AMRITA VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY

School of Engineering

ELEKTRON

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GEN-E
STUDENTS ASSOCIATION

Students Association of EEE & ELC (GEN-E)

Department of Electrical and Electronics Engineering

WHAT IS GEN-E?

Gen - E is a student association, from the department of Electrical and Electronics Engineering (EEE) and Electrical and Computer Engineering (ELC), formerly Association of Electrical and Electronics Engineering (AEEE), which aims to strengthen the intra-department student network and provide a space for everyone to explore their technical interests and offer opportunities off-academics.

Elektron, the department E-magazine, is published by Gen-E, and carries numerous articles from both students and teachers alike from the department. It has been brought back into publication, starting 2022. The fields of Electrical, Electronics and Computers are always evolving, and it has become necessary to keep up with the state-of-the-art technology. The magazine aims to provide a space to every student to encourage and explore various areas of interest, both technical and non-technical that goes beyond books and to provide a platform to share them.

CONTENTS

ELECTROMAGNETIC PULSES AND ITS CONSEQUENCES

As catastrophic as a nuclear blast can be, there is a lesser-known disaster other than incineration, blast wave and a radioactive fallout. That is the nuclear EMP (electromagnetic pulse). A strong EMP has the power to render any electronic device useless which could disrupt the functioning of the modern world drastically.

Smaller EMPs occur in nature, especially during lightning strikes. A nuclear EMP detonated at the right height has the potential to harm an entire continent electrically and electronically. Electrical equipment/infrastructure that require heavy amounts of metal are also prone to an effect similar to one caused by a geomagnetic storm. These could be internet/communication lines, electrical grids, etc.

A geomagnetic storm is an astronomical event where a coronal mass ejection, or solar storm can pack the explosive energy of thousands of nuclear bombs. When such blasts travel up till Earth, the strength of these blasts can hit Earth's magnetic field and as result induce electrical currents throughout the planet.

The crucial part to inducing an EMP are gamma rays. 0.1% to 0.5% of a nuclear blast approximately are emitted as gamma radiation. This contains so much energy as to push out electrons from the atoms in the atmosphere and accelerate them to about 90% the speed of light. The magnetic field of the planet then pulls these particles towards itself in a cork-screw like manner which makes the particles release their acquired energy in the form of electromagnetic radiation, mostly in the spectrum of radio waves.

This phenomenon is so unfathomably rapid that it happens under fractions of a microsecond. This rapid yet highly powerful phenomenon disrupts the circuitries in devices by overloading it in one form or another.

This happens because when an EMP travels through a circuit that is advanced and complicated enough to catch the pulse, it initiates a rogue current that travels through the circuit which destroys it. Power transmission or telecommunications equipment, meanwhile, can overload from the excess current, spark, and fail for miles around.

ELECTROMAGNETIC PULSES AND ITS CONSEQUENCES

If you've ever noticed your Bluetooth or Wi-Fi connection getting disrupted momentarily when standing next to a microwave oven while it is running, then that is a clear example of how external, strong electromagnetic waves can disrupt your device. The intensity of a nuclear detonation's EMP is about 30,000 to 50,000 volts per meter, thousands of times greater than the example mentioned above.

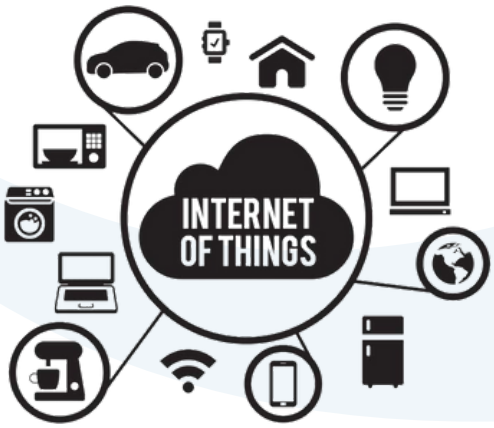
Nuclear blasts that happen dozens of miles above ground can only have a devastating EMP compared to a near-ground explosion. Since gamma rays have a wavelength that's lesser than an angstrom meter, it is only able to travel easily at higher altitudes of the atmosphere where it can spread out over a large area and affect enough atoms/molecules.

The low density at these altitudes enables electrons to move very freely and maximize the intensity of the pulse. At near-ground explosions, many of the gamma rays would slam into the earth itself. Moreover, the rays would have a harder time creating a large electric field that could generate a widespread EMP. But an EMP is not the primary cause of worry in such scenarios.

Adithya H
3rd Year EEE

IOT: YAY OR NAY

Before we delve into its good and bad, let's first understand the core of IoT.
The Internet of Things (IoT) is a network of connected devices, vehicles, home appliances, and other physical objects that are embedded with sensors, software, and network connectivity, enabling them to collect and exchange data. The IoT is a rapidly growing technology that is changing the way we live, work, and interact with the world around us.



Yays:
One of the key features of the IoT is its ability to collect vast amounts of data from various sources and turn it into actionable information. For example, a connected device in a smart home can collect data on energy usage, room temperature, and humidity, and use that information to optimize heating and cooling systems and reduce energy waste.

Another key benefit of the IoT is increased automation and efficiency. By connecting devices and systems, the IoT allows for automatic control and monitoring of processes, reducing the need for manual intervention and increasing efficiency. For instance, a smart irrigation system can use weather data to adjust watering schedules and conserve water, and a connected vehicle can automatically adjust its speed and route based on traffic conditions.
In addition to these benefits, the IoT also has the potential to transform various industries and fields. In healthcare, for example, connected devices and wearable technology can help monitor patients remotely and improve patient outcomes. In agriculture, IoT-enabled devices can help farmers collect data on soil moisture, crop health, and weather patterns to improve crop yields and reduce waste.

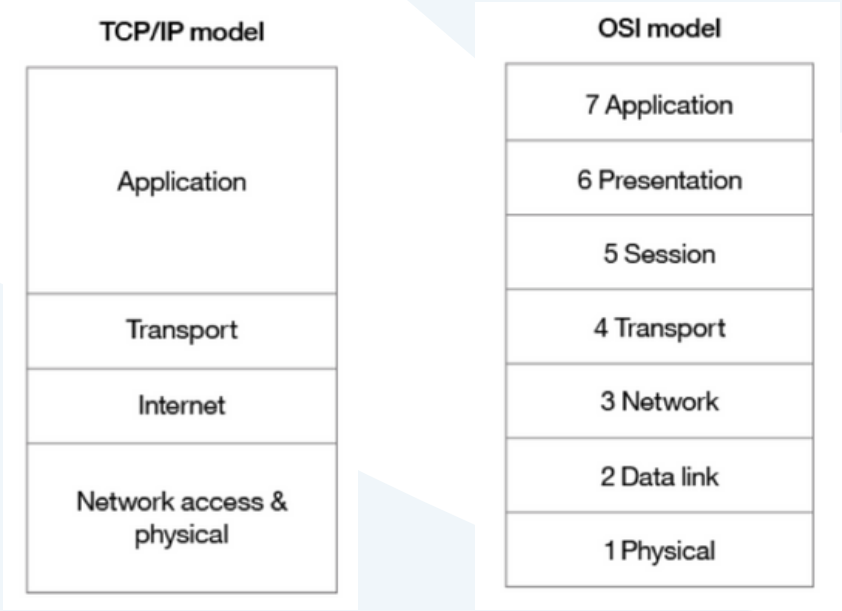
Nays:
Despite these benefits, the IoT also poses significant security and privacy concerns. With so many connected devices and systems, the potential for cyberattacks and data breaches is high, and it is important for manufacturers and users to take security measures to protect sensitive information
Another negative impact is that, the widespread use of IoT devices and systems can lead to increased dependence on technology, which can have negative effects on physical and mental health. As health becomes the priority for any being, this concerns us a lot.

IOT: YAY OR NAY

As automation becomes more prevalent with the growth of the IoT, there may be job losses in certain industries as manual labour is replaced by machines. In a country like India, holding a huge population lack of job opportunities in one of the most debatable concerns and IoT increases this in the wrong cause.

Extensively, IoT follows two major layering infrastructures, namely, ISO-OSI networking model and TCP/IP networking model.

