

# DE RE S O M A N G E



# About

**A**mplifying the World of Electronics and Communication Engineering. Welcome to Resonance Magazine, the pulsating hub for electronics and communication engineering enthusiasts! As the heartbeat of innovation and technological advancement, Resonance brings together students and professionals alike to explore the electrifying world of electronics and communication.

Resonance is not just a magazine; it is an ode to the ever-evolving world of electronics by ECTA. Run by a group of passionate ECE students of CCE, our mission is to amplify the captivating journey of this fascinating field and bring it closer to all enthusiasts, professionals, and curious minds alike. Within our pages, you'll find a harmonious blend of whole events of ECTA, cutting-edge research, industry insights, breakthrough projects, and inspiring stories from individuals who are pushing the boundaries of what's possible. Resonance believes that knowledge gains momentum when shared. With this philosophy, we aim to be the catalyst that fosters a strong sense of community among student enthusiasts worldwide. We encourage students, academics, and industry experts to contribute their expertise, experiences, and discoveries to our publication, making it a vibrant platform for exchange and growth.

Moreover, Resonance fosters a sense of community, where engineering students and tech experts alike can resonate with each other's ideas, collaborate on projects, and delve into the spirited debates that drive progress forward. Our magazine serves as a platform for empowering young minds, nurturing creativity, and fostering a shared sense of wonderment for the possibilities that lie on the horizon. Are you ready to resonate with the brilliance of Electronics & Communication Engineering?

Welcome aboard the Resonance Magazine!

# Vision

To be a premier center of education, research and innovation in Electronics and Communication Engineering that nurtures adept engineers responsive to global challenges and societal needs.

# Mission

1. To enhance the teaching-learning process by implementing state-of-the-art practices suitable for a challenging technological world.
2. To promote innovative research in emerging areas for the advancement of knowledge towards developing sustainable solutions for the society.
3. To foster ethics, values and an urge for continuous improvement vital for professionals to emerge as responsible leaders.

# Message From Executive Director



**I** am very happy to write a message for the magazine produced by our Electronics and Communication Engineering Department. The ECE department at Christ College of Engineering is effectively grooming their students in various aspects, enhancing the college's reputation by providing enjoyable and supportive activities for students. The initiation of interdisciplinary projects has been pioneered by the ECE department. They have given a fitting name to their magazine - 'Resonance III'. I want to congratulate all the staff and students in the ECE department for helping Christ College of Engineering to grow. I hope you have a great release of "Reso-nance". It is my desire that this magazine fully encompasses and showcases the essence of this department and what it stands for.

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

# Message From Joint Director



**I**t brings me joy to learn that this year, our Electronics and Communication Department will be releasing their magazine titled 'Resonance III.' The ECE Department has developed many new plans and ideas in recent years. It makes me happy to see students showing their abilities at different stages through these initiatives, and I applaud them for their energy and excitement. This magazine is a special achievement that shows how the ECE Department is getting better. It helps students and staff think of new ideas and makes their dreams come true. I hope this impressive description of the abilities, advancements, and accomplishments of this department can be a motivating and worthwhile read for everyone. I want to praise everyone for working together and putting in a lot of effort for this project. Wishing the ECE department all the best for their upcoming projects and hoping they achieve great success.

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

# Message From Principal



**T**he Electronics and Communication Engineering Department started off as the smallest department at CCE, but it has made great progress and growth to become what it is today. I am happy to see how it has grown and changed in the past years. The ECE department's creation of their magazine, titled 'Resonance III', is a significant accomplishment this year. I hope this magazine can help students think and feel in new ways, and I hope that everyone who reads it can truly appreciate and embrace what it has to offer. I really think that this magazine will accurately capture and share the excitement, enthusiasm, and energy I see in this department in its content.

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

# Message From Vice Principal



**I** am happy to announce that our Electronics and Communication Engineering Department is publishing their own magazine. I believe that this magazine will make the reputation of the ECE department even stronger by showing that it is a lively and active department. I really like the name of this magazine, "Resonance III". I hope that, just like the name suggests, the things inside will make all the readers feel good. I hope they do really well in this, and in all the different things the ECE department has planned, as they work towards being the best. I hope that ECE students become so successful that people will want their autographs one day.

**Prof. Dr. John V. D**

Vice Principal, Christ College of Engineering

# Message From HOD



**D**epartment of Electronics and Communication Engineering, established in the year 2015, is known for adopting adept teaching learning practices with the support of competent faculty and state of the art learning infrastructure..The core values we hold ensure quality education and holistic development of all students and all activities of the Department are focussed towards nurturing them into evoke creative thinking in them to become leaders in technology for tomorrow.Among youngsters, the gush of inner feelings is so forceful that they transcend to new horizons through expression in the form of creative writing. I see this publication as a platform which gives the students an opportunity to showcase their skills and wonderful authors are born.The technical magazine "Resonance- Volume 3" gives life for the thoughts and aspirations of young minds. It unleashes a wide spectrum of creative skills ranging from writing to editing and designing the magazine. I congratulate the entire Editorial team for their hard work and dedication which have resulted in the publication of this issue. I also extend my sincere thanks to all individuals who have contributed to this issue through their articles

**Dr. Caren Babu**

Head, Department of Electronics and Communication  
Christ College of Engineering



# Message From Chief Editor



**I** found something great during the months when I couldn't stop sleeping and watching things. Movies are exciting but our excitement changes as we learn more about them. This thing can either make us really interested in it or distract us with something more interesting or completely change how we think about that topic. Do you find the topic interesting, or are you happy with the feeling you get from dopamine. I think it's not reaching the end goal that makes us happy, but the journey itself. This can be in many different ways. Resonance is a project that we, as members of ECTA, can join to be a part of something larger and make use of its large audience. I promise that if you give this book a try and flip through the pages, you will find something that resonates with you. Since this is our first time trying this particular thing, I kindly request all the readers and supporters to give us your feedback and suggestions. This will help us improve in future editions. Lastly, I want to express my gratitude to all my fellow editors for their commitment in creating this magazine. We want to say a big thank you to the Christ family and the ECE department for helping us finish this project.

