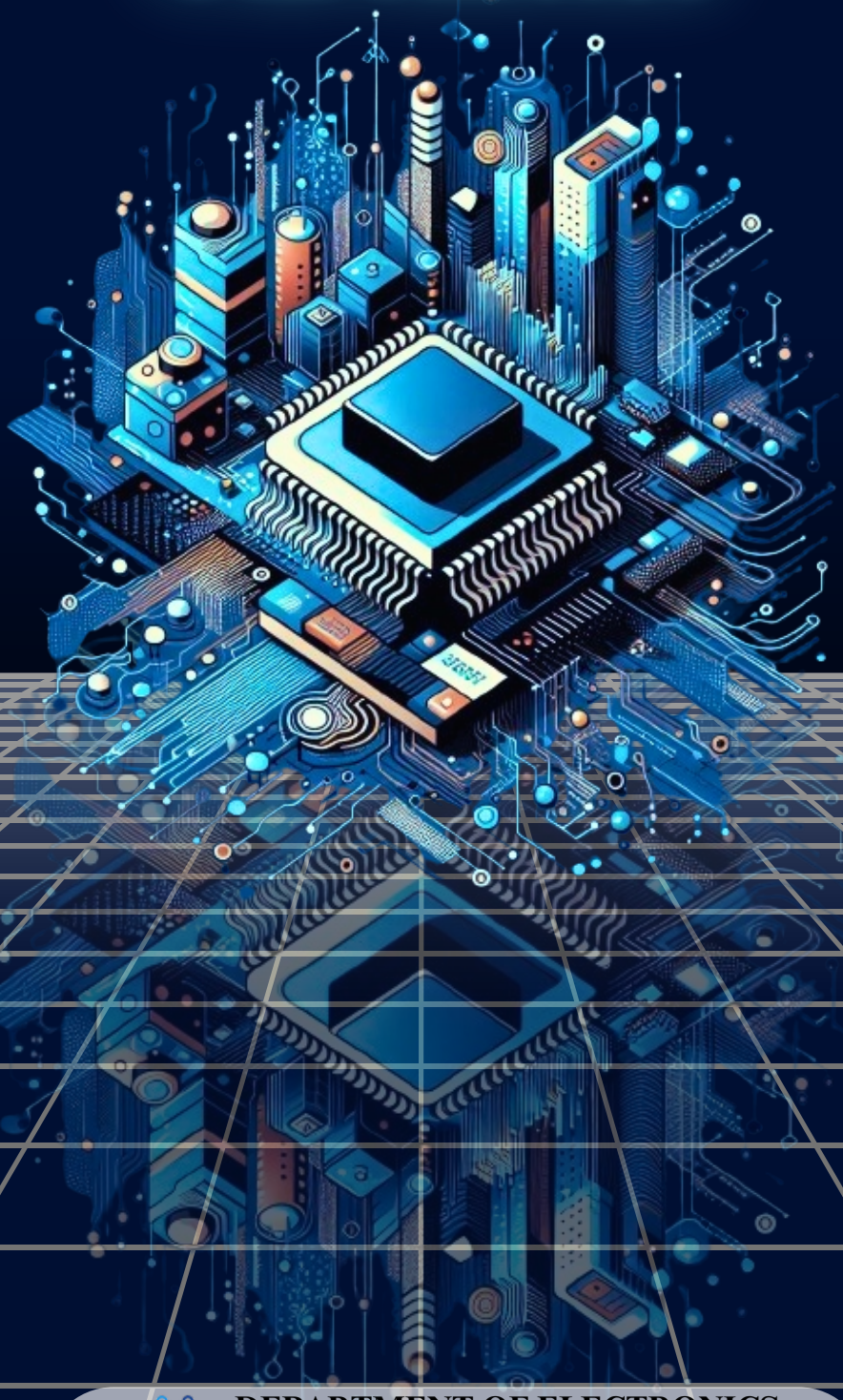
Mar Baselios Institute of Technology and Science

SieTech Chronicles

2024



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

SIEHZ

VISION AND MISSION

VISION

To nurture a positive campus culture and equip the younger generation to take our nation forward.

