



ELECTRONICS & ELECTRONICS
AND TELECOMMUNICATION
STUDENTS
ASSOCIATION

CIRKYTE

2019-2020



ETSA

“Electronics and Telecommunications Student Association“ (ETSA) is a student body of Pillai college of Engineering consisting of ETRX and EXTC students. The foundation of ETSA was laid back in 2013 with the sole purpose of providing a platform for students to explore and express their inner talent. After a gap of three years, it has gained back its momentum and is moving forward with the goal to give the students opportunities to gain technical knowledge as well as soft skills through various activities organised by the committee.

The workshops conducted so far have encouraged students to explore their curriculum from a different perspective and have a hands-on experience under the guidance of experts. Apart from focusing on the extension of curriculum practically, the other sectors like communication skills and general knowledge were highlighted well by the events like Saamvad(debate) and Think Bot(quiz). These really helped students to showcase and enhance their public speaking skills and general knowledge.

The association’s most unique event is their annual event called “ETSA Talks”which gives the attendees the opportunity to interact with some of the finest public speakers of the country.The ideology behind this initiative is connect students with the vision of successful personalities from a variety of fields, with the hope of empowering them with essential life skills.

ETSA has also tried to expand their reach and inspire many more learning minds with their magazine “CIRKYTE”, launched every year that consists of well-documented articles relating to latest technologies and bringing in stories of inspiring people. Beside guiding students, the committee has also organised external events for women’s day, community service, and tree plantation.

Although being a young committee ,ETSA’s lack of experience hasn’t stopped them from standing toe to toe with the rest of the student body’s of the college and create a very profound name for themselves.Establishing an all-round development environment for students and guide them on the right path by providing them with ample of technical knowledge as well as social skills is the ultimate goal of ETSA.



Dr. Sandeep Joshi

Principal, PCE

Technical Education is the backbone of every nation. ETSA has always been pioneer in enhancing the skills of students by providing them technical as well non-technical knowledge. Their major contribution of concentrating on regular curriculum as well as soft skills help students become better both as an engineer and as a person. I am glad that we have such an active committee in our college that conducts various workshops for the enhancement of every student.

I am happy to see that every member of the committee has managed to learn all the traits required to make their 'Where Knowledge Meets Innovation' come true. It gives me immense pleasure to see that their annual magazine '**CIRKYTE**' has successfully reflected the student's ideas and creativity. As the saying goes, 'mind like parachute works best when opened', this humble initiative of budding minds free has created a world of beauty in words. I would like to congratulate the entire team for success of ETSA-PCE. I hope they will make themselves stronger day by day, adding a new leaf to the grandeur of the college.



Dr. Avinash Vaidya

HOD, EXTC

Greeting from the Electronics and Telecommunications Department. The Electronics and Telecommunication Engineering is kaleidoscopically changing and ever evolving branch. Innovation, orientation and an ever expanding base serve as a firm foundation for the latest development in the department of Electronics and Telecommunication Engineering. The department is imparting the required technical and practical knowledge to the students. In our department our own student body ETSA now stand toe to toe with the other student bodies in the college. This committee has come a long way to earn the position they are now at. They've been organizing many technical and non-technical events for the students of the department. It's been a pleasure mentoring them and supporting them in all means possible.

I'm pleased to announce that ETSA is launching their annual magazine "**CIRKYTE**". This magazine is a joint effort of the magazine team. The magazine gives us the knowledge about the recent technologies, their advancement, art works and presents in front of you the creative minds of the young guns of our department. I wish the students of this committee good luck for their future ventures and wish a successful year ahead with new and amazing events.



DR. RAJENDRA KHADE HOD, ETRX

From a small start, climbing step by step, ETSA has now become one of the most impactful and influential student committee of our college. I am pleased to be the witness for the growth of this student body. This committee meets all the aspects in the field of technical and non-technical both.

The hardwork done by the members is really appreciable to conduct and finish any events smoothly. The students of this committee did not ever complain about lack of resources, they always made out the best of what they had. I am proud to see the achievements of committee in short span of time.

The annual magazine of this committee, is the perfect example of hardwork and efforts by these students. "**CIRKYTE**", is the magazine which brings you the knowledge of technical and non-technical fields. I congratulate the team on the launch of its this year edition and look forward to many more.



Prof. Apeksha Chavan Co-ordinator, ETSA

Education plays a vital role in enabling a person to face real life situations. ETSA-PCE invariably believes in empowering the students with skills by conducting completely different events and competitions.

I would like to thank our Principal, Dr. Sandeep Joshi for giving me this wonderful opportunity to be the co-ordinator of such an active team.

It's really inspiring to look at entire team attempting their best to groom themselves for growing their legacy of ETSA.

Their annual magazine ' **CIRKYTE** ' has given a platform for all the students for sharing concepts, analysing new innovations round the world and expressing them with confidence. These enthusiastic write ups of our young writers are sufficient to hold the interest and administration of the readers. With extreme pride and honour I would like to appreciate the entire magazine team for going through an extensive efforts and process for finishing this task. Their continuous hard work and team work have helped them reach great heights. I would wish to congratulate the entire team for the success and wish you all the luck for your future endeavours.



Dikshita Oswal

President, ETSA

The ETSA committee has always served to the students of electronics and telecommunications department by exposing them with maximum knowledge possible. The position of president came with great perks but even greater responsibilities. It's been an absolute honour being on this designation. There were a lot of ups and downs but with the support of principal sir, HOD's, faculty members and my team mates, we crossed every hurdle with joy. We made sure that our committee created opportunities for students in unimagined ways. I take colossal amount of pleasure in introducing this year's edition of our annual magazine **CIRKYTE**.

I would like to take this opportunity to thank our honourable principal sir, Dr. Sandeep Joshi, who has provided us with innumerable opportunities to prove ourselves. I would also like to thank Dr. Avinash Vaidya, HOD of EXTC Department, Dr.R.H.Khade, HOD of ETRX Department and Prof. Apeksha Chavan, co-ordinator of ETSA, for constantly believing in us and helping us in all the possible ways.

I would congratulate our magazine team for putting all the effort and making every section of the magazine with utmost hardwork and dedication. I wish a very good luck to the future committee of ETSA and i hope they achieve greater heights.

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TECH CORNER



HAVING TROUBLE FINDING INSPIRATION FOR
YOUR NEXT PROJECT? MAYBE THESE CAN HELP



— Sakshi Salvi
TE - EXTC

Neuralink

by

Elon Musk

Neuralink is a device that will first be used to help paraplegics with simple tasks such as using an iPhone and making mouse clicks on a computer by making no physical movement. Neuralink Cooperation is an American neuro-technology. It was founded by Elon Musk and developing implantable brain-machine interfaces (BMIs). It was started in 2016 and was publically reported by March 2017 by the company's headquarters in San Francisco. Since this company was founded, it hired many well known neuroscientists from various Universities.

By 2019, it had received \$158 million in funding and employed a staff of 90 members. At that time Neuralink was working on the “sewing machine-like” device capable of implanting 4-6 um thin threads into the brain. It was demonstrated by system that read information from a lab rat via 1,500 electrodes and are expected to start their experiments with humans in 2020.

What is Neuralink ?

Neuralink involves surgical implantation of some components on the surface of your brain. since 1970s, research and development has been going on regarding the brain implants, so its not new to us. Previously, the brain implants were not considered as enhancements, as our brains are still a big mystery, and we have only recently started decoding the genetic origins of our intelligence.

How does it work ?

Ideally, to preserve the sanctity of this sacred chamber – I’m sure Elon Musk and his team would like to do as well. At this point, it’s not possible, as they realized this by running a test using electrodes, which are used to detect electric fields (in the brain, electric fields occur when nerves fire messages to one another - i.e., Neuralink uses the electrodes to detect when nerves are sending messages to each other). In this test, Electrode 1 was placed right on the neuron.

As it's directly on the neuron, a result of neuron firing, it would detect the electrical field generated. Then they placed the Electrode 2 away from the neuron firing, in order to see whether it detects the electrical field. If it detects the electrical field then it is placed a bit more away from the neuron until the point it no longer detects the electrical field. Electrode 1 report the neuron firing, but Electrode 2 will not be able to confirm it. That means Electrode 2 was too far away from the neuron. That distance is 60 nanometres. The fact is that 60 nanometres means it should be inside and not outside the skull.