**Mr, Aldrin Varghese**  
S8 ECE, Christ College of Engineering

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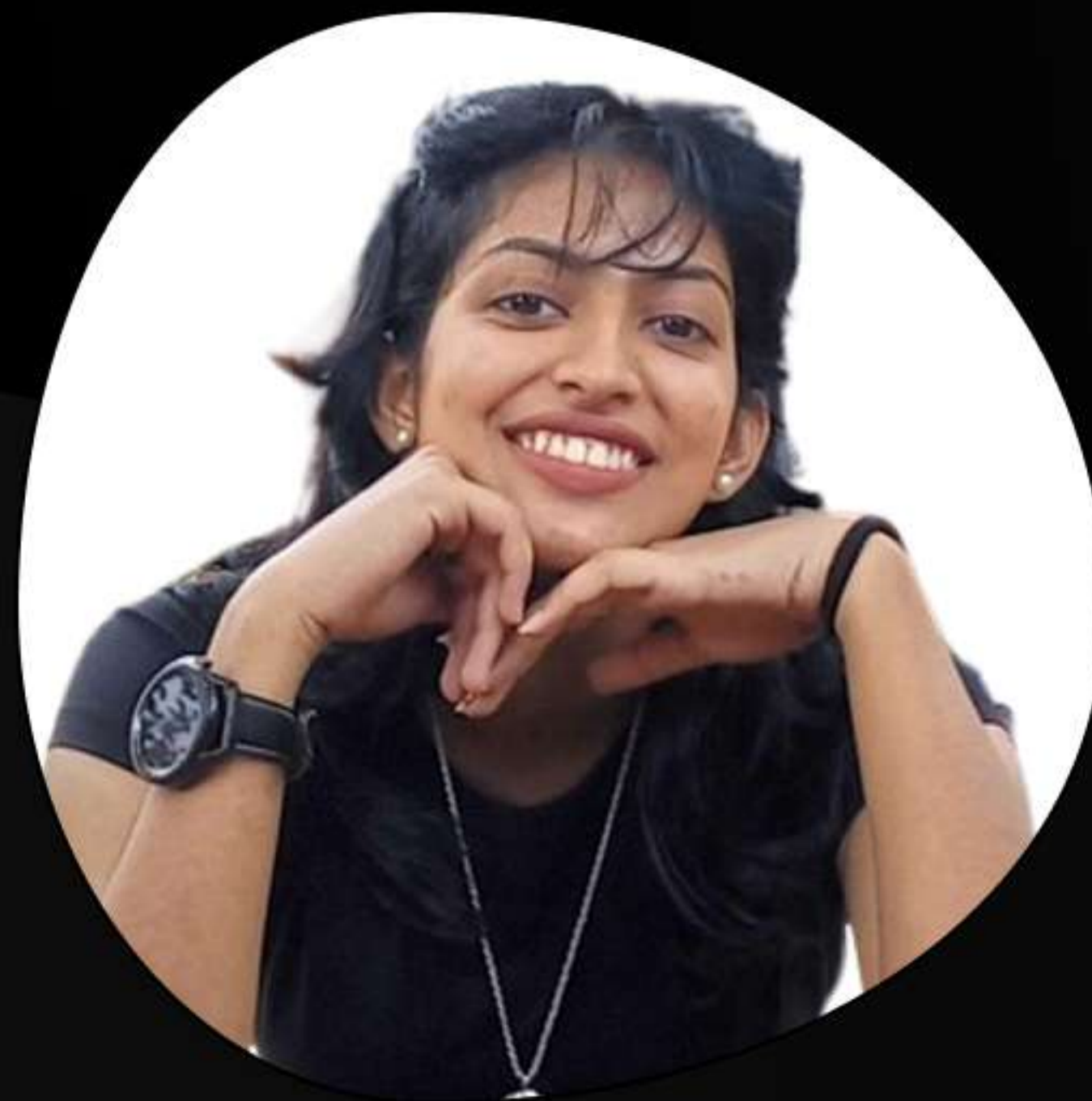
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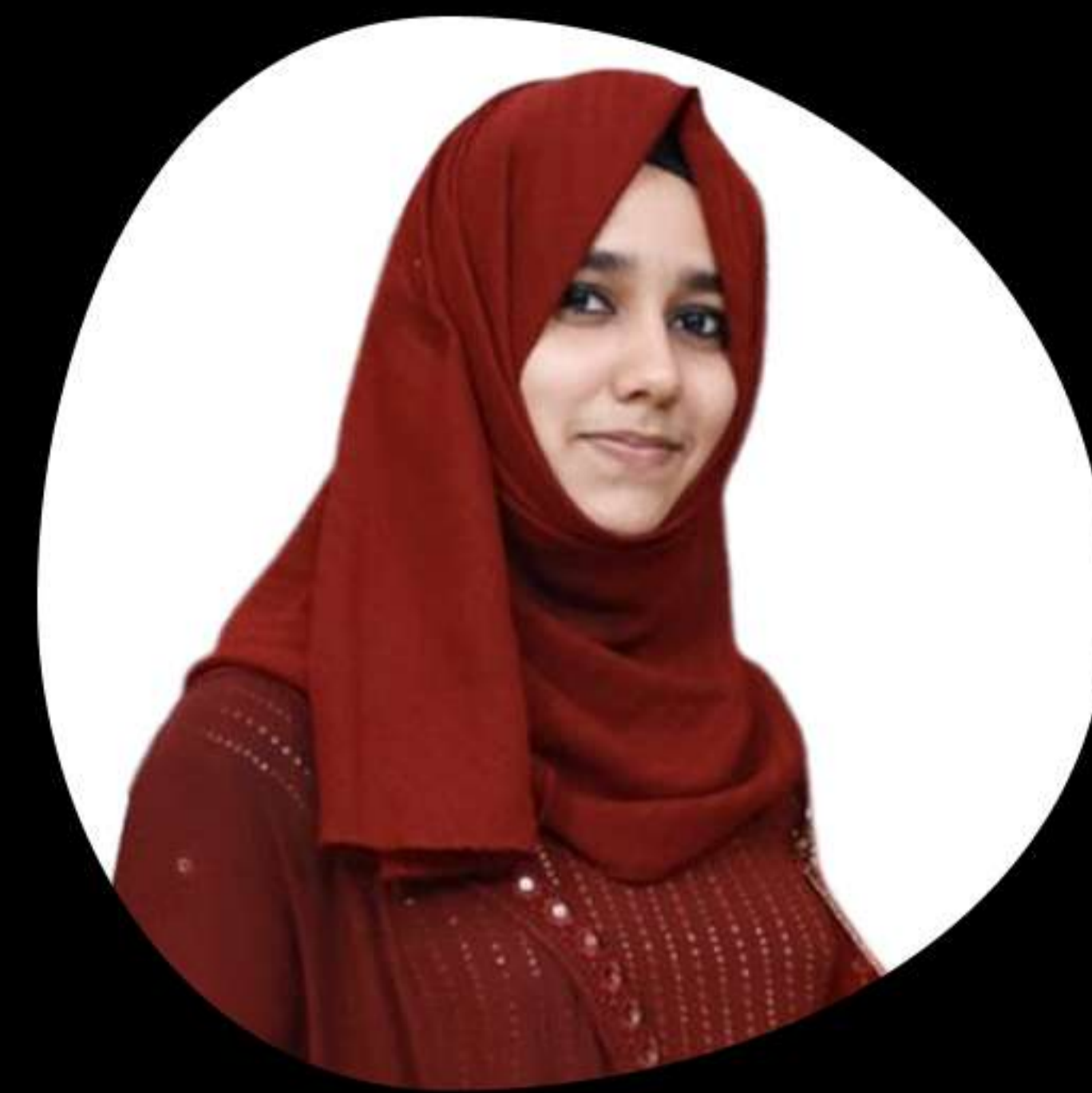
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An infrared blaster(IR blaster) is a device that emulates an infrared remote control to autonomously control a device that is normally controlled only by keypresses on its remote control.The most common use of an IR blaster is to allow a recording device such as DVD or VCR , to change the the channel on a external tuner like cable box or satellite television receiver.

This way the receiving device can automatically select the correct channel to record before starting the recording process.Two other common uses are to extend infrared signals in order to place remote controlled products behind closed doors and to allow mobile devices to control infrared devices.

# INFRARED BLASTER

In an IR blaster device,one digital signal modulates a light source to send commands to other devices.The signal of IR blaster is invisible to the human eye because its wavelength is beyond the range of visible light.The signal does not affect the human body and has no side effects for long exposure.

The IR blaster can control TVs, air conditioners,DVD players and many other devices and can replace the functionality of remote controls.IR blasters can sometimes be found integrated in some Android smartphones.

– **Sanjay Krishna**  
S6 ECE

# Wearable Technology

Wearable technology has become increasingly popular in recent years, as electronics have become more miniaturized and integrated into our daily lives. From fitness trackers and smartwatches to augmented reality headsets and smart clothing, wearables offer a range of benefits and applications. In this essay, we will explore some of the current and emerging trends in wearable technology.

One of the most significant trends in wearable technology is the use of biometric sensors. These sensors can track various health metrics, such as heart rate, blood pressure, and body temperature, to provide users with personalized insights into their health and wellness. With the ability to monitor sleep quality, stress levels, and other biometric data, wearables equipped with biometric sensors offer a more comprehensive picture of one's health than ever before.

Another trend in wearable technology is the development of flexible displays. These displays use thin, bendable screens that can be integrated into clothing, jewelry, or other wearable devices. This technology offers new opportunities for displaying information and interacting with wearables in new and innovative ways. For example, smartwatch displays can now be curved to fit more comfortably on the wrist and provide more screen real estate.

Smart clothing is also an emerging trend in wearable technology. This type of clothing integrates sensors and electronics into the fabric to track various biometric data and provide real-time feedback to the wearer. This technology has potential applications in sports and fitness activities to track performance and provide guidance on form and technique. In addition, smart clothing can be used in healthcare to monitor vital signs and provide early detection of health issues.

