

End of Silicon based
semiconductor pg 19

Into the fold

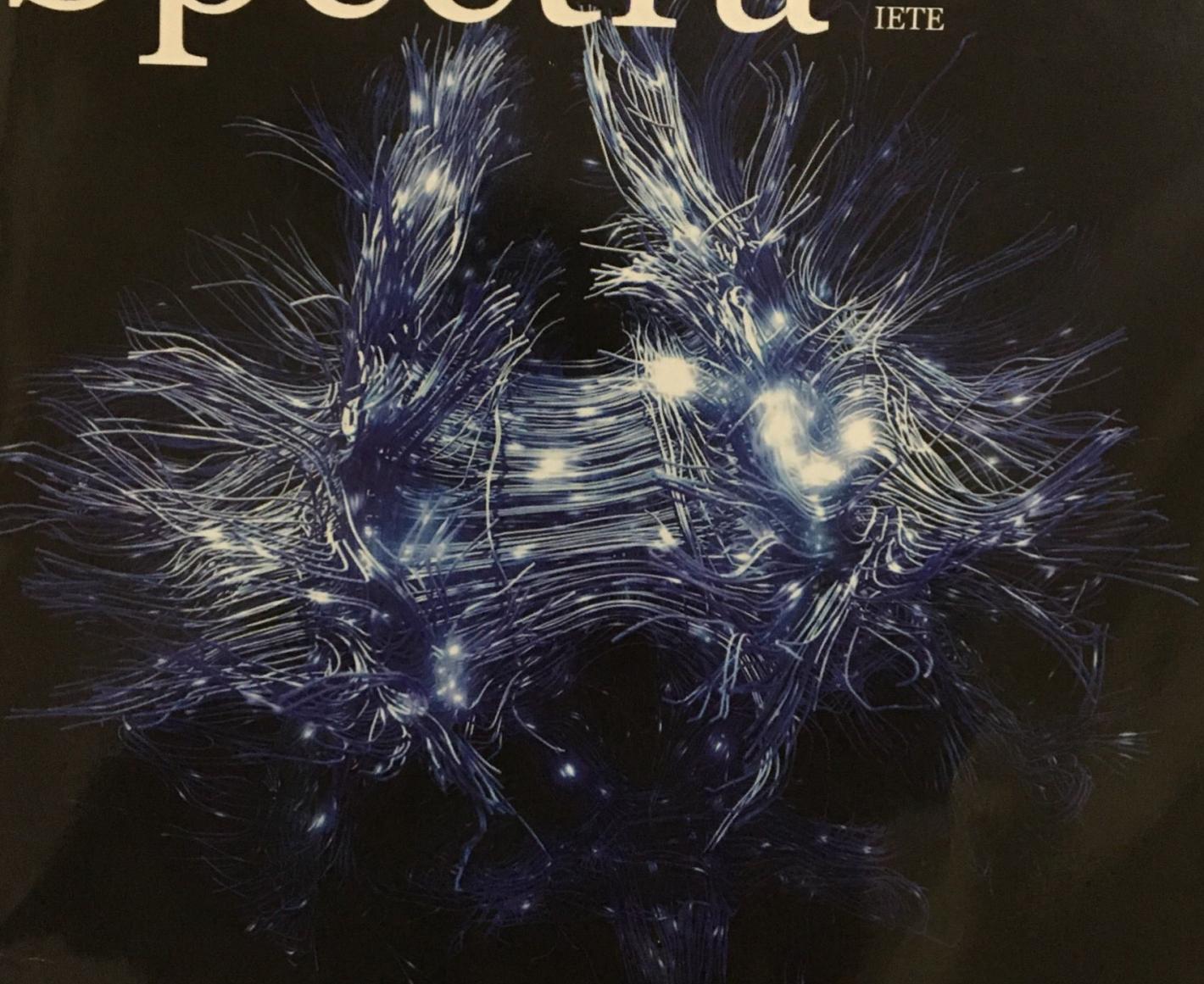
pg 14

Wonder woman
of new era

pg 11

Spectra

THE ANNUAL MAGZINE 2018
IETE



ARTIFICIAL INTELLIGENCE

Can we figure out brain wiring diagram ?

pg 14

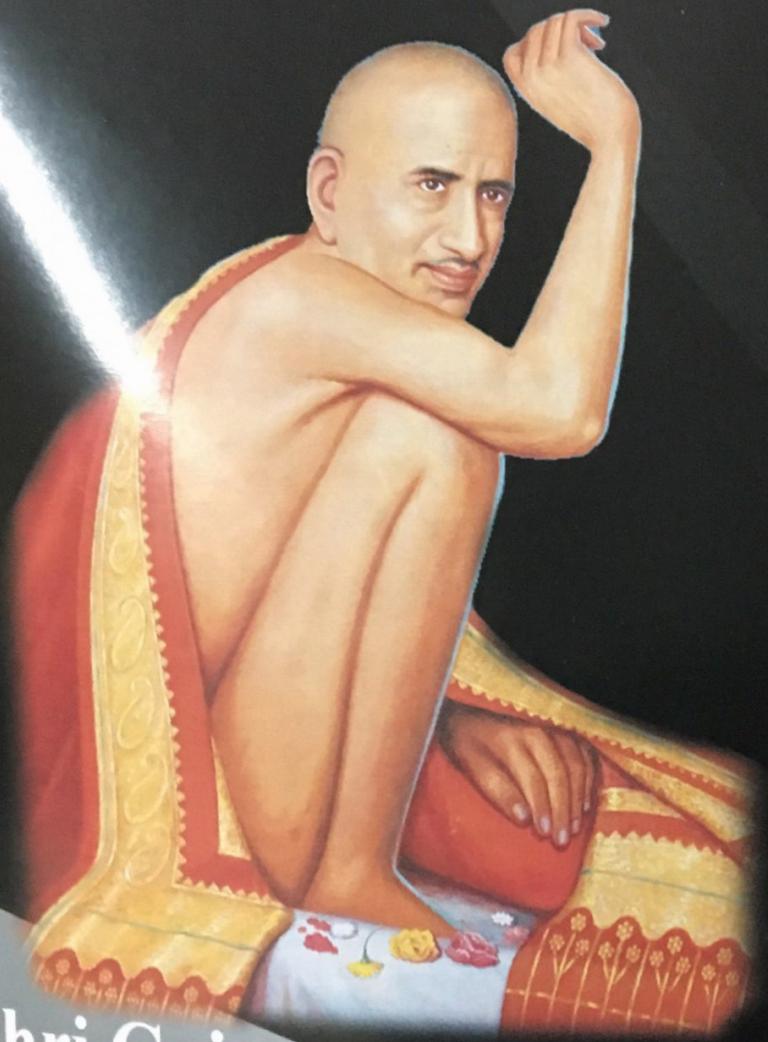


ABOUT IETE

IETE RAIT student is a branch of Institute of Electronics and Telecommunication Engineers, which is a noted institution for its dedication towards advancement of technology and science. We organize workshops, technical meetings, workshops and publish technical journals for budding Engineers. We at IETE-RAIT believe that true brilliance is only accomplished through hard work and experience. Keeping this in mind we not only bestow you with the means to achieve your goals but also groom you to be pioneers in the field. It is a platform for budding engineers to shed their inhibitions they have about their technical prowess by participating & organizing several national level technical events, technical paper presentations (TPP). Even though the passion of our workaholics has not diminished, rather it has surpassed new heights every year. Staying true to the IETE motto, IETE – RAIT has always tried to inspire the students with a spirit of inquisitiveness and to encourage them to explore and push further the limits of the technical knowledge.

The passion of our committee members and volunteers is increasing every day and helping them to elevate their overall development which is helpful for themselves and organizations.

With Inspirations From



Shri Gajanan Maharaj



Shri Satya Sai
Baba

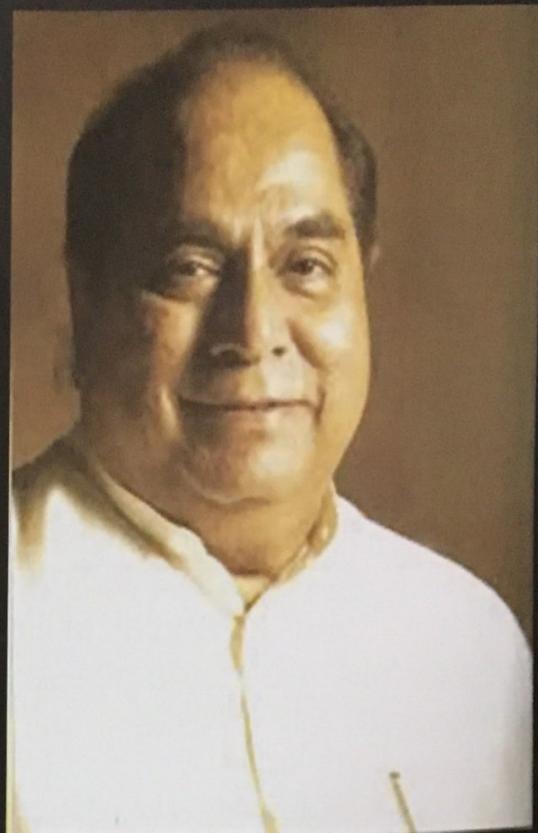
WITH BLESSINGS FROM

Padmashree Dr. D.Y. Patil

Founder's Message:

"Ego is death of life, death of ego is real life. If you follow this principle in life you are bound to succeed"

Dr. D Y Patil believed that youth in India needed a greater platform that offers multiple opportunities to educate themselves across the geography. He envisioned a goal of spreading education across the length and breadth of India by taking steps in a direction to craft each and every institute. He founded the first engineering college called Ramrao Adik Institute of Technology in Navi Mumbai offering bachelors degree in engineering in the year 1983. There was no turning back from there and today Dr D Y Patil has founded more than three deemed universities with more than 150 independent institutions in India.



Dr. D. Y. Patil,

Dr. D Y Patil – Founder, D Y Patil Group, India.

Dr. Vijay D. Patil

From president's desk

As the president, it has always been my endeavor to provide students with the best in terms of infrastructure, facilities and other inputs that transforms an institute into a temple of learning.

Since the past three decades, several alumni will vouch for the fact that R.A.I.T. provided them with a fertile ground to breed leadership skills, team spirit and build wholesome personalities that helped them to make a mark in the outside world.

This can lead to societal contribution and inclusive development which can contribute to our thriving young democracy, making our nation a force to reckon with in the global arena. This, according to me, is one of the prime



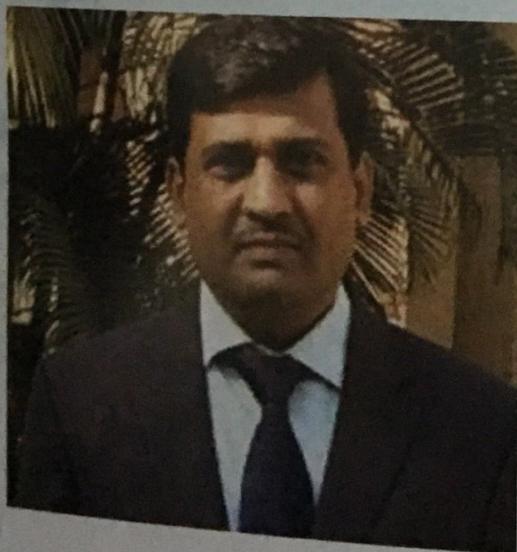
From the Principal's Desk

"The art of communication is the language of leadership." - James Humes
I am elated to see that IETE, RAIT is publishing its first magazine. The committee that strives and works diligently to render knowledge has now encouraged the young and intellectual minds to showcase their creativity and talent. Along with the eminent workshops conducted by them, it has now laid a platform for the budding engineers to dwell into their technical skills. Wishing all the committee members and the participants all success in their future endeavors.