The idea of having to make a trip to the local neurosurgeon every time the software wants to run an update takes away a glimpse of the appeal that having a superbrain might bring. So a large piece of Neuralink resides outside of the skull, as a wearable behind your ear.

This wearable, called the Link, houses the software as well as the battery. This way, when you're at 5% battery life, you can just remove the device to recharge. Same with a software update — the processing happens on the Link.

Neuralink is undoubtedly an innovative project — one can expect from Elon Musk. His tendency to focus on the future, rather than the perceived limitations in existence today, guides others to see the strong potential of this technology or technologies like this one. I'm very eager to imagine more of what it will bring for the future of human intelligence.

This robotic surgeon is capable of making precise movements necessary to implant the threads into your brain. This task looks simple, but as the threads are small to implant, this task becomes as difficult as to safely land a space rocket on the Earth surface — something Musk is all too familiar with.

We might wonder poking our brain may cause pain, but it does not as firstly our brain doesn't have pain receptors, so you won't feel anything. Secondly, all electrodes are so small that they are even smaller than the mosquito proboscis (that long needle that comes out when it wants to suck your blood) — the inner part of its mouth, the Labium, is around 40 nanometers in diameter (compared to the electrode's 6 nanometer diameter).

When was the last time you felt a mosquito biting you?

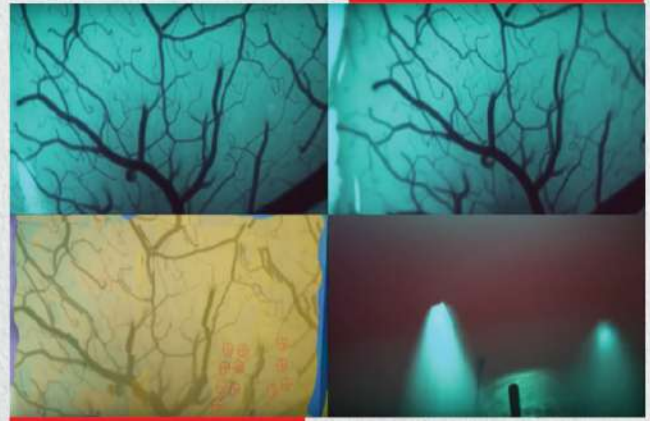


As a bionic superbrain chip robotically implanted in your head is something that most of us would consider a once-in-a-lifetime experience. Software updates are very inconvenient, and always happen whenever we don't want them to.

At the very least, the electrodes would need to reside underneath the skull. And that's exactly what they're going to do. The electrodes, along with a small receiver, will be fitted underneath the skull. No, you won't have an antenna sticking out of your head, and no, poles are not impaling your brain.

A very small chip that is even smaller than the airpods, can fire signals back and forth with my brain caught in crossfire. The cylindrical encasing it will be placed is 8mm in diameter and 4mm tall. The encasing will produce 1,024 tiny, thin electrodes that look exactly like micro threads. The electrodes being 6 nanometres, imagine the diameter of your hair and divide it by ten. It is so small that the a human hand can't install it in the human brain. To implant this Neuralink developed a robotic surgeon.

The Neuralink surgical robot takes the variables into account when identifying the right areas to place each electrode, minimizing the likelihood of hitting a blood vessel which would not be good for the brain. In the image on the right, the top two pieces of footage show the movement of a simulated brain with variables such as heartbeat and breathing, while the bottom left one shows what the robot sees after accounting for these variables — a seemingly still brain.



Hyperloop

Eliminate the barriers of distance and time.

—
- Samruddha Chavan,
SE-EXTC



In our day-to-day lives, from high-spec electric cars to lightning-fast trains, the way we get around is changing and rapidly so. As technology develops, new and innovative modes of transport are being proposed. One such example is hyperloop, a radical concept that could dramatically cut travel time between cities. It is basically a modern form of ground transport, currently developed by number of companies that would revolutionize travel.

Hyperloop is currently in development by a variety of companies. It could see passengers travelling at over 700 miles an hour in floating pods which race along inside giant low-pressure tubes, either above or below ground. Hyperloop technology continues to be in development although the essential concept has been around for several years. At the instant, the earliest any Hyperloop is probably going to be up and running is 2020 but most services are expected to be operational a bit later as trials of the technology are still in their early stages.

Hyperloop will be cheaper and faster than rail and road transport. The basic idea of Hyperloop as envisioned by Mr. Musk is that the passenger pods or capsules travel through a tube, either above or below ground. To minimize friction, almost all of the air is sucked from the tubes by pumps. Overcoming air resistance is one in of the most important uses of energy in high speed travel. Airliners climb to high altitudes to travel through less dense air. So to form an identical effect at ground level, Hyperloop encloses the capsules in an exceedingly reduced-pressure tube, effectively allowing the pods to travel at great airplane-like speeds while still on the ground.

In Musk's model, the pressure of the air inside the Hyperloop tube is about one-sixth the pressure of the atmosphere on Mars. This implies an operating pressure of 100 pascals, which reduces the drag force of the air by 1,000 times relative to water level conditions, and would be equal to flying above 150,000 feet. The Hyperloop capsules in Musk's model float above the tube's surface on a group of 28 air-bearing skis. One major difference is that it's the pod, not the track, that generates the air cushion so as to make the tube as simple and cheap as possible.



The pod would get its initial velocity from an external linear motor, which would accelerate it to '**high subsonic velocity**'. Then it would provide a lift every 70 miles or so. In between this process, the pod would coast along in near vacuum. Each capsule would be able to carry about 28 passengers plus some luggage. Similarly, another version of the pods could carry cargo and vehicles. In an interval of two minutes, we could probably dispatch two pods one after the other. Solar panels can be used to generate energy which will be required to run the pods.

Some of the benefits of the Hyperloop are :

- Capital costs are one-fourth of high-speed trains while the operational costs are going to be a tenth.
- Economic benefits are going to be approximately 4 times greater than high speed trains.
- It will be able to reduce energy consumption significantly.
- It will speed up transport with easy travelling.
- Use of a renewal energy source will help to reduce pollution.
- It can withstand on Earthquake.
- It will be able to reduce traffic congestion.



The success of Hyperloop will vary according to the destinations, geography and local economics. Thus there are major technical and business hurdles that hyperloop technologies will have to overcome. The next stage for hyperloop is moving beyond the initial testing and finding the commercial models that would be viable globally round the world . The solution to this will have the potential to transform hyperloop into a major share holder in the modern transportation system.

Nanotechnology In Everyday Life

- By Yatish Singh,
TE-EXTC

You get up in the morning. The first thing you do is probably pick up your phone and connect it to its charger. Next up you go for the toothpaste of your choice for a cleaner set of teeth. In the process of getting ready you pick up your wrinkle free shirt, pair it with a suitable pair of trousers and rush out to catch the most convenient form of transport not forgetting a little dab of sunscreen on your face.

Now what if I told you that the battery of your phone, that minty toothpaste of yours, your ever so dependable shirt and your sunscreen were all connected to each other? Yup, you read it right. Though nanotechnology is perceived as a tech for the future, its applications in our daily lives are countless, so much so that there is always a possibility of you finding an object that employs nanotechnology at the stretch of your arms!!

Nanotechnology introduces you to some more of such facts which would completely change the way you perceive towards it.

SELF CLEANING WINDOWS A REALITY !



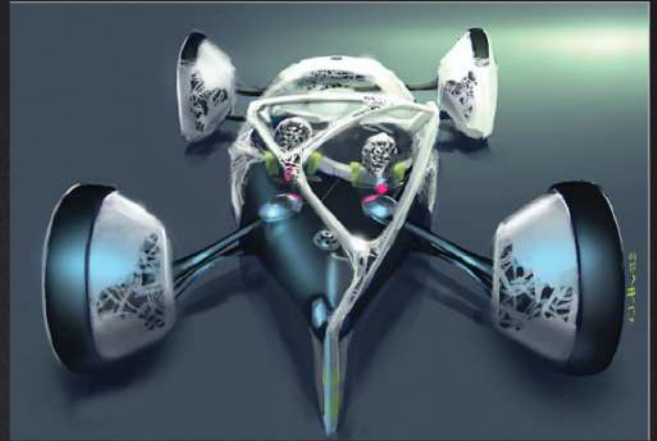
1 Let us assume its Sunday. Your Dad is helping your mom with the weekly cleaning of the house while he waits for you to wake up and take the mantle from him right away. If you can relate to it well then here's one for you. Self cleaning windows are now a reality as the concept of the "Lotus Effect" can be used for the same.