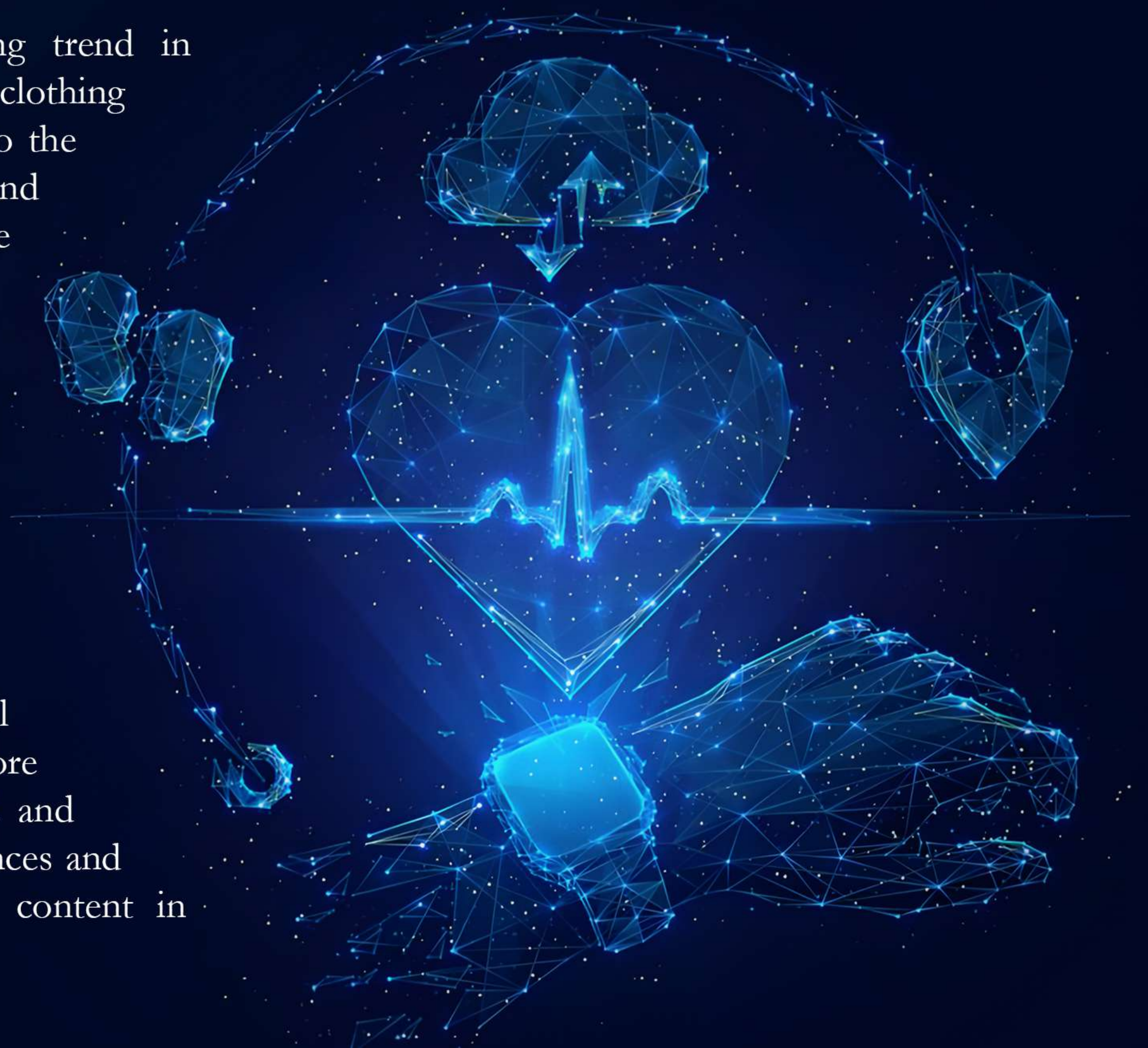
Augmented reality (AR) and virtual reality (VR) are also becoming more popular in wearable technology. AR and VR headsets offer immersive experiences and allow users to interact with digital content in

real-time. This technology has potential applications in gaming, education, and training, and is expected to grow rapidly in the coming years.

Voice assistants, such as Amazon's Alexa and Apple's Siri, are also being integrated into wearable technology. Wearables with built-in voice assistants allow users to interact with their devices hands-free and can help simplify tasks and enhance productivity. This technology has potential applications in healthcare, where voice assistants can be used to help people with disabilities or who are recovering from injuries.

In conclusion, wearable technology is a rapidly growing field with many current and emerging trends. Biometric sensors, flexible displays, smart clothing, AR and VR, and voice assistants are just a few examples of the innovations happening in this space. As technology continues to evolve, we can expect to see even more innovative applications and use cases emerge in the future. With the potential to transform healthcare, sports, education, and more, wearable technology is an exciting field with limitless possibilities.

- Aishwarya Abi  
S6 ECE



# ORGANIC SOLAR CELLS

## INTRODUCTION

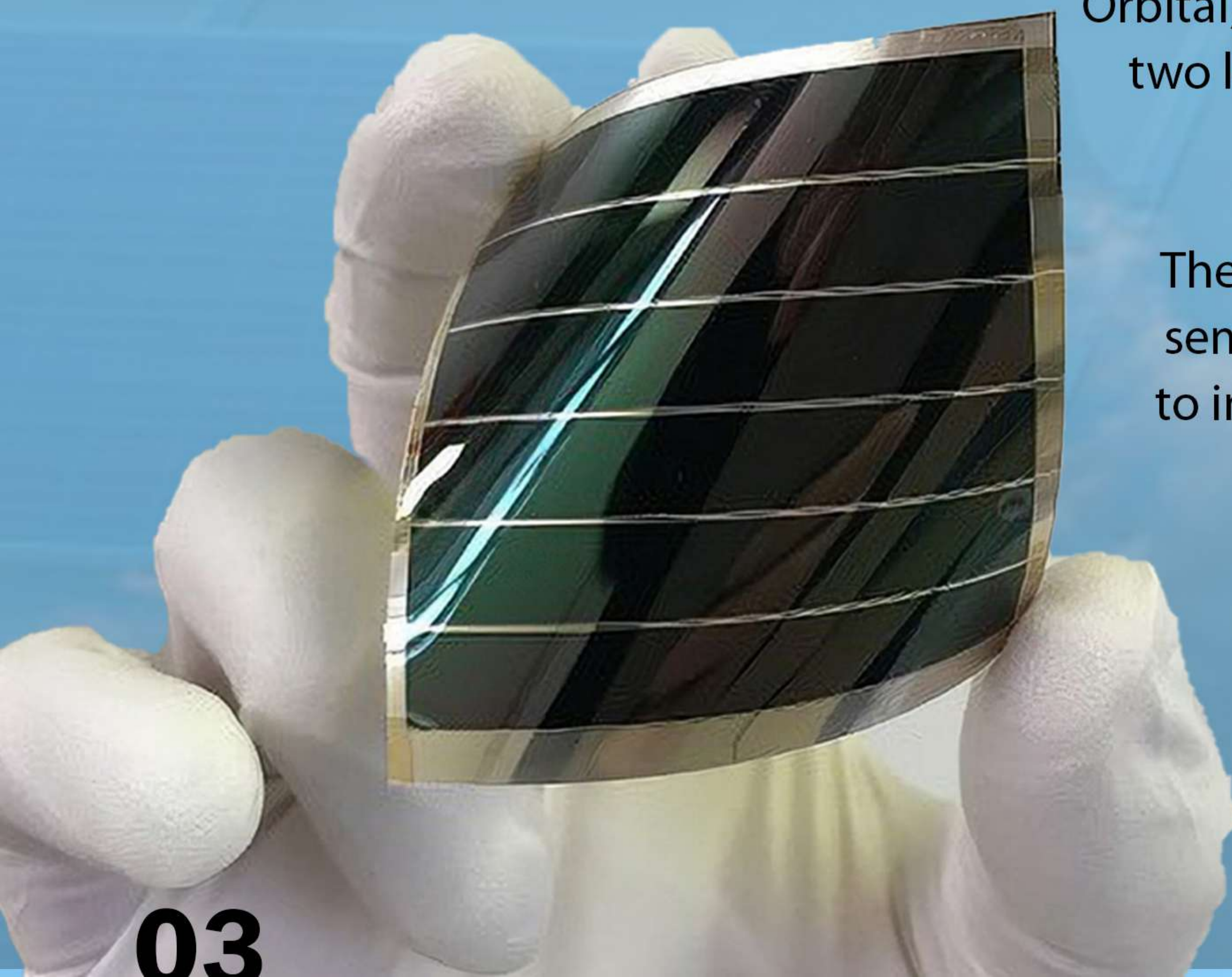
This article details about plastic solar cell which is a type of photovoltaic that uses organic electronics which deals with conductive organic polymers, for light absorption and charge transport to produce electricity from sunlight by the photovoltaic effect. Most organic photovoltaic cells are polymer solar cells.

When sunlight is absorbed by some materials, the solar energy knocks electrons loose from their atoms, allowing electrons to flow through the material to produce electricity. This process of converting photons to voltage is called the photovoltaic effect. Classical photovoltaic solar cells based on inorganic semiconductors- Silicon, developed in 1954 by Chapin, Fuller and Pearson in Bell Labs.

## WORKING

The organic solar cell consists of a photoactive layer composed of two different materials- donor and acceptor. Here conducting glass is the anode and metal is the cathode. The donor and acceptor material has two energy levels - HOMO (Highest Occupied Molecular Orbital) & LUMO (Lowest Unoccupied Molecular Orbital). The energy gap between these two layers is called bandgap.

The dielectric constant of organic semiconductors is low as compared to inorganic semiconductors.





The thickness of the active layer of organic solar cells is only 100 nm thin, which is 1000 times thinner than Si-solar cells and 10 times thinner than inorganic thin film solar cells. So organic solar cells have potential for low cost and large area application.

In organic solar cells, donor is termed as holes transporting materials and makes it contact with the anode. Electron transporting material is acceptor which is in contact with cathode. These organic cells work on basis of the process called Heterojunction which occurs when Acceptor and Donor are in contact.

Current is generated when free electrons and holes are transported through donor polymer and acceptor fullerene respectively to electrodes.

## **ADVANTAGES**

- Cheaper than traditional silicon panels.
- Short energy payback time.
- Low environmental impact during manufacturing.
- Low weight and flexibility of PV modules

## **CONCLUSION**

One thing is certain that these Solar cells have the potential to revolutionize the way we see solar power. Due to its enormous flexibility one day we might use it as solar paint.