MISSION

- M1: To provide graduate level technical education in the existing or conventional branches, as well as in the newly emerging fields.
- M2: To build up a centre of technical excellence for post-graduate studies and research in all fields of human endeavour.
- M3: To help the youth of rural agricultural background to change with times, and join the mainstream of industrial growth and information technology
- M4: To impart ethical values of our Indian tradition to the future generation.

TECHNICAL MAGAZINE COMMITEE

CHIEF EDITOR	:	Gloria Eldhose, S6 ECE
EDITOR	:	Sanjose Biju, S6 ECE
MEMBERS	:	Anand S, S2 ECE Adarsh K A,S2 ECE Abhirami Aji, S8 ECE Kavya Biju, S8 ECE
STAFF IN CHARGE	:	Jeena Jacob, Asst Professor ECE Paul Mathews, Asst Professor, ECE

VISION AND MISSION OF DEPARTMENT

Vision of the Department:

To be a center of excellence to produce globally competent technocrats who can advance our nation.

Mission of the Department:

- **M1: To provide quality education and training through effective teaching-learning practices**
- **M2: To solve the complex technological problems of modern society in the various fields related to Electronics & Communication Engineering**
- **M3: To nurture students to improve their leadership and entrepreneurship skills with core values**

"Innovation is seeing what everybody has seen and thinking what nobody has thought."

ALBERT SZENT-GYORGYI

Albert Szent-Gyorgyi

HOD Message

"Hello Team,

As we step into a new year filled with fresh opportunities and challenges, it's time to reflect on our collective journey and celebrate our accomplishments.

Firstly, I want to extend my heartfelt appreciation to each and every one of you for your unwavering dedication and hard work. Your commitment to excellence is the driving force behind our department's success.

n the spirit of collaboration and innovation, let's continue to support each other and explore new ways to exceed expectations. Remember, our strength lies in our unity and diversity of thought.

As we move forward, let's keep communication channels open, share ideas freely, and embrace change with enthusiasm. Together, we can overcome any obstacle and achieve remarkable results.

Thank you for being an integral part of our team. Here's to a productive and fulfilling month ahead!

Best regards,

Prof Johny Joseph,
HOD ECE

Table of Contents

TECHNICAL ARTICLE-1

TECHNICAL ARTICLE-1

Consumer Electronics

Anand S S2 ECE

In 2023, the market size of Consumer Electronics amounted to approximately USD 750 Billion, projected to reach USD 1 Trillion by 2029, marking it as the swiftly expanding sector within the electronics industry.

Consumer Electronics encompass a range of electronic products utilized in daily life, such as smartphones, laptops, smart TVs, home appliances, wearables, gaming consoles, and IoT devices.