Dr. Ramesh Vasappanavara
Principal
Ramrao Adik Institute of
Technology

From the HOD's Desk



Dr. Mukesh Patil
H.O.D of Electronics &
Telecommunication

It gives me immense pleasure to pen a few words as prologue to "Spectra 2018" exclusively meant for churning out the latent writing talent which bears immense potentiality of sharpening your communication skill as part of your over all personality development. This magazine is a forum which could aptly be used for recording events, fond memories and creative writing. The college magazine exemplifies the voyage transverse and exhibits the literary skills of our students. Congratulations to the editorial team for their determined efforts in bringing out this magazine. On this occasion, I convey my good wishes to the students of the Electronics and Telecommunications Department in their endeavors.

Editor's Note



Dear RAITians

It gives me immense pleasure to present to you IETE Spectra 2018. Truly it has been an exciting challenge to explore a wide range of contributions from fellow IETE members, all of which were of high calibre. The putting together of this edition has been a very thorough and challenging feat. The theme this year explores the stretch of AI. What was once just a dream of science fiction, has now become reality in every sphere of life. This issue of "Spectra" analyzes various aspects of this technology and the need for new ethics in the field of AI and robotics, fueled by rising dependence on technology.

Winston Churchill once said

"I always avoid prophesying beforehand because it is much better to prophesy after the event has already taken place."

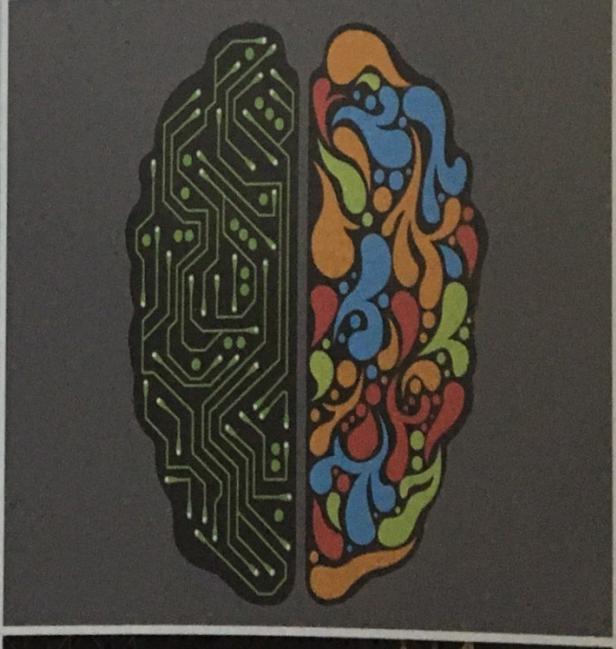
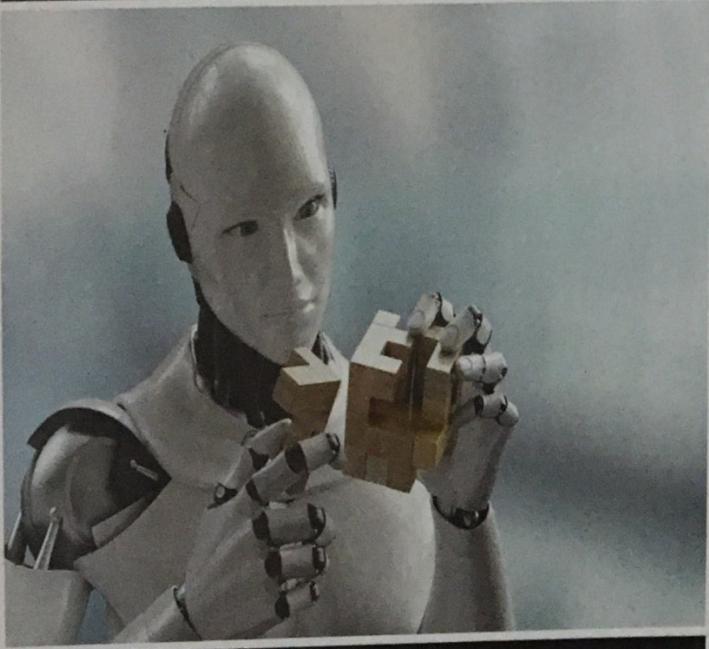
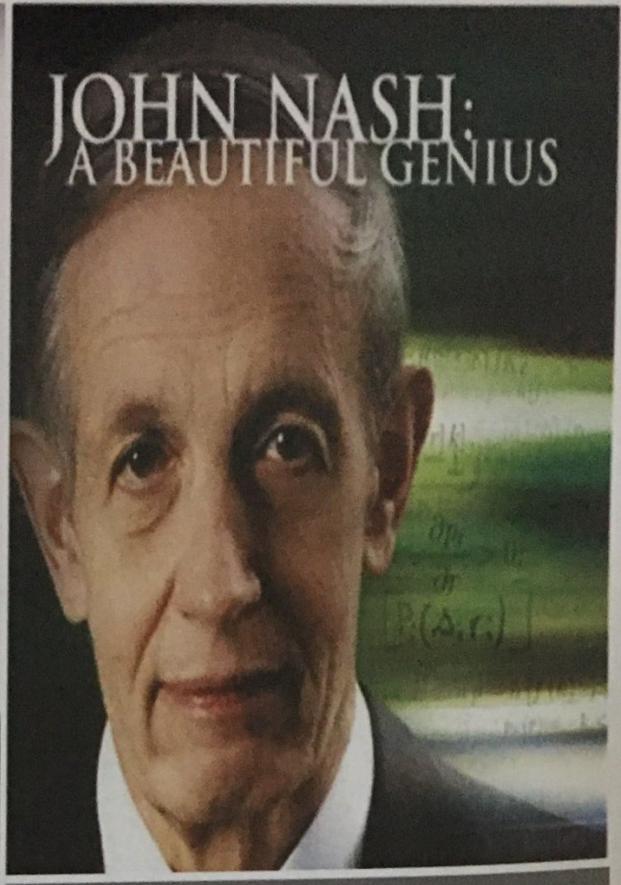
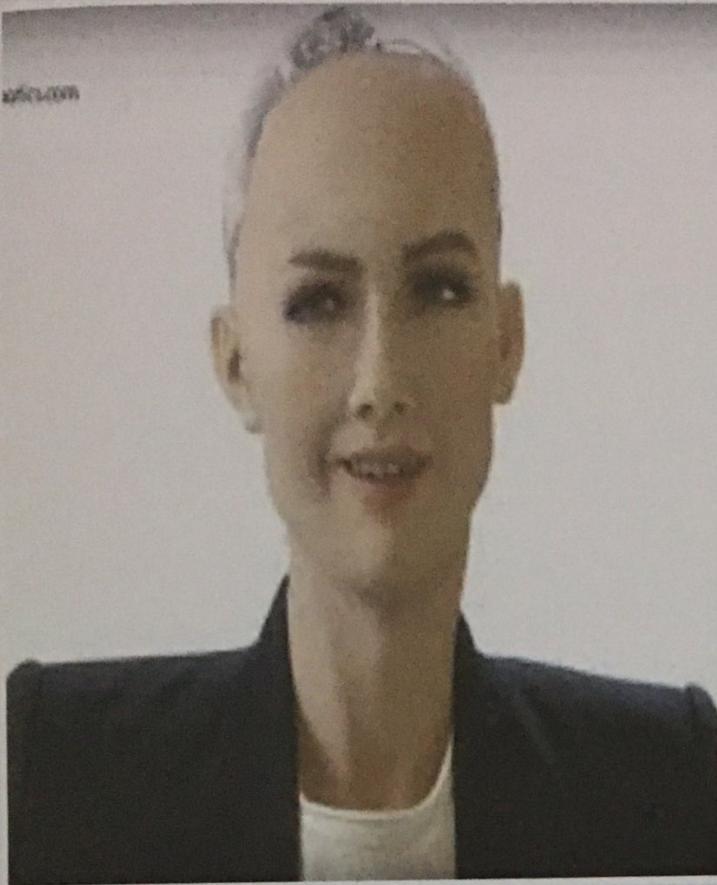
This edition has also covered the ups and downs of the great bitcoin argument. Is it a gamechanger or a bubble waiting to burst? Amid the debate, peripheral stories continue to amuse.

Lastly I would like to thank the junior editorial team and my fellow editors who made it possible.

EDITOR-IN-CHIEF
CHETAN CHAUDHARI

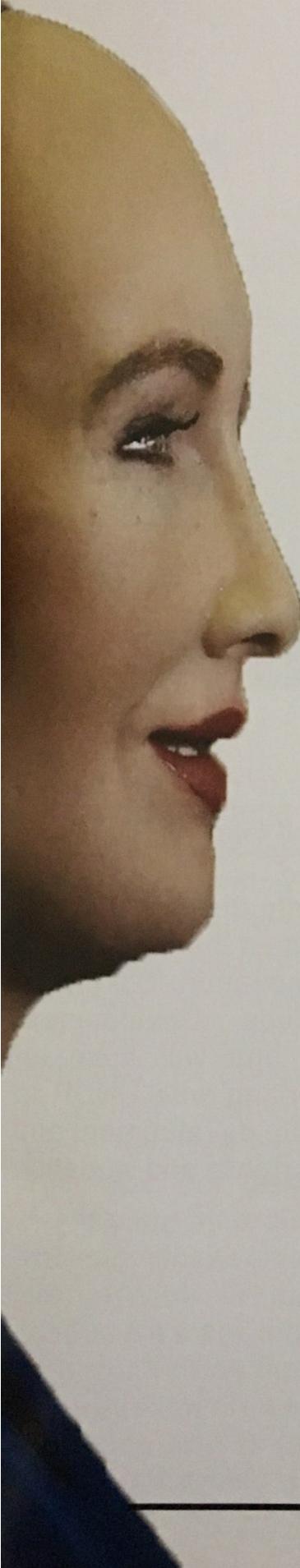
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Scanned with CamScanner



FRIEND FOR LIFE

ROBOTS CAN
ALREADY VACUUM
YOUR HOUSE AND
DRIVE YOUR CAR.
SOON, THEY WILL
BE YOUR COMPANION.

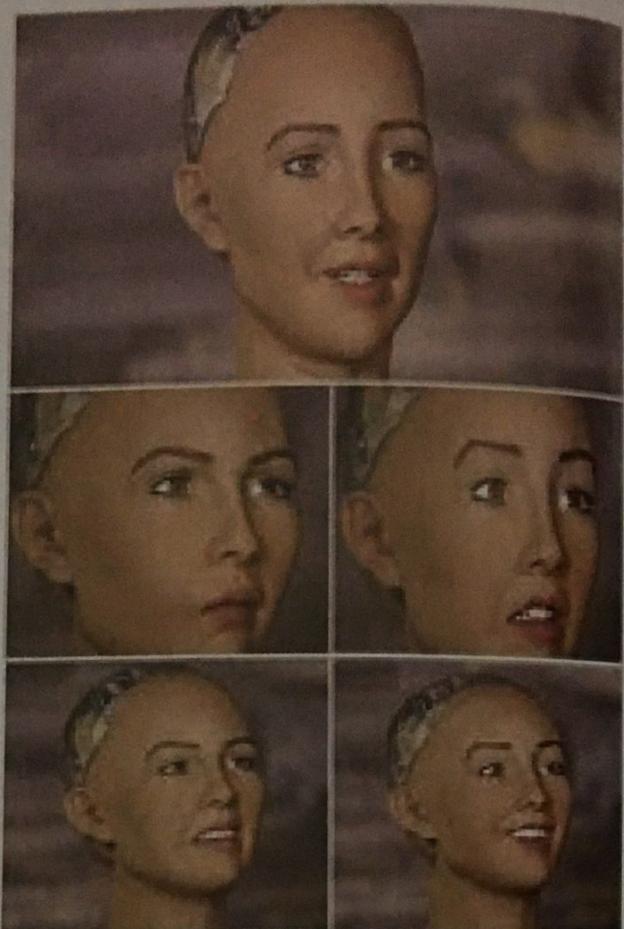
ARTICLE BY ANAM SADIYA



Pepper, Japan's first affordable social robot, goes on sale in February.
It can read emotions and will be a platform for new apps.