– **Mary John**  
(S6 ECE)

# What Is Electromagnetic Bomb?

**A**n electromagnetic bomb or E-bomb is a weapon designed to disable electronics with an Electromagnetic Pulse (EMP) that can couple with electrical/electronic systems to produce damaging current. An electromagnetic pulse Bomb or (EMP) is nonlethal but highly restrictive, weapon that emits an electromagnetic pulse that disables all electrical circuitry with a certain radius. In a matter of seconds, a big enough e-bomb could thrust an entire city back 200 years or cripple a military unit. An e-bomb is a weapon designed to take advantage of cutting power in an area, destroying of machines that use electricity and it can destroy power grids. Electronics and Communication system along an entire coast but spare human and other living species.

In 1925, the theory behind E-bomb was proposed by scientist Arther. H. Compton. In 1940, the existence of the Electromagnetic pulse was observed. In 1998, David Schrinier an electrical engineer in US navy developed a E-bomb whose effect cover circular area having 15-meter radius. In 2000, British scientist Bae Dynamics developed an E-bomb that could destroy electrical and electronics system for miles. Presently Russia, USA, UK are equipped with this electromagnetic weapon.

The Electromagnetic Pulse is an electromagnetic shock wave. This pulse of energy produces a powerful electromagnetic field sufficiently strong to produce short lived transient voltages of thousands of Volts(kilovolts) on exposed electrical conductors like wires, printed circuit boards etc.

#### **E-Bomb technology base:**

- Power source: Battery, Capacitor bank.
- Explosively pumped Flux Compression Generator (FCG).
- High Power Microwave Device.
- Antenna

#### **Advantages:**

- Easy to diffuse or to destroy the missiles.
- Permanent damages the electrical appliances such as computers and micro processor devices.
- Destroys the communication system.
- It can even stop working of generator or cars.

#### **Limitations:**

- The limitations of electromagnetic weapons are determined by weapon implementation and by means of delivery.
- Accuracy of delivery and achievable range must be considered against the allowable damage for the chosen target.
- Patients who are in the ventilation in hospital or using pacemaker may lose their life because of no electric power.

Electromagnetic bombs are weapons of Electrical Mass Destruction with application across a broad spectrum of targets, spanning both the strategic and tactical fields. E-bombs can cause hard electrical kills over larger areas than conventional explosive weapons of similar mass. The E-bomb is a useful punitive weapon as it can cause much economic and military damage with no loss of civilian life. E-bomb could be profitably used against countries which sponsor terrorism and info-terrorism.

**-Sreelakshmi KV**  
S6 ECE

# EMBEDDED SYSTEM V/S VLSI

Embedded systems and VLSI (Very Large Scale Integration) are two distinct fields of engineering that play crucial roles in modern technology. While both are related to electronic circuits, they serve different purposes and require different skill sets. An embedded system is a combination of hardware and software designed to perform a specific task within a larger system. They are commonly used in electronic devices such as smartphones, smartwatches, and other IoT devices. An embedded system can be a single-purpose device, or it can be a part of a larger system. The software running on an embedded system is typically written in a high-level language, such as C or C++, and compiled into machine code that can be executed on the hardware.

VLSI, on the other hand, is a field of electrical engineering that deals with the design and manufacture of integrated circuits. VLSI is used to create microchips that contain billions of transistors and other electronic components. VLSI is used in a wide range of applications, including microprocessors, memory chips, and other electronic devices. One of the main differences between embedded systems and VLSI is their level of complexity. Embedded systems are typically less complex than VLSI designs. An embedded system may have a few hundred to a few thousand components, whereas a VLSI design may contain billions of components. The complexity of VLSI designs requires a higher level of expertise and specialized tools.

Another difference between embedded systems and VLSI is their design process. Embedded systems are designed with the end-user in mind. The design process focuses on creating a system that is easy to use and meets the user's requirements. In contrast, the design process for VLSI is focused on creating a chip that is efficient and cost-effective to manufacture. The design process for VLSI also involves a high degree of optimization to ensure that the chip operates at maximum efficiency.

Despite these differences, both embedded systems and VLSI play important roles in modern technology. Embedded systems provide the intelligence and functionality that enable modern devices to perform a wide range of tasks. VLSI, on the other hand, provides the processing power and memory required for modern computers and other electronic devices.

In conclusion, while embedded systems and VLSI are related to electronic circuits, they are two distinct fields with different skill sets and design processes. Both play important roles in modern technology, and their continued development will be critical to the future of electronic devices.

-Aparna K  
S6 ECE

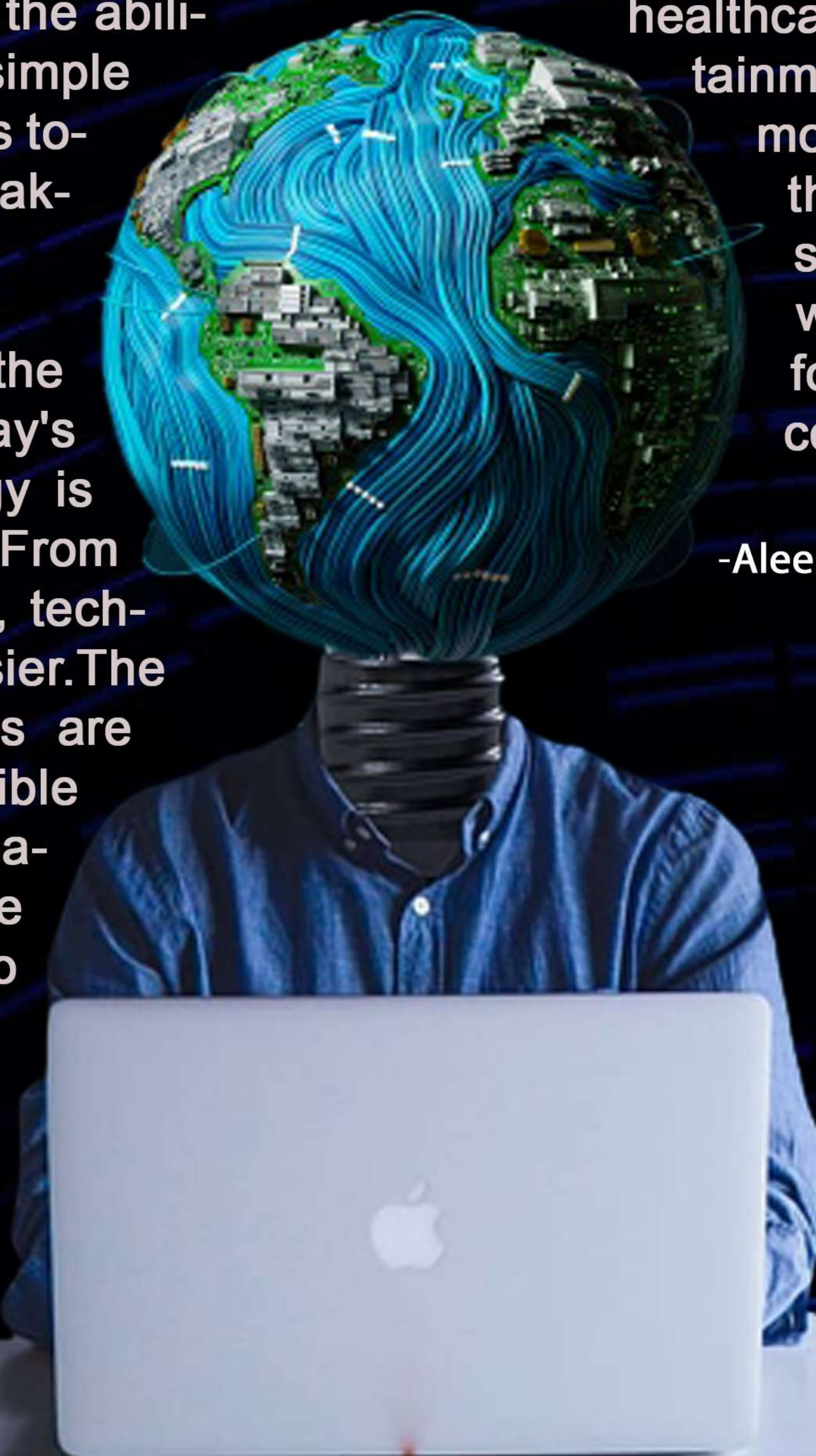
# TECH & INVENTIONS

Rapid developments is happening in our day to day life. As the proverb says 'Necessity is the mother of invention', each new development occurs from a need. People move on to more feasible and flexible methods to overcome their laziness and to find an alternative solution. Considering the real life, a lot of problems pop up in our mind. With continuous research and proper application of knowledge the nation appears to be highly valued. Have you ever imagined of the ability of humans? In simple words we find them as tomorrow's changemakers.

They are actually the magicians of today's world. The technology is rising day by day. From wheel to the internet, technology made life easier. The artificially made ones are now being more sensible along with more features, they could be now replaced to human beings.

Technology have also made impact on the way we work, live and communicate with others. This change is notable through various domains such as development of new tools for better communication, the way business operates, the different e-learning platform and digital resources for education, vibrant introductions in healthcare, entertainment and lot more. It's been the factor, to shape the world we live for years to come.

