

RESONANCE

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MAGAZINE BY ECE DEPARTMENT
CHRIST COLLEGE OF ENGINEERING, IRINJALAKUDA
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

A large, black, serif letter 'E' with a space shuttle inside it, flying upwards.A large, black, serif letter 'C' with a circuit board inside it.A large, black, serif letter 'T' with a flag inside it, featuring the colors of the Indian national flag.A large, black, serif letter 'A' with a sunset or sunrise scene inside it.

About

On March 13, 2017 an idea began to form in the minds of the 1st year and 2nd years of the Department of Electronics and Communications to form a department association. As this being the first venture to both the classes and the college as a whole after a lot of brainstorming sessions in the canteen, classrooms, and hallways a name started to come up" ECTA" to promote the idea of unity among those 31 young engineers and also giving an apt full form of Electronics and Communications Technocrats Association. They quickly started preparing for the inauguration on April 19th by which ECTA became the first departmental organization at Christ College of Engineering. The first Association Day Konvergenz 2k18 was celebrated on 26 February 2018 which had a lot of memorable games and events which would go on to be a stepping stone for all the future ECTA events. Later on, ECTA was able to hold quality workshops, internships, exhibitions on different industry-level subjects for budding engineers in the short term of 6 years. In the very next year of 2019 in the first Tech fest-"Techletics" in the history of CCE, ECTA was able to coordinate and deliver events that peaked the public and intercollege interests in the departmental activities.

Of course! There are moments when one just lifts his head and looks around. Yes, People call it reality checks! The past year has been such an eye-opener for most of us. While the world is still trying to claw its way out of the situations, there may be some who couldn't. While this is the general case, we believe there are some things in the world when struck at the right frequency can make miracles happen. **Resonance** hopes to tune you to that right frequency with our little bunch of articles, stories, poems and so much more which will bring the smile of hope in these times of need. Pour in and let's resonate together with a higher frequency and much higher amplitude to spread hope to many more around us.

Vision

- To become pioneer in higher learning and research and to produce creative solution to societal needs

Mission

- To implement best learning teaching practices by providing excellent facilities and quality education
- To mould character of every student by providing value-based education
- To make students self-dependent and useful for the society

Message From Executive Director



I feel elated to pen down a message for the first-ever magazine being brought out by our Electronics and Communication Engineering Department. It is heartening to note that the ECE department is consistently contributing to the all-round development of its students and consequently to the positive image of Christ College of Engineering, by engaging their students in creative and productive activities. The ECE department has also been the first out of the blocks to execute interdisciplinary projects. They have aptly titled their magazine – ‘Resonance’. I take this opportunity to congratulate the entire staff and students of the ECE department for their role in the growth of Christ College of Engineering. My best wishes on the release of “Resonance”. May this magazine be able to showcase, among others, all that this department is about and all that it stands for.

Rev. Fr. John Paliakara CMI
Executive Director, Christ College of Engineering

Message From Joint Director



It is indeed my pleasure to know that our Department of Electronics and Communication is coming out with their first-ever magazine 'Resonance' this year. Their persistence and determination in releasing this during the pandemic period itself is praiseworthy.

The ECE Department has come up with a host of initiatives over the past years. It is heartening to see the potential of the students unfolding at various stages through such initiatives and I commend them for their vibrancy and enthusiasm. This magazine is a milestone that marks the growth, gives wings to the imaginations and infuses life to the aspirations of both the students and staff of the ECE Department. I pray that this eloquent expression of the talents, progress and achievements of this department may be an inspiring and worthy read for all. I would like to applaud all the coordination and efforts behind this venture. My best wishes to the ECE department for this and all their future endeavours.

Rev. Fr. Joy Payyappilly CMI
Joint Director, Christ College of Engineering

Message From Principal



From being the smallest department at CCE initially, the Electronics and Communication Engineering Department has come a long way to being where it is today. I am pleased to see its growth and transformation over the past years. It is indeed a milestone in the history of the ECE department that they are bringing out their first magazine '**Resonance**' this year. May this magazine be a platform where the students are able to stretch their minds and hearts beyond limits and may all who read this magazine be able to foster genuine acceptance of the content on offer. I truly believe that this magazine will do justice in reflecting and resonating the passion, zeal and dynamism that I see in this department through its pages.

Prof. Dr. Sajeev John
Principal, Christ College of Engineering

Message From Vice Principal



I am delighted to note that our Electronics and Communication Engineering Department is releasing their first-ever departmental magazine. I am sure that this magazine will further strengthen the credentials of the ECE department as that of being a very vibrant department. I liked the name being given to this magazine – ‘Resonance’ - and I hope that true to its name, the contents of this magazine will resonate positively in the minds of all its readers. I wish them the very best for this, and all the array of activities that the ECE department has come up with, in their quest for excellence. May the ECE students reach such a level that their signature may one day be an autograph.

Prof. Dr. John V. D

Vice Principal, Christ College of Engineering

Message From HOD



Technology at the current pace with which is changing demands a mix of creative and innovative skill set for an Engineer to be successful. The demand for creative and innovative Engineers is unending, so promoting creativity is the need of the hour as creative minds leads to innovative ideas. I hope the Departmental Magazine –**Resonance**, a Magazine from Department of Electronics and Communication Engineering of Christ College of Engineering Irinjalakuda, Thirissur will be one such step in harnessing and promoting the creative aspect of the students. This will definitely offer a platform for students to express and showcase their talents in various technical and non technical domains. The students and faculty members of the department are always proactive and in the forefront in taking initiatives in technical, cultural and social events.

It gives me great pleasure to congratulate the team Resonance and the students of the Department who overwhelmingly responded to this idea with contributions in various field both technical and non technical. I hope that everyone would continue to give their full efforts to keep the momentum and continue to enhance the standards of the magazine regularly. Keep up the good work

Mr Rajiv T R

Head, Department of Electronics and Communication
Christ College of Engineering

Message From Chief Editor



One of the fine things I discovered in the months of endless sleep and watching movies was that the things that excite us always tend to change once we know a lot about it. It can either make us deeply involved in it or can divert us into something more interesting or can totally change one's perception towards that topic. So does the topic necessarily intrigue oneself or does the dopamine hit give you enough to be satisfied? I have always felt that it is not the destination but the journey that elevates us to a state of bliss.

This takes a lot of forms. It may be regarding people who think alike or the people who think they think alike (Courtesy: Thanneer Mathan Dinangal). Isn't it beautiful to see when people of different cultures and backgrounds come together to work just because they all had one beautiful dream? Resonating with a group of people can give you the energy you didn't know you had. So take a minute and think of the days where you did something with people who had similar goals to achieve the impossible. Did the success or failure really matter or was the journey more beautiful?