In nature, nanostructures on the surface of lotus leaves repel water which carries away dirt as it rolls off the leaf, allowing the lotus to remain spotless despite growing in muddy water. This concept is used in windows wherein the surface is covered with nanostructures which repel any unwanted particle on the surface of the window.

A LIGHTHER RIDE FOR YOUR CAR AND YOUR POCKET



2 By building vehicle parts from nanocomposite materials we can achieve improved fuel efficiency in vehicles as they are lighter, stronger, and more chemically resistant than metal parts. This comes with an additional advantage of corrosion resistance which also improves the longevity of the vehicle itself. With the help of nanofilters we can help achieve the removal of nearly all airborne particles before the fuel reaches the combustion chamber which invariably increases the mileage.



“ *The impact of nanotechnology is expected to exceed the impact that the electronics revolution has had on our lives* ”

- Richard Schwartz

WON'T NEED AN UMBRELLA ANYMORE !



3 Has it ever happened to you that on a rainy day, in the quest of saving yourself from the splashing water from the vehicles on the road you tilted your umbrella? Well then think of a scenario in which you hadn't done so. You might have realised that now your trousers have become dirty. This is where nanotechnology can play its part. A nanoparticle lining of silica on your fabric along with the use of nanofibres can make it stain resistant, water resistant, and surprisingly even flame resistant.

What makes it more interesting is that all this comes without a significant increase in weight, thickness, or stiffness of the fabric. Additionally, the use of “Nano-whiskers” on pants makes it effectively resistant to water and stains.

FEDERER AND NADAL TOO MIGHT HAVE IT IN COMMON!

4 Carbon nanotubes is a name you must have heard quite a few times in the last decade or so. But do you know how miraculous it is as a material? Well to start you off, let me tell you that it is the strongest material ever discovered in terms of elastic modulus and tensile strength, not to forget it's over the top thermal and electrical conductivity. This means that a lot of objects around us can become virtually unbreakable if synthesised using carbon nanotubes.

For example, a tennis racket manufactured using carbon nanotubes would bend less during impact and then effectively increase the force and accuracy of the shot played. A tennis ball treated with nanotechnology would keep bouncing twice as long as the usual tennis balls.



TOOTHPASTE, SUNSCREEN AND WHAT NOT



5 Almost all the sunscreens today have nanoparticles as their core ingredient which effectively helps to absorb light, more importantly from the ever so dangerous UV range. It also helps to spread more easily on the skin. Come to think of food packaging and these same nanoparticles are used to reduce UV exposure and prolong shelf life. Hand washes, bandages, and socks employ nanoparticles of silver to deliver antimicrobial properties whereas zinc or titanium nanoparticles are the active elements in modern sunscreens for UV-protection.

The contents of your bathroom cabinet may contain micellar or liposomal products that use nanospheres to trap dirt or deliver medicines or skin care. Your favourite toothpaste for example might contain upto three nanoparticles in the form of Hydroxyapatite, titanium dioxide and nanosilver.

A lot of the world that we see today is a result of the Industrial Revolution. Whether it's luxury cars or a simple toothpaste, all of these things are now produced on a large scale with the help of specific machines in huge factory setups. Hence, a lot of scientists believe that if used to its full potential, nanotechnology can have an impact greater than the mighty Industrial Revolution. This will truly change the face of earth and the life that exists on it forever.

SELF-DRIVING CARS

- Yatish Singh
TE - EXTC

The world has come a long way. A lot of discoveries which at the time did not look so important now form the basis of our very existence. Take the wheel for example. No one knows who invented it, definitely not the guys from Flintstones!! But think about transportation and how it has evolved over the years. From cycles and carts to buses and aeroplanes, we have definitely come a long way.

On the other hand inventions were meant to make our life simpler and one such modern concept is automation. Now what happens when you integrate these two concepts? Yup, you guessed it right – Self Driving Cars.

A self driving car can be defined as a vehicle which is capable of sensing its environment and moving safely with little or no human input. Now it sounds very simple but it's not as simple as it sounds.



How Does It Work ?

Self-driving cars combine a variety of sensors to perceive their surroundings, such as radar, lidar, sonar, GPS, odometry and inertial measurement units. But the real challenge here is to integrate all these sensors. It takes a well laid out electrical circuit. Now, this is connected to the automobile system of the car which will eventually help the car to move.

How These Two Systems Entirely Different From Each Other Work In Tandem ?

The answer to the aforementioned question lies in algorithms and codes. Modern self-driving cars generally use

Bayesian simultaneous localization and mapping (SLAM) algorithms, which fuse data from multiple sensors and an off-line map into current location estimates and map updates. current location estimates and map updates. Waymo on the other hand has developed a variant of SLAM with detection and tracking of other moving objects (DATMO), which has an additional feature of handling obstacles such as cars and pedestrians. Simpler systems though use roadside real-time locating system (RTLS) technologies to aid localization.

What Is The Requirement Involved ?

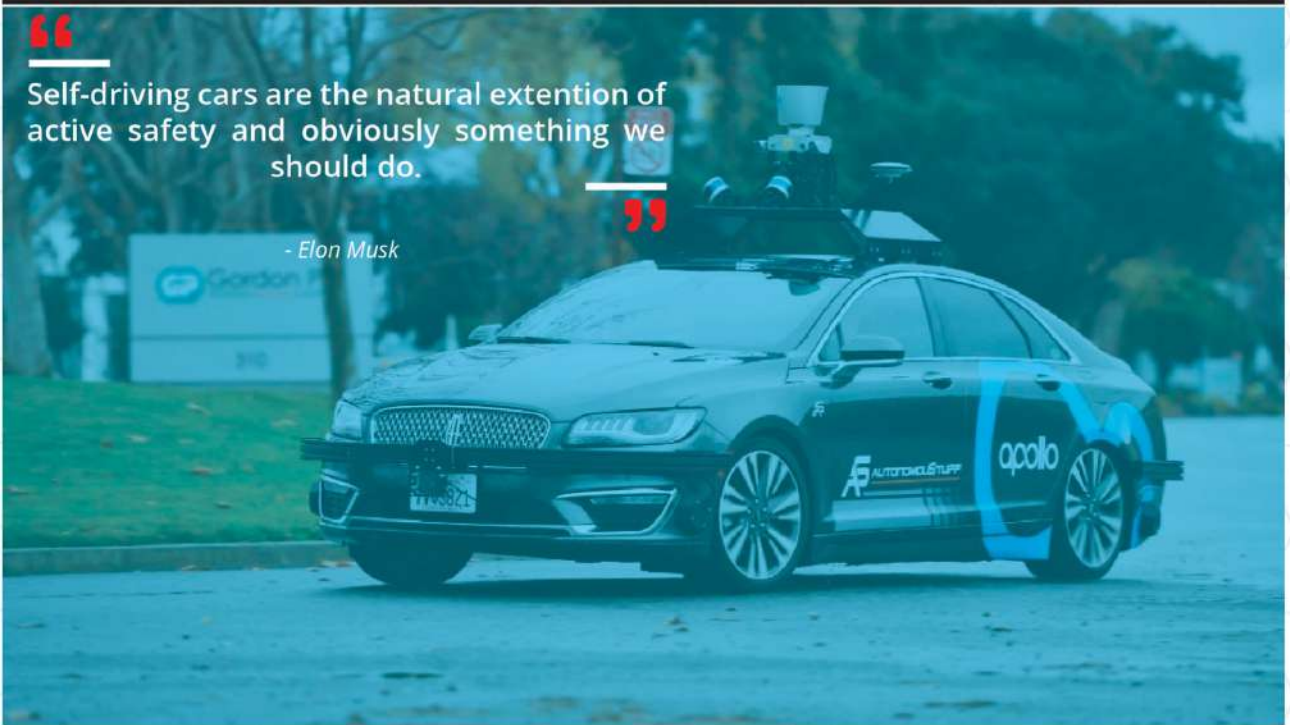
For driverless cars an essential requirement is some form of machine vision for the purpose of visual object recognition. Such vehicles are being developed with deep neural networks, a type of deep learning architecture with many computational levels in which neurons are simulated from the environment that activate the network. It's dependency lies on an extensive amount of data extracted from real-life driving scenarios, enabling the network to "learn" how to execute the most reliable course of action.