-Aleena John Gracious  
S6 ECE



With today's growing dependence on computing technology, the need for high performance computers (HPC) has significantly increased. Many performance improvements in conventional computers are achieved by miniaturizing electronic components to very small micron-size scale so that electrons need to travel only short distances within a very short time. This approach relies on the steadily shrinking trace size on microchips (i.e., the size of elements that can be 'drawn' onto each chip).

Despite the incredible progress in the development and refinement of the basic technologies over the past decade, there is growing concern that these technologies may not be capable of solving the computing problems of even the current millennium. Optical computing includes the optical calculation of transforms and optical pattern matching.

An optical computer is a computer that uses light instead of electrons to manipulate, store and transmit data.

## ADVANTAGES

- Increase in the speed of computation.
- Applications for Artificial Intelligence in future.
- Free from electrical short circuits.
- No power loss due to excessive heating.
- Have low loss transmission and large bandwidth.
- Posses superior storage density and access accessibility.
- Reconfigurable.



**OPTICAL**

## CHALLENGES

A significant challenge to optical computing is that computation is a nonlinear process in which multiple signals must interact. Light, which is an electromagnetic wave, can only interact with another electromagnetic wave in the presence of electrons in a material, and the strength of this interaction is much weaker for electromagnetic waves, such as light, than for the electronic signals in a conventional computer.

This may result in the processing elements for an optical computer requiring more power and larger dimensions than those for a conventional electronic computer using transistors.



## WHAT IS PROBABLE TO BE SEEN IN THE FUTURE ?

- Opto-electronic in nature.
- Use direct analogy of presence or absence of signals from a medium.
- Many lasers will be able to travel through one pathway, making the travel time within the computer much faster.

— **Rehan P R**  
(S6 ECE)

# WIRELESS COMMUNICATIONS FROM HIGH ALTITUDE PLATFORMS

The demand for wireless communication is increasing day by day. People want a high speed of communication in less time. No one is interested in the use of bunch of wires. So we move to wireless communication. Even rural area also requires internet facility. It is too hard to establish a Base station for particular small village for broadband communication or any wireless communication. Even it's too costly to launch a satellite for particular rural area.

So, Engineers made an intermediate way to satisfy both facilities of data transfer from terrestrial to satellite and satellite to terrestrial via HAP (High Altitude Platform). HAPs are air balloons, airships and airplanes which operate at altitude of 17-22km. HAP provides facilities of wireless communications. Terrestrial systems are used in mobile applications while satellite systems are used where terrestrial system can't be reached. HAPs have been proposed mobile services in stratosphere. It has advantages of both terrestrial as well as satellite.

## HAPS TOPOLOGIES

There are 3 main topologies based on the way they transfer the data and the services they provide.

- 1.) A terrestrial-HAP-satellite system.
- 2.) An integrated terrestrial.
- 3.) A standalone HAP system.

### 1) A terrestrial-HAP-satellite system

It is a mixed infrastructure, includes a HAPs network using a satellite as a link to the terrestrial networks to the final users. It provides best features of both HAPs and satellite communications. It can support high QOS (Quality Of services).

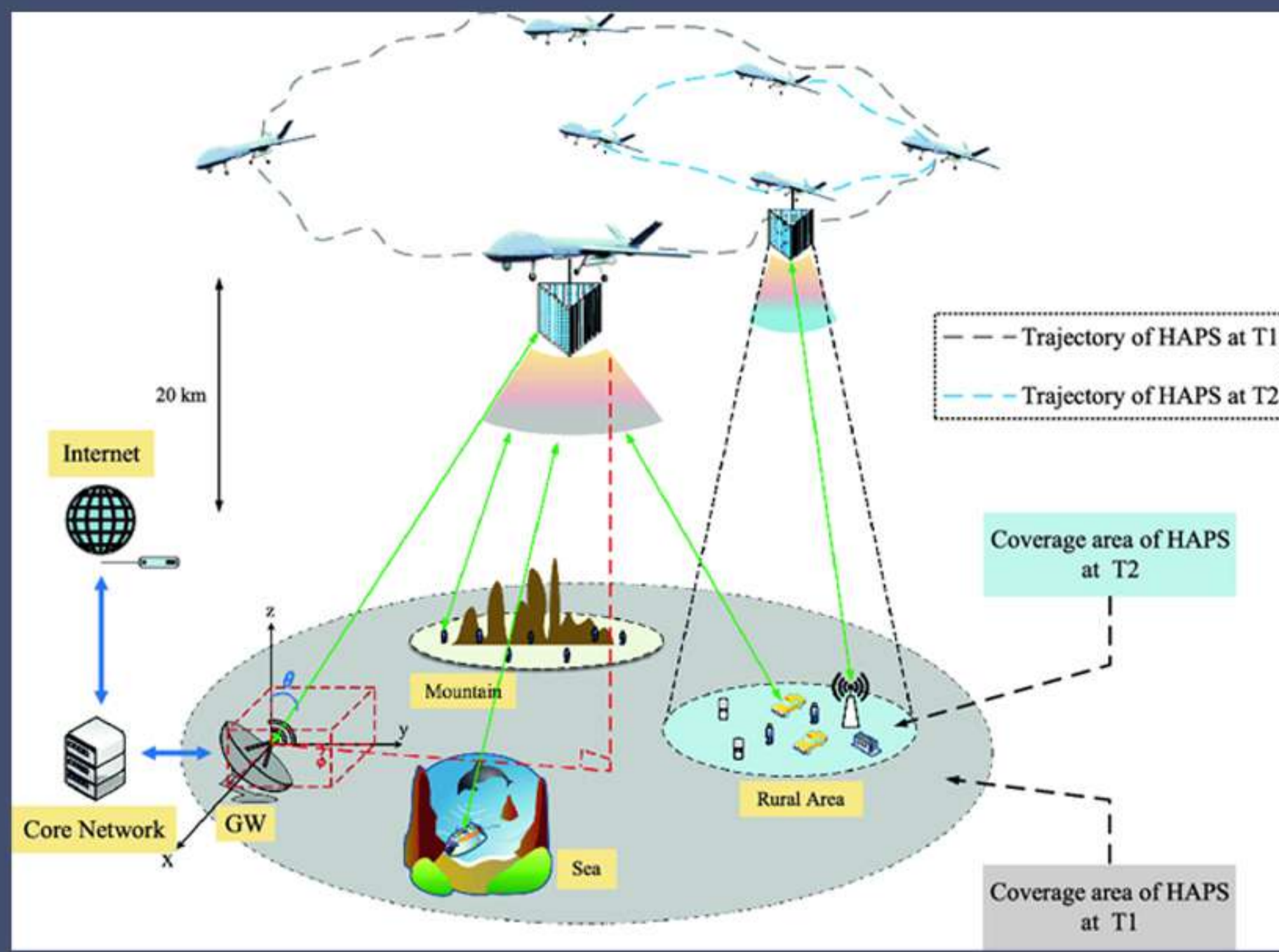
### 2) An integrated terrestrial – HAP system

This system works without the satellite-HAP link. Haps are considered to project one or more macro cells Here HAP network can be connected to terrestrial network through gateway.

### 3) A standalone HAP system

A standalone HAP system This system is used in many applications. For example broadband for all. In rural or remote area, it is expensive to deploy terrestrial systems. Satellite system is costly to be launched if traffic demand is small. This system may be deployed economically and efficiently.





## HAPs APPLICATIONS

HAPs offer such a big variety of services according to the topologies as broadcasting services (TV and radio), Internet access, telephony etc. Main applications of HAPs are as follows: Broadband Fixed Wireless Access Applications, 2G/3G and 4G applications, Emergency and disaster scenarios, Military Communications, Earth monitoring and positioning.

## HAPs COMMUNICATION SCENARIO

Services can be provided from a single HAP with up and down links to the user terminals, together with backhaul links as required into the fiber backbone. Inter-HAP links may serve to connect a network of HAPs. HAP coverage region is determined by line-of-sight propagation. The size, number, and shape of cells is design of the antennas on the HAP, with the advantage that the cell configuration may be determined centrally at the HAP. The HAP architecture includes resource allocation techniques, which can provide efficient usage of bandwidth and maximize capacity.

Higher capacity with HAPs is also costly. It represents a power advantage of up to about 34 dB compared to a LEO satellite, or 66 dB compared to a GEO satellite. And compared with terrestrial schemes, a single HAP can offer capacity equivalent to that provided by a large number of separate base-stations. Depending on the geography of the area, aerostat is raised an altitude of around 50-70 m AGL on which a payload consisting of a router box and Omni directional antenna will be mounted. The router circuitry receives the signals from a router box located away from the Aerostat, which in turn will be directed to the client antennas located in the surrounding villages within around 10 km range. Power supply for the access point is provided from the ground over the PoE cable which doubles up as a data cable. Access point is a bridge between the Ethernet and wireless interface at the base station. This bridge will transmit the data packets wirelessly to the client side, from the Omni-directional antenna mounted on top of the aerostat. At the client side flat panel antenna receives these data packets with the line of sight connectivity maintained. Tether is used to lift an airship.