Resonance is one such venture in which we as members of ECTA could be part of something bigger and utilize its great audience. I assure each and everyone who has given at least a try of running their fingers through this book will find something that has echoed with yourselves. As this is our first venture in this particular field I ask all the readers and well-wishers to give your feedback and suggestions so we can improve in the later issues. And last but not least I would like to thank all my fellow editors for their dedication to making this magazine come into existence. Finally thanking the Christ family and the ECE department for helping us make this come to completion.

Mr. Martin Pius

S8 ECE, Christ College of Engineering

Our Crew



**Catherine J
Nereveetil**
Staff Editor



Shintu Abraham
Staff Editor



Martin Pius
Chief Editor

Editors



Silfa Jose
S8 ECE



Vinita Varghese
S8 ECE



Sandra Palatty
S6 ECE



**Sneha
Maria Vincent**
S6 ECE



Gopika Menon
S6 ECE



Albert Davis
S6 ECE

Designers



Alan Alphonse
S6 ECE



Aldrin Varghese
S4 ECE



Savio Sabu
S4 ECE



Abhinav Menon
S2 ECE



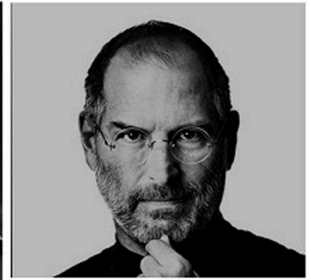
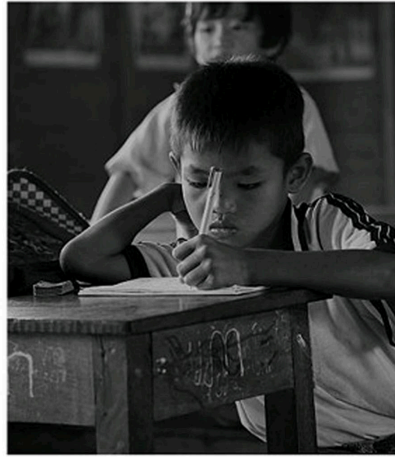
Rehan P R
S2 ECE



**Meghasyam
Pulikkathara Modesh**
S2 ECE

CREW

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A CUP OF WATER



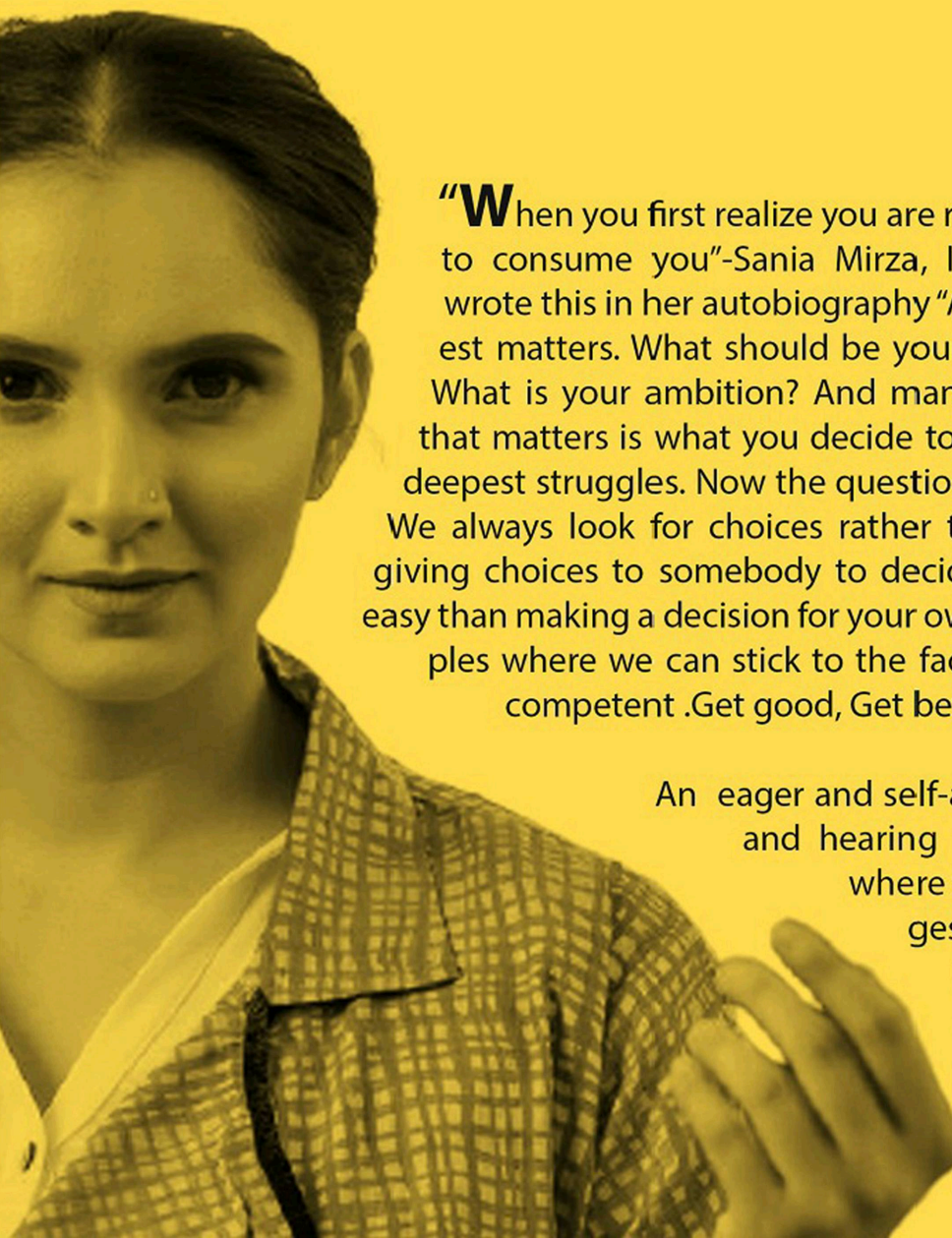
Another long queue at the water cooler! All tired, waiting for the queue to end so that one can quench the thirst with those precious drops of blue gold. And after having your drink you filled your cup for the next person. Surprised, Yes sounds like a trivial thing right, But I assure you that these little things make a lot of difference to the giver's and taker's day. Don't believe me, let me explain. You see everyone once in a while we start to question negative aspects or situations in our lives and what makes us come back to our normal morale maybe it is good to sleep or some songs to which you tune in but sometimes it is the random actions of strangers that makes us believe that people are still good and we can be better. So you see how a person will be shown a little bit of positivity when the previous person in the line fills the cup for him. So how does it benefit the giver you may think, it gives him a hit of dopamine as he gets to see them happy and surprised and is able to go do the daily duties with a little positiveness. These acts of random but surprising kindness are what is needed in our days left on our home planet. The act does not right any wrong and certainly ain't going to change the fate of humankind. So why is this important you may ask? This act of random kindness will help you show someone else there is some humanity after all in this world. And when each time you look back at that moment you will feel slightly positive. These acts do not need to be something like giving some poor soul a fortune or leaving all