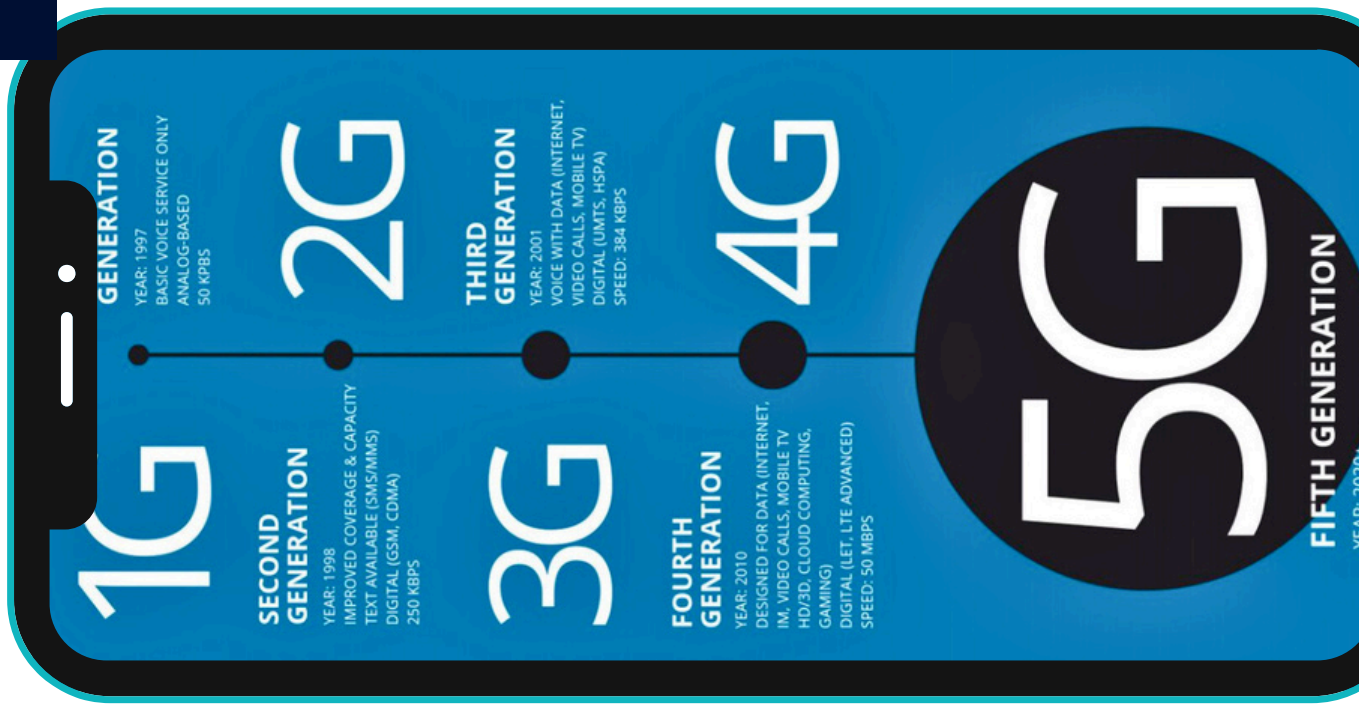
These electronic gadgets play a vital role in enhancing efficiency, facilitating personal work, communication, entertainment, and various daily tasks, meeting the growing needs of people globally.
Consumer electronics have become indispensable in our daily lives, with increasing demand worldwide, driven by evolving needs and requirements.

The incorporation of cutting-edge technologies like Artificial Intelligence (AI), Machine Learning (ML), Augmented Reality (AR), Virtual Reality (VR), among others, adds efficiency and power to consumer electronics products.

Looking ahead, the future of consumer electronics holds promise as it continues to advance, integrating with new technologies to further simplify and enhance the way
we live and work, revolutionizing our daily experiences.

5G Technology

Navaneeth C.V S2 ECE



5G is the fifth generation of wireless network technology. It offers faster download and upload speeds and allows for more connected devices at the same time.

Before 5G Technology

- Superb connectivity for mobile devices
- Relatively fast internet speed of up to 100 Mbps
- Up to 4,000 devices supported per square kilometer

With 5G Technology

- Superior connectivity designed for more types of devices aside from smartphones
- Expected download speeds of over 10gbs (100 to 1,000 times faster than the preceding generation)
- Up to 1 million devices supported per square kilometer

Mobile Networks and 5G Technology

1G	2G	3G	4G	5G
1980s	1990s	2000s	2010s	Current
Analog cell phones allow people to talk to each other	Addition of new features like SMS and voicemail	Mobile data let users browse the internet	LTE offers faster speed and more functionality to mobile devices	5th generation tech allows more connectivity and faster speeds

Is 5G better than LTE?

How 5G is different from 4G LTE

5G is a lot faster than the previous Gs, has a lower latency rate, and allows more devices or users to connect to the internet at the same time.

How 5G Benefits Individuals' Daily Lives

5G can improve people's lives

IMPROVED SERVICES

Users can have better experiences with tech and systems, including cloud services, augmented reality, gaming, and more.

EFFICIENT ENERGY CONSUMPTION

5G equipment is energy-efficient, so using 5G tech can significantly reduce energy consumption.

REMOTE HEALTH CARE

Health care providers can access patients' vitals and health data in real-time or perform remote surgery when necessary.

> The advance of technology is based on making it fit in so that you don't really even notice it, so it's part of everyday life.
>
> BILL GATES

TECHNICAL ARTICLE-1

Unveiling the Magic: A Technical Deep Dive into Wi-Fi

Angel Bobby ,S6ECE

Wi-Fi, short for Wireless Fidelity, has become an essential part of our modern lives. It allows us to connect to the internet wirelessly, freeing us from the constraints of tangled cables and enabling seamless connectivity on our laptops, smartphones, tablets, and other devices. But have you ever wondered how this magic happens? This article delves into the world of Wi-Fi technology, exploring its workings, benefits, and some key security considerations.