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Self-driving cars are the natural extension of active safety and obviously something we should do.

- Elon Musk

”



What Are The Challenges Faced ?

Having explored the technical aspects of this technology, let's also have a look at the challenges that it faces. The first and foremost is the price of such cars. Developed nations and their citizens might find it easier to own a Tesla or a Waymo but the same does not apply to developing nations like India. On the contrary, it will benefit the people from developing nations more if this technology was available to them. Secondly, the AI based system cannot determine the actions of pedestrians, animals and other fellow drivers on the road and so this technology will take a lot of time to be deemed safe. Moreover, this would lead to a huge loss in driving related jobs and chaos that would follow would be very hard deal with.

Accidents due to human errors would reduce to none and as tailgating, aggressive driving, over speeding and rubbernecking are concepts which an AI based vehicular system would be unaware of. In addition to that, as your car would be a software based one it could be updated on a regular basis which means you won't need to buy a new set of wheels to be ahead in the game. This in turn would be environmentally friendly and hopefully a start to a better world thereafter.

The technology of self-driving cars is still a work in progress and unless you are a fan of the Men In Black series or the Blade Runner series, you aren't bound to be disappointed at all.

What Are The Advantages Of The System ?

The advantages of course on the other hand are limitless. The number of accidents would reduce tremendously along with reduced chaos and honking.



Bluetooth-Enabled Subcutaneous Heart Monitors

By Sakshi Salvi, TE EXTC

A cardiac rhythm disorder, also known as cardiac arrhythmia, is actually an abnormal rhythm of heart that occurs when the chambers of the heartbeat are irregular. This rhythm of the heart can be slow or fast. And have symptoms such as dizziness, shortness of breath, lightheadness and sometimes loss of consciousness. The most common rhythmic disorder is atrial fibrillation or AFib. As a cure for this disorder, Abbott Laboratories has developed an implantable device that can monitor the heart rhythms and this device can also help use to communicate via smartphones. It is a very small size device called the CofirmRx Insertable Cardiac Monitor(ICM), it does not require charging and it is usually used when patients are not required to be hospitalized.

The heart rhythms can be monitored and recorded, which can help the doctors to know about the symptoms and the diagnosis can be beneficial for the treatments. The intensity and the abnormality registered can help the doctors to follow specific therapies and can also help to save one's life. These remote monitors also known as bluetooth enabled monitors does not require the patient to regularly visit the hospital or doctors but the patients can follow their day-

to-day routines without any issues. As they follow their daily routines, the 24x7 changes happening in the body can be registered which may help in giving detailed information about the changes happening in the body's system.

The ConfirmRx developed by Abbott does not require charging and can be implanted under the skin. Being bluetooth enabled, it can be connected and the patients can track every moment in the body using their smartphones. These monitors use an app called MyMerlin on the smartphones. The app helps the patient to stay in contact with the doctors regarding the symptoms they are facing. ConfirmRx can diagnose unexplainable symptoms such as heart palpitations, fainting and chest pains. It can also diagnose the main symptom faced by a AFib patient i.e. **Cryptogenic stroke** - stroke of an unknown origin. The feedbacks for this monitor are positive from the doctors as well as patients. Being used for many demographic and being tech savvy, it is still available in more than 40 different languages. The Abbott Laboratories are planning to advance this remote monitoring technology in such a way that it can be a part of fully integrated health care solution.

Tesla Cybertruck , The next generation vehicle

— Abhijeet Kanojiya,
SE EXTC.

The Cybertruck has arrived, and it looks nothing like any pickup truck you have ever seen. Tesla CEO Elon Musk had revealed the new generation vehicle. As Tesla is known for its electrical vehicles, cybertruck also stands in category, which is an electric pickup truck.



The truck more resembles the futuristic design, with sharp cuts. It is like a large large metal trapezoid on wheels with the stainless steel alloy and it has lithium ion batteries, software and hardware for self driving and a solar roof option to help the Cybertruck range. This six seater is built with an exterior shell made for ultimate durability and passenger protection.

Starting with a nearly impenetrable exoskeleton, every component is designed for superior strength and endurance. Futuristic Cyber- truck have 3,500 pound of payload capacity and air suspension, which provides stability.

With most powerful tool ever built, it has lockable storage that is strong enough to stand on. It is like mini truck with space for your tool box. While overview for its ruggedness, it has ability to pull near infinite mass and a capability to tow over 14,000 pounds.

It is made to perform in almost any extreme situation. It comes with six seats, comfortable and enough space with extra storage under second-row seats. To control, it has steering and touchscreen display with all new customized user interface. With all this heavy specifications, this vehicle is impressive with its pickup too. Enabling acceleration from 0-60mph in as little as 2.9 seconds and upto 500 miles of range. With all these qualities this truck meets the need of modern world toward no-pollution.



Electronic Skin

- Anmol Sharma,
TE ETRX

With the development in the field of Science and Technology, scientists have come up with lots of innovation. With the passing years, the innovation in the field of electronics is laudable. One of its kind is Electronic Skin (e-skin). Electric skin is developed as an attempt to bring a sense of touch to robots and those who wear prosthetics. The skin effect is due to opposing eddy currents induced by changing magnetic fields resulting from the alternating current. These skins are very thin like a transparent plastic sheet which is a rubbery polymer called as polyimide. It can even float in the air like a feather.

They are very flexible, stretchable and self-healing. The skin uses semiconductor based thin film transistor. The organic semiconductors have inherent bendability. This is the reason why this skin can be easily attached to our skin and won't be destroyed on even disintegrating. The flexibility is achieved by using silicon nanowires on which the transistors and sensors are attached. For effective use of electric skin in robots, we need the sensory data to be acquired and transmitted in less than a millisecond so that the robot can react quickly.



The pitfall to silicon skin is that silicon cracks on bending which leads to questioning the flexibility. This can be overcome by using transfer printing approach. We carve silicon nanowires out of bulk and transfer print them onto flexible plastic substrate. The buildout in this direction is Electronic Skin can be made using organic semiconductor based thin film transistor. According to an article from Jan 11' 19 e-skin bandage can be used as a health monitor that continuously checks blood pressure and pulse rate.

These are also used for wireless communication, touch sensing input and for displaying output. Scientists have found out that wounds under electric skin (bandage) heals within 3 days in comparison with those under normal bandages, they take 10/12 days. With furtherance in electrophysiology inventions like these are proving out to be of great help.

THE ROBOTIC WORLD

We are headed towards a future driven by intelligent and specialized machines and the possibilities are limitless.

By Divya Wairkar, TE EXTC

The machines have long moved out of search labs to venture into new spheres. A fully automated earth in which robots work with humanity in every conceivable way has been imagined a million times. The previous years have shown a vast development in this field. In 2016 the robot 'Sophia' created by Hans Moravec has become a media personality having spoken at the United Nations. She can animate a full range of facial expressions, track and recognize faces, look people in the eye and hold natural conversations. In 2017, Saudi Arabia gave her a citizenship, making it the first country in history to do so. Simple robots like PARO, the therapeutic seal, respond when spoken to and have been used to reduce stress in elderly patients.

Another great advancement is the development in the field of cardiology that has shown a customized soft robot that fits around the heart to help it beat. In 2018, World Robot Summit, an international robotics event, is going to be held that consists of a robot exhibition and aims to bring together the most advanced technologies from around the world and showcase actual cases where robots solve difficult challenges, accelerating the implementation of robots in society.



Sophia- A social humanoid robot

Majority of what many people expect in the nearer future tends to the darker side of things. We compare robotics and the research into artificial intelligence which usually accompanies with other similar large advances in technology that often had some scary results. Indeed work on atomic power began with bombs led by military programs, and that is where much of the headway is being made today with robotics. Robots are proving advantageous but on the other hand overdepending on them will lead to just as much disruption as the rise of web. It's a warning that we are at a tipping point where robotics could lead to mass unemployment and economic collapse.