Network Access & Physical Layer: Basically handles the physical infrastructure that deals with communication of computers over the internet.
The TCP/IP layer subsumes the Physical and Data Link Layer of the ISO-OSI architecture. In the case of wired connections we've got optical cables and in cases of wireless networks, Wi-Fi IEEE 802.11 is generally formulated.



Internet Layer: Essentially controls the flow and routing of traffic which acts as the network layer.
This particular layer maps Internet layer from TCP/IP and Network Layer from ISO-OSI. Logical addressing with certain defined protocols is being carried over here. IPv6 is being majorly adopted in IoT device addressing.

Transport Layer: Provides a reliable data connection in between two or more communicating devices.
Both the models have incorporated the same functionalities inside the transport layer. UDP or User Datagram Protocol is generally used here for efficient performance.

Application Layer: All the services that desires to access the module for communication and lets the user to access the network.

IOT: YAY OR NAY

The Session, Presentation and Application layers of the ISO-OSI model constitutes to the Application Layer of the TCP/IP architecture. The very well known application layer protocol, https or Hyper Text Transfer Protocol, is widely used for general applications.

In conclusion, the Internet of Things is a rapidly growing technology that has the potential to transform the way we live, work, and interact with the world around us. By connecting devices and systems and collecting data, the IoT enables increased automation, efficiency, and innovation. As the IoT continues to evolve and expand, it will be exciting to see the many new and innovative ways it will change our lives.

While the IoT offers many benefits, it is important to consider and address the potential harmful effects. By taking steps to ensure the security and privacy of data, promoting interoperability between devices, and investing in sustainable technology, the IoT can continue to improve our lives while minimizing its negative impacts.

Overall, the IoT has the potential to greatly improve our lives and revolutionize industries. By leveraging the power of connected devices and systems, the IoT is enabling us to collect, analyze, and use data in new and innovative ways.

Anish Krishna M
3rd Year ELC

MAGNETIC LEVITATION

Magnetic Levitation also known as MAGLEV is the phenomenon of suspending objects in mid-air using magnetic field. Magnetic field is used to offset the gravitational force of the Earth (among other forces).

According to Earnshaw's Theorem, collection of point charges cannot be kept in equilibrium configuration that is stationary and stable solely by the electrostatic interaction of the charges. Which renders dipole magnets and paramagnetic materials useless because they cannot create static system to reliably lift against gravitational force. However, a stable system can be attained using servomechanisms, diamagnetic materials, super conduction or eddy current-based system.

A combination of permanent magnets and electromagnets or diamagnetic can be used to achieve successful levitation and steering in all six axes. Earnshaw's theorem also conveys for a system to be levitated successfully, the system must have at least one stable axis, while other axes can be stabilised using ferromagnetism.

Two crucial factors affecting MAGLEV are Static Stability and Dynamic Stability –
Static Stability – When a slight displacement occurs from the stable equilibrium, static stability causes a net force to push it back to the initial equilibrium point. This can be achieved using electronic stabilizers and diamagnetic materials.

Dynamic Stability - Dynamic Stability occurs when the levitation system is able to damp out any vibration-like motion that may occur. This can prevent deter in the equilibrium as it allows vibration modes to occur that can push the object out of the region of stability.

MAGLEV is a ground-breaking phenomenon that has a major impact on modern technologies. But MAGLEV trains have been the focus of much of the worldwide interest in MAGLEV. The concept of MAGLEV is created to cut-off the cause of wear and tear. MAGLEV eliminates friction on rails, that deterred trains from reaching their maximum speed and disk slippage that can occur at high speeds. Bullet trains have been modified to adapt MAGLEV in daily use. Central Japan Railways Company has made Quantum leap in this domain by building bullet trains that can travel 603 km/h using Superconducting MAGLEV.

MAGLEV vehicles follow 3 principles – Magnetic Levitation, Lateral guidance, and Propulsion.

MAGNETIC LEVITATION

Magnetic Levitation – As the principle's title suggests, it the levitation of upwards superconducting magnet using forces.

Lateral Guidance – Current is induced in the levitation coils that are connected under the pathway by the running MAGLEV vehicle or the superconducting magnet. The induced current in-turn results in a repulsive force on the levitation coils of the side near the car and an attractive force on the levitation coil of the side away from the car. This propels the vehicle to travel through the centre of the pathway.

Propulsion – The attractive and repulsive on the levitation coil is used to propel the vehicle.
MAGLEV usages from the viewpoint of engineering science can be categorized as –

1. Transportation Engineering
2. Automotive Engineering
3. Biomedical Engineering
4. Electrical Engineering
5. Chemical Engineering

It is evident from the fast development and transformation of MAGLEV technology, that it will have a significant impact on modern technology and is bound to create a leap in transportation, Automotive, Biomedical, Electrical etc industries, hence creating a faint vision of the nearby future.

Arjun M Nair
3rd Year ELC

HACKERS AND METHODOLOGIES

Are all hackers dangerous people? What are the methods they use to hack? What is information security? You will get the answer to all these questions after reading this article.

Hackers are the people with excellent computer and networking skills who crack into our computer software and try to gather sensitive information such as passwords, service details, account details, etc. All hackers are not dangerous; the two major classifications of hackers are ethical hackers and attackers. Ethical hackers and attackers are intelligent in software analysis, penetration testing, and vulnerability analysis, but they use their knowledge in different ways. Ethical hackers are the people who will do penetrating testing, vulnerability analysis, and report the vulnerability to the respective owners, but attackers will take advantage of the vulnerability and exploit the devices.

The steps followed by hackers are: fingerprinting, weaponization, delivery, exploitation, installation, command, and control. Attackers gather as much information about the target as possible during the footprinting stage and then use that information to build the payload during the weaponization stage. In the delivery stage, hackers deliver the payload via email attachments. In the exploitation stage, attacker triggers the payload. In the installation stage, it will install the backdoor in the software. At last, in command and control, the attacker carries out his motive.

Information security refers to protecting our sensitive and critical data from attackers. There are five elements in information security - Confidentiality, Integrity, Availability (these three are commonly known as the CIA Triad), Authenticity, and Reputation. Confidentiality is the assurance that the information is accessed only by the authorized user. Integrity is the trustworthiness of authorized access. Availability refers to the information that should be available whenever a user wants to access it. Authenticity is the quality of being genuine. After sending messages, the user's reputation is such that he cannot deny that he sent them.

Attackers usually have a motive to attack the organization: to perform information theft, manipulate data, create fear and chaos by disrupting critical infrastructures, bring financial loss to the target, propagate religious or political beliefs, achieve a state's military objectives, damage the reputation of the target, to take revenge.

Balakumaran
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FORMULA E:
REVOLUTIONIZING MOTORSPORTS WITH ELECTRIC TECHNOLOGY

In recent years, the world of motorsport has witnessed a profound transformation with the emergence of Formula E. Unlike its gasoline-powered counterparts, Formula E is an all-electric racing series that has captured the imagination of racing and technology enthusiasts alike. This article explores the technical aspects and innovations of Formula E, shedding light on the engineering marvels that make it a pioneering motorsport.

Formula E made its debut in 2014 as the first global electric racing series. It was initiated with the aim of promoting sustainable and environmentally friendly transportation solutions. The championship features high-performance electric vehicles (EVs) that showcase cutting-edge technology and push the boundaries of what is possible in electric mobility.

Powertrain and Battery Technology:
The heart of a Formula E car lies in its powertrain and battery system. Each vehicle is equipped with a bespoke electric powertrain, consisting of an electric motor, an inverter, and a single-speed transmission. The power output of these motors reaches up to 250 kW (335 HP), providing impressive acceleration and top speeds. The battery pack is a crucial component of the Formula E car, delivering the energy required to propel the vehicle throughout the race. The batteries are designed to handle high power demands and rapid charging. Currently, the cars use a standardized battery pack, but teams are permitted to develop their own powertrain components, including inverters and motors, to enhance efficiency and performance.

Regenerative Braking:
One of the most fascinating aspects of Formula E is regenerative braking, which plays a pivotal role in maximizing energy efficiency. When a driver brakes, the kinetic energy generated during deceleration is converted into electrical energy and stored in the battery. This stored energy can then be used to provide an extra power boost during acceleration or to extend the vehicle's range. Regenerative braking requires sophisticated power electronics and control systems to seamlessly transition between energy generation and consumption modes.