How Does Wi-Fi Work?

Imagine data as tiny packets that need to travel between your device and the internet. Wi-Fi uses radio waves, similar to those used by radios and cell phones, to transmit these data packets. Here's a breakdown of the process:

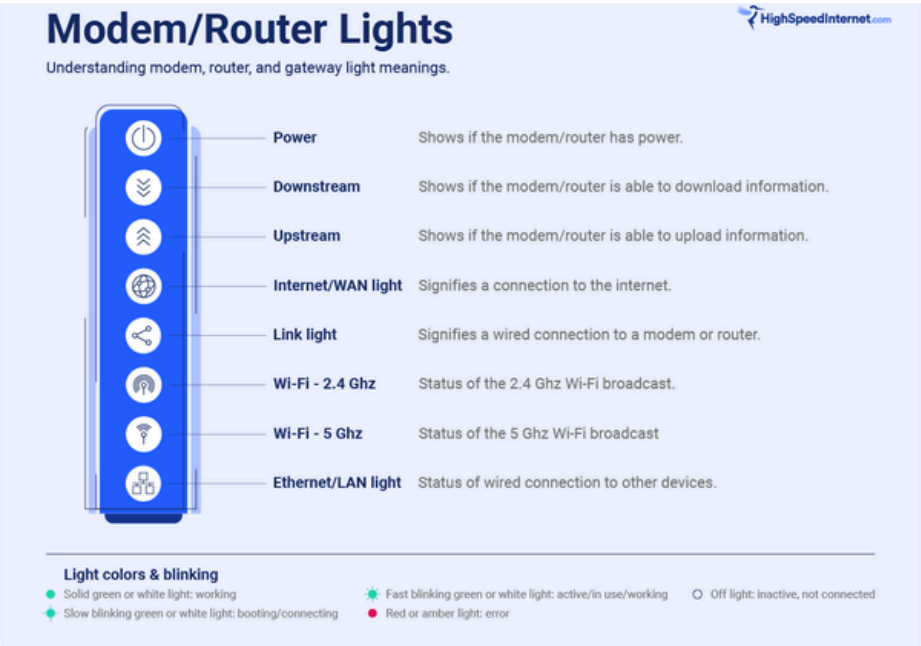
1. **Routers and Access Points:** A router acts as a central hub in your network, connecting your devices to the internet. It receives data from the internet via a cable connection and translates it into radio waves using a built-in transmitter. Access points, sometimes integrated into routers, further amplify these radio waves to extend the Wi-Fi signal throughout your space.
2. **Device Communication:** Your Wi-Fi enabled devices have built-in receivers that can pick up these radio waves. They then decode the information and translate it back into usable data, allowing you to browse the internet, stream videos, or play online games.

3. ***Security Measures***: To ensure only authorized devices can access your network, Wi-Fi uses encryption. This process scrambles the data packets before they are transmitted and then decrypts them on the receiving device using a password (also known as a security key).

Benefits of Wi-Fi

Wi-Fi offers a multitude of advantages over traditional wired connections:

- Convenience: Wi-Fi eliminates the need for cables, allowing you to connect your devices from anywhere within the network's range. This provides greater flexibility and mobility for using your devices, whether you're working from the couch, catching up on emails in bed, or video conferencing from your patio.
- Scalability: Wi-Fi networks can be easily expanded to accommodate additional devices. Adding more devices to a wired network can become cumbersome and require additional cables. With Wi-Fi, simply connect your new device and enter the network password – no need to crawl under desks or behind furniture to find an available ethernet port.
- Improved Aesthetics: Wi-Fi eliminates the clutter of cables, creating a cleaner and more organized workspace or home environment. This is particularly beneficial in open-concept living spaces or areas where aesthetics are important.
- Versatility: Wi-Fi allows you to connect a wide range of devices, from laptops and smartphones to printers and smart home devices. This creates a truly interconnected environment where you can control your lights, adjust your thermostat, or stream music to your speakers – all from the comfort of your couch.