We often misunderstand what Robots really are.. Countless robots are already contributing to higher quality products and shorter turn around times in the manufacturing sector. These robots are proving to be effective at basic tasks and jobs. Thus the only thing to keep in mind is building cool robot technology is not an end in itself; instead, we can put them to work to extend humanity's capabilities thus making this earth a better and an easier place to live in.

Small Satellites

By Sakshi Salvi, TE EXTC

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The first trillionaire will be made in space

”

US Republican Senator Ted Cruz

The expense to launch a satellite is comparable with the value of its weight in gold. Thousands of dollars are spent over the whole process. The price tag of this whole mission is around 250 million dollars. As, space is a big business, globally many companies have invested millions of dollars in the space technologies. The satellites are used for telecommunications, navigation and remote sensing. In US, they spend billions, mainly for military, meteorological and communications purposes.

Satellites are still bulky and expensive. But, most of them perform only predefined sets of instructions. These satellites don't last for long and fail in decades. Now, that the space technology has advanced, satellites are now smaller and can repair themselves. And also can be operated in swarms.

Nowadays, satellites are shrinking. These small satellites are also called as Cubesats. More than 800 Cubesats are present in the orbit of Earth. They are made from palm sized modules and its basic unit is 1U. A 0.5U module is also available. At present, upto three modules may be linked lengthwise. They weigh only 1 kilogram and are as small as 10 x 10 centimeters. Researchers can package the brain of these satellites in 1 cubic millimeter in the coming future. The smaller the device the less is the energy used for launching them. These satellites use small rockets to launch themselves.

These Cubesats are generally characterized by ancillary equipments such as antennas, solar panels and sails or drag chutes to facilitate deorbiting may extend the overall dimensions of the satellite. The cameras present in these Cubesats have a great focusing power, its vision is so powerful that it can observe the activities taking place even through the clouds that act as an obstacle. They have such an exceptional speed that they can visit a particular coordinate twice a day.

According to the researchers the next mission is to upgrade their constellations. It is too soon to say whether the space economy will become profitable. But central to that economy will be the coming constellations of these tiny satellites. In the coming years, many additional features will be added to these Cubesats. And the space technology will reach new heights and get more advanced.

SpaceX: Reusable Launch System

By Abhijeet Kanojiya, SE EXTC

Humanity is on its peak to meet the modern generation with new technologies. Advancement in technology led to explore our space. To visit in space millions are used and if the mission gets unsuccessful then those millions get into vain. In space missions, launch system is used which helps to launch the object. But those are only for one use, therefore there is need of reusable launch system.

SpaceX, the space agency which is scripting new chapters and achieving new milestones to explore the space. It is a private American aerospace manufacturer and space transportation services company. It was founded by Elon Musk in 2002. Main aim of this company is to reduce the space transportation cost.



One of the biggest milestones achieved by SpaceX is to develop a reusable launch system.

To make one space program successful, millions are used but this cost can be wrapped to some extent. SpaceX CEO Elon Musk, said if one can figure out how to reuse rocket like airplanes, the cost of access to space will be reduced. To make reusable system, there is need of some recovery in component stages. SpaceX Falcon9 rocket currently carries a list price of about \$54 million. 0.4% of total cost is used to provide fuel for each flight. Each new plane will cost nearly similar to Falcon9, but advantages is that , it can take fly multiple times per day and can conduct tens of thousands of flights over its lifetime.

The company is developing the technologies over a number of years to facilitate full and rapid reusability of space launch vehicles. The project long-term objective includes returning a launch vehicle first stage to launch site in minutes and to return a second stage to the launch pad following orbital realignment with launch site and atmospheric re-entry in up to 24 hours. SpaceX long terms goal is that both stages of their orbital launch vehicle will be designed to allow reuse a few hours after return. This company is on the verge to make the space missions more comfortable and affordable.



STORIES WHICH INSPIRE



INCREDIBLE STORIES BY COMMON PEOPLE



The Hopes Of Life



ORDINARY PEOPLE AND THEIR EXTRA ORDINARY WORK



By Abhijeet Kanojiya,
SE-EXTC

“

**Kindness is a language that a
deaf can hear and a blind can
see**

”

- Mother Teresa

In the world, where people consider life as a race, Dr. Johny Gabriel, the protagonist of our story proved that you can be kind and still run in the race. Dr. Johny Gabriel from Cherthala, Kerala After graduating from T.B. Medical College, Alappuzha, and completing his Master's from Trivandrum Medical College, got his first posting at the Karuvatta Primary Health Centre in Harippad. For him, medical was all about treating the sick.

"I didn't have any major surgeries to start with, as it was a primary health centre, but I still managed to do deliveries and minor surgeries" explains Gabriel. Within a couple of months, not only did he become the hospital's favourite doctor, but also the go-to person for any organisations conducting medical camps. These camps were really helpful for the patients but the elderly and the bed ridden patients could not attend it. He developed a feeling of empathy towards them and went beyond his job.

The majority of population in the area where Gabriel was posted were geriatric patients. So, Gabriel decided to attend to these patients individually and also started a geriatric clinic at the primary health centre for patients to get their sugar and blood pressure checked at a minimal cost.

Keeping the same spirit, Gabriel and his colleagues took an initiative to begin a rotary club in harippad in 2003. He visits that first Sunday of every month for his patients. It's been 17 years and he has never missed a single visit on Sunday. He provides his patients with all the medical and emotional support they need. "Geriatrics is a very sensitive area to work in. Most of my patients struggle with depression, anxiety and psychotic disorders. I came to realise that

behind those doors, there were individuals in dire need of help", shares Gabriel.

A few months into his Sunday visits, Gabriel decided to take children along with him to help him break the ice with his patients. To his surprise, this technique worked wonders. "My patients were so happy to see children. I saw that they felt a sense of purpose with the kids around. The children would tell my patients to take their medicines and food, and I saw their eyes light up, something that had never happened before."

For his Sunday visits, he carries as many kinds of supplies as he can. According to the need of patients the medicines, food and bedsheets were provided. Over these 16 years, Gabriel has built houses for six families and the rotary club managed the funding of Rs 70,000 for the geriatric patients. After retirement from the government service in 2011, he is playing the role of district chairman of the Rotary. His efforts and dedications have extended his services to the nearby districts.

The story of Dr. Johny Gabriel is a motivation to all of us. **He has taught us that how ordinary people do extra ordinary work and win million's hearts.** All you need is a little courage to fight the odds and a heart filled with empathy.



Amul

The Amazing Story Of *India's Most Successful Brand*

- Gaurav Pandey, SE-EXTC

In the age of social media it's become known as real time marketing brands throwing witty remarks about current events into social flow. The story of India's most beloved advertising icon begins in 1966, when Dr. Verghese Kurien—who almost singlehandedly turned India into the world's largest milk producer. The Amul girl is a hand-drawn cartoon of a young Indian girl dressed in a polka dotted frock with blue hair and a half pony tied up. The cooperative movement that began Gujarat back in 1946 was a movement against the atrocities of Polson Dairy, a locally-owned dairy in Anand, Gujarat, which allegedly procured milk from farmers at very low rates to sell to the Bombay (now Mumbai) government..

Amul's architect in almost every way was the late Dr Verghese Kurien (who, ironically, died in the 50th year of the creation of the Amul girl).

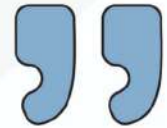
The Amul girl was created by Eustace Fernandes, the art director of DaCunha Communications in 1966, the same year the simple yet catchy phrase "*Utterly Butterly*" was coined by Sylvester's wife, Nisha DaCunha.

When experts asked Kurien to choose brand names that would sound foreign, he wisely insisted on an Indian name. Thus, Amul (then short for Anand Milk Union Ltd) was born.





India's place in the sun would come from partnership between **wisdom** of its rural people and **skill** of its professionals.



- Dr Verghese Kurien

Verghese Kurien (Milkman Of India) vision was a simple one of offering thousands of small dairy farmers centralised marketing and quality control facilities, the missing links in the dairy economy at the time. In 1973 the Gujarat Cooperative Milk Marketing Federation was established to market milk and milk products manufactured by six district cooperative unions of Gujarat.