The Hum of Silence:
As Formula E cars zoom past the cheering crowds, one notable difference stands out: the absence of roaring engines.

FORMULA E:
REVOLUTIONIZING MOTORSPORTS WITH ELECTRIC TECHNOLOGY

Image Reference: https://i0.wp.com/electrek.co/wp-content/uploads/sites/3/2023/01/FES9T01_124525SMG_3012-2048x2048-1-e1673405284788.jpg?w=1500&quality=82&strip=all&ssl=1

Instead, the high-pitched whine of electric motors fills the air, reminiscent of futuristic sci-fi movies. It's a captivating soundscape that reflects the silent power of electricity propelling these cutting-edge machines.

Energy Wars:

In the world of Formula E, pit stops take on a whole new dimension. Drivers strategically activate "Attack Mode" to gain an extra power boost, like activating a turbocharger in traditional racing. It's akin to entering a sci-fi realm where racers unleash hidden reserves of energy, battling it out on the track like electric warriors.

Energizing Pit Stops:

Formula E's pit stops are electrifying in more ways than one. While conventional races involve refuelling, Formula E teams swap out battery packs for a quick recharge. It's a spectacle to behold as technicians deftly handle the battery swap, channelling their inner engineering wizards while the car powers up for the next thrilling lap.

FORMULA E:
REVOLUTIONIZING MOTORSPORTS WITH ELECTRIC TECHNOLOGY

Control and Telemetry Systems:

Formula E vehicles are equipped with advanced control and telemetry systems that monitor and optimize various parameters in real-time. These systems collect data on vehicle performance, battery temperature, power consumption, and tire wear, among other variables.

Innovations and Future Developments:

Formula E continues to be a hotbed for technological advancements in the electric mobility sector. The series serves as a testing ground for new technologies, which often trickle down to consumer electric vehicles. Future developments in Formula E may include advancements in battery technology, power electronics, and energy management systems, ultimately leading to more efficient and capable electric vehicles on the road.

In conclusion, Formula E stands as a testament to the rapid advancements in electric vehicle technology and serves as a catalyst for the widespread adoption of sustainable transportation solutions. By exploring the technical aspects of Formula E, EEE students can gain valuable insights into the intricacies of electric mobility, inspire innovation, and contribute to the future of the automotive industry.

Nithishkumar
3rd Year EEE

DISSECTING THE GAMEBOY – GOLD FROM SILICON

Nowadays, people drool over the highest-end graphics cards and power-hungry CPUs. Notably, companies start to abuse this obsession and raise their prices by the year, citing inflation as a reason. Anti-consumer tactics, microtransactions, subscription services, and so forth are starting to riddle a consumer's product. Technology wasn't so intrusive back then.

One such product was the Gameboy from the Japanese giant Nintendo. What is a Gameboy, you ask? Well, a Gameboy is a portable console that is capable of playing video games on the go. Saying the Gameboy is a success is the understatement of the century. To give you context, the Gameboy and one of its revisions, the Gameboy Color, sold 118 million units in total. Launched in April of 1989, it went on to become a huge phenomenon for the next 4 years.

The Gameboy is touted as the zeitgeist of the tech during the 90s and is often compared to the rigidity of the Nokia 1100. The console survived the Gulf War in 1991. I am not joking. Look it up. The console had 4 models. The first model codenamed DMG expanded as Dot Matrix Game (terrible screen, terrible name). Nintendo was truly ahead of their time. The Gameboy Advance SP, the successor, had both a rose gold color option and needed an adapter to plug in your headphones (wish some things wouldn't repeat often. Sigh).

Coming to the looks, the Gameboy had a 2.5-inch screen with a pretty terrible resolution of 160x144 pixels and was capable of producing 4 simultaneous colors at a time, which was 4 different shades of gray (ahead of their time again). Coming to the features, it has a mono speaker or stereo if you plug in headphones, a link connector, and a serial port for connecting another Gameboy to it. The backside of the device has slots for 4xAA batteries and a game pack, which is basically a ROM chip.

Peering into the internals, it has a 1MHz 8-bit CPU, which is an SOC or a system on a chip, 8 KBs for RAM and VRAM respectively, and is capable of drawing 10 sprites or lines per second. This was the last 8-bit system that was being developed for common use. Clones were super popular back then as well. GB Boy was a Chinese competitor that was able to perfectly mimic the Gameboy, and you can still buy it for like 30 or 40 US dollars. Such a shame though, its quartz is clocked 30 times faster, and you can't run any games on it. But you can buy it if you want though.

Coming to the chip, we can take the NES and the Super NES as a reference for Nintendo's consoles.

DISSECTING THE GAMEBOY – GOLD FROM SILICON

The NES released in 1983 was based on a MOS 6502 chip, which is an 8-bit chip, and the SNES released in 1990 was based on a WDC 65816 chip, which is basically a 16-bit version of the MOS. So, obviously, the Gameboy uses a SHARP LR35902, which is also an 8-bit chip.

On the context of chips, on one end, we have an Intel 8080, which was used in computers like ALTAIR, the one in which Bill Gates wrote software on. And on the other end of the spectrum, we have a Zilog Z80, which was unanimous with almost every other home computer. Very successful indeed. Imagine if every CPU was backward compatible with each other. Instructions on one CPU perfectly working on the other as well. Throw a pie on that because in comes SHARP with their chip.

The Z80 formed a superset with the 8080. The LR35902 had a scoop of the 8080, a scoop of the Z80, and sprinkled some of SHARP's own instructions. The core architecture remains the same though.

DISSECTING THE GAMEBOY – GOLD FROM SILICON

The Architecture is made up of the registers A, F, B, C, D, E, H, L, SP, and the program counter. A is the accumulator mainly used for arithmetic operations, F is the Flag bit which raises some of the flags commonly seen in the microcontrollers like the zero flag or the negative flag and such. Registers B to L are general purpose and SP is the stack pointer. A difference here is that registers B to L and SP can be used as individual 8-bit registers or they can also be combined as a 16-bit register following the naming as BC, DE, and HL. This is the core architecture of the Gameboy.

On the operating system aspect, they just said, "Let's do it on the next one" and just left a BIOS, which allows booting directly into the game. Tough luck. Complex circuitry and software are made just so that people could fail the first level of Super Mario Bros. It is such a wonder that something so small was able to make such a big impact.

Next time you get a portable console, learn first on how to assemble it back and start to dissect it. Who knows? You might strike gold from that silicon. Nintendo sure did.

Gunalan J T
4th Year ELC

FUTURE OF EV IN INDIA WITH FOCUS ON GOVERNMENT POLICIES

The European Union (EU)is planning to go completely electric by 2035..... UK to go electric by 2030..... Most of German car manufacturers are planning to go completely electric by 2035, stopping all ICE vehicles. So, in which way is India going?

Electric vehicles (EVs) are becoming increasingly popular in India as the government and private sector work to promote the adoption of clean and efficient transportation. The government has set ambitious goals to increase the number of EVs on the road and has implemented a number of policies and incentives to encourage the uptake of EVs. One of the key drivers of the growth of EVs in India is the increasing concern about air pollution and the need to reduce greenhouse gas emissions. The Indian government has set a target of having 30% of all vehicles on the road be electric by 2030, and it has implemented a number of policies and incentives to support this goal. These include the Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) program, and the National Electric Mobility Mission Plan (NEMMP), which aims to put 5-6 million electric and hybrid vehicles on Indian roads by 2020. Many State governments are also providing subsidies and incentives for buying electric vehicles, to promote more people to buy EV's.

The Indian automotive industry is also taking steps to increase the production and availability of EVs. Several major automakers, including Tata Motors and Mahindra & Mahindra, have introduced electric models in the Indian market, and more are expected to follow suit in the coming years. In addition to government policies and the efforts of automakers, the expansion of charging infrastructure is also a key factor in the growth of EVs in India. The government has announced plans to install EV charging stations in major cities and along major highways, and private companies are also investing in charging infrastructure. However, there are also several challenges to the adoption of EVs in India. There is currently limited charging infrastructure in the country, which may be a barrier to widespread adoption. One of the biggest problems is the high upfront cost of EVs compared to traditional internal combustion engine vehicles. Just for comparison, TATA Nexon's Petrol Engine Vehicle costs 7.99 lakhs, the same car's Diesel specification costs 9.99 lakh whereas it's Electric variant stats at 14.99 lakh (all prices are ex-showroom for base variants). The Lithium-ion battery pack used in Nexon EV costs around 7 - 8 lakhs which is more than half of the price of the car. I think this sums up why electric vehicles are way costlier than its ICE counterparts.