your fortune to the needy(blessed be those who do the above acts). These acts have to have only a single effect which is a little bit of happiness on the giver and taker. In today's world of selfish interests and thinking of what one will gain by doing even a trivial act, I would like to state that all acts don't need to be political or democratic for that matter. Same as when a complete stranger opens the door for you may be surprised and would feel a bit happy and it gives a positive rush. See that is the point when someone else unexpectedly sends you a gift or a birthday wish you feel ecstatic now picture you making someone the same way by doing these small acts. Now don't get me wrong, sometimes you may encounter people who may doubt that free cup and pass it along don't blame them, they are not accustomed to this type of kindness. You make your point and call it a day. Sometimes the person may just throw out the filled cup and fill it for himself, yeah but there will come people who just be awestruck by the action and would feel a rush to do something generous to others. So can one random filled cup make a person feel inspired to do a positive act himself? We may never know but it is in doing which counts. This may or may not affect you today or tomorrow but would certainly make a good influence in the future. So try to inspire someone in your life each day and thereby make the world a better place to live in.

- Martin Pius

S8 ECE

Countd- OWN



“When you first realize you are really good at something, it begins to consume you”-Sania Mirza, Indian professional tennis player wrote this in her autobiography “ACE against ODDS”. Yes! Your interest matters. What should be your future? What do you like to do? What is your ambition? And many more “your” questions. The thing that matters is what you decide to be, so that you can achieve your deepest struggles. Now the question is “is that your decision valued”? We always look for choices rather than making a decision, because giving choices to somebody to decide your future has become more easy than making a decision for your own life. Let us take some real examples where we can stick to the fact that “The future belongs to the competent .Get good, Get better, Be the first”-Brian Tracy.

An eager and self-asserting child who lost her sight and hearing at the age of nineteen months, where the doctor termed it as ‘acute congestion of stomach and brain’, has turned to be a remarkable one .Her life illustrates the fact ‘I came, I saw, I conquered’. The day of March 3, 1887 was the most im-

portant day in her life as her teacher Mrs. Anne Sullivan arrived in her life. Her teacher gave her slips of cardboard which had raised letters printed on them and each printed word stood for something like an object, act etc. She had a great influence on the girl's life. Their journey to Boston and the arrival at Perkins institution for the blind, made her quite friendly with the other children. In 1890, she learned to speak. She would put one hand on her throat and with the other hand she tried to feel the movements of her lips. Could you imagine she was the first blind and deaf person to earn a bachelor's degree and that too from Radcliffe College. By the time, she wrote her Autobiography "The Story of My Life" which then adapted by William Gibson titled as "The miracle Worker" and won the Oscar award in 1962. She is an author of 12 published books and articles, leading member for American foundation for the blind. She flew a plane. She is one of the inspirational icons ever. i.e. Helen Keller.

The "Female Obama" Kamala Devi Harris has scripted the history by becoming the first woman black and white American vice president of the United States. Born to immigrant parents. Her father was from Jamaica and mother was of Indian origin. After they were divorced, she was raised by a single mother, she grew up embracing Indian culture but also living a African-American life. She spent her high school years living in French-speaking Canada - her mother was teaching at McGill University in Montreal. She attended college in the US, spending four years at Howard University, which she has described as among the most formative experiences of her life. After Howard, she went on to earn her law degree at the University of California, Hastings, and began her career in the Alameda County District Attorney's Office. She became the top prosecutor for San Francisco in 2003, before being elected the first woman and the first black person to serve as California's attorney general in 2010, the top lawyer in America's most populous state. She is considered to be close to Barack Obama, the first black American President, who endorsed her in her various elections including that of the US Senate in 2016.

In 1919, A man was fired by a newspaper editor because he lacked imagination and had no good ideas. In the



GO

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WIN



very next year he started a short-lived company along with a cartoonist. After having a rough start he temporarily moved to Kansas City film AD Company. He was soon joined by Iwerks, who were not able to run their business alone. Later, he acquired his own studio which was successful, but the profits were not enough to pay the salary to the employees. The studio was bankrupt as of debt. Then, he decided to set up a studio in the movie industry's capital city, Hollywood, California. One of his huge successes was OSWALD, a rabbit but only he was receiving 20 percent on his films and he was also ready to negotiate. He received another setback when his producer stole the character, and also stole his animation crew by negotiating contracts with them. While most of them quit, this young man created his most successful character ever-Mickey Mouse. The man was none other than the greatest cartoonist and Entrepreneur Walt Disney, which was happiness on the screen for all of us.

The exceptionally talented director Steven Spielberg, known for his movies like Jurassic park, Catch me if you can, Jaws etc. initially had a wish to study film at the University of Southern California's School of Cinematic Arts. But he couldn't make it as his grade was "c". He applied for the same university three times and he got neglected all the time. Later, he joined California State University. When he was a student, he got an unpaid intern job at Universal studio's editing department and got an opportunity to do a short film of 26 minutes named Amblin', which he wrote and directed. Studio vice president Sidney Sheinberg was impressed by the film, which had won a number of awards and offered him a seven-year directing contract. It made him the youngest director ever to be signed for a long-term deal with a major Hollywood studio. Now he has directed over 27 films over 40 years, winning 3 Oscars and that too two times for best director.

The author of the 400 million sold book "Harry Potter", J.K.Rowling had a time in her life where she was diagnosed with clinical depression and contemplated suicide. Her marriage failed and she was a jobless woman with a dependent child. She signed for a government

aid describing her economic status as being “Poor as it is possible to be in modern Britain, without being homeless”. When she was on a four hour delayed train trip from Manchester to London in 1990, the idea for a story of a young boy attending a school of wizardry came into her mind. In 1995, she finished the manuscripts of her first book and all the twelve publishing houses, where the book was submitted, rejected the manuscript. Editor Barry Cunningham from Bloomsbury advised her to get a daily job as she had only little chance of making money from writing children’s books. Now she is UK’s best-selling living author also ranking her as one of the richest women in the UK.

