a type of "Intelligence Science" that aims to transform data into knowledge, intelligence and wisdom. In this transformation comprehensive intelligence, or "X-intelligence", is often used to address a complex data science problem, referring to comprehensive and valuable information. X-intelligence can help inform the deeper, more structured and organized comprehension, representation, and problem solving in the underling complexities and challenges

Known-to-Unknown

Transformation

Complex Data Science problem-solving journeys taken by data scientists represent a cognitive progression from understanding known to unknown complexities in order to transform data into knowledge, intelligence, insight for decision taking b inventing and applying respective data intelligence discovery capabilities. In this context knowledge represents processed information in terms of information mixture, procedural action, or propositional rules; resulting insight refers to the deep understanding of intrinsic complexities and mechanisms in data and its corresponding physical world.

A Hybrid ac/dc Nanogrid

Excerpt from IEEE Electrification Magazine, June 2017

Following the emergence of micro grids, the concept of nanogrids has been proposed for assimilating distributed energy resources in low-voltage applications. In principle, a nanogrid has a similar structure to a microgrid, but it is spread out in a much smaller geographic area (e.g. a single building) and usually entails a much smaller capacity. Nanogrids are designed to satisfy very objectives within a micro grid. For instance, the surgery building within a hospital campus or the police station within a university campus could be regarded as critical operations that would be designed as nanogrids. The implementation of nanogrids is also a subject to fewer technological challenges than those encountered in microgrids. In accordance with increasing popularity of solar-plus-storage utilization at a single-building level, nanogrids tend to flourish wit time, thereby meeting the goals of smart-grid technoloyg to enhance the economic advantages, sustainability, reliability and resilience of electric power services supplied to electricity customers. The nanogrid was traditionally designed as a diesel-based, off-grid installation to supply basic loads in remote locations of the world. What is different here is the introduction of an ac/dc technology that utilizes control and communication strategies embedded in smart grids for supplying critical loads in an urban-based micro gird.

A nanogrid is a technologically simpler microgrid, but its implementation and operations are more flexible than a microgrid. Meanwhile, the diversity and modularity of nanogrids make them ideal for forming the basis for a nanogrid

Bespoke Processors : A new path to Cheap Chips

Excerpt from IEEE SPECTRUM, AUGUST 2017

Processors are overdesigned for most applications, says Rakesh Kumar, an Associate Professor of Electrical and Computer Engineering at the University of Illinois. It's a well known and necessary truth: In order to have programmability and flexibility, there's simply going to be more stuff on a processor than an one application will use. That's especially true of the type of ultralow-power microcontrollers that drive the newest embedded computing platforms such as wearable and Internet of Things sensors. These are often running one fairly simple application and nothing else not even an operating system) meaning that a large fraction of the circuits on a chip never, ever see a single bit of data.

The solution is a method that starts by looking the design of a general-purpose microcontroller. They came up with a rapid way of identifying which individual logic gates are never engaged for the application its going to run. They can strip away all those excess gates. The result is what Kumar calls a "bespoke processor". Its physically smaller, less complex version of the original micro controller, designed to perform all the application needed. Starting with an openMSP430 microcontroller, the produced bespoke designs meant to perform applications such as the fast Fourier Transform, autocorrelation, and interpolation filtering.

Puzzle

9. Find out the sequence

What are the next terms in the sequence?

17, 15, 26, 22, 35, 29, ...

1. Solution: 62100010000

Trending News

Biomedical Engineers are using the eyes to Gain insight into the body

Excerpt from IEEE Spectrum, August 2017

They are hard at work on futuristic-sounding technology that uses smart contact lenses and implantable lenses to diagnose, monitor and treat a wide range of diseases. To fit comfortably in or on the eye, a smart lens must measure about 14 millimetres in diameter and mere 100 to 200 micrometers thick. The small curved disk must incorporate sensors as well as microelectronics to manage power consumption, control the sensors' operations, and transmit the sensors' readings to an external device such as smart phone. In these tiny lenses, the biggest challenges are supplying power and ensuring that the sensors give reliable readings.

For the 422 million people worldwide who have diabetes, a smart contact lens with micro sensors that continuously measures glucose levels could be a life changing technology. Contact lenses offer a view into the interior of the body via the fluids that bathe the eye. For monitoring diabetes, most smart lenses use sensors that measure the glucose concentration in the basal tears, the fluids that lubricate the cornea and wash it clean of dust.