AUTOMOTIVE/TECHNOLOGY/GOVERNMENT

FUTURE OF EV IN INDIA WITH FOCUS ON GOVERNMENT POLICIES

Is there any way that EV prices would come down in future especially for cars?
The Answer is YES. Thanks to the research for developing EV which uses Sodium ion battery instead of the conventional Lithium-ion battery. The results look positive and now many giants and multi billionaires like Mr. Ambani are coming forward to invest in this research. Tesla is in the race to switch to the usage of Sodium based battery sooner. Elon Musk says he is excited to see that the performance of Sodium based batteries are better than that of Lithium batteries at a more economical rate.

Overall, it is safe to say that the electric vehicle market in India will continue to grow in the coming years, driven by a combination of government policies, industry efforts, and consumer demand for more sustainable transportation options.

Krishna Prasath
3rd Year ELC

METAVERSE

Imagine you coming home after a long day at work, all tired out, frustrated and burnt out from all the work day. You hop in the couch, get the gang together, and fire up your favourite game. Sounds like a great way to let off some steam, doesn't it? Now what if, you were to actually LIVE what you played? Well, not live technically speaking. More of, say experience it first-hand. Virtual Reality? You might ask. Close, but not exactly. What is being referred to here, is a much more expansive concept when compared to VR. VR, after all, is merely a part of what is widely known as the Metaverse. What exactly is the Metaverse? The "metaverse", as Wikipedia puts it is a hypothetical iteration of the Internet as a single, universal, and immersive virtual world that is facilitated by the use of virtual reality (VR) and augmented reality (AR) headsets. To Laymanize it, the Metaverse is an alternative 3D, connected reality. Virtually, of course. The Metaverse allows one to seemingly replicate pretty much whatever he does in his actual life, but virtually. Let's take a brief look into what this phenomenon is.

The Metaverse concept was first introduced 1992, when American sci-fi writer Neal Stephenson coined the term in his book Snow Crash, which depicts a dystopian future world where rich people escape into an alternative 3D, connected reality. It comprises of 7 layers, these being-

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METAVERSE

Layer 1 – Experience.
Layer 2 – Discovery.
Layer 3 – Creator economy.
Layer 4 – Spatial Computing.
Layer 5 – Decentralization.
Layer 6 – Human Interface.
Layer 7 – Infrastructure.

As exciting as it may sound, a full-fledged concept of the Metaverse sadly may not be possible. At least not in the future. It blurs the line between reality and the virtual world. And with this very move comes its own share of pros and cons. It would help take learning and discovery to a new level. Also giving us the power to design our own environments and experiences and share those experiences with others. It could create better ways to communicate with those who are far away. You also get to try things that you normally wouldn't dare try in the real world, extreme sports for example.

On the flip side, the disconnect from the real world could seriously impact our mental health. Not to mention real life issues that can find a place to spread much faster than in the real world. Propaganda, definitely. Also, the fact that there is literally no credible governing authority would make it a child's play for a crime to take place. After all, it is an extension of the internet.

To put things into perspective, let's look into Ready Player One. The Steven Spielberg movie that describes exactly what a Metaverse would be like, although very much fictional. For those of you who haven't heard of Ready Player One, imagine James Cameron's Avatar, but virtual. Better yet, think of Roblox, or Minecraft. Who remembers Club Penguin? All these are examples of the Metaverse, although a case can be made as to the last 3 not being true to the definition. Another "trending" example of the metaverse is the one advocated Facebook, or should I say Meta founder Mark Zuckerberg; Ironically it's name is the metaverse itself. News around is that the avatars used in Meta's version of the metaverse have been given an upgrade: they now have legs. Much better than when it was just a bunch of faces staring at you isn't it?

Lastly, although it's a concept that's still in its buds, the metaverse has the potential to truly succeed. Its future would undoubtedly depend on how well it can meet the two basic needs of all people: to connect with other people, and to make things.

Pranav Balasundaram
4th Year EEE

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BEYOND JUST CHATTING WITH CHATGPT ALIKES

The dawn of ChatGPT marked a significant turning point in the digital realm. The Internet was abuzz with excitement as people first encountered the concept of AI-powered chatbots. While many hailed it as an entirely novel idea, it's important to recognize that the foundation for such technology had been laid by preceding AI systems. What truly set ChatGPT apart was its revolutionary approach to training—an approach that involved exposing the AI to vast amounts of data all at once. This distinctive methodology rendered it previously unattainable for many, lending it an air of novelty and intrigue.

OpenAI, the pioneering force behind ChatGPT, achieved what seemed implausible at the time. Even organizations equipped with massive datasets were grappling to create AI systems of comparable proficiency. The key lay in OpenAI's ability to harness the power of comprehensive training data, surpassing the limitations posed by disparate and disjointed information repositories.

BEYOND JUST CHATTING WITH CHATGPT ALIKES

As the technological landscape evolved, a paradigm shift occurred. Gathering, refining, and training with extensive datasets became attainable for a diverse range of companies. This transformation set the stage for what could be likened to a cinematic portrayal of an all-encompassing AI-dominated world—AI integration everywhere, catering to every conceivable need.

The progression of data accumulation and training methodologies has propelled AI systems into the realm of multifunctionality. Numerous companies have ventured beyond merely answering human queries; instead, these AI entities are now performing tasks as instructed. The outcomes of their endeavors are not confined to mere textual responses or informational tidbits; they exhibit an astute comprehension of context, often translating into tangible actions.

For instance, consider the AI-powered platform Personal.ai, which not only engages in interactive discussions like ChatGPT but also carries out personal knowledge management where the AI learns about our personal and professional life information which we feed it via documents or plain texts. This extension of capabilities signifies a profound leap forward from conventional AI interactions, to a standalone productive assistant. In this era where the timely task management and system to organize everything in our life from financial goals to planning our recreational activity is significant.

In today's ever-evolving technological landscape, the applications of AI-powered conversation extend beyond mere communication. Businesses are recognizing the value of integrating AI-driven chatbots into their operations, streamlining customer service and providing instantaneous responses to queries. From e-commerce platforms to healthcare institutions, the versatility of these AI-powered interactions is reshaping how we interact with digital interfaces. Furthermore, the advancement of AI capabilities opens doors to unprecedented innovation in various sectors. Education, for instance, witnesses the emergence of virtual tutors—AI companions capable of providing personalized learning experiences. These AI-driven tutors adapt to individual learning styles, pacing, and preferences, effectively revolutionizing the traditional classroom setup.

The entertainment industry also benefits from AI integration. With increasingly sophisticated AI language models, video game narratives can dynamically adapt to players' choices, creating immersive and personalized gaming experiences. This fusion of AI-generated storytelling and interactive gameplay sets the stage for a new era of entertainment.

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BEYOND JUST CHATTING WITH CHATGPT ALIKES

In healthcare, the potential is equally transformative. AI-powered medical chatbots can offer preliminary diagnoses, assist in medical research, and provide patients with reliable health-related information. The ability to process vast amounts of medical literature in seconds empowers healthcare professionals to make well-informed decisions, potentially saving lives.

Beyond virtual interactions, the convergence of AI with robotics holds tremendous promise. The notion of humanoid robots, once relegated to science fiction, inches closer to reality. These robots, driven by advanced AI algorithms, could serve as companions for the elderly, assist in household chores, or even play roles in hazardous environments, reducing human risk.

However, the ascent to this advanced AI-humanoid integration is not without challenges. Ethical considerations arise, questioning the boundaries between human-like AI and genuine human consciousness. Privacy concerns also intensify as AI systems become increasingly intertwined with our daily lives.

As we stand at the brink of an AI-driven era, the horizons of possibility continue to expand. ChatGPT and its counterparts are transcending the realm of casual conversations, fundamentally reshaping the potential of artificial intelligence. This trajectory of progress points unequivocally towards a future where AI seamlessly integrates into our lives, catalyzing a revolution across industries, simplifying intricate tasks, and perhaps even culminating in the realization of humanoid robots capable of unprecedented interaction and assistance.