WONDER WOMEN OF NEW ERA

Sophia is Hanson Robotics' latest and most advanced robot to date and a cultural icon. She has become a media darling, appearing on major media outlets around the world, igniting the interest of people regardless of age, gender, and culture, even gracing the cover of one of the top fashion magazines. Sophia is a highly sought-after speaker in business and showed her prowess and great potential across many industries. She has met face-to-face with key decision makers in banking, insurance, auto manufacturing, property development, media, and entertainment. In addition, she has appeared onstage as a panel member and presenter in high-level conferences, covering how robotics and artificial intelligence will become a prevalent part of people's lives. Her reputation extends



in the pic; Sofia and Emotions

beyond business into the global social arena. She was named the world's first United Nation Innovation Champion by United Nations Development Program (UNDP) and will have an official role in working with UNDP to promote sustainable development and safeguard human rights and equality.



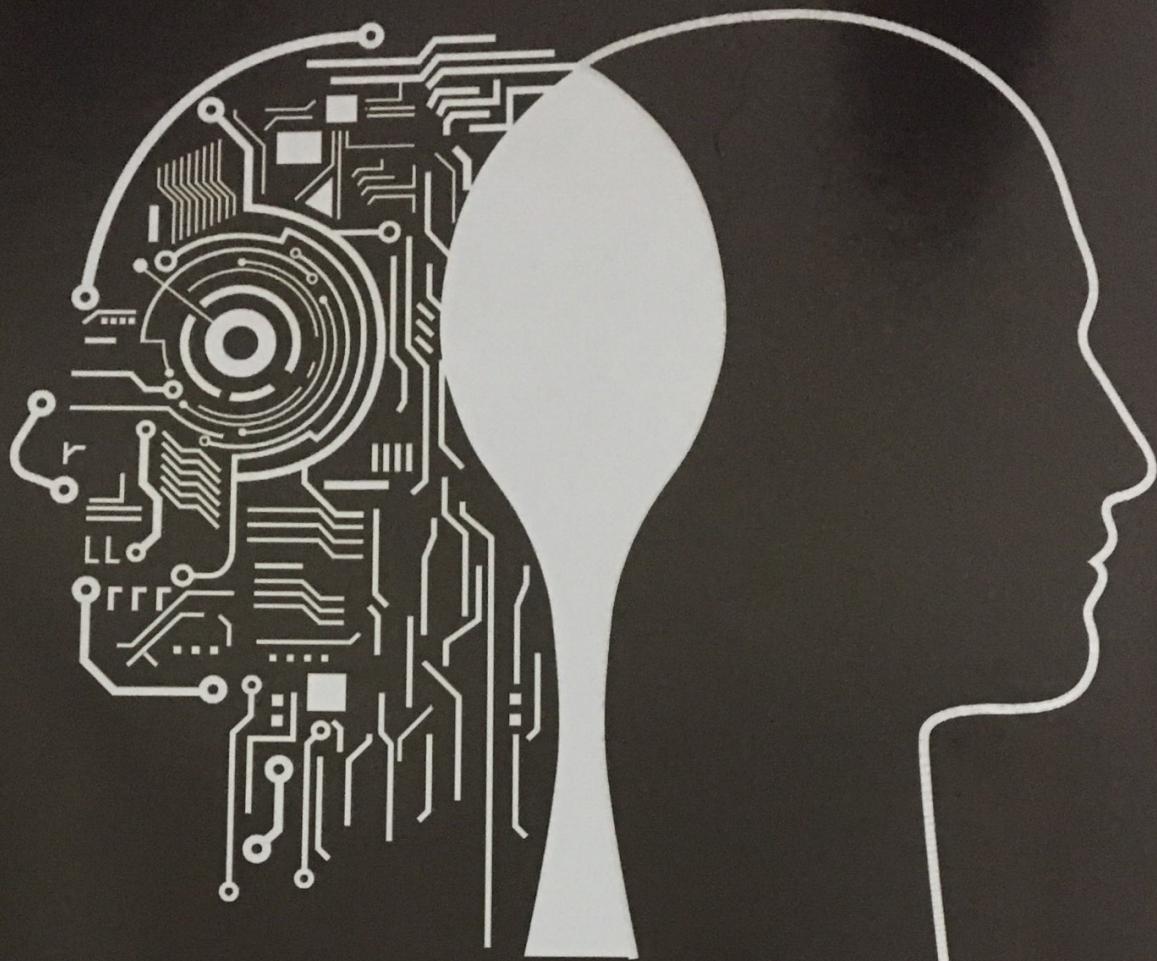
ETHICAL DILEMMAS OF ROBOTS

Jia Jia is a humanoid robot from china

If the idea of robot ethics sounds like something out of science fiction, think again. Scientists are already beginning to think seriously about the new ethical problems posed by current developments in robotics. At the top of their list of concerns is safety. Robots were once confined to specialist applications in industry and the military, where users received extensive training on their use, but they are increasingly being used by ordinary people. Robot vacuum cleaners and lawn mowers are already in many homes, and robotic toys are increasingly popular with children. As these robots become more intelligent, it will become harder to decide who is responsible if they injure someone. Is the designer to

blame, or the user, or the robot itself? Isaac Asimov was already thinking about these problems back in the 1940s, when he developed his famous "three laws of robotics". If we are to provide intelligent answers to the moral and legal questions raised by the developments in robotics, lawyers and ethicists will have to work closely alongside the engineers and scientists developing the technology. And that, of course, will be a challenge in itself.

Human-level AI: how far are we?



Already artificial intelligence can do many things that humans cannot. But how far away are we from building "human-like" AI? What are the key problems that we need to solve before we get there? To answer this question I will propose that there are five milestones that must be conquered in order to machines to become as intelligent as humans: generalization, transfer learning, learning without being taught, common sense and self-awareness. Let's look at them, in turn, and see where we stand today in the roadmap towards human-level AI.

1) Generality

This means that we have developed an approach, or a systems architecture that can be applied to any problem independent of the domain.

Status



2) Learning without being taught

Status



3) Common sense and Self awareness

This is a really hard problem. Take for example the sentence “Sania Nehwal won the Badminton Women’s Singles Bronze medal in the London Olympics”. When you read this sentence you instantly, and implicitly, assume a long list of things; for example, that Sania got wet in achieving the medal, that he had to take his socks off before he went into the pool, etc. This association of logical hypotheses to the original statement is extremely hard to code affectively in a computer. We are still along way from solving for common sense. But, a good start, would be to look into what neuroscience can teach us about the way we form, retain and use memories. The function of human memory is perhaps the key to developing approaches for common sense in machines.



Will AI Ever Become Conscious, And How Would We Know if It Did?

Scientists are also exploring whether consciousness is a computational virtual process. Some scholars have argued that the creative moment is not at the end of a deliberate computation. For instance, dreams or visions are supposed to have inspired Elias Howe's 1845 design of the modern sewing machine, and August Kekulé's discovery of the structure of benzene in 1862. A dramatic piece of evidence in favour of consciousness existing all on its own is the life of self-taught Indian mathematician Srinivasa Ramanujan, who died in 1920 at the age of 32. His notebook, which

was lost and forgotten for about 50 years and published only in 1988, contains several thousand formulas, without proof in different areas of mathematics, that were well ahead of their time. Furthermore, the methods by which he found the formulas remain elusive. He himself claimed that they were revealed to him by a god while he was asleep. The act of observation can freeze and even influence atoms' movements, as Cornell physicists proved in 2015. This may very well be an explanation of how matter and mind interact. It is possible that the phenomenon of consciousness requires a self-organising system, like the brain's physical structure. If so, then current machines will come up short. Perhaps it's true that only biological machines can be sufficiently creative and flexible. But then that suggests people should or soon will start working on engineering new biological structures that are, or could become, conscious.

THE *bitcoin* MANIA

FROM BARTER TO BITCOIN

In stone age days we used to rely on barter system to trade where goods were exchanged for goods. gradually money came into existence which carried certain values and got accepted as a payment medium for transacting an goods and services. In Bronze age currency was more a kind of Commodity Money an objects that have value in themselves as well as value in their use as money. Shekel was used by Mesopotamian, ancient China, Africa & India used cowry shells.If you are wondering what shekel is - In bronze age, it was more of a Commodity Money that has value in itself as well as value in its use as money. Shekel was used by Mesopotamian, ancient China, Africa & India used cowry shells.

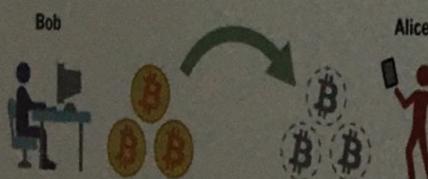




THE BITCOIN GAME

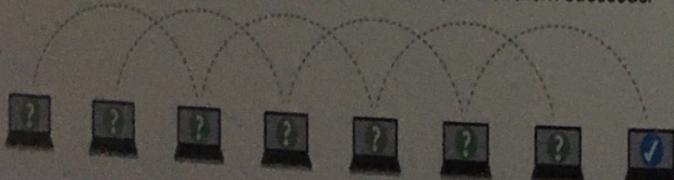
THE TRANSACTION

Bob sends some bitcoins to Alice, both use pseudonyms to keep their identities secret.



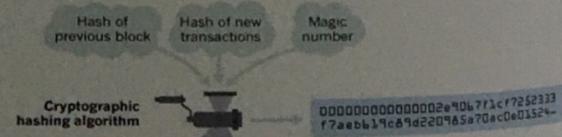
THE MINERS

Digital copies of the transaction are passed to **miners** for verification. The miners are individuals or groups running the **Bitcoin software** in a worldwide network of independent computers. They compete to turn the latest transactions into a **block**. Roughly every ten minutes, one of them succeeds.



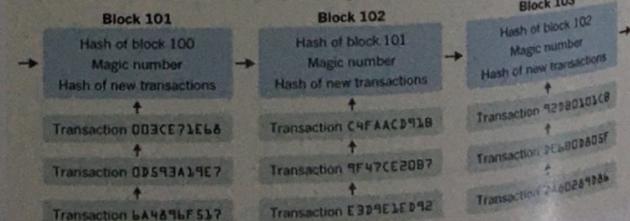
THE WINNING BLOCK

Encrypting the transactions creates a **hash** — a seemingly random sequence of numbers and letters. The miners try to find a **magic number** that when encrypted alongside the transactions and the most recent block in the chain creates a hash that starts with a particular number of zeros. Although this number is very hard to find, once a solution has been found it can be verified easily by the other miners. The first miner to solve the problem is rewarded with bitcoins, and the block is added to the **block chain**.



THE BLOCK CHAIN

The block chain is an online ledger that records every Bitcoin transaction ever made. A copy of the block chain is held by each miner and it is used as proof of ownership for all bitcoins. Chronological order is very important in the chain. If Bob has already spent his bitcoins elsewhere it will be recorded in the block chain and his transfer to Alice will be rejected.



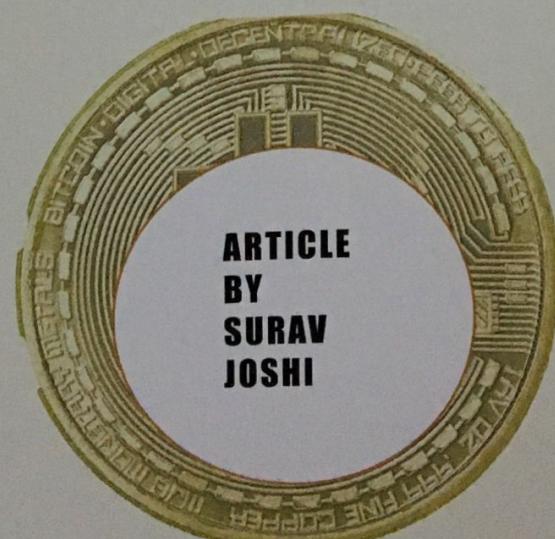
Now a Million Dollar Question

WILL BITCOIN REPLACE ALL EXSISTING CURRENCIES ?