Chakdaha, a small town in west Bengal produced an Indian international cricketer Jhulan Nishit Goswami. She faced challenges to access infrastructure and travelling extra miles to get the basic training. She grew up as a sports loving person, playing cricket with friends and cousins. The street cricket ramp has helped her to improve the pace. She blossomed her passion and made her debut for India in 2002 when she was 19. But in order to reach this position, she had to travel from chakdaha to Kolkata for the practice session. That troubled her family as she wanted to travel alone all these distances and to reach by 7.30 AM. She also got affected by her academics because she used to dedicate her whole day to cricket. From 4:30 am to 5 am, she had to wake up, catch the train, walk to the ground, and then do heavy training there, before again rushing back, where her mind was unwilling to concentrate on anything. She, as a youngster was working on the line and length, so that she had to ball five or six overs more after the regular session. Her story of working her socks off to go from a small town in Bengal to the highest level of cricket while battling multiple societal and logistical obstacles is something most of her peers have had to experience. Now, she is the prolific wicket taker in the fifty over format and at one time, she was one of the fastest from India. In 2017, she became the highest wicket-taker in One Day Internationals, in 2018; she became the first and thus far only women to take 200 wickets in 50 over format, and eventually claimed her 300th international wicket. She has won the ICC Women’s Cricketer award, captained the Indian team and is

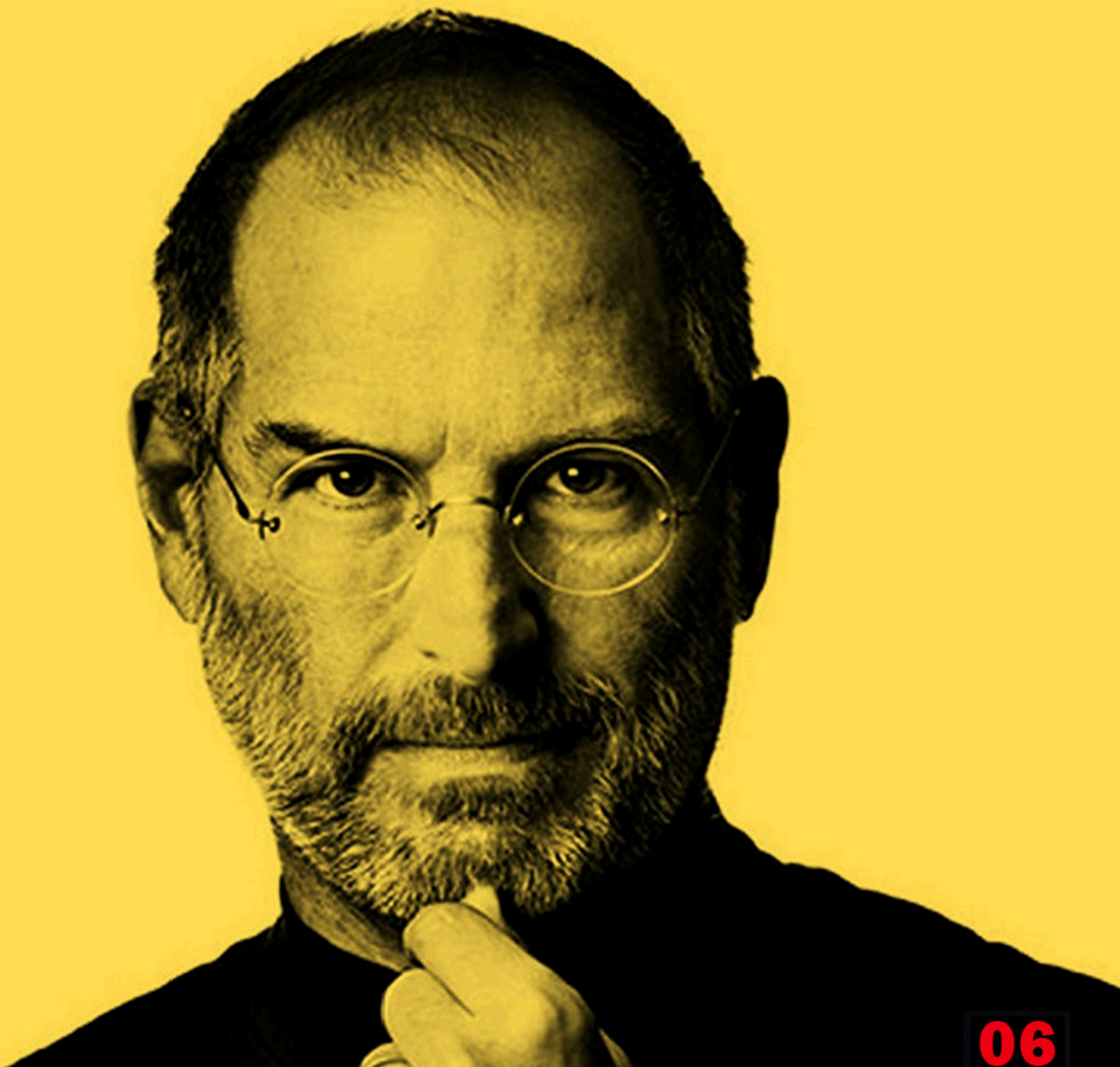
DOWN



also a two-time World Cup finalist: in 2005 and 2017.

These are some of the real life inspirations that we could follow to have success in the interested portion that we really want to be. As Steve Jobs said "If you are working on something exciting that you really care about, you don't have to be pushed. The vision pulls you". We need to acquire the Determination, competitive spirit, a positive attitude and above all the acceptance of failure, thus success will be more fruitful. The countdown would start when you realise what your interest is. As Dr. APJ Abdul Kalam sir said "If you fail, never give up because F.A.I.L. means "First Attempt In Learning". End is not the end, if fact E.N.D. means "Effort Never Dies." If you get No as an answer, remember N.O. means "Next Opportunity", so let's be positive."

- Malavika Viswanath.P
S8 ECE



Education and Humanity

-A tale of my journey

It all started with a dream in my mind that dug my thoughts deeper and forced me to ask myself - what is the real purpose of education? What is it that makes us fall into it? Why do we give so much importance to it? After all, do we get something out of it? These thoughts started reverberating in my mind and became the first steps of my journey to a whole new world. Years before, when people used to spend less time staring blankly at the screen in front of them, the idea of education was more of an elaborate, time-consuming process. A journey in which one traversed almost one-third of their life to get a piece of paper that gave them the key to unlocking the doors of yet another world. This strange new world was nothing like the previous one. This part of life was one filled with obstacles - an arduous, yet necessary journey - to earn money and thereby, to build a safe and secure future. At last, in the last phase of life or the so-called "future", realisation dawns, that the 'key' inadvertently started a rat race where humanity is lost and, in the end, there is nothing left within us, just some flesh that becomes one with mother Earth.