In a landscape where countless individuals have wholeheartedly embraced ChatGPT and its alternatives for light conversation and information-seeking, the latent capabilities of these technologies far exceed the scope of mere chitchat. Their potential permeates a multitude of applications, igniting anticipation for the creation of self-sufficient humanoid robots.

The journey from initial text-based interactions to the realm of sophisticated actions and even physical embodiment symbolizes the incredible odyssey of AI evolution—a journey poised to intricately shape the world of tomorrow.

Hari Raghav R
4th Year EEE

AY2021-2022/CBE/JAN ISSUE01

AUTOMOTIVE/TECHNOLOGY

TESLA INC.

Tesla Inc. is an American electric vehicle and clean energy company based in Palo Alto, California, United States. Tesla designs and manufactures electric cars, battery energy storage from home to grid-scale, solar panels and solar roof tiles, and related products and services.

Founded in July 2003 by Martin Eberhard and Marc Tarpenning as Tesla Motors, the company's name is a tribute to inventor and electrical engineer Nikola Tesla. In February 2004, the company raised US$7.5 million in series A funding, including $6.5 million from Elon Musk, who had received $100 million from the sale of his interest in PayPal two years earlier. Musk became the chairman of the board of directors and the largest shareholder of Tesla.He has served as CEO since 2008.

A lawsuit settlement agreed to by Eberhard and Tesla in September 2009 allows all five – Eberhard, Tarpenning, Wright, Musk, and Straubel – to call themselves co-founders.

According to Musk, the purpose of Tesla is to help expedite the move to sustainable transport and energy, obtained through electric vehicles and solar power.

Other Companies owned by elon musk are Zip2, X.com, PayPal,SpaceX,Tesla Inc., Tesla Energy, OpenAI, Neuralink, The Boring Company.

In 2020, Tesla had the most sales of battery electric vehicles and plug-in electric vehicles, capturing 16% of the plug-in market (which includes plug-in hybrids) and 23% of the battery-electric (purely electric) market. Through its subsidiary. The company develops and is a major installer of photovoltaic systems in the United States. Tesla Energy is also one of the largest global suppliers of battery energy storage systems, with 3 gigawatt-hours (GWh) installed in 2020.

As of June 2021, Tesla offers four car models: Model S, Model X, Model 3, and Model Y. Tesla's first vehicle, the first-generation Tesla Roadster, is no longer sold. Tesla has plans for a second-generation roadster, a semi, and a pickup called the Cybertruck.

Tesla does not pay for direct advertisement. The company aims to educate customers through its showrooms situated in malls and other high-traffic areas, and sells its vehicles online rather than through a conventional dealer network.

TESLA INC.

The company is the first automaker in the United States to sell cars directly to consumers.

Tesla has a high degree of vertical integration, reaching 80% in 2016.Tesla generally allows its competitors to license its technology, stating that it wants to help its competitors accelerate the world's use of sustainable energy. Licensing agreements include provisions whereby the recipient agrees not to file patent suits against Tesla, or to copy its designs directly.Tesla retains control of its other intellectual property, such as trademarks and trade secrets to prevent direct copying of its technology.

"Failure is an option here. If things are not failing, you are not innovating enough." ~ Elon musk

Sakthivel S and Aswin A
4th Year EEE

AY2021-2022/CBE/JAN/ISSUE01

BATTERY RECYCLING DONE IN ELECTRIC VEHICLES

The battery pack of a Tesla is a feat of extraordinary engineering. Thousands of cells with components sourced from around the world transform lithium and electrons into enough energy to propel the car hundreds of kilometres. But when the battery comes to the end of its life, the green benefits fade. If it ends up in a landfill, the cells can release very problematic toxins, including heavy metals.

The individual battery cells consist of a metal cathode (made of lithium along with other elements that can include cobalt, nickel, and iron), a graphite anode, a separator, and a liquid electrolyte generally composed of a lithium salt. As charged lithium ions flow from the anode to the cathode, an electrical current is generated.

A single one of these batteries is enough to power a phone. To run a car, thousands of cells must be bundled together—typically in a series of modules that are wired together into battery packs and housed in a protective metal casing.

With the number of EVs on the roads expected to rise from 10 million in 2020 to upwards of 145 million by 2030, demand for battery minerals is poised to surge.

After the battery is discharged and the tough outer casing is removed, modules are often shredded and thrown in a furnace. Lighter materials like lithium and manganese burn, leaving behind an alloy slurry that contains higher-value metals like copper, nickel, and cobalt. Individual metals can then be purified out of that alloy using strong acids. These processes, known as pyro- and hydrometallurgical recovery, require large amounts of energy and produce toxic gases and waste products that need to be re-captured.

While cobalt and nickel are often recovered at high rates, in most cases, lithium isn't valuable enough for recyclers to try and recycle it. If lithium is recovered, it's often not at a quality suitable for making new batteries.

The International Energy Agency (IEA) estimates that the world currently has enough capacity to recycle 180,000 metric tons of dead EV batteries a year.

BATTERY RECYCLING DONE IN ELECTRIC VEHICLES

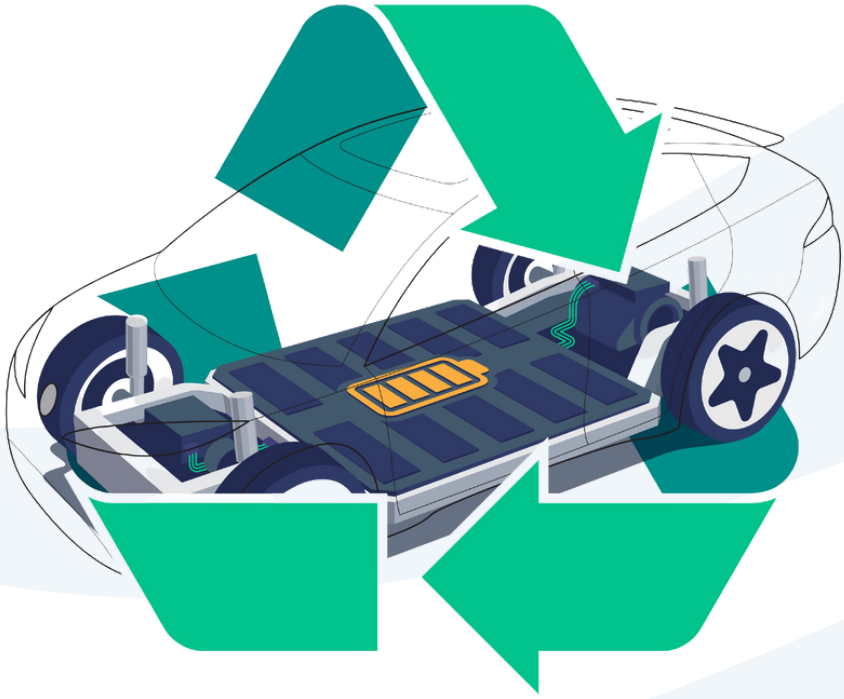


Image Reference: https://www.electrichybridvehicletechnology.com/wp-content/uploads/2021/12/AdobeStock_426668629-702x459.jpeg

Recycling won't be enough to meet all, or even most, of our battery metals demand as the industry enters a phase of rapid growth. For comparison, all of the EVs put on the road in 2019 will eventually generate 500,000 metric tons of battery waste.

By 2040, the IEA estimates there could be 1,300-gigawatt hours' worth of spent batteries in need of recycling. If recycling can be scaled up, that waste could be a significant source of minerals. In a scenario where the EV market grows at a pace consistent with today, the IEA estimates that recycling could meet up to 12 percent of the EV industry's minerals demand by 2040.

To jump-start recycling, governments and industry are putting money into an array of research initiatives. The U.S. Department of Energy (DOE) has pumped close to $15 million into a ReCell Center to coordinate studies by scientists in academia, industry, and at government laboratories. The United Kingdom has backed the ReLiB project, a multi-institution effort with a concentration in EV battery recycling.

BATTERY RECYCLING DONE IN ELECTRIC VEHICLES

Recycling won't be enough to meet all, or even most, of our battery metals demand as the industry enters a phase of rapid growth. Other approaches could include developing new batteries that use less minerals and improving public transit and building walkable, bikeable cities to reduce overall demand for private vehicles.