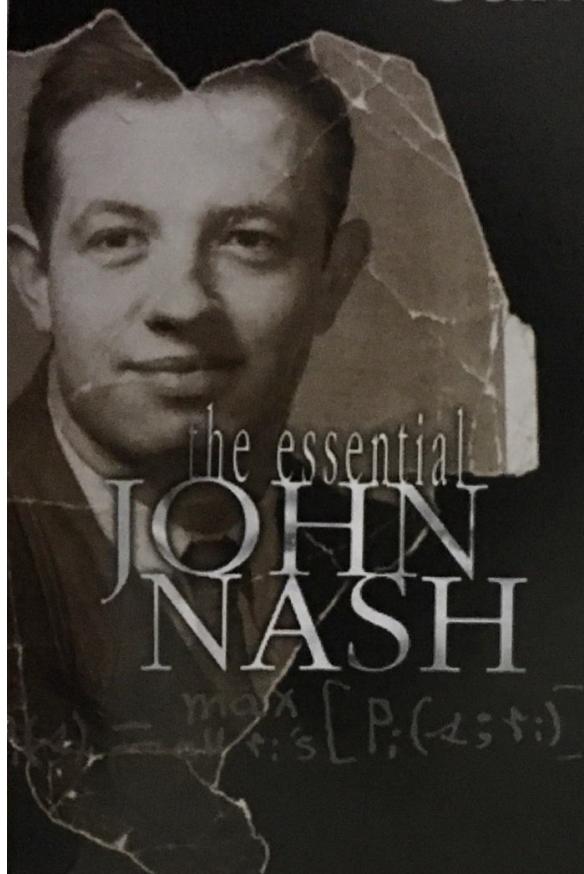
Jamie Dimon, the CEO of JPMorgan Chase & Co., recently slammed bitcoin in no uncertain terms: It "won't end well," he said, calling the cryptocurrency a "fraud" and "worse than tulip bulbs."

Is Dimon right? It depends. In at least two important ways, bitcoin and other cryptocurrencies will probably fail to achieve the dreams of their creators and enthusiasts. They are unlikely to usher in a hard-money revolution, and are also unlikely to supplant national fiat currencies as the standard means of payment. But that doesn't mean they won't change the world.

Many bitcoin enthusiasts believe that the digital currency will create what amounts to a new gold standard. The basic logic is that the number of bitcoins in existence is limited, while the number of dollars is not. Simple intuition says that if you create more of something, its value goes down in other words, central bank money-printing makes the dollar slowly lose value over time through inflation.



Game Theory



Who was John Nash?

John Nash Jr. renowned for his breakthrough work in mathematics and game theory as well as for his struggle with mental illness, died in an automobile accident May 23 when he was 86. Born on June 13, 1928, in Bluefield, his father, John Sr., was an electrical engineer. To step in his father's shoes, he entered Carnegie Mellon University (then called Carnegie Institute of Technology) in Pittsburgh. But he was vexed at the regimentation of the coursework and switched to mathematics, encouraged by professors who recognized his mathematical genius. He invented a game, known as Nash, that became an obsession in the Fine Hall common room. He also took on a problem left unsolved by Dr. von Neumann and Oskar Morgenstern, the pioneers of game theory, in their now-classic book "Theory of Games and Economic Behavior".

Nobel Award

John Forbes Nash

NASH EQUILIBRIUM

Dr. Nash's theory of noncooperative games, published in 1950 and known as Nash equilibrium. Nash equilibrium is the solution to a game where each player thinks about his best strategy irrespective of what others would be doing. John Nash used a situation called the "Prisoners Dilemma" to explain Game theory to students of psychology. The concept is that, in a closed cell, a prisoner would rather seek to maximise his gains than to "cooperate".

A Game of Probability



Article by Gunjan Kuhikar

Why Clusters Of Like Businesses Thrive?

Pizza Hut located right next to Domino's Pizza. Starbucks placed across the street from Burger King, 3 petrol stations on the same intersection. Have you ever wondered why restaurants, gas stations, and cafes are usually crowded in one singular spot? There might be an occasion where you had been driving for hours without seeing a petrol station, but when you spot one, you see a couple more clustered together as well.

Although it might seem more logical for similar businesses to move further away from one another, business theories show that it is not optimal for competitors to be placed extremely far from one another.

Imagine that there are two hamburger stalls that are located on the same stretch of a 100m street, and the road is a straight line. Both agree to place their stall evenly along the road, so that stall A will gain all the customers from the left of the middle and stall B will get customers from the right of the middle, creating what is known as the socially optimal solution minimizing the distance required to reach either one of the stalls and both stalls gaining equal benefits from the placement of their stalls. Progressively, both burger stalls will want to attract more customers than its rival, causing them to move nearer towards the centre of the street. Consequently, both stalls will eventually end up in the middle of the street the central point, both serving 50% of the customers.

Explanation of Facebook's agreement to pay such a heavy price for this purchase of what's app through game theory

Facebook's strategy was simple: price out the rivals from the market. Initial reports had claimed that Google had bid \$10 billion for the company, just about half of the amount Facebook offered later it was raised. It is an example of a game theoretic exercise, where firms try to out-think each other in a competitive market.

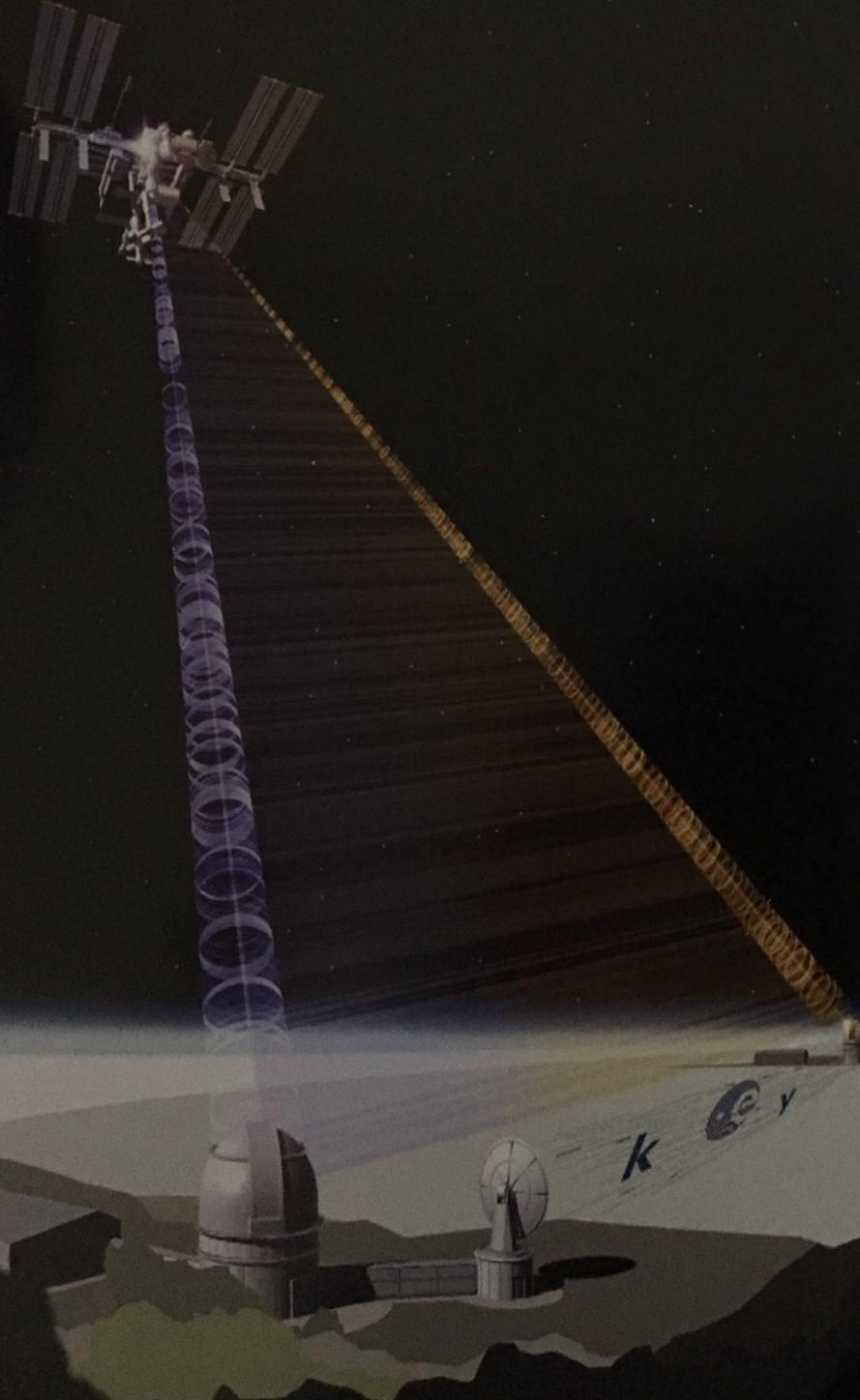
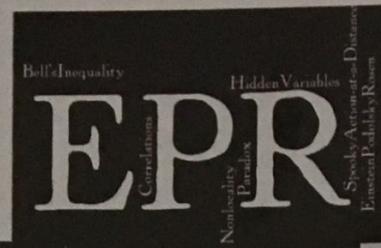
QUANTUM TELEPORTATION

Spooky action at a distance

Article by Sharvari ,SE

QUANTUM ENTANGLEMENT, as the name suggests, it is linking of something. Here, it means the linking of particles in such a way that the measurement of one particle's quantum state determines the possibility of other particles quantum states. The best advantage of this linking is even if these entangled particles are separated by billions of miles, the changes made in one particle will induce change in other particle.

Einstein, Podolsky and Rosen together named this thought experiment as EPR paradox and attempted to show that the quantum mechanical theory was incomplete. As decades passed by many other scientists also called it incomplete but John Bell proved the Principle Of Locality. This led to many other pioneering works of freedman clauser which agreed with quantum mechanics.

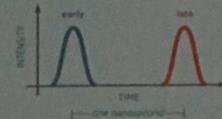
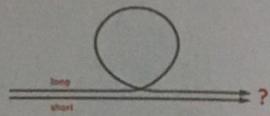


HOW TO TELEPORT QUANTUM INFORMATION OVER 100 KM of FIBER

CREATING THE QUANTUM STATES

The NIST experiment adds quantum information to a photon in its position in a very small slice of time.

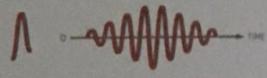
The photon can take a short path, or a long path, with a 50/50 chance ...



So it can be either "early" or "late" in the time bin.

If we don't know which, then it's both—a quantum "superposition" in time.

If the photon is in a superposition of two states, they can be "in phase"—the peaks of their waves lining up with each other ...

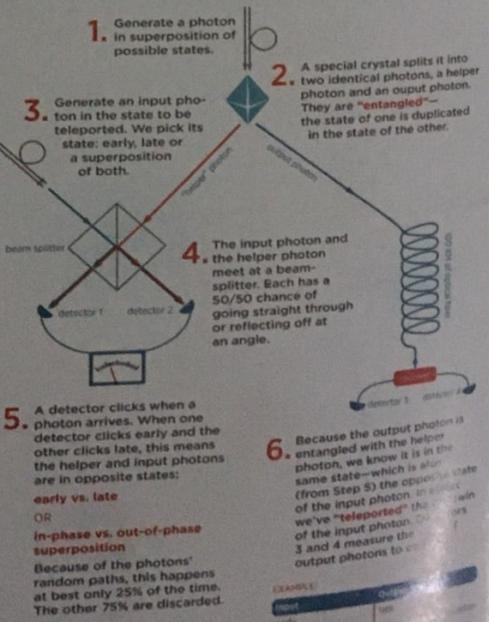


OR
"out of phase", with their waves cancelling each other out.



Simultaneous out-of-phase photons cancel out.