Beyond Convenience: Applications of Wi-Fi

The impact of Wi-Fi extends far beyond everyday internet browsing. It plays a crucial role in various applications that are transforming our world:

- Smart Cities: Wi-Fi forms the backbone of smart city initiatives, enabling communication between sensors, traffic lights, and other infrastructure, leading to improved traffic management, waste collection, and overall efficiency.
- The Internet of Things (IoT): As more and more devices become connected, Wi-Fi provides a reliable and scalable way to connect these devices to the internet, allowing for remote monitoring, data collection, and automation in homes, businesses, and industrial settings.
- Education: Wi-Fi empowers educational institutions by enabling seamless connectivity for students and faculty. This facilitates online learning resources, collaborative projects, and access to educational tools and materials.
- Healthcare: Wi-Fi plays a vital role in modern healthcare by enabling remote patient monitoring, telehealth consultations, and data sharing between medical devices and healthcare professionals.

Security Considerations

While Wi-Fi is a convenient technology, it's crucial to be mindful of security risks. Here are some tips for staying safe:

- Use a Strong Password: Choose a complex and unique password for your Wi-Fi network that is difficult to guess. Avoid using easily identifiable information such as birthdays or pet names.
- Enable Encryption: Most modern routers offer different encryption options, such as WPA2 or WPA3. Ensure encryption is enabled on your router to protect your data from unauthorized access.

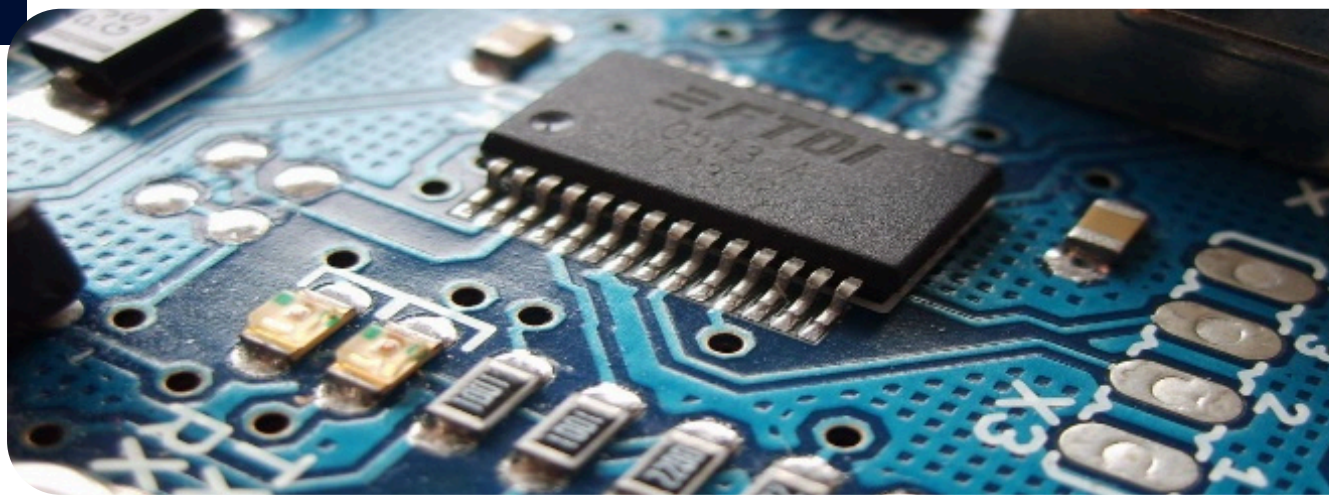
wi-Fi Router

- Be Cautious on Public Wi-Fi: Public Wi-Fi networks are often unsecured. Avoid using them for sensitive activities such as online banking or entering passwords for financial accounts. If you must use public Wi-Fi, consider using a VPN for added security.
- Consider a VPN: For added security, especially when using public Wi-Fi, consider using a Virtual Private Network (VPN).