Partly due to the cost and complexity of EV battery disassembly, today's recycling methods are fairly crude.

Still, even if recycling only meets a quarter to a third of our battery mineral demand over the coming decades, it would definitely be an encouraging sign for us humans to continue using EVs as a mode of transport.

Maitreya Cherukupalli
3rd Year EEE

AN OVERVIEW OF VIRTUAL REALITY

"Sometimes you need fantasy to survive reality " - we can create such a fantastical world with VR (Virtual Reality Headset). With the extended reality (XR) revolution already underway, it's easy to envision a future where the line between the real and virtual worlds is becoming more and more blurred than they are today.

Virtual reality is a 3D simulated environment that allows users to explore and interact with a virtual environment in a fashion that approximates reality as perceived by the users' senses. The more thoroughly users can immerse themselves in a VR experience and shut out their physical surroundings, the more they can suspend their disbelief and accept it as real, even though it is fanciful.

VRs are usually associated with gaming because the industry has been at the forefront of the VR effort, however, it is not all fun and games – the technology is now being used in military training, education, and healthcare.

AN OVERVIEW OF VIRTUAL REALITY

Virtual reality Has a Big Future in Healthcare. By Combining diagnostic images from CAT scans and ultrasounds, healthcare professionals can use software to create 3D virtual models that in turn help surgeons choose the best locations for surgical incisions and get ready for surgery. Also, VRs are incorporated into diagnostics treatment and are used as training tools for complex surgical procedures. Additionally, virtual reality therapy has broader therapeutic advantages, particularly for those battling phobias, anxiety, and post-traumatic stress disorder (PTSD).

Virtual reality operates on the fundamental basis of our perception of the world and scene comprehension. VR headsets are built to record human reactions to natural stimuli, and the software behind them is powered by artificial intelligence. After that, the stimuli are saved as a featured dataset that is utilized to create virtual objects in a geographically mapped environment. VR designers carefully capture the intricacies of real-world objects and clone them well enough to trick the human brain.

Virtual reality headsets are head-mounted devices that track data supplied by human senses. When you wear a virtual reality (VR) headset, your natural field of view (FOV) is replaced with a computer-generated field of view. Stereoscopic lenses incorporated into VR headsets distort the image to make it appear three-dimensional and realistic. The helmet transmits two images through these lenses, one for each eye, much like in normal vision. Infrared cameras also adjust the light to the user's accommodation level. As we move our heads to navigate, the content that is shown on the screen likewise changes.

Based on the decisions and deeds of the community therein, the virtual world constantly expands and changes. In the future, humans will be able to engage with the metaverse partially in their physical space via augmented and mixed reality or virtually (i.e., using virtual reality). Virtual reality will eventually have more uses and applications than it is currently capable of. Future generations will devote more time, resources, and effort to living and working in a virtual environment than in the real one. Like today's smartphones, virtual reality will soon gain widespread recognition, and headgear will be considered ordinary equipment in homes and offices. The world is gradually becoming a hypersphere where everyone can connect and share their thoughts, feelings, and ideas thanks to virtual reality.

Sivaani
3rd Year ELC

HAPPENINGS OF THE WORLD

- The USA primarily used Thomas Edison's 110V DC over Tesla's AC. When the world adopted AC, the majority of Europe preferred 240V/50Hz over 120V (standard of the USA) as it was found to be more efficient drawing lesser current than 120V. This also helped them use thinner wires for their appliances. As the USA found it too expensive to change their voltage supply nation-wide and by the time this was found, had already manufactured appliances that barred the use of higher voltages. To combat this, the USA supplies buildings/homes with 240V and then splits it into two 120V supplies.

- TSMC (Taiwan Semiconductor Manufacturing Company) is the world's largest manufacturer of semiconductor devices. They produced more than 12,300 products for 535 of their clients in 2021 alone. Their customers include Apple, AMD, MediaTek, NVIDIA, Intel, Qualcomm to name a few. This company alone contributes to roughly 15% of Taiwan's entire GDP and also makes up about 1/3rd of the value on the Taiwanese stock market.

- The Kardashev scale is a scale meant to measure the technological advancement of a civilization. A type-1 civilization will have the ability to harness almost all of the energy that it receives from its parent star(s). A type-2 civilization will be able to absorb almost all of the energy emitted by its host star using machines like a Dyson's sphere. A type-3 civilization is postulated to be able to harness the entire energy output of the host galaxy. Our civilization currently falls under a Type 0.7276.

- The Citroen DS, with its launch in 1955 revolutionized the suspension systems installed in automobiles. Until then, traditional coils and springs were placed beside the wheels to absorb shock but the DS, used a new hydro-pneumatic suspension system. Spheres were designed by pressurizing nitrogen gas at the top half (as gasses were easier to compress than liquids) and filling a hydraulic fuel in the bottom half separated by a rubber membrane. Each wheel had a sphere of its own connected by a piston. When the car encountered a bump, the piston would move into the sphere and the increase in pressure would progressively push the piston back to mimic a spring action.

- The first form of binary data storage was in the form of punch cards. These paper cards were punched in a particular sequence by hand or machine and then fed as input to the computer where the sequence is converted to digital information.

HAPPENINGS OF THE WORLD

These holes are punched on the respective character columns until the card is filled with its data size. The largest punch card program was around the size of 5MB which used 62,500 punched cards.

- Viewers of anime would've noticed that the screen darkens noticeably when colorful and bright sequences, especially scenes with fights in it, are introduced. This is to protect the viewers from photosensitive disorders such as epilepsy and, the law was instated after the Porygon incident of 1997. Pokémon stands famous even to this day but in December 16 of 1997, an episode called Dennō Senshi Porygon (AI Warrior Porygon for the West) was aired which contained bright flashing red and blue lights which landed around 685 children in the hospitals. 10% of the viewers (total viewership was around 4.6 million) stated having experiences of mild symptoms of blindness, seizures, etc.

- Advanced RISC Machine or Acorn RISC Machine (If you want to feel old), came into existence out of pure spite. Clive Sinclair, the genius behind one of the first color computers, the ZX spectrum, had a young protege named Chris Curry. Chris was a humble guy. His mentor, not so much. When tasked with the pursuit of finding the design behind the latest calculator technology, Chris came into the existence of something even bigger. So big that it would go on to define the very existence of co-processors. Chris began working secretly with Herman Hauser, an Austrian and formed a company called Acorn Computers. These underdogs won a national level contract from the BBC purely through their ability to hype. Clive was pissed. They got into a physical fight, Chris won and eventually recruited two of the best minds in Oxford and formed Acorn RISC Machine.

Side note: The place where the fight happened between the two men is called 'The baron of beef'. You can't make this stuff up. You got to love history sometimes.

Adithya H
3rd Year EEE

"...teaching was not my dream profession"

"I am a die-hard fan of Rajinikanth"

"...not much enthused about power systems"

Going beyond the textbooks and into the captivating narrative of our esteemed chairperson,

DR. S. BALAMURUGAN

as he shares his journey, a story that echoes beyond the classroom.

BEHIND THE ACADEMIA

With
Dr. S. Balamurugan
Chairperson, EEE

What made you so passionate about power systems, your major?

Back during my undergraduate or postgraduate days, I was not that much enthused about power systems. My only motive was just getting good scores. When I started to teach however, I was offered only the subject of power systems since my major was that. I started to think on how to deliver it properly and how the students might begin to question each aspect. Over the period of three to four years, I started to think about getting better gradually. It definitely was not comfortable as a subject back in my undergraduate days though.

As the head of a department, there would be immense pressure. What was the biggest challenge you had until now?

The authority and the responsibility are not easy, honestly speaking. I have to do justice to this position and the seat. I have to put forth various opinions from my colleagues, students, higher officials and think on how to satisfy all 3 levels of people' expectations. Meeting all of those is quite difficult. I should also be available for them as well. Everyone believes that I'm offering a solution. I am moving towards them yet to achieve those solutions.

If we have an extra funding for a new lab, what would you like to see and why?

This is the easiest question you have asked so far. Thank goodness. Electric Vehicles would be the next laboratory of choice. Easy funding from a lot of industries, Tons of research and development alongside the welcome reception by the students as well. We would be set at least for the next 10 years. Tell you what, right now we are in the process of building one.