THE EXPERIMENT



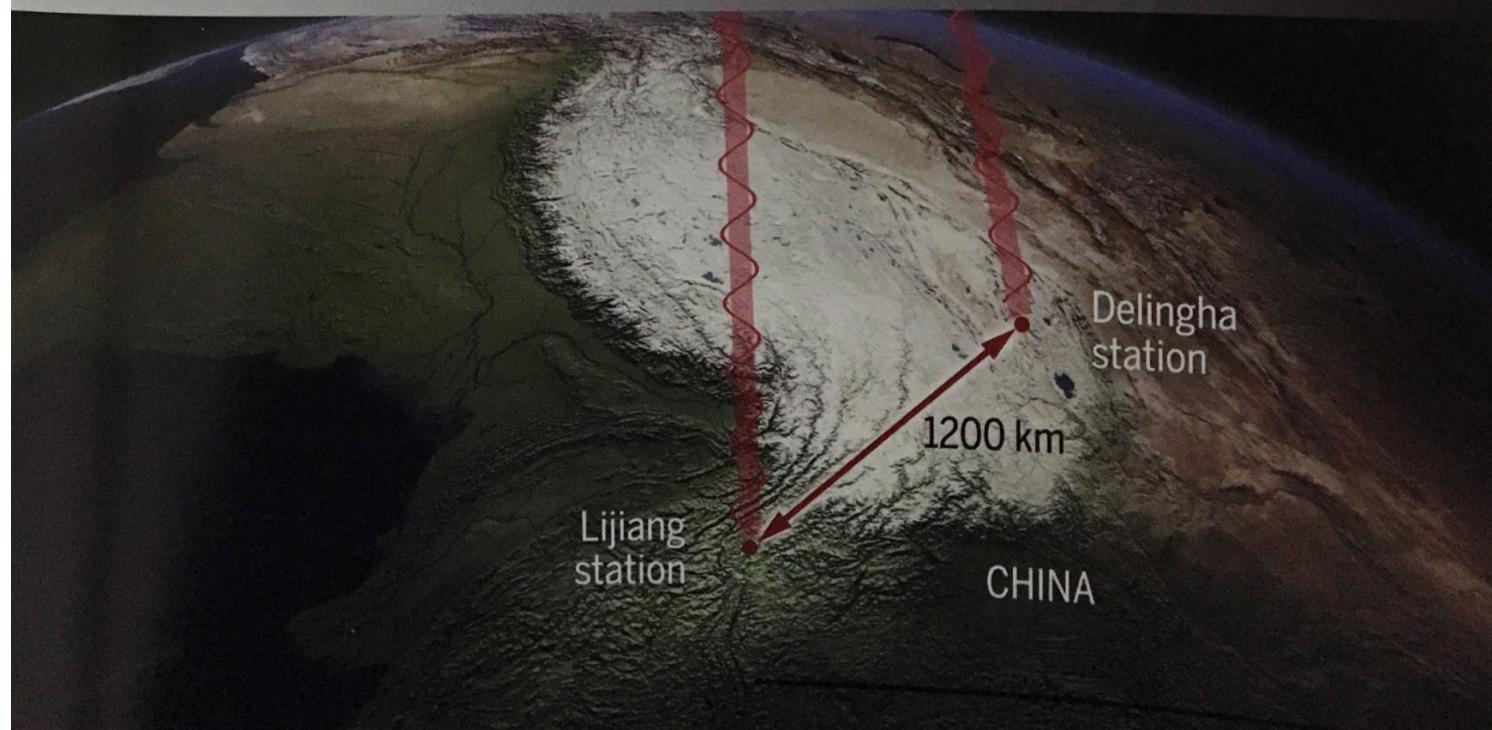
EXAMPLE
IN-Phase Out-Of-Phase
In-Phase Superposition 1 0.25 0.75
Out-Of-Phase Superposition 0.75 0.25



5.9 million entangled pairs/second

THE WORLD'S FIRST QUANTUM-COMMUNICATIONS SATELLITE

The Quantum Experiments at Space Scale (QUESS) satellite, which lifted off from the Jiuquan Satellite Launch Center in northern China at 1:40 a.m. local time, successfully entered orbit at an altitude of 500 kilometres. Quantum communications are secure because any tinkering with them is detectable. Two parties can communicate secretly by sharing an encryption key encoded in the polarization of a string of photons. Any eavesdropping would leave its mark. At the heart of their satellite is a crystal that produces pairs of entangled photons, whose properties remain entwined however far apart they are separated. The craft's first task will be to fire the partners in these pairs to ground stations in Beijing and Vienna, and use them to generate a secret key. Eventually, quantum teleportation in space could even allow researchers to combine photons from satellites to make a distributed telescope with an effective aperture the size of Earth and enormous resolution. You could not just see planets, but in practise read license plates on Jupiter's moons!



THE NEW ERA OF SEMICONDUCTORS

ARTICLE BY-KUNAL KAPOOR

THE TECHNOLOGICAL BREAKTHROUGHS THAT MIGHT BE AN ALTERNATE FOR TRADITIONAL SILICON SEMICONDUCTORS.

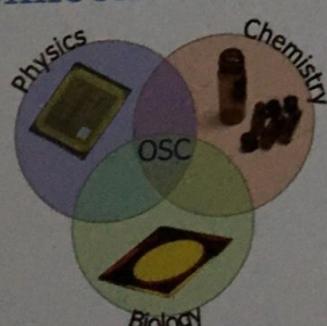
As the world grows ever hungrier for laptops, iPhones, solar cells, and lights, the race for next-generation semiconductors is on. When it comes to semiconductors silicon is the king, but for how long, is a different way to ask the question. Historically, there have been many materials looked after, but silicon has satisfied most of the criteria as it forms a nice stable oxide, it can also be doped as p and n-type, also relatively stronger and stable. Now with the enormous infrastructure that has been built around silicon and the amount of knowledge that has been obtained it is hard for other materials to compete with silicon for computation. However, if you look at the different roadmaps the silicon industry is approaching fundamental limits. As a result, there are several trends emerging. Some are considering organic semiconductors others are looking for high power electronic materials.

SEMICONDUCTORS
are the devices that
have conductivity
less than metal and
more than non metals

Carbon alone is not a semiconductor. But certain arrangements of carbon atoms allow charge to flow through the system. Earth is rich in carbon. So now scientists are taking our most abundant element and using it to do something that we're currently doing with the rare-earth elements. Beside this in polymers, we can manipulate both their molecular structure and atomic structure to get flexible properties that we may not be able to get from naturally occurring materials. So, if you have an irregular surface and you want to cover it with, say, solar panels, then, maybe you can get an organic that can bend and fit around it.

What are organic semiconductors?

Organic semiconductors, are solids whose building blocks are polymers of carbon. Polymers are larger molecules made from smaller ones. If you think about a pearl necklace, a pearl would be your molecule but the necklace would be your polymer.



why Organic semiconductors?

Everyone wants a mobile phone, everyone wants a laptop, everyone wants a flat-screen TV, and we need semiconductors to do this. Silicon being the most prevalent. Everyone knows silicon—Silicon Valley that drives our computer industry. The manufacturing of silicon is not trivial. Most of the costs of your computer are not the plastic and stuff that's outside; it's the inside. It's the chips and the processing of silicon. Also, there are handheld devices that require "rare-earth" metals, because they're not as abundant as other elements. If we're all depending on these rare-earths, somebody's not going to be able to have a phone.



ORGANIC SOLAR CELLS

Unlike the inorganic solar cells widely used today, organics can be made of inexpensive, flexible carbon based materials like plastic. Manufacturers could churn out rolls of them in a variety of colors and configurations, be laminated into almost any surface. Organics notoriously poor conductivity has slowed research on it. However, University of Michigan researchers have found a way to coax electrons to travel much further, than was previously thought possible in the materials often used for organic solar cells and other organic semiconductors. With this breakthrough technology like this could help us produce power in a way that's inexpensive and nearly invisible.



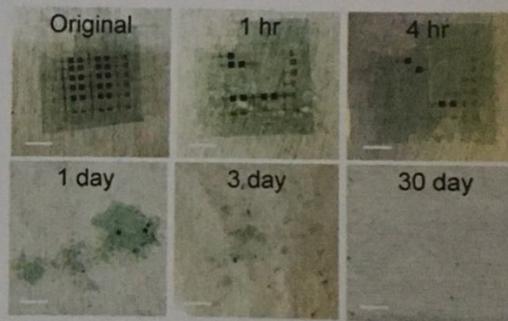
A flexible and biodegradable semiconductor developed at Stanford university



A study from UN recently found that 50 million tons of electronic waste, were thrown out in 2017, which is more than 20 percent higher than the amount thrown out in 2015.

BIODEGRADABLE SEMICONDUCTORS

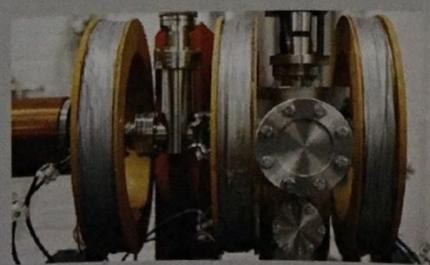
We engineers know how to develop new technology in electronics, but are way far behind in managing the e-waste developed by them. In Stanford, a team led by Zhenan-Bao has developed a flexible electronic device that can easily be degraded into non-toxic compounds just by adding a weak acid like vinegar to it. The key to this new semiconductors is a polymer that degrades into harmless organic molecules. It won't just fall apart while you're using it, though. Apart from the polymer and the degradable electronic circuit, the team has also developed a new cellulose-based biodegradable substrate material for mounting the electrical components. According to them, this substrate supports electrical components, flexing and moulding to rough and smooth surfaces alike.



Beryllium-Doped Gallium Nitride: The Next Generation of Power Electronics?

The world has seen a great change in magnitude of energy efficiency when we moved from traditional light bulbs to LEDs. One such breakthrough is doping of beryllium in Gallium nitride which will reduce the power loss due to a traditional silicon semiconductor. Gallium nitride is used in the devices that require high power.

There has been a greater demand for gallium nitride in power industry. To make the devices that have higher power requirement, like electric cars where we need structure based on a semiconductor that allows minimising power loss and can dissipate heat efficiently. To achieve this, adding beryllium into gallium nitride shows great promise.

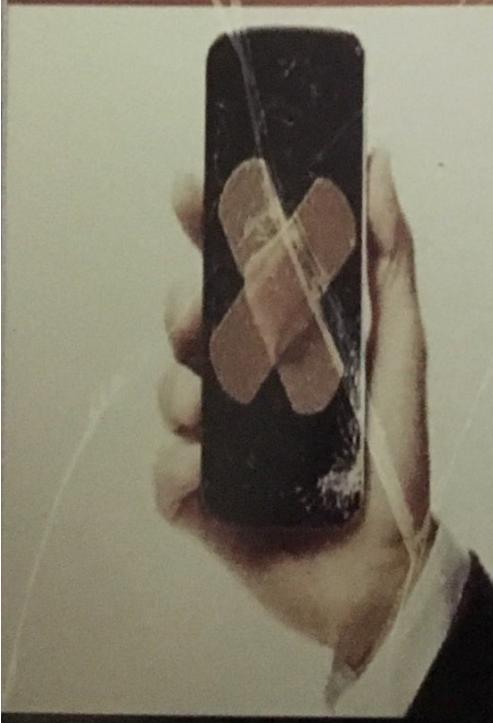


Experiments with beryllium doping were conducted in the late 1990s however the work was unsuccessful and research on beryllium was largely discarded. Thanks to advances in computer modeling and experimental techniques, researchers at Aalto University and collaborators have now managed to show that beryllium can actually perform useful functions in gallium nitride.

If the beryllium doped gallium nitride structures and their electronic properties can be fully controlled, power electronics could move to a whole new realm of energy efficiency. It could be possible to cut down the global power consumption by up to ten percent by cutting the energy losses in power distribution systems.

SELF-HEALING GLASS

SELF-
HEALING
GLASS...
NO MORE
CRACKED
PHONE
SCREENS?