TECHNICAL ARTICLE-1

Exploring the Diverse Scopes in Electronics and Communication Engineering

-Fiza Fathima,S6ECE



In the realm of Electronics and Communication Engineering (ECE), the landscape is vast, encompassing a myriad of exciting and innovative fields. From cutting-edge telecommunications to intricate circuit design, ECE professionals delve into various scopes that shape the modern world. Let's embark on a journey through some of these fascinating areas:

- Telecommunications: Telecommunications lies at the heart of ECE, facilitating global connectivity through technologies such as cellular networks, satellite communications, and internet protocols. Engineers in this field design and optimize communication systems, ensuring efficient data transmission across vast distances.
- Signal Processing: Signal processing deals with the manipulation and analysis of signals to extract meaningful information. Applications range from audio and image processing to radar and sonar systems. ECE specialists develop algorithms and techniques to enhance signal quality and extract valuable insights from noisy data.
- Embedded Systems: Embedded systems are omnipresent in modern electronics, powering devices ranging from smartphones to automotive control systems. ECE professionals working in this domain design hardware and software solutions tailored to specific tasks, often focusing on real-time operation and resource efficiency.
- Integrated Circuit Design: Integrated circuits (ICs) are the building blocks of electronic devices, comprising millions of transistors etched onto a tiny silicon wafer. Engineers in IC design meticulously craft these intricate circuits, optimizing performance, power consumption, and manufacturing costs to meet the demands of diverse applications.

- Wireless Communication: Wireless communication technologies have revolutionized how we connect and interact with the world around us. From Wi-Fi and Bluetooth to 5G and beyond, ECE experts drive innovation in wireless networking, pushing the boundaries of speed, coverage, and reliability.
- Robotics and Automation: Robotics and automation integrate ECE principles with mechanical systems to create intelligent machines capable of autonomous operation. Engineers in this field design control systems, sensors, and actuators to enable robots to perceive and interact with their environment, revolutionizing industries such as manufacturing, healthcare, and transportation.
- Photonics and Optoelectronics: Photonics and optoelectronics explore the generation, manipulation, and detection of light for various applications, including telecommunications, sensing, and imaging. ECE researchers develop photonic devices and systems that harness the unique properties of light, paving the way for advances in high-speed communication, medical diagnostics, and renewable energy.
- Power Electronics: Power electronics focuses on the conversion and control of electrical energy, playing a crucial role in renewable energy systems, electric vehicles, and industrial automation. Engineers in this field design efficient power converters and motor drives, enabling the seamless integration of renewable sources and the electrification of transportation.

In conclusion, Electronics and Communication Engineering offers a diverse array of scopes, each contributing to the advancement of technology and society. Whether it's revolutionizing telecommunications, optimizing signal processing algorithms, or designing innovative embedded systems, ECE professionals continue to push the boundaries of what's possible, shaping the future of our interconnected world.

TECHNICAL ARTICLE-1

Unleashing the Potential of Hydrogen Fuels

Nirmal Suresh, S2ECE

Introduction

Hydrogen fuels have the potential to revolutionize the energy sector, offering a clean and sustainable alternative to traditional fossil fuels. This presentation will explore the current state of hydrogen technology and its future implications.

Hydrogen Production

The production of hydrogen fuels can be achieved through various methods, including steam methane reforming, electrolysis, and biomass gasification. Each method has its own advantages and challenges, influencing the overall sustainability of hydrogen production.
Efficient storage of hydrogen is crucial for its widespread use as a fuel. Technologies such as compressed gas storage, liquid hydrogen storage, and solid□state storage are being developed to address the challenges of hydrogen storage.

Hydrogen Transportation

Hydrogen fuel cell vehicles offer a promising solution for zero-emission transportation. The advantages of hydrogen vehicles include fast refueling, long driving range, and minimal environmental impact.

Hydrogen in Industry

Hydrogen fuels have the potential to transform various industrial processes, including refining, ammonia production, and steel manufacturing. The integration of hydrogen into industrial applications can lead to significant emission reductions.

Hydrogen in Power Generation

Hydrogen can play a vital role in decarbonizing the power generation sector. It can be used in fuel cells to produce electricity with zero emissions, offering a sustainable alternative to traditional fossil fuel power plants.

While hydrogen fuels hold great promise, there are challenges to overcome, including cost, infrastructure development, and scaling up production. However, the opportunities for a sustainable energy future make the investment in hydrogen technology worthwhile.

Policy and Regulation

The development and adoption of supportive policies and regulations are crucial for the growth of the hydrogen fuel industry. Governments and regulatory bodies play a key role in incentivizing investment and ensuring the safety and reliability of hydrogen technologies.