Did you have any other aspirations apart from you know, EEE?

I would definitely be an engineer though even if not for EEE. Everyone around me brought me up by saying that I would be an engineer in the future. My aspiration was to be a civil engineer but my higher studies in schooling pushed me towards the field of electrical engineering.

What are your other activities apart from being the Head of Department?

To be frank, I don't have time to spend on extra work. A lot of time, I just want to rest. I do like movies though. But my movie watching hobby got reduced after my marriage. It reduced even further at the time of my daughter's birth. Now I rarely watch them. All of my inspirations and my actions were imbibed from movies.

BEHIND THE ACADEMIA

With
Dr. S. Balamurugan
Chairperson, EEE

One of my favourites was 'A beautiful mind' which is about John Nash of the famous Nash Equilibrium concept. Whenever I don't get my expected results or outputs, I watch that movie. Pursuit of happiness was also one of those movies that inspired me. All of these movies were relatable when I was a bachelor. In that way those two are my all-time favourites. Apart from that, in our own movie industry, I am a die-hard fan of Rajinikanth. All of his films, I watch day one and the first show at that. Even if it's at 2 am. I watched the last released movie with the same fanatic energy.

How would you compare your teaching methods from your earlier years and now?

I used to be tempered a lot back then. Now, not so much. Maybe people think I might be over reacting at sometimes. But whatever I am today, is not even 10% of what I was during 2002. Maybe I got more matured enough to handle my students. To put it in a way that electrical engineering students get, my time constant back then was very short. I wanted my students to react to me very quickly. Now, it's quite large, I try to understand students better and see that the students try to self - learn based on the delivery. My teaching methods now compared to the past might be better in some cases and might not be in some cases. Technically, it's still the same. But I didn't know what to bring into class back then. Now, I have the control and the scope to give to the students now.

You would have connected with a lot of people at similar posts. Are there any positive character traits that you would like to mimic or any other qualities that you would talk about?

A lot in fact. I basically learn from others by observing them. Even some from students. From my teaching career though, My principal from my earlier institution. His thumb rule was extracting the maximum and giving the students the maximum effort. Without the required extraction from the students, don't expect the same treatment. I am not unfair in the balance though. This thumb rule is how I'm conscious of being ethical and fair. If I can't extract, I consider it my failure as well.

I also don't see the difference between people of varying hierarchy. People are so humble. Even an 80 plus year old opens a door for a guest of 30-35 years. being humble to everyone was what I learned over here in Amrita. I tend to follow this to my last breath as well.

Any student that stood out during the course of your entire teaching career?

I Can't single out them, sorry. There are a lot of people. I can recall a lot of faces as you are asking me this. I see a lot of them working with me, a lot of them teaching. But I can't mention any single person for that. That is not justice to the rest of them. I am thankful to have met each and every person.

BEHIND THE ACADEMIA

With
Dr. S. Balamurugan
Chairperson, EEE

Would you have considered any other job if you're given the chance now?

I'll have you know that teaching was not my dream profession. I was offered one. That's the reality. Over the period of time, I realized what teaching was. Life took me into this flow and I didn't have a choice of controlling it nor steering it. I do know one thing. I'm giving 100 percent of whatever I receive. I try to analyse my past and see if I would have gone on to some other passion. Technically, I'm not very sound, that's why I try to question and see each and everything as something new.

That's how I can see how I would answer that if a normal student, as in, a student who is new to something asks me a question. Some of my classmates asked me to teach them back during my undergrad, I didn't understand that my future would be built upon my experience in those days. But I guess that's how it became my destiny as well.

Have you faced any tough times in your teaching career, not as the chairman but as a professor?

I haven't faced any problems in teaching till date. But I did have some doubts in my life when I had not finished my PHD. Teaching has become my ecstasy. When I am at the front of the board, I lose myself and I am inside that specific vortex of teaching.

I do have problems in time management though. If I do face problems in teaching, I'll quit my job.

If I can't adapt to new technologies or If I am not able to satisfy the expectations of the various levels of people, in that moment, I should quit.

Amrita has a student capability that is simply put, 'vera level'. I found that shift when I moved from a self - financing course based college to Amrita.

Dr. S. Balamurugan
Chairperson, EEE

"Now, I'm watching the Mandalorian"

"We're all like Inductors..."

"I got fed up with online classes..."

Dive into the insightful conversation with our esteemed faculty member,

DR. MOHANRAJAN S.R

as he shares his unique perspectives on life.

BEHIND THE ACADEMIA

With
Dr. Mohanrajan S.R
Assistant Professor, EEE

When we had asked about the choice for the faculty interviews, many students replied with your name instantaneously. What do you think made the students to like you this much?

Really? They suggested me? I scold them a lot. maybe that? I cannot judge them. Pre Covid, I knew about the thought process of some of the students but after Covid, I can't understand them a lot.

A link exists between the senior students and the current batch. Some of the Seniors might be giving feedback like I was a person they considered to be my friend or something like that and Juniors followed suit. Everybody's expectation becomes different.

As a teacher, I look for a certain aspect for a student. I really don't know why they suggested me though (hahaha). Even now, I cannot understand the students fully. Whatever I feel is good with the students, I try to understand.

Power electronics is one such subject that has quite a "legacy" attached to it. what attracted you to this topic?

I feel it's more complex. I like solving puzzles. I try to understand and keep on bugging that question find out the base problem. This started from my schooling where I remove and put back parts and stuff. Power electronics never ends. It keeps on going. I learn everything new. I don't think it's possible for me to learn about Power systems or machines though. It's always a challenge to learn something new. When a student doesn't get an output, I feel happy that I can explore and solve it. That makes it interesting for me. There's no guarantee that everything works every time. This might be a reason as well.

Students are not really enthusiastic about the subject. If you had an option to pick another field, would you choose it? if so, what would you choose and why?

I really can't answer that question since I'm knee deep and I can't think of any other field that I can sink my time and effort into. I don't think anything can be done and if I am given an option, that I have to go with, I will find a way to bring in power electronics inside there as well. That justifies my passion for the field.

Maybe I should choose to learn something new? I'm learning to use chatbots and stuff like that which is the new fad. When I'm having time, I try new things. Any subject I'm given, I'll take it as a challenge. I'll be selfish in learning and teaching that entire thing to students in every opportunity.

I really can't think beyond my subject for now though...

BEHIND THE ACADEMIA

With
Dr. Mohanrajan S.R
Assistant Professor, EEE

Did you have any other aspirations?

I want to travel a lot. I travelled to 3 Faculty Development Programmes and the live in labs programme just in last year. I like social work very much. There are many places still ignorant of the developed outside world and the way they communicate with people, it's restricted. I want everybody to know everything. I would like to have everybody get a chance to know about the entirety and get full freedom. Even I might have some restrictions. But there are families, that don't have anything apart from their family. Everyone should experience everything.

Students feel that you are always energetic and sometimes uptight. What are you like when you are relaxed and free?

I use chatgpt for relaxation here in college.

I try to watch some tele series. Maybe 1 or 2. if I am at home. I was watching game of thrones when it was the trendsetter. I got bored after 2 seasons. Now, I'm watching the Mandalorian since I'm getting into Star Wars now. I spend time with my son. Have a walk in the morning with him.

Whenever a new course gets introduced, my time gets reduced as well. I have to keep on studying late in the night. Sometimes the post grad students get some very advanced subjects. I never anticipated anything like that. Stuff like modulation techniques. I never explored that.

When I study, my son studies as well. During Covid, half of my time went into watching TV and I started learning for some time as well.... because of that I got fed up with online classes...

I got tired of it eventually. My effectiveness was reduced after covid though. More hours timetable wise and preparing for a particular subject, and the freedom to explore further and not missing even one aspect that might be helpful for the future. I really don't know how others manage their time.

The reason for me being uptight is that I got a lot of confidence. I do simulations and find out where a particular aspect is correct for me to confidently comment on that.

Over the period of 17 years since you joined the university, how well do you think you have adapted to the changes in the surroundings? Both with respect to the students and the field.

17 years have passed? Wow. We're all like inductors. We don't like change but there is no other option. If there is no change though, we won't improve. If I'm continuing to take basic EEE, I won't be taking my major. If it isn't given, I should explore. If not for power electronics, I can't take electric vehicles as a course. It's like an exploration whenever a change occurs.