In the sixties and seventies, India was a milk-deficit country, not at all self-sufficient. Milk powder was imported. From a per capita milk consumption of less than 110 grams per person to around 300 grams per person is a long way, and largely possible due to the cooperative movement. But branding also played a role, cleverly designed to add a tinge of nationalism to an essentially rural. Amul was not just a milk and butter brand, it became an umbrella for all the products that GCMMF marketed. A seasoned marketer, Kurien gave DaCunha Communications immense creative freedom to release the Amul Girl ads without waiting to take permission from the company. The freedom is still maintained and is the the reason the Amul Girl is never late with her take on the world around, says the agency, led by Rahul DaCunha, son of Sylvester.

The Jungle Man Of India

By Anmol Sharma, TE ETRX

Did you know that you could convert a piece of land in your backyard into a beautiful forest within a year? Shubhendu sharma, the protagonist of our story could do it for you. Shubhendu sharma, an industrial engineer, is allowing you to bring nature home.



It all started back in the days when sharma volunteered to assist a naturalist, Akira Miyawaki, to cultivate a forest at Toyota plant where he worked. Miyawaki's technique has managed to regenerate forests from Thailand to the Amazon, and sharma thought to replicate the same in India. Sharma took the plunge and started to experiment the same model and came up with an indian version after some modifications using soil amenders. "the idea is to bring back the native forests", says sharma.

His first tryst with making forests was in his own backyard in Uttrakhand. This gave him confidence and he decided to launch it as a full time initiative. He quit his job and spent almost a year to do research on the methodology. Sharma was adamant on making his idea work and started a company with initially a team of 6 members. "the biggest challenge was to launch something which had no existing market and we didn't even know if it ever would", says sharma.

As this was one of it's kind initiative in India, sharma had to do a lot of research. After much planning, research and enthusiasm, sharma started Afforest. This was a unique model, finding clients and convincing people was a major task. The unique technique of plantation helps grow saplings at a speed of around 2 meters per year. For this sublime attitude and technique he is also titled as "the jungle man of India".

Afforest has created 33 forests so far across 11 cities of india and wants to increase the number. Sharma has a lot of plans to scale up and put this technology out there for more and more people to implement. He aims at a scenario where plucking a fruit from a tree in the backyard will be easier than buying it from the market.

" The clearest way into the universe is through a forest wilderness. "

- JOHN MUIR





POETRY CORNER



WELL WHO CAN SAY NO TO A BEAUTIFUL POETRY?
SHOWCASING THE POETIC SKILLS OF A LOCAL
ENGINEER/POET.



Sunte chalo

Ji haa janab, Waqt bewaqt tumse baat karna aacha lagta hai,
 Bhale mann me pareshani ho, tumse milne k baad sab changa lagta hai,
 Tumhe bhale ehसास naa ho humari maujudgi ka,
 Par tumhare bin, mujhe ek din bhi ek arsaa sa lagta hai!!!!

Bas tumhara haath thamna chahta hu,
 Is safar ko tumhare saath jeena chahta hu,
 Manzil ki abhi baat nahi karni mujhe,
 Aakhri saans tak ,bas tumhara saath chahta hu!!!!

Toh aao na, ek saath chalte hain...
 Thoda sa dard ek duje k sang baatte hain...
 Kya pata kal ye sama ho na ho...
 Chalo na, kuch waqt ek saath kaatte hain!!!

Agar hai mujhse koi dikkat, toh bejhijhak bol do...
 Kabtak dil k darwaje par kundi rakhoge, usse bhi khol do...
 Zamane se kabtak uhi ghabrate firoge...
 Mann me rakhe un bandishon ko bhi tod do!!!

Mana ki mai tumhare liye sahi nahi hu...
 Jaisa tum chahte ho , waisa raahi nahi hu...
 Ab tajmahal bhi toh ek din me bana nahi tha....
 Waqt dunga, yakeen rakho, bewafa nahi hu!!!!

Hosakta hai ki ye shaam aachi nahi thi...
 Jisne tumhe dhoka diya ,unki niyat aachi nahi thi...
 Abhi toh agle din k suraj ko aana baaki hai,
 Aur bhi din hai mutthi me , ye shaam aakhri nahi thi!!!

~~ABHIJEET .K

लव MUMBAI

Mumbai tu kitni haseen hai....
 Jaanta hu tu insaan nahi ...phir bhi rangeen hai .
 Naa jaane kitne raaz apne kant taale dabaye baithi
 hai...
 Kai dashkon se apni gond khole baithi hai.

Sach hi kehete hain log ki ye sapno wala sheher hai....
 Puri mumbai me zindagi jeene ki alag hi leher hai.
 Raah chalte musafir ko kuch anokha dikh jaata hai...
 Vadapav ka chaska har kisi k jubaan pe reh jaata hai.

Din raat bhagdaud karte log local me soo jaate hain...
 Par ye toh sach hai ki mumbai tu kabhi nahi sooti.
 Raat me bhi ujala rehta hai har mod pe....
 Antelia aur dharavi bhi mil jaayenge kisi chor pe.

Tune chabiss july ke keher ko bhi jhela toh tune 26/11
 ke hamle ko bhi jhela...
 Phir bhi aaj salamat daud rahi teri raftaar hai...
 Isliye toh jubaan se nikalti 'aamchi mumbai' har baar
 hai.

Sapno ka shehre hai jagmagati mumbai...
 Kisike sapne pure hue toh kisi k aarman..
 Kuch nahi toh jeene ka aandaz sikh leta hai insaan.

Mumbai tu badi dildaar hai....
 Local train logo ke liye ek varda hai.
 Kahin rahe ya naa rahe duniya me..
 Mumbai me rehena hi khud me ek jahan hai.

~~ABHIJEET.K

Mere Abba Jaisa Banna Hai

Akelepan me toh har koi yaad karta hai
 Ek insaan hai Jo mujhe mujh se bhi zyadah
 pyaar karta hai
 Meri har khwahishon ko pura karte hue
 dekha hai
 Maine uss insaan ko apni zimmedariya
 nibhate hue dekha hai
 Mehengi se mehengi cheezein kharid te huye
 dekha hai
 Maine apne Abba ko 4 saal purane jooto
 pehente dekha hai
 Har kisiko ek super hero jaisa banna hai
 Par mujhe mere Abba ke jaisa banna hai



Ek Tarfa Pyaar

Yun aata hai koi Zindagi me iss tarah Badal jaate
 hai mausam jis tarah
 Pura hota hai din uske deedar ke saath aur Kat
 jaati hai raatein uss hi ke baaton ke saath
 Kuch Naya Naya sa lagne lagta hai yeh jahan jaise
 mill jaata hai iss dill ko ek Naya aasman
 Kuch pal ka hi hota hai shayad yeh sapna Aur kuch
 hi dino me badal jaata hai har koi apna
 Hoti hai shaam sochte hue uske baare me
 Dhal jaata hai din pura uss hi ke intezaar mein
 Kya hum kabhi samaj nhi paaye ek dusre ko
 Yaa hua ek Khoobsurat dhoka in aankhon ko
 Agar tha hi nhi kuch toh kaha Kyu nhi
 Kyu chup rahi hamesha ki tarah
 Mujhe Kya pata tha yeh khaamoshi nhi yeh inkaar
 hai
 Yeh ikraar nhi yeh ek tarfa pyaar hai

Tujhe Pata Hai

Yun toh khul Kar kabhi kuch keh nahi
 paata
 Par tujhe pata hai
 Yeh Zindagi toh waise hi fizool hai agar
 tera saath na ho isme
 Itna mujhe pata hai
 Mai hamesha se hi bht Kam bolta hu
 Itna toh tujhe bhi pata hai
 Itni dooriyan hone ke baad jab humare
 Milne ka waqt aaya
 Main bebas khade hokar tujhe dekhta
 raha
 Kya tujhe Zara sa bhi Rona nhi aaya
 Haan Mai jaanta hu ke bolne me bht
 der kardi Maine
 Par ab toh tujhe pata hai





THE ARTIST CORNER



WELL WHO CAN SAY NO TO A BEAUTIFUL PICTURE?

SHOWCASING THE ARTWORK OF A LOCAL
ENGINEER/ARTIST.