Future Outlook

The future of hydrogen fuels is promising, with increasing investments and technological advancements driving its adoption across various sectors. As the world seeks cleaner energy solutions, hydrogen is poised to play a significant role in the transition to a sustainable energy future.

Conclusion

n conclusion, hydrogen fuels have the potential to transform the energy landscape, offering a clean and sustainable alternative to traditional fossil fuels. With ongoing advancements and collaborative efforts, hydrogen technology is poised to play a pivotal role in achieving a more sustainable future.

TECHNICAL ARTICLE-2

TECHNICAL ARTICLE-2

The Rise Of 5G Technology

Anjaly Jayan, S8 ECE

INTRODUCTION

The rise of 5G technology represents a transformative leap forward in wireless communication systems. Building upon the foundation laid by its predecessors, particularly 4G LTE, 5G promises unprecedented speed, reliability, and connectivity. With data speeds potentially reaching up to 20 gigabits per second, 5G networks enable seamless streaming of high-definition content, rapid downloads/uploads, and near-real-time communication. Moreover, the ultra-low latency of 5G, reduced to milliseconds, unlocks the potential for applications demanding instantaneous responsiveness, such as augmented reality (AR), virtual reality (VR), autonomous vehicles, and remote surgery. This low latency also enhances experiences in gaming and video conferencing, creating immersive and seamless interactions. Additionally, 5G's capacity to support a massive number of connected devices simultaneously enables the proliferation of the Internet of Things (IoT), facilitating interconnected smart devices and sensors across various domains, including smart homes, cities, industrial automation, and healthcare. Furthermore, the concept of network slicing in 5G allows operators to partition the network into virtual networks tailored to specific applications or users, enabling customized services efficiently. With these advancements, 5G technology is poised to revolutionize industries and enhance everyday experiences in profound ways.

CONTENTS

SPEED AND DATA TRANSMISSION

The speed and data transmission capabilities of 5G technology represent a significant advancement in wireless communication systems. Unlike its predecessors, 5G promises unparalleled data speeds, potentially reaching up to 20 gigabits per second. This dramatic increase in speed translates to lightning-fast downloads and uploads, enabling users to transfer large files, stream high-definition videos, and engage in real-time communication with minimal latency. At the heart of 5G's speed is its use of higher frequency bands, including millimeter waves, which offer significantly wider bandwidth compared to previous generations. These higher frequencies enable 5G networks to transmit data at much faster rates, revolutionizing the way we access and share information.

Moreover, 5G technology leverages advanced techniques such as beamforming and massive MIMO (Multiple Input Multiple Output) to optimize data transmission. Beamforming focuses the signal directly towards the intended receiver, rather than broadcasting it In all directions, resulting in more efficient data delivery and increased network capacity. Massive MIMO further enhances data transmission by utilizing multiple antennas to transmit and receive data simultaneously, maximizing spectral efficiency and throughput.

The implications of 5G's speed and data transmission capabilities extend beyond individual users to various industries and sectors. For example, in healthcare, 5G enables high-resolution medical imaging to be transmitted in real-time, facilitating remote consultations and improving patient care. In manufacturing, 5G-powered robotics and automation systems can exchange large amounts of data instantaneously, optimizing production processes and increasing efficiency.

Additionally, the speed and data transmission capabilities of 5G technology are driving innovations in emerging technologies such as virtual reality (VR), augmented reality (AR), and autonomous vehicles. With 5G's ultra-fast speeds and low latency, immersive VR experiences can be delivered seamlessly over wireless networks, while AR applications can overlay digital information onto the physical world in real-time. Autonomous vehicles rely on high-speed, low-latency connectivity to communicate with other vehicles and infrastructure, enabling safer and more efficient transportation systems

FUTURE IMPLICATIONS AND OPPORTUNITIES

The future implications and opportunities of 5G technology are vast and transformative, promising to revolutionize various industries and aspects of daily life. In manufacturing, 5G's high-speed, low-latency connectivity will usher in the era of Industry 4.0, enabling real-time monitoring, predictive maintenance, and autonomous robotics. Healthcare will undergo significant changes as 5G facilitates remote patient monitoring, telemedicine platforms, and augmented reality-assisted surgeries, improving access to quality care. Autonomous vehicles will rely on 5G networks to communicate with infrastructure, enhancing road safety and transportation efficiency.Smart city initiatives will leverage 5G to create connected urban environments, leading to more sustainable and livable cities. The Internet of Things (IoT) will flourish with 5G, enabling smarter resource management and enhanced customer experiences across industries.