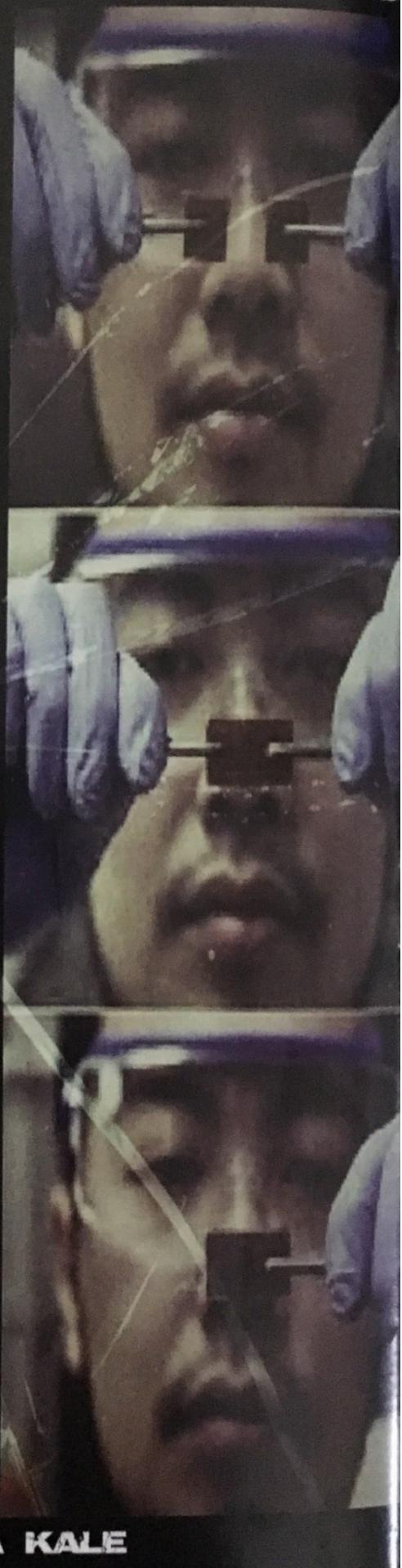
Got a crack on your new phone, heart breaking right? Well not from now. If not your heart but your phone screens can be fixed, want to know how, then keep reading.

A Japanese researcher has developed - by accident - a new type of glass that can be repaired simply by pressing it back together after it cracks.

The discovery opens the way for super-durable glass that could triple the lifespan of everyday products like car windows, construction materials, fish tanks and even toilet seats.

Yu Yanagisawa, a chemistry researcher at the University of Tokyo, made the breakthrough by chance while investigating adhesives that can be used on wet surfaces. Yanagisawa, who was a research student in the lab of Professor Takuzo Aida, told it is not realistically about fixing what is broken, more about making longer-lasting resin glass... We may be able to double or triple the lifespan of something that currently lasts for 10 or 20 years."

Unlike the non-crystalline, high molecular weight polymers used for glass materials, the new low molecular weight polymers, when cross-linked by dense hydrogen bonds, "give mechanically robust yet readily repairable materials, despite their extremely slow diffusion dynamics," said researchers in their paper.



WRITTEN AND ILLUSTRATIONS BY NIKITA KALE
SE-EXTC

THE APPLE ANGLE

In anticipation of the iPhone 6, there were rumours that Apple was working on introducing Sapphire glass to protect the display. The rumoured iPhone 6 was to feature sapphire glass which was said to be nearly twice as hard as standard glass coming close to diamond. While it was said to be almost impossible to scratch and was claimed to be 'unbreakable'.

Turns out that it didn't work out that well as Apple ran into manufacturing issues. Sapphire is thicker and bulkier than regular glass, which is a problem considering smartphones are going thinner and lighter.

Currently, Apple uses a special ionised glass on the iPhone X and iPhone 8 which it claims to be the hardest glass of its kind used on a smartphone, though this also breaks when dropped.

"The new material thiourea anomalously forms a zigzag hydrogen-bonded array that does not induce unfavourable crystallization," they explained.

Most of the self-healing hard polymers created in the lab need to be exposed to high heat of atleast 120 degrees Celsius to basically melt the tangled polymer chains and reset the covalent bonds. The new material, known as a polyether thiourea, doesn't do that because its hydrogen-bonded thiourea are non-linear and break up any crystalline structure. The material is capable of healing fine cracks in as little as 30 seconds. All you need to do is press the edges together, and wait for them to stick. You don't even need heat, room temperature will do just fine. After a few hours, the material should perform just as it did before the break. The key to this process is the hydrogen bonds between hydrogen and sulphur atoms.

DOES THIS MEAN THAT WE WILL HAVE UNBREAKABLE SMARTPHONES IN NEAR FUTURE?



"I HOPE THE REPAIRABLE GLASS BECOMES A NEW ENVIRONMENT-FRIENDLY MATERIAL THAT AVOIDS THE NEED TO BE THROWN AWAY IF BROKEN,"
YANAGISAWA

JAPANESE SAGA

IN JAPAN THERE IS AN OLD FOLK TALE IN WHICH THE FEMALE SERVANT OF A SHOGUN BROKE A DISH TO TEST HIS LOVE FOR HER. THE TEST DIDN'T WORK OUT SO WELL, AND THE SHOGUN KILLED HER AND THREW HER BODY DOWN THE WELL. SHE THEN RETURNED AS A GHOST AND COUNTED THE REMAINING PLATES UNTIL THE SHOGUN DECIDED TO KILL HIMSELF TOO.

AND IF THEY'D ONLY HAD THIS COOL NEW MATERIAL, DEVELOPED AT THE UNIVERSITY OF TOKYO, BACK IN THE 17TH CENTURY, THOSE TWO CRAZY KIDS COULD HAVE SETTLED DOWN TOGETHER AND GOTTEN SENSIBLE RETIREMENT SAVINGS PLANS INSTEAD OF ALL THAT MURDER AND MAYHEM.

Clearly, everyone's hoping this technology can be used in phone screens. There's still a lot that could go wrong before that happens, though. The polymer needs to optically clear enough to have a display under it, and we don't know anything about its resistance to scratches. The polymer may also prove too expensive to produce in large volumes for phone screens. That's what doomed sapphire glass production for smartphone screens. Even if it costs a bit more, some people might prefer that to paying for a screen repair.

REVERSING PARALYSIS

INTRODUCTION

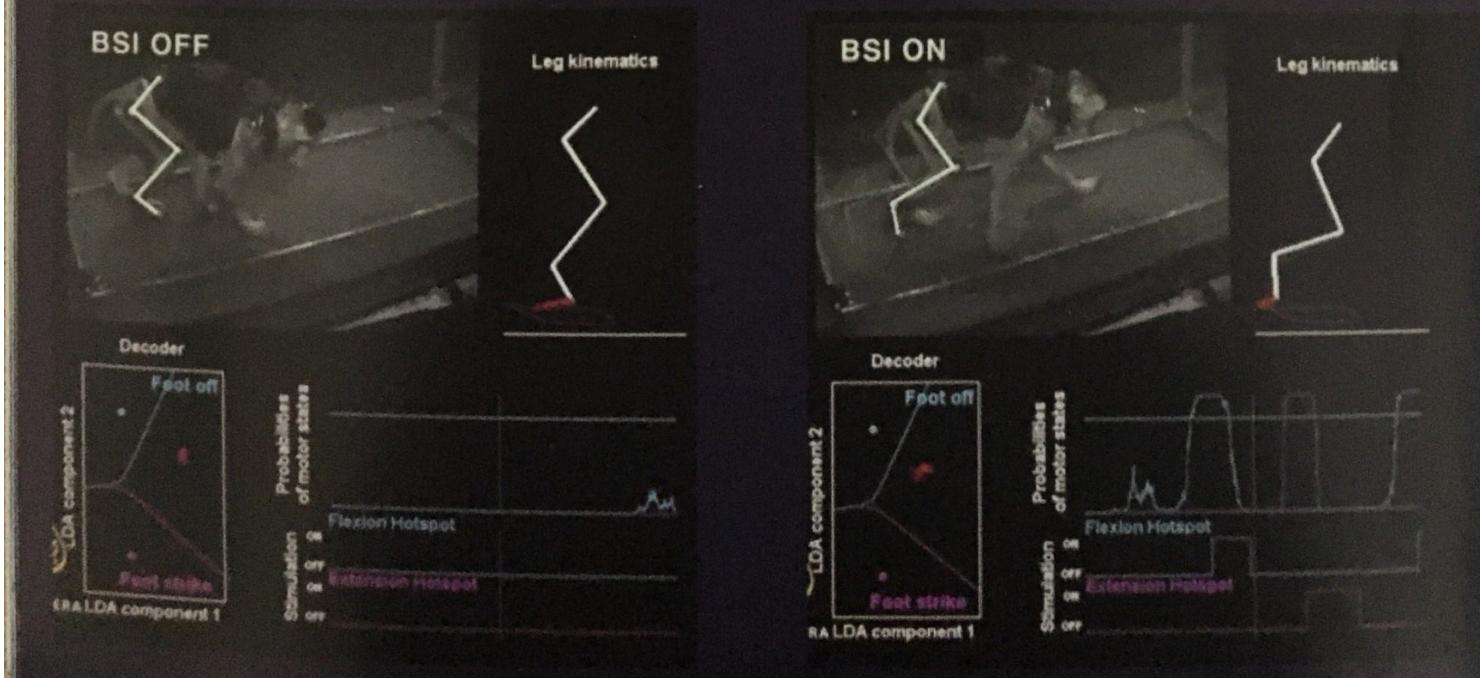
Enabling someone with paralyzed legs to rise to their feet and walk again has long been considered impossible, the kind of bogus miracle promised by faith healers. But who needs aith healers when you have clever scientists and electricity? In the new field of **BIOELECTRONIC** medicine, doctors may soon make the miraculous a reality. A new experiment using paralyzed monkeys has shown the way toward that goal. **GRÉGOIRE COURTINE**, professor of neuroprosthetics at the EPFL, invented a brain implant for reversing paralysis to restore the freedom of movement that spinal cord injuries take away. This technology is a marvelous combination between **neurology** and **telecommunication engineering** since it contains a flexible electrode chip which generates signals.

EXPERIMENT

The research team tested their technology on a partially paralyzed primate(macaques i.e .African monkeys).The primate has a partial spinal cord lesion so it's right leg does not receive neural signals from the brain.Neural activity still occurs in an attempt to control the leg

His team aimed to record the neural activity and send it to the muscles that control the primate's right leg.

The brain implant records motor cortex activity in the primate's brain. A computer decodes the neural activity. The pulse generator reads the decoded activity and creates stimulation protocols. The spinal implant runs the protocol and stimulates neural paths to control muscles



TRANSITION TO HUMANS

To apply these technologies to humans, scientists wired a man's brain to his muscles using electronics.

William Kochevar, paralyzed from the shoulders down, uses a brain implant to control his arm and lift a fork to his mouth. This Paralyzed Man Is Using a Neuroprosthetic to Move His Arm for the First Time in Years



REVERSE PARALYSIS : BEFORE AND NOW

Before

Scientists mainly focused on getting the brain signals to control a machine (i.e. robotic arm) Experimented on mice and rats After eight weeks from injections stem cells into the spine, only half of the mice had definite results

After

Scientists want to restore the control over the body itself Rhesus macaques were used for this experiment, which helped give them more assurance to translate their research onto humans. The macaques were able to walk in only two weeks and one monkey was able to walk in only six days

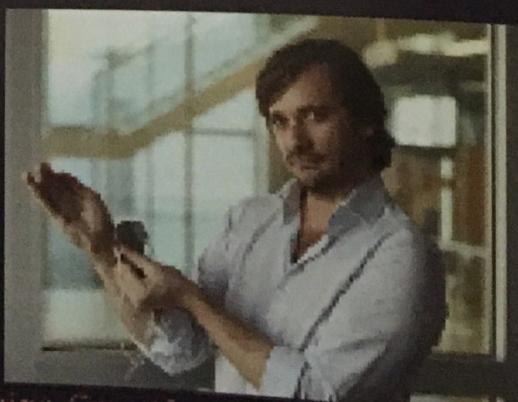
Breakthrough Wireless brain-body electronic interfaces to bypass damage to the nervous system.