When we look at how the concept of education started, we can see that the earliest human beings needed to pass along knowledge to their next generation for their survival. Nature need not always be man's best friend. They educated the youth on an individual basis within the family unit. Over time, however, as population grew and societies formed, a group of adults started teaching large groups of relatively young people, and slowly, schools began to take form. After the Agricultural Revolution, education became a top priority. People started sending their young ones to schools to learn the language, basic human skills, and of course, religion, which was an important pillar of faith for the society to survive along. Later, when education started to spread in the Western world, it took a more formal shape, with a single school system split into different levels such as pre-school, high school, college and so on. A country invested heavily into education because it was successfully able to inject the idea of patriotism at a young age which would unify them as adults to work for their country. However, ever since the Industrial Revolution started, the main concept of education chamfered to a vicious clash of egos that dominated over skills.

At what point did we lose the real meaning of education? If we look at the Indian scenario our education system was more focused on humanity and skills, but later when westerners started to colonize us, they completely changed our education system. They started imposing their ideas to such an extent that even after independence, we are still completely ignorant of our history and culture, and it will take years for our country to get back on the right track. We can see that even after 70

plus years of freedom, our education system gives more focus on running the rat race, eliminating our pals, to "make our future secure". Failures can't be accepted and the race deems to be won, not because we wish for it, but because the society demands it. Gradually, a different mentality begins to take form within us, where we think less of ourselves. In schools, we are taught to win but only failures can teach us to move forward. More than 80 percent of our exams focus on three things: how well you can memorize things, how beautifully you can present them and how fast you can solve them. Our exams are mainly used as a tool for eliminating people, to sort out a few from the masses. In that process, we churn out people with competitive minds, who always focus on winning the race. However, minor failure will make them uncomfortable, depressive even, because they haven't learned or experienced failures. Our education system made us forget our history, we've forgotten how we evolved, and we focus more on our unseen future and in the process, forget to enjoy the present. Our minds have become more robotic and function in a monotonous manner. We tend to blindly believe in some ideology which we never try to truly understand, because the system has made us to believe what our rulers think of it, unquestioningly.

So, what is the real meaning of education? I define education as a process of changing our attitude, a self-evolving process to become a good human being. Being a good human means understanding oneself and taking care of your companion. Being a good human means, giving equal respect to everyone regardless of gender, race, and other divisions that we have created. A good human is someone who does not kill their fellow pals to win the race. So how can

So how can we achieve this? This is where the new idea of education should be practiced. We should teach our kids to understand that our life is not a hundred-meter race, but a marathon, where to reach far, we need to run together and not alone, and take care of our fellow runners en route. We should teach them not just to

\win but also to fail. We should teach them to move out of their comfort zone, to explore their passion, to understand things rather than studying it. This kind of education will make each generation more progressive and make this world more humane and beautiful.

**-Athul Parameswaran
Alumni**

RESYNC

RELAY SYNCHRONIZER

RESYNC is a device developed by Albin Joseph C. R and Krishnaprasad C of Semester 6 Electronics and Communication Engineering Department of Christ College of Engineering, Irinjalakuda. It was developed to automate a submersible water pump which is used to water the crops on the farm of Sir Geo Paul who is a faculty in the Civil Engineering Department of the college.



The device is primarily developed to automate the submersible water pump which is used to irrigate the crops on the farm. The device has a wide range of specification, is less expensive and affordable which makes it stand out from the ones available in the market.

RESYNC has two timers that allow the user to set two different times. The user can set starting time and duration of working of the pump. An OLED information display is provided for the user to interact with the automation system. The display is even provided with light and dark themes. A Rotary Encoder is provided to navigate through the

smooth and very responsive menu in the display.

A major feature of RESYNC is POD. This grabs our attention as it is a very useful and necessary feature especially in the case of Sir Geo's farm. The POD stands for 'Power Off Detect' which ensure that when electrical power is cut off during working duration, the system detects the situation and resumes from that instant when power is available and completes the remaining duration. POD hereby guarantee that crops get the same amount of water regularly.

Another important feature of RESYNC is LWC which stands for 'Lower Water Cutoff' and this one is essential in this situation as the farm has a submersible water pump. LWC is implemented using a water level sensor which is kept inside the well.

Arduino NANO microcontroller is used for processing and controlling RESYNC, DS3231 RTC (Real Time Clock) module is used to measure the passage of time. The water pump is powered via a relay switch. RESYNC is small in size and is well built and surely it is going to impress the user with its functions and performance. It is truly a game changer and is going to capture the market.

- Albert Paul
S6 ECE

SCARY FUTURE TECHNOLOGY

From human error and system failures to bloodsucking hackers and thieves, business people running, crying, and even transmogrifying into expletive-throwing beasts as technology took a turn for the digitally macabre.

The world falls silent. All you can hear is the echo of your heart pounding, palpitating as beads of cold sweat trickle down the side of your face. You feel nothing, except for the lump in your throat and nausea quickly creeping in as you realize that something has gone wrong. Very wrong. We've all been there — that dreadful moment when a technology mishap became our worst nightmare!!!

Nowadays 'techno horror' is a word which is familiar to all of us!! But when have you ever thought about it so deeply? When is this, what will be the future development? Anyway, I hope we can think that this won't happen in future. Techno-horror is a subgenre of horror fiction where the major source of horror is a science and technology. It may be seen as a subgenre of techno-thriller.

The genre heavily relies on elements of science fiction or fantasy. The major motives are the sinister consequences of modern science/technology, used either by evil actors towards their evil goals, or



by benevolent actors who lose control and things go horribly wrong.

This subgenre notably belongs to Western civilization and Japan and does not exist in China, India, Egypt, etc.

As the younger generation grew up beside the internet, they do not have the same anxieties about the endless possibilities of the internet. In other words, techno-horror using the internet as a motif is outdated in relation to contemporary culture. The internet cannot be terrifying due to lacking the ability of its horror to extend beyond the world of the film and into the mind of a young, contemporary viewer.

As the isolation of seven plus months of lockdown has forced us into a reality mediated almost entirely by screens. For those of us working remotely, days are spent on computers and in video meetings. We socialize through phones and laptops too: Zoom birthday parties, FaceTime calls with friends, and confessional Instagram stories. Every person who interacts with is as far away or near as every other. So, techno-horror as a genre must continue to adapt to modern society to truly be "terrifying."