– **Divyasree M**  
(S6 ECE)

# DIGITAL ELECTRONICS REVOLUTIONIZES COMPUTING

**D**igital electronics is a field of electronics that deals with digital signals, which are signals that have only two states - high or low, on or off, or 1 or 0. These signals are processed using digital circuits, which are composed of transistors, logic gates, and other components.

Digital electronics has revolutionized the world of electronics and computing. It has made possible the development of the modern computer, the internet, and a plethora of other digital devices that are part of our daily lives.

One of the key advantages of digital electronics over analog electronics is the ability to process and store data more accurately and reliably. Digital signals can be processed and manipulated using a variety of techniques, including binary arithmetic, Boolean algebra, and digital signal processing.



The basic building block of digital electronics is the logic gate. Logic gates are electronic circuits that perform logical operations on input signals to produce an output signal. The most common logic gates are the AND, OR, and NOT gates, which are used to perform the Boolean operations of conjunction, disjunction, and negation, respectively. Another important component of digital electronics is the flip-flop, which is a circuit that can store a single bit of information. Flip-flops are used to build registers and counters, which are essential components of digital circuits that require the storage and manipulation of data.

One of the most important applications of digital electronics is in the field of digital signal processing (DSP). DSP is the use of digital processing techniques to manipulate signals in order to extract useful information or to remove unwanted noise. DSP is used in a wide range of applications, including audio and video processing, telecommunications, and medical imaging.

In conclusion, digital electronics has transformed the world of electronics and computing, enabling the development of a wide range of digital devices and systems that are part of our daily lives.

-SREELAKSHMI K V  
S6 ECE



# KWA

## Kerala Water Authority

The Kerala Water Authority is a government agency responsible for providing safe and reliable water supply and sanitation services to the people of Kerala, India. A project for the Kerala Water Authority could involve a variety of tasks, such as designing and implementing new water supply systems, improving the efficiency and sustainability of existing systems, or conducting research on water quality and treatment methods. So as a part of the Kerala water authority innovation challenge conducted by Kerala water authority, we developed a prototype for the challenge which was to automate the pumping stations all around the state.

The Kerala Water Authority's innovation challenge was a call to individuals and teams to come up with innovative solutions to automate the pumping stations. The challenge drew participation from a wide range of students all working towards a common goal of reducing the manpower required for the production of water around the state.

Water pumping stations play a crucial role in ensuring a reliable supply of clean water to communities. However, traditional water pumping stations require a significant amount of manpower to operate and maintain. Automating these pumping stations can bring numerous benefits, including reducing the need for manual labour, increasing efficiency, and improving the overall reliability of the system. One of the main advantages of automating water pumping stations is the reduction in manpower needed to operate and maintain them.

As part of this challenge, our team consisting of four members ( Ashik Jose, V Nandagopal , Rinu Manoj , Megha Shaju ) reached the final round of the competition in which only three teams are now left for the final prototype developing segment. We have gone through several rounds along the year and finally reached the final round. KWA has also provide us with a grant of 1.5 lakhs for the completion of the project.

In order for the efficient completion of the project, we divided the project into various parts. That is the study of various starters, analysing the working of soft starter, automation of switch, study of various communication techniques and study of sensors and its response. Each part was looked upon by each member separately and each member gained enough knowledge about their part. Various components were required, which were brought with the help of the grant provided to us. The development of a control unit , a proper communication network , app development are the major objectives for the efficient completion of this project. We will be using sigfox and lora for the communication requirements of this project. We have also visited various pumping stations nearby and did a research on how they currently work .

The design and set up of the control unit will be completed by April and then the testing process will be done and finally within this year we will be developing this into a product form into the market.

We would like to sincerely thank our mentor Dr. Caren Babu HOD, Department of Electronics and Communication Engineering for her support and ideas which have helped us a lot.

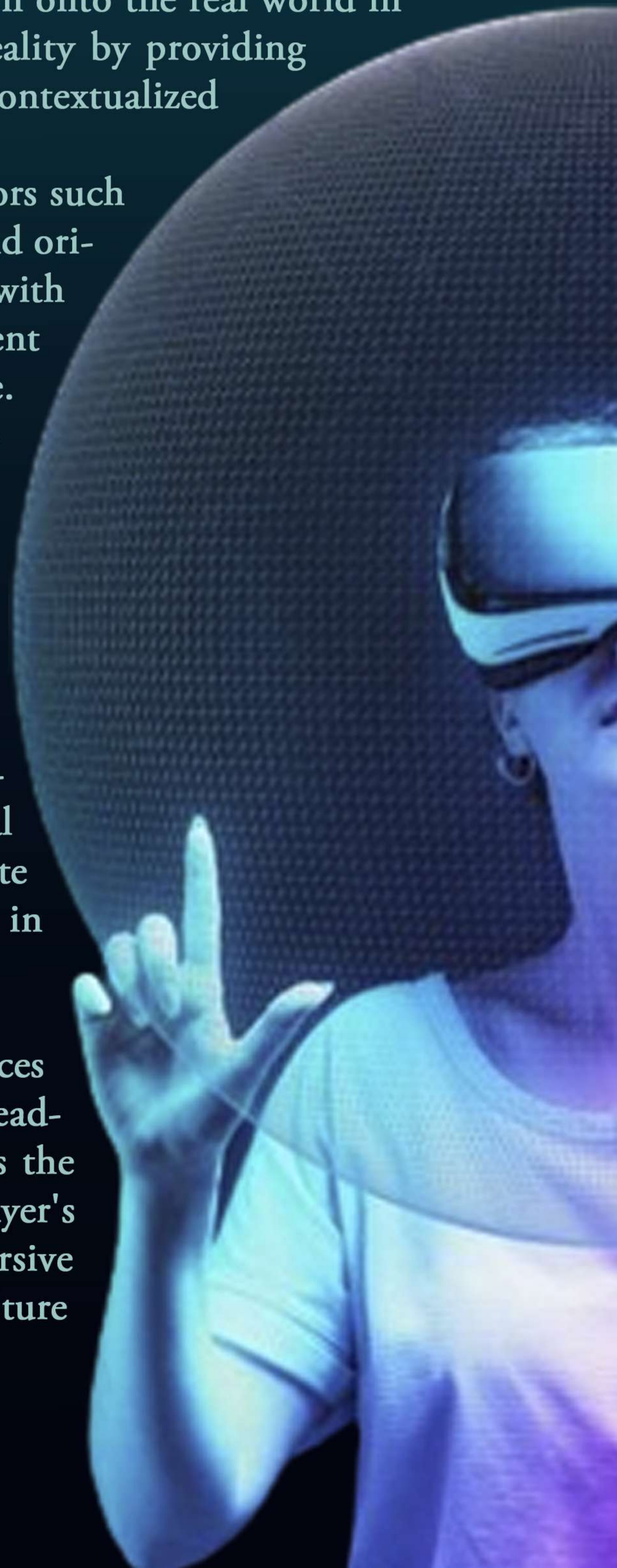
-V Nandagopal  
S8 ECE

# AUGMENTED REALITY

**A**ugmented Reality (AR) is a technology that blends the physical and digital worlds by overlaying virtual objects or information onto the real world in real-time. It enhances the user's perception of reality by providing them with additional digital information that is contextualized to their physical environment. AR technology works by using sensors such as cameras and GPS to track the user's location and orientation. The software then combines this data with pre-programmed or user-generated digital content to create an interactive and immersive experience. AR has a wide range of applications across industries, including gaming, entertainment, education, healthcare, retail, and advertising.

For example, in the gaming industry, AR technology can be used to create immersive gaming experiences that incorporate real-world environments. In the healthcare industry, it can be used for surgical training or to provide visual aids for medical procedures. In advertising, AR can be used to create interactive advertisements that engage consumers in a unique and memorable way.

AR can be experienced through a variety of devices such as smartphones, tablets, smart glasses, and headsets. One of the most popular examples of AR is the mobile game Pokemon Go, which uses the player's smartphone camera and GPS to create an immersive and interactive experience where the user can capture virtual Pokemon in real-world environments.



AR has also been used in retail environments to provide customers with a more engaging shopping experience. For example, an AR app can be used to allow customers to see how furniture would look in their homes before making a purchase. In the automotive industry, AR can be used to create virtual showrooms where customers can interact with and explore cars in a virtual environment.

In healthcare, AR can be used for a variety of purposes such as medical training, surgery planning, and patient education. AR can provide doctors with a 3D view of a patient's anatomy, allowing for more accurate and efficient medical procedures.

AR technology is still developing, and there is a lot of room for innovation and growth. Some of the challenges associated with AR include creating realistic and high-quality virtual content, ensuring seamless integration with real-world environments, and addressing privacy concerns related to the collection of user data.

Overall, AR has the potential to revolutionize many industries and change the way we interact with the world around us, AR is a rapidly advancing technology that has the potential to transform the way we interact with our environment and the digital world.