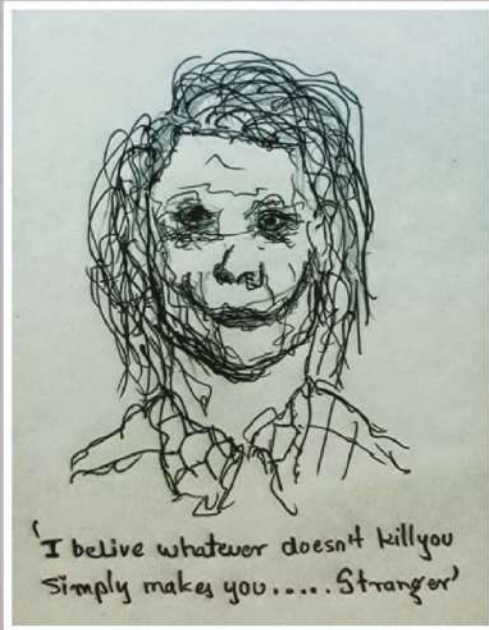


- By,
Naved Shaikh
BE EXTC





- By,
Naved Shaikh
BE EXTC



PHOTOGRAPHY





CONVERSATION WORTH READING



AN EXTRAORDINARY INTERVIEW WITH ONE
OF MOST INFLUENTIAL PERSON.



VASUNDHARA JAKKA

FOUNDER CEO, MIND SPARK CONSULTANCY



Mrs.Vasundhara Jakka sharing her experience with the students.

Q.Why did you choose this career path?

I was a recruiter for almost 10 years. I suddenly realized this is not my calling- I definitely want to make a career so that I can make difference in people's life and thus chode to be in this profession

Q.Did anything about this job/career surprise you?

Many a times I do not have a particular leaning intended but few have come up with something on their own-which makes me feel surprised and also

realize that wisdom is there within us all along just need to check it

Q.What are some everyday challenges you face in your profession?

My dates are booked much in advance -2-3 months in advance-and there is lot of arrangement preparation from company or client side I have very little choice to cancel for health reasons or any personal reasons-as commitment is counted high in my field it's a huge responsibility

Q.Are you able to have a positive work/life balance in this career?

Balance is what one needs to manage you have to be in charge of your life.I think I have fairly managed this part-and frankly my family supports me so much that its been an easy journey so far

Q.What are some things you wish did differently in school/college/past jobs?

I think I have learnt many things with age and experience it's a continuous process- I should have been more patient- and also my focus was not sharp as now.

Q.How important is networking in this industry?

Your network is your net worth no two ways about it

Q.What advice would you give someone changing careers?

There is a fantastic tool called IKIGAI refer that and will definitely help you choose something right if one feels strongly from within just go for it but take a calculated risk is what I would advise.

Q.If you weren't in this career, what would you be doing instead?

I would have been in drama that's my love too

Q.What do you enjoy most about your job?

Connecting with my audience and seeing people change get motivation from my talk is a big high!

Q.What advice would you give to your younger self?

Don't create glass ceiling around you-just go for it ask for help its there aim high



Mrs.Vasundhara Jakka with our President Dikshita Oswal



ETSA 2019-2020



EVENTS CONDUCTED IN ODD SEMESTER



LATEX

LaTeX workshop was conducted on 9 th August 2019 in R102 lab for the final year students. The speaker of the workshop was Prof. Ruchira Patole. During the workshop, students were trained to prepare their own blackboowith the help of LaTeX which will help them to prepare their own reports and blackbook for their final year projects.

MAKER'S DAY

Maker's Day is a day on which all the F.E Students are sent to have a look around all the labs and the amenities present and all the machines present here in our College. It was conducted on 17th August, 2019. The Students were informed about all the active student bodies present in the college. ETSA represented itself by presenting posters of the events, internships and IV's that displayed the best opportunities



ARDUINO



Arduino was the workshops held by the ETSA committee in two batches on 23rd & 27th August, 2019 for SE EXTC student which was a great success. The speaker for the workshops was Prof. Ruchira Patole students were trained to prepare their own Arduino projects with the help of coding which will help them in future. Students were provided with ultrasonic sensors,oled display and arduino.

DOORDARSHAN VISIT

An industrial visit to Doordarshan Sahyadri was organized by ETSA on October 10, 2019. At the head office, the students were slated to learn briefly about the complete process of transmission and receiveal of television signals and messages and experience various signal and voice modulation techniques. The experience turned out to be a whole lot overwhelming



EVENTS CONDUCTED IN EVEN SEMESTER

VISIT TO CIBA

ETSA organized an industrial visit to CIBA, Vashi on January 24, 2020. The CEO of CIBA, Mr. Prasad Menon himself addressed the students and conducted an interactive Q&A based session which introduced us to some never heard-before concepts. The IV was capped off with a mini tour of the office with our guide, Mr. Sagar Chandni.



ETSA TALKS

ETSA Talks is the event conducted by our committee wherein renowned speakers from different areas came together to motivate students, share their experiences. This event is conducted as our annual event and launch our annual magazine "CIRKYTE". The guest speakers were Mr. Navin Reddy and Mrs. Vasundhara Jakka. The event was conducted on 17th January, 2020.



INTERNET OF THINGS

ETSA organized a workshop on Iot (Internet of Things) on 6 th March, 2020. This workshop was conducted by Prof. Ruchira Patole for second year students. The students were introduced to NodeMCU. A mobile application called Blynk was used for this part of the workshop. An obstacle sensor was used to detect obstacles with the help of NodeMCU.



WOMEN'S DAY

The Womens day celebration was held on 9th March, 2020 for the teachers of EXTC and ETRX Department of Engineering. All the teacher's from our department had gathered for the event. The event consist of various games that the teacher's enjoyed and at the end we also had a cake cutting ceremony. The event was a huge success..