BEHIND THE ACADEMIA

With
Dr. Mohanrajan S.R
Assistant Professor, EEE

Over a period of time changes from the students, teachers or even the generation gap occurs, we can't exactly find it. It's difficult. My effectiveness differs based on this. This can be back and forth. If I get a good student, my teaching might be better. I might personally relate to a student and they might be interested. Then a question arises if a student isn't coming forward or if it's the other case.
Its challenging for every subject. It depends on how you take things when a change comes. If many are not interested in a particular subject, how could you make them look your way?

Trying is a good thing though. If my age is around 40, I won't consider myself to be 40. I take the average of the particular class and consider myself to be that age. You don't have much change as a 20-year-old. My hair might become grey. The previous HOD suggested to be friendly to a student and not a friend. If I openly talk, shout or praise you, it should be friendly. I should tell you what is what like a friend.

You would have worked with people from many different backgrounds, both elder and younger to you. Are there any particular people who have inspired you, and if so, what did you observe from them and would like to pass on the community?

When I see a student, I see their parents, their expectations and such. I might think that the students have paid an entire lump sum for this hour and I see if I'm able to satisfy those expectations. I got that from Dr. Vijayakumari madam. I'm reciprocating about 20 percent of what she has done. Sasi Sir, who was a faculty here always helped a lot. We have to analyse an uninterested person and see that he moves from his own track to the other track. We have to make a student to understand that he knows nothing. If he realizes that, he starts learning. If we don't understand where we are in the universe, we can't explore further. Same analogy.
If a student simply comes into class, sleeps and leaves. We don't usually care for them. But these people have to be allocated time to solve their issues. Enough time should be given to these people. I learnt this from him. No one is innocent and no one is incapable enough. I learnt this from our previous chairman.

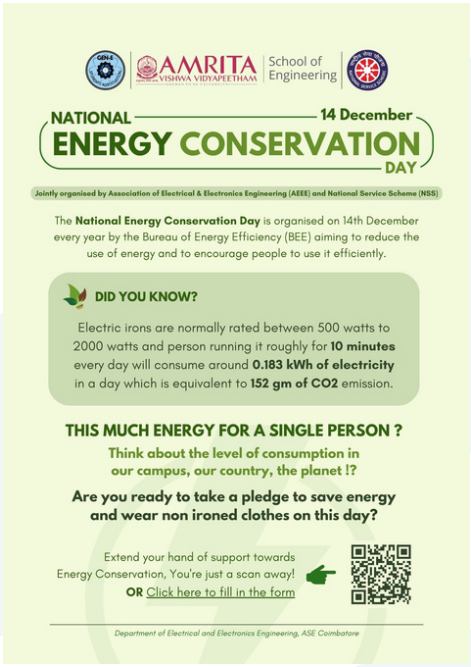
Dr. Mohanrajan S.R
Asst. Professor, EEE

ARCHIVES

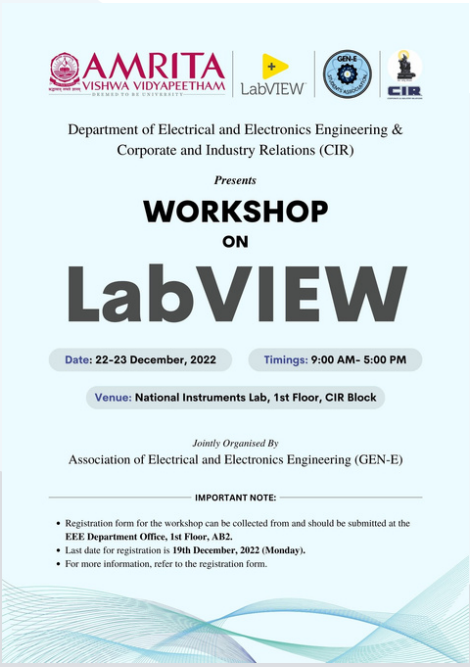
EVENTS UNDER GEN-E

Fresher's Day 2022-23

Energy Literacy Training

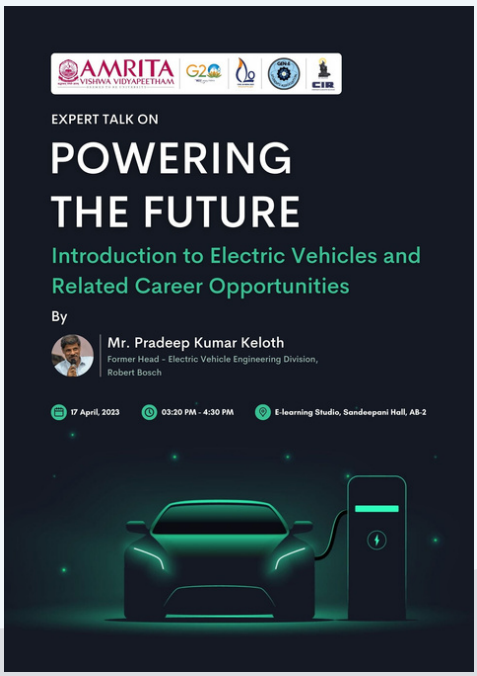


Energy Conversation Day



Workshop: LabVIEW

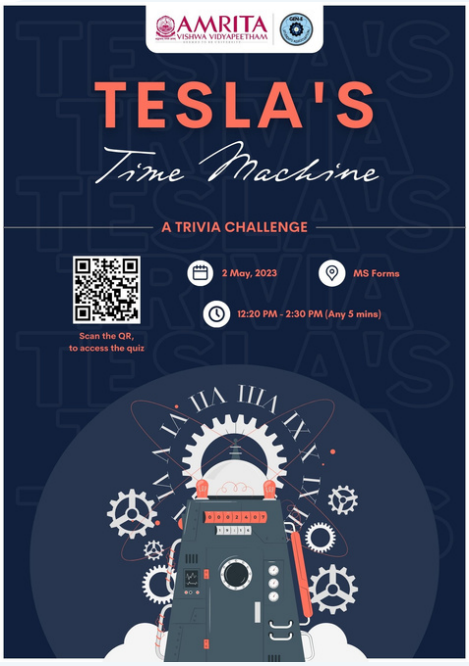
Seminar: Energy Storage Systems



Seminar: EVs

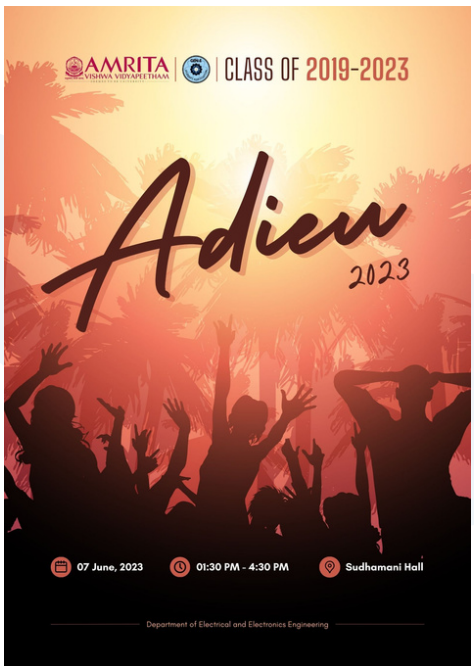
ARCHIVES

EVENTS UNDER GEN-E



Trivia: Tesla's Time Machine

Climate Correction Day



Farewell 2022-23

EVENTS UNDER EEE

International Symposium: Autonomous Mobility and Electric Vehicle Technology

OUR MENTORS

Dr. Balamurugan S
Chairperson & Professor

Dr. Jayabarathi R
Vice-Chairperson & Associate Professor

Dr. Kavitha D.
Associate Professor

Dr. Ilango Karuppasamy
Associate Professor

Our mentors have been our guiding light from the very start. Their unwavering support and invaluable guidance have paved the way for everything we have achieved.

CORE TEAM 2022-2023

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Kota Abhijith
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Kommidi Neethika
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JOINT SECRETARY

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M Sri Ram Gupta
LEAD EXECUTIVE

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Sriaadith
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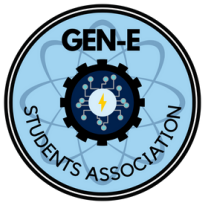

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