-Athul Tony  
S6 ECE



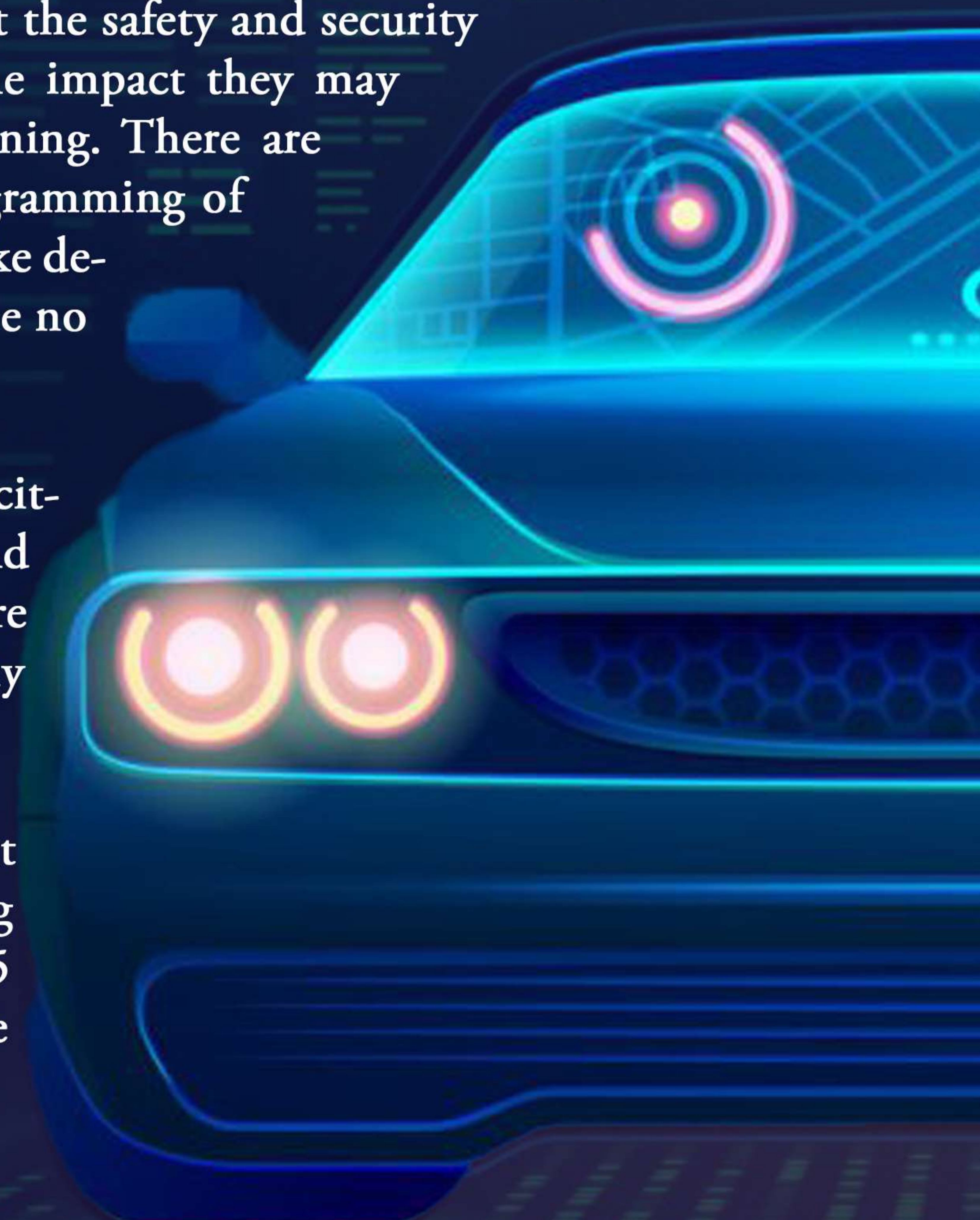
# AUTONOMOUS

Autonomous vehicles, also known as self-driving cars, are vehicles that are capable of sensing their environment and navigating without human input. These vehicles use a combination of sensors, cameras, GPS, and advanced software to detect and respond to the surrounding environment, such as other cars, pedestrians, traffic lights, and road signs. The development of autonomous vehicles is seen as a significant technological advancement with the potential to revolutionize the transportation industry. They are expected to improve road safety, reduce traffic congestion, and provide mobility options to those who cannot drive or do not have access to a car.

However, there are also concerns about the safety and security of autonomous vehicles, as well as the impact they may have on employment and urban planning. There are also ethical questions around the programming of autonomous vehicles and how they make decisions in situations where there may be no clear "right" answer.

Overall, autonomous vehicles are an exciting area of innovation and research, and it will be interesting to see how they are adopted and integrated into our daily lives in the coming years.

Levels of autonomy: There are different levels of autonomy for vehicles, ranging from level 0 (no automation) to level 5 (full automation). Level 0 vehicles have no automation features, while level 5 vehicles can operate without any human input under all conditions.





# VEHICLES

## **BENEFITS:**

1. Autonomous vehicles are expected to bring several benefits, including improved safety (as they can avoid accidents caused by human error), reduced traffic congestion (as they can communicate with each other and optimize traffic flow), increased accessibility (as they can provide mobility options to people who cannot drive), and reduced environmental impact (as they can be designed to be more energy-efficient).

2. Challenges: There are also several challenges that need to be addressed before autonomous vehicles can become widely adopted, including safety concerns (such as the ability of sensors to detect and respond to all possible scenarios), legal and regulatory issues (such as liability in case of accidents), and social and ethical considerations (such as job displacement and data privacy).

3. Current status: Autonomous vehicles are still in the testing phase, with several companies and organizations conducting trials in various locations around the world. However, they are not yet available for public use on a large scale.

4. Future potential: The potential for autonomous vehicles extends beyond passenger cars, with applications in areas such as logistics (e.g., self-driving trucks for deliveries) and agriculture (e.g., autonomous tractors for farming). They could also have implications for urban planning, as the need for parking spaces may be reduced and the design of roads and intersections may change.

-Abhinav Menon  
S6 ECE

# AI REVOLUTION: U

Artificial Intelligence (AI) has become a buzzword in recent years, with advancements in machine learning and natural language processing. From chatbots to self-driving cars, AI is transforming industries and society as we know it. In this article, we will explore the advancements in AI and their implications on various aspects of our lives.

Artificial Intelligence is the simulation of human intelligence in machines that can perform tasks that typically require human cognitive abilities, such as learning, problem-solving, and decision-making. AI can be categorized into two types - narrow or weak AI and general or strong AI. Narrow AI is designed to perform specific tasks, while general AI can perform any intellectual task that a human can do.

# UNLEASHING THE POWER

Advancements in AI have been remarkable in recent years, with machine learning, natural language processing, and deep learning algorithms. Machine learning algorithms enable machines to learn from data and improve their performance without being explicitly programmed. Natural language processing algorithms enable machines to understand human language, and deep learning algorithms enable machines to analyze vast amounts of data to make predictions. AI is transforming industries, including healthcare, finance, and manufacturing. In healthcare, AI is being used to develop personalized treatments and to diagnose diseases. In finance, AI is being used to detect fraud and to develop investment strategies. In manufacturing, AI is being used to automate processes and to develop predictive maintenance strategies.

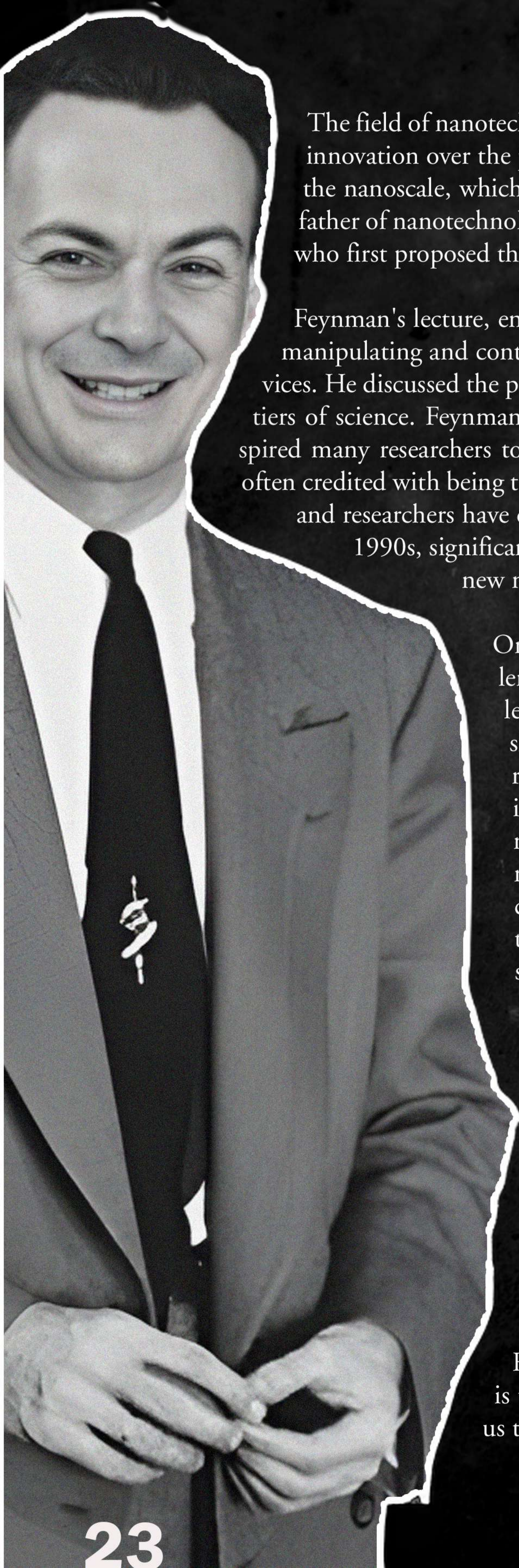
While AI has numerous benefits, it also raises concerns about its implications on society. One of the major concerns is the impact of AI on employment. The rise of automation and AI has led to concerns about job displacement, particularly in industries where routine and repetitive tasks can be automated. Another concern is the impact of AI on privacy and security. AI algorithms rely on vast amounts of data to learn and make predictions. However, this data can be used for nefarious purposes, such as identity theft or cyber attacks. AI also raises ethical concerns, particularly with the development of autonomous weapons and the use of AI in decision-making processes. There are concerns about the accountability and transparency of these systems, and the potential for biases to be embedded in algorithms.