- **Rosemary Sabu**
S4 ECE

ALUMINIUM AIR

A Aluminium–air batteries (Al–air batteries) produce electricity from the reaction of oxygen in the air with aluminium. The aluminium acts as the anode in this battery and oxygen as the cathode and uses a water based electrolyte. They have one of the highest energy densities of all batteries. Al-air batteries have the potential for up to eight times the range of a lithium-ion battery with a significantly lower total weight.

Aluminum is the 3rd most abundant element in the earth's crust and the most abundant metal. The extraction and manufacturing of aluminum also emits less pollution, which makes it more eco-friendly and cost effective compared to lithium which are their main competitors. Al-air batteries have a theoretical energy density of 8100 Wh/kg and a practical of 1300 Wh/kg, whereas lithium ion batteries have about 100-265 Wh/kg. Since the Al-air batteries use water based electrolyte, it doesn't explode or burn like the lithium ion battery. We can also recycle the byproduct of the Al-air batteries which is Aluminum hydroxide completely, whereas recycling of lithium ion batteries yields many risks and can only be partially recycled. Which make the Al-air batteries a better candidate to replace lithium ion battery



AL-AIR BATTERIES

Since nothing in this world is perfect, Al-air batteries also have their disadvantages.

Al-air batteries are primary cells so they can't be recharged and they should change their anode when completely discharged. Once the aluminium anode is consumed by its reaction with atmospheric oxygen at a cathode immersed in a water-based electrolyte to form hydrated aluminium oxide, the battery will no longer produce electricity and aluminium anode should be replaced with a new one which can't be done easily. It also requires a refill of water as aluminium hydroxide is produced.

Even though Al-air batteries are not the perfect batteries, with further research and development we could make it a viable alternative for lithium ion batteries.

- Paul Jojy
S2 ECE

NETWORK

Another year has come and gone, but that just means there's another year to look forward to. This is especially true if you've got your finger on the pulse of the latest technological advancements. With so much innovation and change over the last decade that has affected every sphere of life, it's understandable if you're excited to see what the start of the new decade will bring.

5G INTERNAL NETWORKS

With an estimated 38.5 billion devices connected to the internet in 2020, it seems obvious that a faster, safer and more reliable network is necessary. Between all the different smartphones, tablets, laptops, desktops, wearables, and connected smart home devices, the need to always be connected is clear. These devices are mostly based around 4G technology, but major telecommunications companies are making moves towards launching the newer 5G network at the start of the new decade. Some network providers have started offering 5G service, but as it becomes more widely used, lightning-fast connection speeds and improved reliability will come to be expected by consumers. So, what exactly does this mean for you? The 5G network brings faster connection speeds of up to 100 gigabits per second, which is about 100 times faster than 4G. The 5G network also will solve the network congestion and band-width problem. Currently, there are so many devices connected to the 3G/4G networks, the infrastructure isn't able to cope and the strain on the networks has become too much.



The 5G network will handle devices differently and will be able to handle new and emerging technology like driverless cars. Of course, before it can be completely adopted as the main network, there are still aspects that need to be fully worked out. With such a huge number of connected devices, a new level of security threat is presented as there are so many points where hackers could find vulnerabilities to exploit. It's vital that security protocols improve, otherwise the benefits of 5G can be weakened and undermined by data breaches. In order to ensure security levels are where they should be and there is a smooth transition of infrastructure, 5G is being rolled out slowly around the world.

6G INTERNAL NETWORK

In telecommunication 6G is the sixth generation standard currently under development for wireless communication technologies supporting cellular data networks. It is the planned successor to 5G and will likely be significantly faster. Like its predecessors, 6G networks will probably be broadband cellular networks, in which the service area is divided into small geographical areas called cells. 6G networks will exhibit even more heterogeneity than its predecessors and will likely support applications far beyond anything seen so far in mobile scenario, such as virtual and augmented reality (VR/AR).

Currently, there is little information about the standards of 6G. However, it is estimated that the international standardization bodies will sort out the standards for 6G by the year 2030. The work at some of the research centers has shown that 6G will be capable of transmitting a signal at a human computational capability by the year 2035 .

- **Abhijith K S**
S 6 ECE



Have you considered taking your passion for sports and business thinking to a level where you can actually pursue a successful career out of it? You don't need to be athletically gifted to take up a career in sports management. With the emergence of the Indian sports industry as a key player in global markets, the scope of Sports Management jobs in India is rising significantly. Don't you think now is the right time to follow your dreams in the world of sports business?

To this day, many find sports management interesting but how many are thinking of making a career in it? Not many.

You may ask why?

Well, the reasons are many. But one of the major reasons is, not having enough information about sports management jobs and how to go about a career in this field. This article is going to take you through the major aspects of sports management and how you can plan for an exciting future in this career field.

ABOUT SPORTS MANAGEMENT

Sports Management involves the management of all the business-related matters related to sports. Sports Management involves handling all the administrative aspects of sports teams, sports clubs, athletes, sportspersons, sports venues, and sports events. Sports Management is required at all levels where sports are played – from schools to colleges and from local, national to international levels.

Sports management offers roles for individuals in diverse areas and functionalities. Therefore, if you wish to go for a career in sports management, you may explore functional areas/roles such as Sports Marketing, Sports Analyst, Sports Agent, Sports Facility Management and so on.

HOW TO PURSUE ?

A whopping 19% increase in the demand for professionals in the sports industry is indicated in the upcoming years. Therefore, if you are planning for a career in Sports Management, then you need to know more about the scope of sports management jobs in India. After graduation with any subject, you can pursue higher studies such as MBA in Sports Management or other Masters level degree courses in Sports Management. There are colleges and institutes offering MBA programs for sports management, for which prerequisites are to clear the common entrance exams or the admission tests in these respective

A Career in SPORTS?

colleges.

Below is a list of top sports management jobs which you can pursue after completing your MBA in Sports Management or other sports management courses in India

Sports Event Manager

Sports Analyst

Sports Consultant

Sports Communication Manager

TOP DEGREE PROGRAMS IN SPORTS MANAGEMENT

B.Sc. in Sports Management

MBA in Sports Management

Master of Science in Sports Management

MS in Sports Analytics and Management

Master of Professional Studies in Sports Industry Management

CHANCES OF PURSUING COURSE ABROAD

There are a number of career opportunities available if one wishes to study abroad. There are several graduate and postgraduate courses in sports management to choose from.

A student looking for sports management jobs in the United States may get to work for professional programs like the National Football League (NFL), National Basketball Association (NBA), National Hockey League (NHL) and other famous sports associations and organizations. Moreover, after completing graduation, students may find work in areas such as marketing, business administration, economics, accounting, and law.