Why It Matters

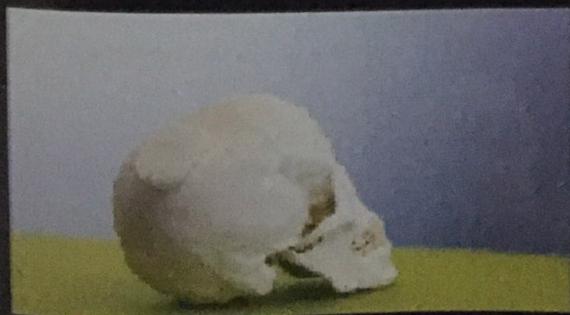
Thousands of people suffer paralyzing injuries every year.

Availability

10 to 15 years



Grégoire Courtine holds the two main parts of the brain-spine interface.

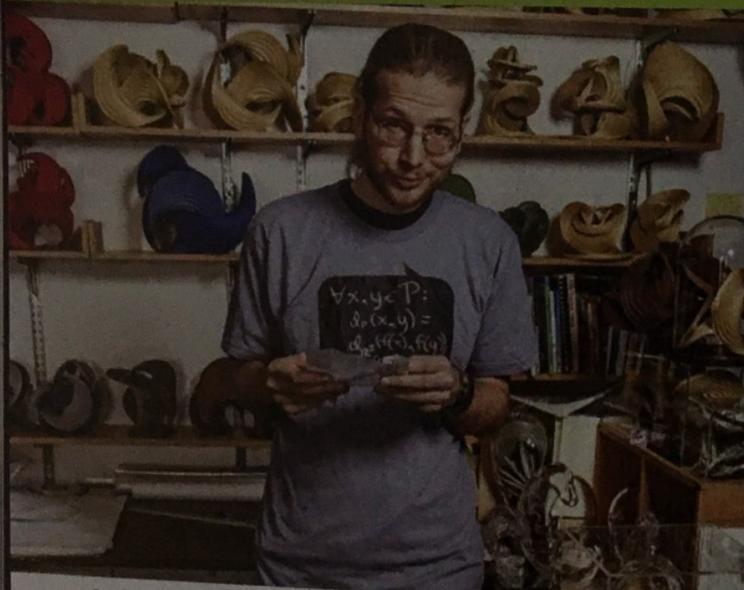


A model of a wireless neurocommunication device sits on a skull.

INTO THE FOLD

Earlier ORIGAMI was known just as the Japanese art of folding paper and making it into beautiful art and craft with just one sheet of paper. But know it is far beyond paper folding paper

"Origami engineering can meet the demand, across multiple industries, for products and systems with very complex applications. origami is inspiring engineers to design active materials and smart structures that bend, stretch and curve, overcoming traditional design constraints and rendering products and systems with remarkable performance characteristics and features. also learned of more elaborate forms, such as a three-car model locomotive crafted from a single sheet of paper. That train, like many intricate works of origami, sprang from a basic folding pattern called the box pleat.



In fig . Erik Dimani The Genius Who Plays For A Living

Demaine has published nearly 300 papers and won numerous honors, including a Popular Science Brilliant Ten award in 2003. It would be easy to attribute his success to the mere fact of genius, but that would overlook the most important aspect of his work. Instead of concerning himself with applications or even defining a specialized area of research, Demaine chooses projects based purely on his curiosity, regardless of where they may lead

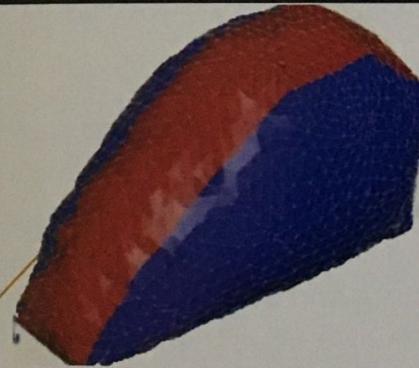
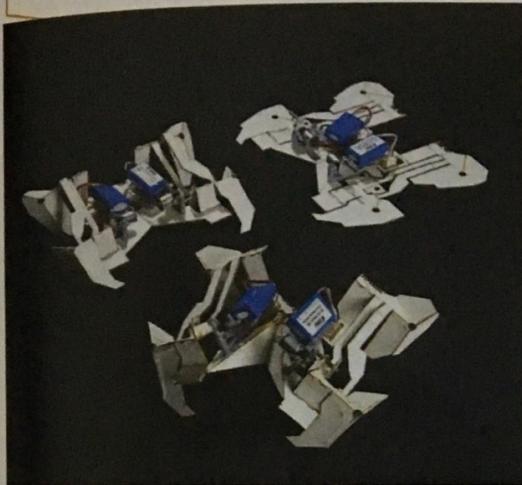
Just before he was old enough to vote but after he'd begun a doctorate in computer science, Erik Demaine arrived in New York City for the annual Origami USA convention. He'd recently taken an interest in the hobby because he thought the math behind it might make for a compelling dissertation topic. Walking the aisles of the convention, Demaine saw the usual paper artistry—delicate moths, puffed up bunnies but he also learned of more elaborate forms, such as a three-car model locomotive crafted from a single sheet of paper.

In 2001, at the age of 20, Demaine joined the faculty of MIT, as a professor of computer science. He was the youngest professor ever hired by the university. In 2003, he won a MacArthur genius grant. By then, he'd set aside the box pleat in favor of other work on folding. But a few years later Mooser's Train came rumbling back into his mind. He'd begun collaborating with another MacArthur fellow, the roboticist and computer scientist Daniela Rus, to design "programmable matter." They wanted to create a sheet made from interlocking panels that could turn into any object, from a sofa bed to a computer, with the push of a button. To do so, they would need a simple folding template that was versatile enough to handle many different forms.

ORIGAMI IN SCIENCE

Self Assembling Robot

MIT and Harvard researchers have designed something at its core: a robot that can assemble itself. But it gets better. Initially, all the materials for the machine are quite flat, and they can fold to create a device that can move on its own and make turns. The flat panels are embedded with electronics and connected by hinges; they are also made of materials that contract and fold when heated to 100 degrees Celsius. These machine takes four minutes to assemble. Search-and-rescue bots are also a possibility, as the thin pre-machine could fit in a small hole and then be deployed. The concept could also be used to automate steps used in manufacturing.



Air Bags

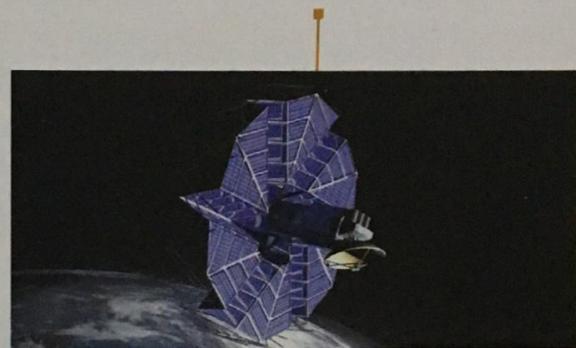
Making an air bag is pretty tough. It's got to open in a split second and become rigid, but not too rigid; it can't be rock hard, after all. It turns out that the best way to model the inflation of a shape of this size is to figure out how to create a 3-D polyhedron from a flat sheet, using folds. It is possible to create one in minimum space in Origami

Foldable Homes

A simple origami fold could change not only how we pack away furniture, but also how we perform surgeries and use robotics, according to a new Nature Materials study. The Miura-ori fold, which creates a pattern of mountains and valleys on a flat sheet of paper can easily be folded and unfolded, making it perfect for applications including making affordable. Origami homes realises this mathematical curiosities as a solution to living in extreme climates

Mirrors and solar panels in space

Origami-type folding principles have been used to make folding mirrors, such as those on the James Webb Space Telescope (PDF), meanwhile NASA is working to advance a highly emissive coating principally made of vanadium oxide, a transition metal oxide. Dwivedi's idea is to then apply the special coating on the origami radiator. He also is investigating its potential use on other spacecraft components, including solar-array panels.



Built-in USB cable for easy file transfer

The high-speed, built-in USB 2.0 cable allows for easy connection to your computer for charging or file transfer without having to remember separate cables. It also fits conveniently into the hand strap so it's out of the way until you need it.

POINTERS TO PLACEMENTS

Learn. Laugh. Live.
Engineering!

A series of memories to cherish.
A bag of lessons to learn.

Life is a journey with many upheavals, but setting your foot on the path of engineering is like a wholesome expedition within itself!

We usually say life is a journey, but engineering is a journey within a journey!

They say every problem in this world has a solution to it and engineering just proves this statement correct! It can be anything :a riddle, a question, a concept,a functional entity or a mystery. Technically speaking, every single thing in this world is engineered either by humans or by Gods. Engineering really means playing with or dismantling different types of things around for ease of humans, but very few among hundreds are blessed with this knack. Possessing this love for engineering in our hearts, we all proudly ended up in 'RAIT' for 4 unforgettable years of our life!

First year is full of unexpected events, surprises, discovering the college campus, keen observation of seniors and participating in many fests. Moreover, adapting to the newly introduced ambience of university, making friends, adopting exam patterns and finding yourself in a new place altogether make it a tumultuous and overwhelming roller coaster ride. As the year moved on, we realized that engineering wasn't for the weak and witnessed our class size drop to half. It can be challenging and overwhelming, and despite the strong urge to give up, we somehow learned to hold on. We survived our first year and things only started getting better. Doesn't life work in a similar way too >Incorporating new perspective, fresh knowledge and perception of how things work, our ride continues towards the next year.

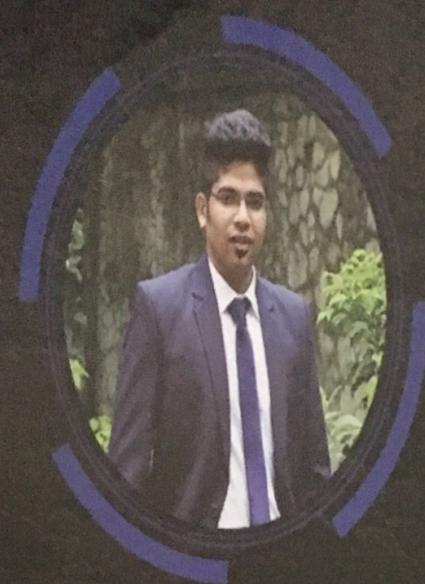
The 'real' engineering subjects start from 2nd year, where the actual topics related to our branches come into play. Different workshops are conducted by different committees to welcome us to technical world. This is when our confidence gets boosted and it is this time when under seniors we understand, take up events during fests to work as volunteers, organizers and at times as event heads. This marks the beginning of imbibing great things apart from academics. Geeks get into their skins and start working on most prominent question "What after engineering?". Many try to figure out what to opt and decide which entrance exam to be taken - 'CAT', 'GATE', 'GRE' or 'IES', etc.

'Time and tide spare none'

This phrase comes in play when the third year commences. This year inculcates within us the responsibilities and focuses on learning and developing soft skills. We get the best exposure to organize our own events in fests. Here, hidden and unexplored qualities are discovered. This is considered as the most crucial year to prepare for both placements and also for preparation of entrance tests. The hustle- bustle elevates as we try to build our 'CVs' by undertaking many different courses, taking responsibilities in committee, attending and organizing workshops, doing internship in some company to add brownie points to our 'CV'.

It is the time when jeans and tees undergo a change and transform to formal wears as we enter the 4th year. TPC is the name on every student's lips as they train us for placements, general aptitude ,GDs ,mock and technical interviews. Many get the best of placements, others score very well in respective engineering exams they opt for, while some find their dream jobs. Amid all this, what remains common is the bundle of unforgettable memories and great life lessons.