AI has the potential to transform industries and improve our lives in numerous ways. However, it also raises concerns about its impact on employment, privacy, security, and ethics. As AI continues to evolve, it is important to consider these implications and take steps to address them. This requires collaboration between governments, industry, and academia to develop ethical guidelines and regulations that ensure the responsible development and deployment of AI.

-Meenakshi P S  
S6 ECE

# Father of Nanotechnology -

# RICHARD FEYNMAN



The field of nanotechnology has emerged as a fascinating and promising area of research and innovation over the past few decades. It involves the study and manipulation of materials at the nanoscale, which is incredibly small, typically ranging from 1 to 100 nanometers. The father of nanotechnology is widely considered to be Richard Feynman, an American physicist who first proposed the concept of nanotechnology in a now-famous lecture he gave in 1959.

Feynman's lecture, entitled "There's Plenty of Room at the Bottom," presented his vision of manipulating and controlling individual atoms and molecules to create new materials and devices. He discussed the possibility of using tiny machines to perform tasks and explore new frontiers of science. Feynman's lecture laid the foundation for the field of nanotechnology and inspired many researchers to explore the potential of working at the nanoscale. While Feynman is often credited with being the father of nanotechnology, it is important to note that many scientists and researchers have contributed to the field's development over the years. In the 1980s and 1990s, significant progress was made in nanotechnology research, with the discovery of new materials and techniques for manipulating them.

One of the key figures in the early days of nanotechnology was Eric Drexler, an American engineer and writer who popularized the concept of molecular nanotechnology in his book "Engines of Creation." Drexler envisioned a future in which nanomachines could be used to build new materials and structures atom by atom, leading to a revolution in manufacturing and medicine. Another notable contributor to the field of nanotechnology is Sumio Iijima, a Japanese physicist who discovered carbon nanotubes in 1991. Carbon nanotubes are cylindrical structures made of carbon atoms that are incredibly strong and lightweight. They have potential applications in a wide range of fields, from electronics to aerospace.

In addition to these pioneers, there are countless other scientists and researchers who have made significant contributions to the field of nanotechnology over the years. Today, nanotechnology is a thriving area of research and innovation, with potential applications in fields as diverse.

In conclusion, while Richard Feynman is often credited with being the father of nanotechnology, the field's development has been the result of the contributions of many scientists and researchers over the years. Feynman's visionary ideas helped lay the groundwork for the field, but it is the collective efforts of researchers around the world that have brought us to where we are today.

- Safreen Saleem  
S6 ECE

# Father of Video game-

# RALPH BAER

Ralph Baer, widely known as the "Father of Video Games," left an indelible mark on the world of interactive entertainment through his groundbreaking technical innovations. Born in 1922 in Germany, Baer's passion for technology and engineering propelled him to become a pioneer in the gaming industry.

During his time at Sanders Associates in the late 1960s, Baer conceived the idea of a television-based gaming system. This led to the development of the "Brown Box," a prototype that later evolved into the Magnavox Odyssey, the world's first home video game console. Baer's technical acumen allowed him to design a system that could be connected to a standard television set, enabling users to play interactive games in the comfort of their homes.

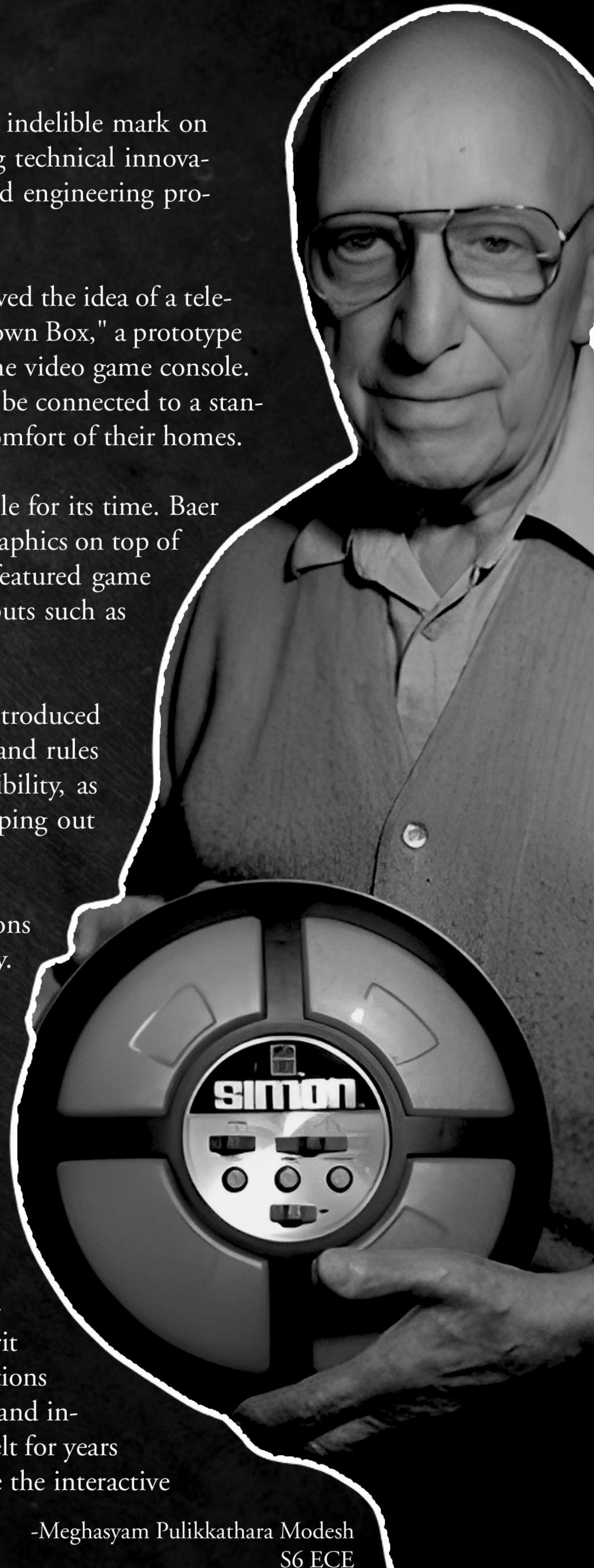
The technical capabilities of the Magnavox Odyssey were remarkable for its time. Baer devised a method to generate game graphics by overlaying simple graphics on top of the television screen using transparent overlays. The console also featured game cartridges, a light gun for shooting games, and various control inputs such as dials, switches, and buttons.

Baer's engineering prowess extended beyond hardware design. He introduced the concept of a "game box," a comprehensive set of components and rules that defined a specific game. This approach provided greater flexibility, as multiple games could be played using the same hardware by swapping out different game boxes.

Although met with initial skepticism, Baer's technical innovations paved the way for significant advancements in the gaming industry. The Magnavox Odyssey served as a catalyst for the development of more sophisticated consoles with enhanced graphics, sound capabilities, and gameplay features.

Baer's technical contributions extended beyond hardware and console design. He held numerous patents related to electronic gaming, covering areas such as electronic memory systems, video simulation, and interactive educational tools.

Ralph Baer's technical achievements garnered him numerous accolades and recognition throughout his lifetime. His pioneering spirit and innovative mindset continue to inspire and guide future generations of game developers. Baer's enduring legacy as a technical visionary and inventor ensures that his impact on the world of video games will be felt for years to come, as the industry continues to push boundaries and redefine the interactive entertainment landscape.



-Meghasyam Pulikkathara Modesh  
S6 ECE

# RESONANCE



CHRIST  
COLLEGE OF ENGINEERING