You can choose to work in major and minor leagues, universities, talent agencies, and PR firms for sports with a degree abroad. Countries like the U.K. Australia, U.S.A. provides good courses on sports management.

- Jorfin Jose M
S8 ECE

THE UNTOLD TRUTHS OF 3D PRINTING

With all of the hype surrounding additive manufacturing and 3D printing, it's easy to forget that, as with all new technologies, there is a learning curve.

Additive manufacturing is as guilty as any industry of guzzling its own Kool-Aid and giving people the idea that it's all very, very simple: put in your CAD file, press a button, wait a bit, and here comes your finished part. But as with all new technologies there is always a learning curve required to be able to apply the technology to its fullest. It helps if we remember the value of any new innovation is directly proportional to the problems it solves, the efficiencies it brings to a process, or the opportunities it makes possible. From that perspective 3D printing is one of the biggest bonanzas of all time. A genuine three- to five-year addi-

tive manufacturing strategy doesn't exist for most companies; certainly not the smaller ones. And while it's easy to interpret that as a criticism, it's not. It's a reflection on the complexity of the technology as it is today and what it takes to transform your business to fully leverage the benefits of 3D.

3D printing is now undergoing a complex evolution. 3D printing is transforming from a prototyping and a low production run technology to producing higher volumes of parts in demanding applications in such fields as aerospace and automotive.

So, the question becomes: if you print a component or an assembly with a very complicated geometry, will that geometry scale to a large number? In other words, you printed 10 of something; they came out of the printer looking okay, but not great. The post-print processing to clean up those 10 parts may have been labor and time intensive to make them look great, but that's okay because you want the customer to see the best 10 printed parts they can get.

Now the customer is so impressed that they want to order 1,000 of them. Now this really complex geometry that you made look perfect doesn't scale so easily due to



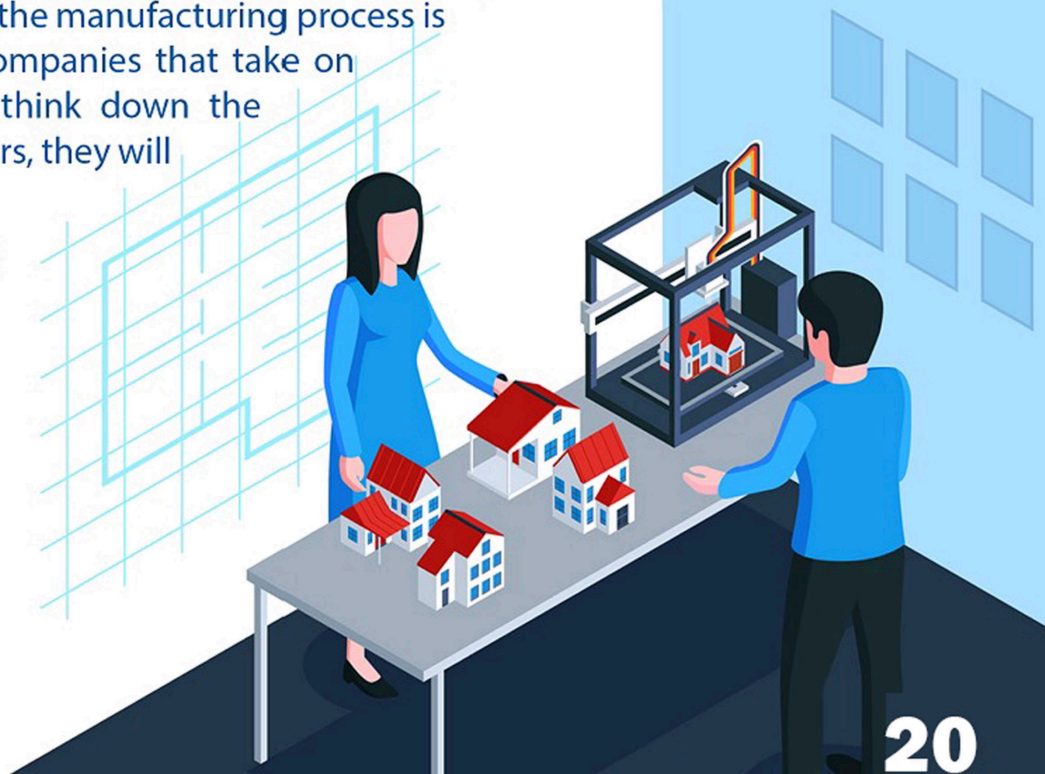
the time and labor the post-print processing takes. Whether you run a service bureau or you're bringing 3D printing in house for your own company's needs, these steps and associated costs have to be taken into account. This isn't just an issue for a service bureau. It's just as much an issue for the established manufacturer that is trying figure out how to adopt additive technologies to keep giving customers a reason to do business with them and to stay competitive with startups that don't have to bear the cost of these transformations.

Further complicating the matter is the learning curve of designing for additive manufacturing and how it varies from one technology to another and from one material to another. Thermoplastics, resins, and powders all have their unique material properties and the way you design to maximize the benefits for one type of 3D technology and material will be different than how you design for the other.

"Every single additive manufacturing process has different design constraints you need to follow." Just to give that some perspective and the challenge it represents, that means being aware of the design criteria for fused deposition modeling (FDM), stereolithography (SLA), multi jet fusion (MJF), SLS, DMLS, ProJet, and PolyJet. That's a tall order for any company. And that's not even all the 3D printing technologies available.

The transformation additive manufacturing is bringing for business in the coming years is going to produce winners and losers. But the transformation is especially challenging given all the variables that have to be considered such as design, which 3D technologies to use, and to what part of the manufacturing process is best applied. But those companies that take on this challenge and truly think down the road, will not just be winners, they will have survived.