IETE CORE 2017-2018



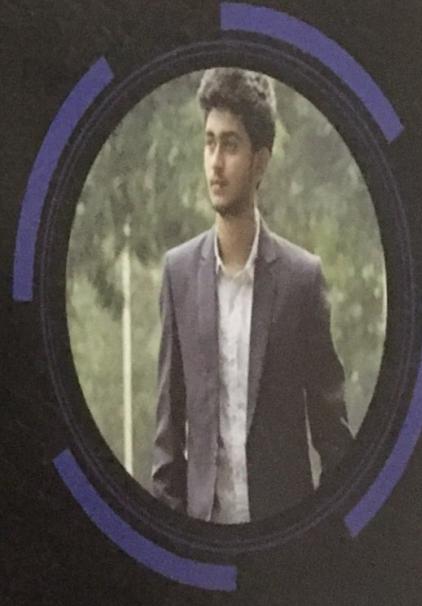
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Pradnesh Mhatre
General Secretary



Anuja Pillai
Treasurer



Yash Khade
Joint Secretary

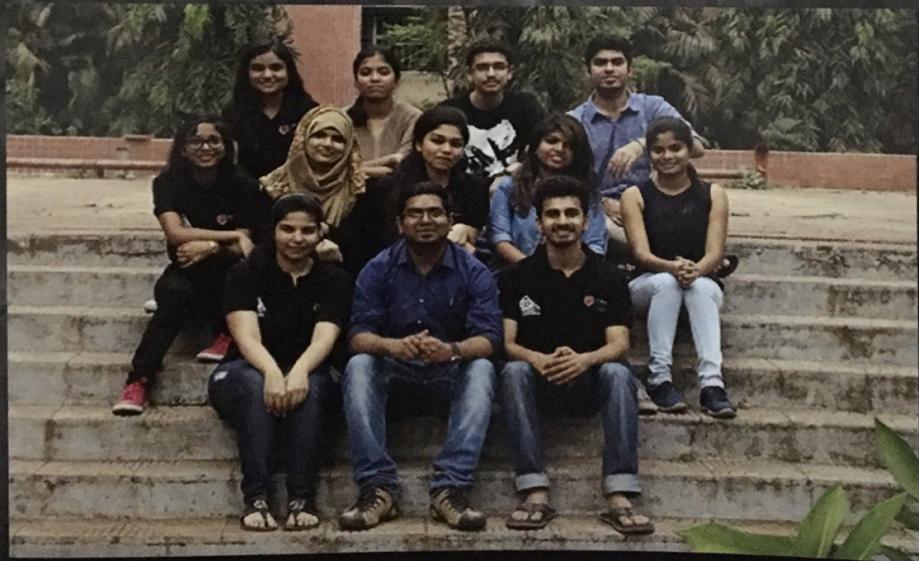


Harshal Gaikwad
Vice Chairman

THE EDITING TEAM



(L to R): Payal Trivedi, Chetan Chaudhari, Ayush Pandey



(Top row, L to R): Suyesha Lamne, Nikita Kale, Saurav Joshi, Kunal Kapoor

(Middle row, L to R): Sharvari Lad, Anam Khan, Sayali Khot, Gunjan Kuhikar, Archana Kharde

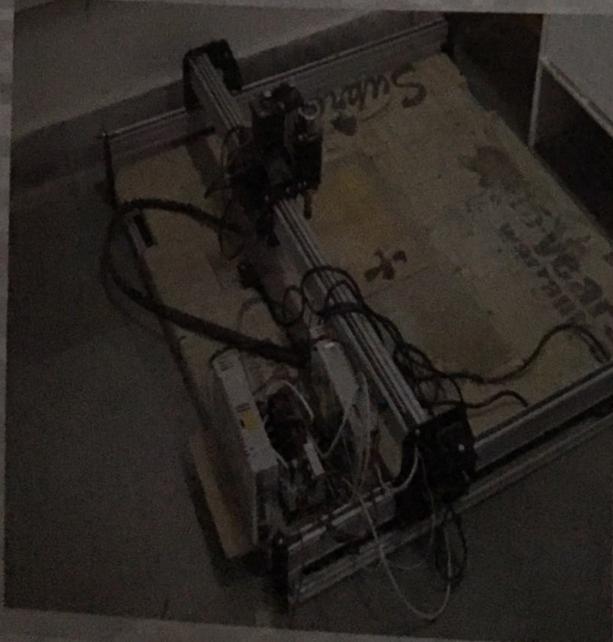
(Bottom row, L to R: Payal Trivedi, Chetan Chaudhari, Ayush Pandey

IETE-Projects

The prime motive of IETE-RAIT is to encourage students to develop and ignite their intellect and knowledge. Many students have come up with innovative ideas and applied the same in the various projects created by them. Some of them include:

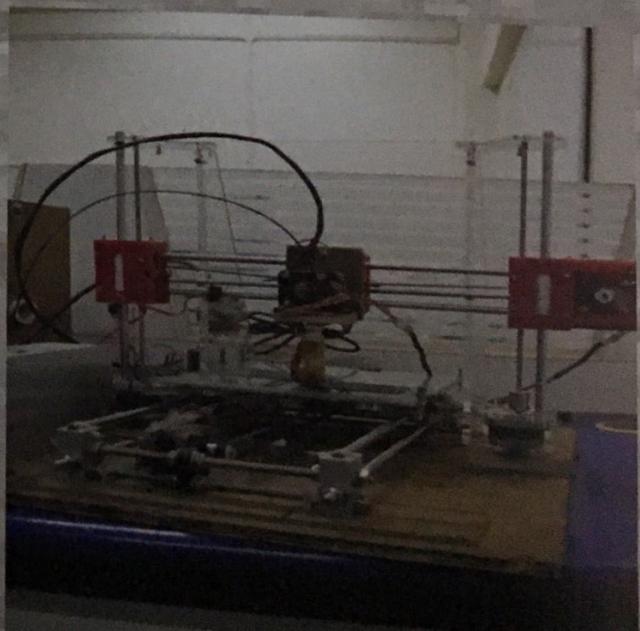
3D Printer

This printer uses the principle of Additive Manufacturing(AM) whereby a three-dimensional object is created by forming successive layers of material under computer control. It uses the technique of Fused Deposition Modelling (FDM) which is commercially viable and easy to build. At student level, 3D printers can be used in robotics projects for making gears, pulleys, wheels, aerodynamic parts. It can also be used visualizing 3D objects in engineering drawing or in creating intangible 3D surfaces.



CNC Miller

Nowadays, more and more machines are being converted to CNC machines due to their high accuracy, high precision, less settling time and greater repeatability. CNC Miller basically involves a milling machine using Computer Network Control through which the product is designed on the computer first and subsequently how the machine should cut is specified. This project involves PCB Milling which is quite a dynamic feature of the same.

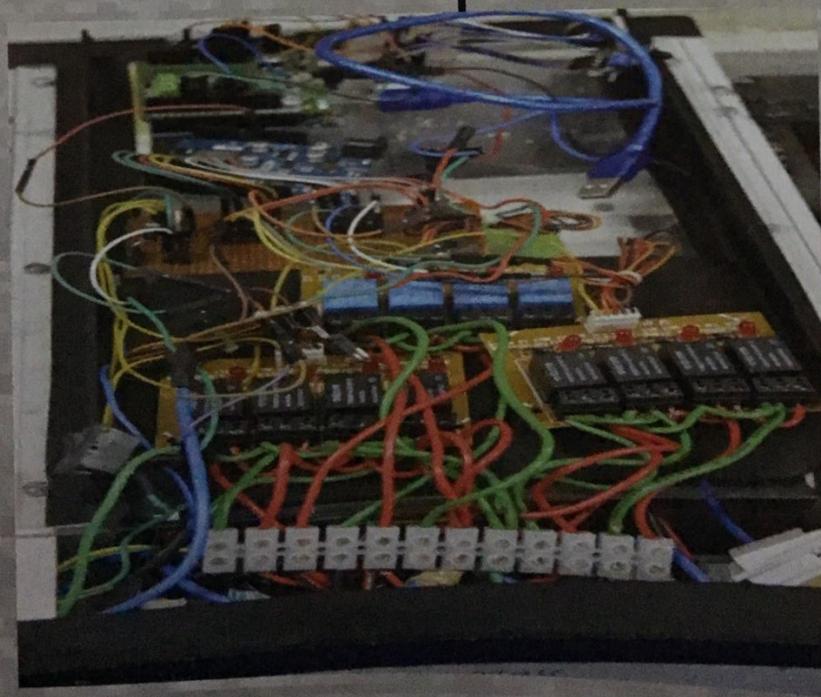


Arshi

The CCTV cameras which we generally observe in our daily lives has one major flaw. It occupies unnecessary memory space even when no crucial movement is observed. This flaw is overcome by Arshi. Arshi uses a camera/webcam, a tablet and a Raspberry Pi where pictures are only clicked when the camera senses movement saving memory.

Shadow Humanoid

Shadow Humanoid: It mimics human action. This can be used for stealth detection, diffusion, works on radioactive elements. The moments are captured with ADXL355 and sent wirelessly through XBEE and then to the humanoid which obtains data to control the servo motor and act accordingly.



WORKSHOPS

IETE-RAIT conducts several enlightening workshops for the students to reinforce practical and theoretical learning in relation with the building blocks of electronics and telecommunication. Some of the workshops organized by IETE-RAIT are:

Arduino

Arduino is an open-source electronics platform based on easy-to-use hardware and software which aids in building digital devices and interactive objects that can sense and control objects in the physical world. The Arduino project provides the Arduino Integrated Development Environment which is a cross-platform application written in the programming language Java. IETE RAIT has organized more than five workshops after the first Arduino workshop of the year 2017-18. And based on the interest of students for the previous Arduino workshop IETE decided to organize another workshop for the students who could not attend the previous ones since there were limited seats. On 23rd and 24th September 2017 IETE RAIT organized its second Arduino workshop of the year under the guidance of Dayanand Dhongade, Ganesh Ingale, Sandeep sangle and Amruta Chintawar.



The topics taught in this workshop increased. Ganesh Ingale sir took Bluetooth module teaching students Bluetooth communication using Arduino Uno.

Antenna designing

There were two antenna designing workshops held this year wherein the students were firstly taught about the theoretical concepts of antenna such as radiation pattern, directivity, gain, various types of bandwidth, antenna efficiency and so on. Following that the students were taught to design different types of antenna such as (Yagi-Uda, monopole, dipole, etc.) and simulate the antenna using EM Cube software.

VHDL

VHDL (VHSIC Hardware Description Language) workshop was organized on 23rd and 24th September, 2017. This workshop was organized for SE students and essentially provided them with an overview of the applications of VHDL in electronic design automation. The students also learnt the entire software simulation to design digital and mixed-signal systems such as field-programmable gate arrays, integrated circuits, flip-flop logic circuits, etc. VHDL is commonly used to write text models that describe a logic circuit and is also used as a parallel programming language.



Network simulator

Network simulator (ns) is a name for a series of discrete event simulators specifically ns-1 and ns-2. All of them are discrete-event computer network simulators, primarily used in research and teaching. Ns provides substantial support for simulation of TCP, routing and multicast protocols over wireless and wired networks. NS-2 is an open simulation tool that runs on Linux. The NS-2 workshop was organized by IETE-RAIT to explain the features of data transmission and the differences between wireless and wired data network. The workshop also explained the significance of terms like TCP, FTP, UDP, https and DSR. The various steps of creating a simulation, i.e., Topology definition, Model development, Node and Link Configuration, Execution, and Graphical Visualization was taught. This workshop was organized on 20 & 21 January, 2018.

ENHANCING ANALYTICAL SKILLS IN LINEAR INTEGRATED CIRCUITS USING SIMULATION

PSPICE (Simulation Program for Integrated Circuits Emphasis) is a general purpose analog circuit simulator that is used to verify circuit designs and predict the circuit behaviour. PSPICE is a PC version of SPICE which has analog and digital libraries of standard components which makes it a useful tool for a wide range of analog and digital communications. PSPICE workshop was conducted by IETE-RAIT. The students firstly learned the various features of PSPICE such as libraries, file structures, parts, design structures, etc. The students learned the implementation of practical examinations such as BJT, differential circuits, etc. as well as the steps to create simulation profile and perform the AC analysis and observe the desired output. This workshop was organized on 17 & 18 February, 2017.