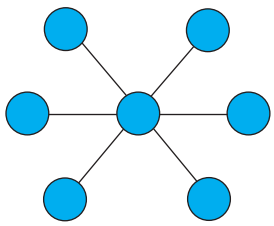
Puzzle

10. Special Number

What is special about this number 1729?

11. Number Wheel

Here is a number wheel. Can you arrange the numbers 1 to 7 in such a way as to have one of them in the centre and the rest at the ends of the diameters? The sum of the three numbers on each diameter should be same



5. Solution:
Tom's Granny is 58 years old. Let's see why:
First child born: Granny is 19
Second child born: Granny is 23 (19 + 4)
Third child born: Granny is 27 (23 + 4)
Fourth child born: Granny is 31 (27 + 4)
Fifth child born: Granny is 35 (31 + 4)
Sixth child born: Granny is 39 (35 + 4)
Sixth child is 19: Granny is 58 (39 + 19)

Department of Electronics & Communications

IETE Students Forum

The Department of ECE of the college inaugurated the IETE Students Forum (ISF) on 31st August 2017. The IETE is the National Apex Professional body of Electronics and Telecommunication, Computer Science and IT Professionals. The institution provides leadership in Scientific and Technical areas of direct importance to the national development and economy.

The objectives of ISF of the college focuses on conducting and sponsoring Technical Meetings, Workshops, Exhibitions etc., and provide continuing education to its members.

Dr Ramakoti Reddy, Hony Secretary, IETE Visakhapatnam Centre was the Chief Guest of the function. Dr P Somaraju, Secretary, GVP was the Special Guest of Honour. Dr K Raja Rajeswari, Member Governing Council, IETE and Dr EV Prasad, Principal and Dr D N Madhusudana Rao, Head ECE Department, GVPCEW were other dignitaries present on the dias. The speaker urged the students to utilize the services of IETE to gain expertise and verifiable skills in the domain of interest. The body of the GVPCEW IETE consist of

CHAIRMAN	Srividya Vangala	IV Year
HONY. SECRETARY	Kalluri Sesha Sai Savitri Sri Likhita	IV Year
PROGRAM COORDINATOR	Nanduri Lakshmi Sowjanya	IV Year
VICE-CHAIRMAN	Sagi Sai Vandana	III Year
JOINT SECRETARY	Aishwarya Khangar	III Year
TREASURER	Sakuru Sai Lakshmi Harshitha	III Year

Department of CSE & IT
CSI Students Chapter

Department of CSE and IT marked the beginning of a new venture for GVP College of Engineering for Women as it was the inauguration of its CSI Students Chapter. The idea of CSI GVPCEW Students chapter was much awaited and was finally realised through the efforts of CSE and IT department. The CSI is the largest and most professionally managed association for IT professionals in India.

The objectives of CSI student chapter of the college focuses on conducting and sponsoring Technical Meetings, Workshops, Exhibitions etc., and provide continuing education to its members. The inauguration ceremony began with the lightening of lamp by the dignitaries to seek the blessings of goddess of lord Saraswathi. Dr E V Prasad, Principal, GVPCEW welcomed the gathering and stressed on the need for the students to associate themselves with professional bodies like CSI. **Dr M L Sai Kumar, Ex Chairman, CSI, Hyderabad Division,** was the Guest of Honour and spoke on the relevance of CSI membership to an engineering graduate. **Dr Anindya Paul, Secretary, CSI, DGM (IT), RINL** was the Chief Guest and spoke about the different activities of CSI and motivated for the active participation of its members.

The programme was enlightening and inspiring for student. The members of CSI-GVPCEW consist of :

PRESIDENT	C Bala Shivani	III CSE
VICE-PRESIDENT	K Mounica Sai	II CSE
SECRETARY	N Divya	III CSE
MEMBER	G Mounika	III IT
MEMBER	D Mounica	II CSE
MEMBER	K Aishwarya	II CSE
MEMBER	A Sai Bhavana	III CSE

Call for Papers

The faculty or students who are interested in getting their articles published in the magazine can send their papers to editor@gvpcew.ac.in

Editorial Team

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Ms. G.P.S. Prashanthi,	Assistant Professor
Mr. M. Santhosh,	Assistant Professor
Ms. S. Rajeswari,	Assistant Professor
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GAYATRI VIDYA PARISHAD

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Other Institutions

GVP College for Degree & PG Courses

GVP College of Engineering (Autonomous)

GVP Centre for Policy Studies

GVP Junior College

Indo German Institute of Advanced Technology (IGIAT)

GVP College for Degree & PG Courses School of Engineering

GVP Institute of Health Care & Medical Technology

GVP MLBT School