- Krishnan KV
S8 ECE



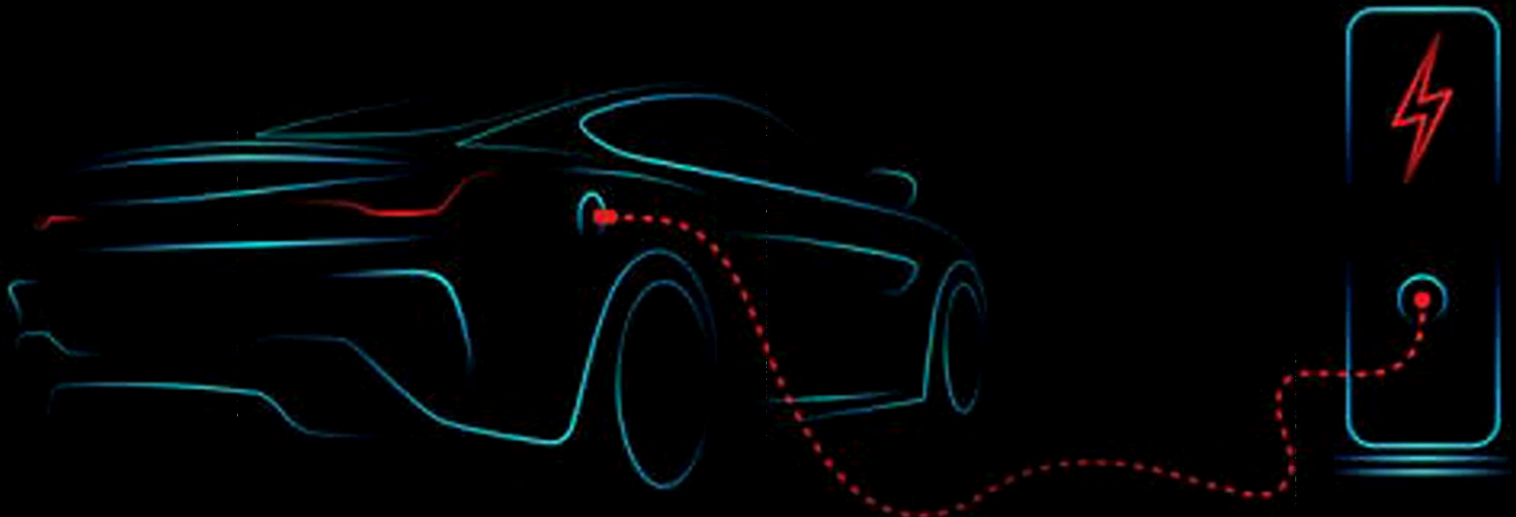
LOG 9 DEVELOPS ULTRA-FAST CHARGING BATTERY TECHNOLOGY FOR EVs

India-based start-up Log 9 has announced the development of its new graphene-enhanced battery for electric vehicles. Log 9 states its Rapid Charging Battery Technology is capable of fully charging in under 15 minutes and that it has a lifetime of over 15 years of use.

Other claims made by Log 9 include up to 5x power which would help in increased load-bearing capacity and ac-

celeration. Additionally, the Company says that it is 5-times safer than lithium-ion batteries in terms of fire-resistance and impact-resistance. Log 9 says that its new batteries would offer a range of up to 70 kilometers for two-wheel EVs and 60-80 kilometers for three-wheel EVs.

The initial application for the new Log 9 Superlative battery pack is expected to be in intra-city electric vehicles. The



company is targeting the B2B last-mile delivery segment of India for the new battery system. Log 9 is said to have partnered with Amazon, Vogo, Shadowfax, Delhivery among others for their last-mile delivery vehicles.

The company is planning to deploy over 3000 vehicles with its Rapid Charging Battery Packs by March 2022. These would include both electric two and three-wheelers. By FY 2023, the automaker aims to deploy over 20,000 vehicles across the country. Log 9 has already performed pilot runs across India, but is looking to tap into other markets like South East Asia as well.

Akshay Singhal, founder & CEO, Log 9 Materials, said, "In the current scenario, 2-Wheeler and 3-Wheeler EVs in our country need an average charging time of 4-5 hours, leading to significant downtime which in turn affects consumer sentiment adversely; especially in the commercial segment wherein downtime directly impacts revenues. This is exactly where we at Log 9 are stepping in to solve the problem and/or bridge the gaps.

We are presenting an optimized solution for intra city 2-wheelers and 3-wheelers through our latest supercapacitor-based battery technology, which enables EVs to be charged in as low as 5 minutes. Apart from providing superfast charging for EVs, Log 9's battery packs will also be superior in terms of range and power density, and will be positioned as a highly cost-effective solution. We have identified suitable partners (including OEMs and fleet operators) for both 3-Wheeler and 2Wheeler integrations of our battery technology into their vehicles, and our commercial pilots have already started which will run over the next 3-4 months."

- Albert Davis
S6 ECE

BONE FRACTURE DETECTION USING DIGITAL IMAGING PROCESSING

ABSTRACT

A crack (not only a break) in the bone is also known as a fracture. Causes of bone fractures include trauma, overuse and diseases that weaken bones. The main symptom is pain. There may also be loss of functionality depending on the area affected. Treatment often involves resetting the bone in place and immobilizing it in a cast or splint to give it time to heal. Sometimes, surgery with rods, plates and screws may be required-Rays are one of these techniques for detection of bone fractures. Sometimes the size of fractures is not significant and could not be detected easily. Therefore, effective and intelligent systems should be designed. This idea proposes a model to detect the minute bone fractures without using MRI, CT scan methods, but using the input as X-rays with the help of digital image processing. Digital image processing consists of the manipulation of images using digital computers. Its applications range from medicine to entertainment, passing by geological processing and remote sensing. The three general phases that all types of data have to undergo while using digital technique are pre-processing, enhancement, and display, information extraction. The implementation of image processing such as image enhancement and feature segmentation and feature excitation are used for fracture detection. The Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images which is used for segmentation. The Hough transform is a feature extraction technique used in image analysis, computer vision, and digital image processing. The purpose of the technique is to find imperfect instances of objects within a certain class of shapes by a voting procedure.

Team Members

Anupama CD
Malavika Viswanath P
Pooja AS
Della Reasa Vliaveetil



Scan to
know more

In our fast moving life we have seen data speeds as an important factor of our daily life .throughout history data speeds are increasing in a fast manner .the name is simple lifi, just like we know wifi both of them does the same job and that is transfer data wirelessly through air and of course there are major differences between these two

LIGHT FIDILITY

Lifi is a wireless communication technology that uses light to transmit and receive data at a high data speed. it uses modulation of light to transmit data .the person who first introduced this technology is a German professor Harold haas .today our internet is provided by ISPS and we have major concern about speed and this problem could be solved with lifi because data speeds achieved with lifi is incomparable according to experiments lifi could transmit speeds up to a 100Gbit/s

It's 10 times faster than the fastest connection, that's your favorite movie downloaded in seconds in 4k

Lifi can be useful in fields like internet of things (iot) especially in household network. the led's we use for lighting in our home can serve as a second purpose as a source of internet.

Now one question in our minds would be that the lights should be turned on all the time to access internet but that's not a problem for lifi cause the lights can be dimmed to such a low extend that it won't be noticed by the human eye.the main advantage of lifi would be it foms a secure network because light cannot pass through walls hence our data remains secure to our rooms

- **Sreehari P S**
S6 ECE