ETSA COMMITTEE 2019-20



MANU KRISHNAN
TREASURER



DIKSHITA OSWAL
PRESIDENT



OMKAR CHAUHAN
TECHNICAL HEAD



NEVEDITA KALE
VICE PRESIDENT



JANHAVI KHARMALE
EVENT HEAD



DIVYA WAIRKAR
JT.SECRETARY



SAKSHI SALVI
JT.TREASURER



SHRISH SINGH
JT.EVENT HEAD



PRACHI BAINGANE
DIGITAL HEAD



NEHAL MEJARI
GRAPHICS HEAD



ASHUTOSH SINGH
PHOTOGRAPHER

REPRESENTATIVES



ALVIN JACOB



SAMRUDDHA C



SHRISHTI S



ADTIYA J



ABHIJEET K



SHREYASH M



GAURAV P



ANMOL SHARMA



NIKESH SATHEESAN



AJAY MAGAR



YATISH SINGH



VISHNU NAIR



SARVESH M

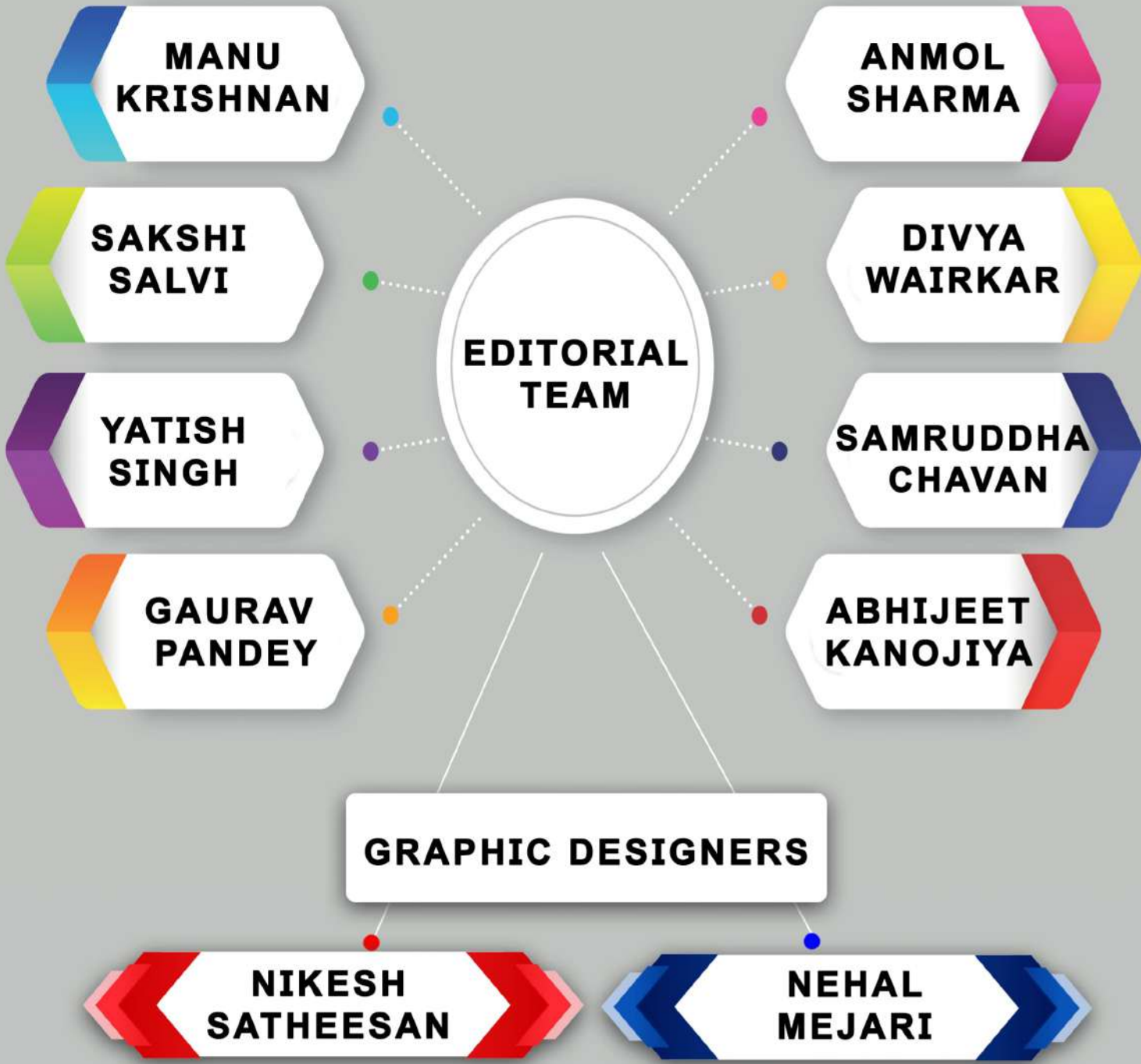


NAVED SHAIKH



RUTURAJ SAWANT

MAGAZINE COMMITTEE





INSTITUTIONS CONDUCTED

SCHOOLS

(S.S.C. PROGRAMME)

- Chembur English Pre-Primary & Primary School - Chembur
- Chembur English High School - Chembur
- Chembur Marathi Madhyamik Shala - Chembur
- Powai Marathi Madhyamik Shala - Powai
- Mahatma School of Academics and Sports - Khanda Colony, New Panvel (Pre-Primary, Primary & Secondary, English & Marathi Media)
- HOC International School - Rasayani (English & Marathi Media)
- (CBSE PROGRAMME)
- Mahatma International School Khanda Colony, New Panvel
- HOC International School - Rasayani

JUNIOR COLLEGES

- Chembur English Junior College - Chembur
- Mahatma Night Junior College - Chembur
- Mahatma School of Academics & Sports, Junior College of Arts, Science & Commerce Khanda Colony, New Panvel
- HOC Junior College - Rasayani (Junior College of Arts, Commerce, Science with Vocational)

TEACHERS' TRAINING INSTITUTIONS

D.T.Ed. B.Ed. B.P.Ed. M.Ed. Ph.D.

Approved by National Council for Teacher Education (NCTE) (Affiliated to the University of Mumbai & Recognised by Govt. of Maharashtra.)

- Mahatma Junior College of Education (D.T.Ed.)- Chembur (English & Marathi Media)
- Pillai College of Education & Research (B.Ed.), Chembur Re-Accredited 'A' Grade by NAAC
- Pillai College of Education & Research (B.Ed.), Accredited 'A' Grade by NAAC Khanda Colony, New Panvel
- Pillai HOC College of Education & Research (B. Ed), Rasayani
- Vidyadhiraja College of Physical Education & Research (B.P.Ed), Khanda Colony, New Panvel
- Pillai College of Education & Research (M.Ed.), Chembur
- Pillai College of Education & Research (M.Ed.), Accredited 'A' Grade by NAAC Khanda Colony, New Panvel
- Pillai College of Education & Research (Ph.D Centre), Khanda Colony, New Panvel

INTERNATIONAL SCHOOLS & INTERNATIONAL JUNIOR COLLEGES

(CIPP / IGCSE/ICSE/IB SCHOOLS) 'AS' / 'A' level and 'IB' Programme

- DR. PILLAI GLOBAL ACADEMY
- Gorai
- New Panvel

POLYTECHNIC (3-Year Diploma Programme)

AICTE Approved, Recognized by Govt. of Maharashtra & Affiliated to MSBTE

- Pillai HOC Polytechnic - Rasayani
Diploma in Computer Engineering
Diploma in Information Technology
Diploma in Electronics & Tele-communication Engineering
Diploma in Mechanical Engineering
Diploma in Civil Engineering

DEGREE COLLEGES

Bachelor and Master

- (Affiliated to the University of Mumbai & Recognised by Govt. of Maharashtra.)
- Mahatma Night Degree College of Arts & Commerce- Chembur
 - Pillai College of Arts, Commerce & Science - New Panvel Re-Accredited 'A' Grade by NAAC
 - B.Com.
 - B.Com.(Accounting & Finance)
 - B.Com.(Financial Markets)
 - B.M.S.
 - B.M.M.
 - B. Sc.(I. T.)
 - B. Sc.(Computer Science)
 - B.Sc.(Biotechnology)
 - M.Sc.(I.T.)
 - M.Sc.(Biotechnology)
 - M.Com.(Business Management)
 - M.Com.(Accounting & Finance)
 - Pillai HOC College of Arts, Science & Commerce - Rasayani
 - B.Com.
 - B.M.S.
 - B.Sc.(I.T.)
 - B.Sc.(Computer Science)
 - B. Com.(Accounting & Finance)
 - B.M.M.
 - B.Sc.(Maths, Chemistry, Biology & Physics)
 - B.A.(English Ancillary, History & Economics)

ARCHITECTURE

Bachelor and Master

- (Approved by the Council of Architecture and AICTE) (Affiliated to the University of Mumbai & Recognised by Govt. of Maharashtra.)
- Pillai College of Architecture - New Panvel
 - Pillai HOC College of Architecture-Rasayani (B.Arch.5-year degree course) M.ARCH.(Urban Design)
 - Pillai College of Architecture - New Panvel

MANAGEMENT COURSE

MMS

- (Approved by AICTE) (Affiliated to the University of Mumbai & Recognised by Govt. of Maharashtra.)
- NBA Accredited 'A' Grade by DTE, Govt. of Maharashtra
- Pillai Institute Of Management Studies & Research - New Panvel
- (MMS: 2-year Post-Graduate Course) Executive MBA
 - Pillai HOC Institute Of Management Studies & Research - Rasayani (MMS: 2-year Post-Graduate Course)

ENGINEERING COURSE

Bachelor, Master & PhD

(Approved by AICTE)

(Affiliated to the University of Mumbai & Recognised by Govt. of Maharashtra.)

NBA Accredited

- Pillai College of Engineering- New Panvel
- B. E. in Information Technology
- B. E. in Computer Engineering
- B. E. in Electronics Engineering
- B. E. in Mechanical Engineering
- B. E. in Electronics & Tele-communication Engineering
- B. E. in Automobile Engineering
- M. E. in Information Technology
- M. E. in Computer Engineering
- M. E. in Electronics Engineering
- M. E. in Mechanical Engineering (CAD/CAM, Robotics)
- M. E. in Mechanical Engineering (Thermal)

PhD (Technology) Computer Engineering Mechanical Engineering

- Pillai HOC College of Engineering & Technology, Rasayani
- B.E. in Mechanical Engineering
- B.E. in Electronics & Telecommunication Engineering
- B.E. in Automobile Engineering
- B.E. in Information Technology
- B.E. in Computer Engineering
- B.E. in Civil Engineering
- B.E. in Electrical Engineering
- B.E. in Computer Engineering (Direct second year)
- M.E. in Mechanical Engineering (Machine Design)
- M.E. in Electronics & Telecommunication Engineering
- M.E. in Computer Engineering
- M.E. in IT(Information & Cyber Warfare)
- M.E. in Civil Engineering (Construction & Management)
- M.E. in Computer Engineering (Computer Network & Information Security)

PhD (Technology) Civil Engineering Computer Engineering

Read EduNation

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