Entertainment and media will be transformed by 5G's ability to deliver immersive experiences such as virtual reality gaming and ultra-high-definition streaming. Education and remote work will become more accessible and flexible with 5G-powered online learning platforms and virtual collaboration tools. Additionally, 5G-enabled environmental monitoring will aid in tracking and mitigating environmental issues, supporting efforts to build more sustainable communities. Overall, 5G technology holds immense promise for driving innovation, improving efficiency, and enhancing quality of life in the future.

TECHNICAL ARTICLE-2

The Vital Role of Embedded Systems in Modern Electronics

Jeeva T S, S6 ECE

Embedded systems are the unsung heroes of modern technology, quietly powering the devices and applications we rely on daily. As an engineering student majoring in Electronics and Communication Engineering (ECE), understanding embedded systems is crucial, as they are at the heart of many innovations in various industries. This article explores the importance, applications, and future prospects of embedded systems.

What Are Embedded Systems?

Embedded systems are specialized computing systems that perform dedicated functions within larger mechanical or electronic systems. Unlike general-purpose computers, embedded systems are designed to execute specific tasks, often with real-time computing constraints. They consist of both hardware and software components, including microcontrollers or microprocessors, memory, input/output interfaces, and dedicated software.

Why Are Embedded Systems Important?

T1. Integration and Efficiency: Embedded systems are designed to integrate seamlessly into larger systems, enhancing their functionality while consuming minimal power and space. This makes them ideal for applications where efficiency and compactness are paramount.

2. Real-Time Operation: Many embedded systems operate in real-time environments where timely responses are critical. This capability is essential for applications such as automotive systems, industrial automation, and medical devices.

3. Reliability and Performance: Embedded systems are optimized for specific tasks, ensuring high performance and reliability. They are designed to operate continuously and withstand harsh conditions, making them suitable for critical applications.

Applications of Embedded Systems

Embedded systems are ubiquitous, with applications spanning numerous industries. Here are some key examples:

Embedded systems are ubiquitous, with applications spanning numerous industries. Here are some key examples:

1. Automotive Industry: Modern vehicles are equipped with numerous embedded systems, including engine control units (ECUs), anti-lock braking systems (ABS), airbag control systems, and infotainment systems. These systems enhance vehicle performance, safety, and user experience.

2. Consumer Electronics: Embedded systems power everyday devices such as smartphones, smartwatches, digital cameras, and home appliances. They enable advanced features like touchscreens, voice recognition, and wireless connectivity.

3. Healthcare: Medical devices such as pacemakers, insulin pumps, diagnostic equipment, and wearable health monitors rely on embedded systems for precise control and data processing. These systems improve patient care and enable remote health monitoring.

4. Industrial Automation: Embedded systems are integral to industrial automation, controlling machinery, monitoring processes, and ensuring safety. They are used in programmable logic controllers (PLCs), robotics, and sensor networks.

5. Telecommunications: In the telecommunications sector, embedded systems are used in networking equipment, base stations, and communication satellites. They facilitate data transmission, signal processing, and network management.

6. Aerospace and Defence: Embedded systems are critical in aerospace and defence applications, where they control navigation, communication, and weapon systems. They must meet stringent reliability and performance standards to ensure mission success.

The Future of Embedded Systems

The future of embedded systems is bright, driven by advancements in technology and growing demand for intelligent, connected devices. Here are some trends shaping the future of embedded systems:

1. Internet of Things (IoT): The proliferation of IoT devices is expanding the scope of embedded systems. These systems enable smart homes, cities, and industries by connecting and controlling a vast network of devices.

2. Artificial Intelligence (AI): Integrating AI with embedded systems allows for more sophisticated and autonomous operation. AI-powered embedded systems can perform complex tasks such as image recognition, natural language processing, and predictive maintenance.

3. Edge Computing: Embedded systems are increasingly being used in edge computing, where data is processed locally rather than in centralized cloud servers. This reduces latency and bandwidth usage, making real-time applications more efficient.

4. Energy Efficiency: As the demand for portable and battery-operated devices grows, energy efficiency becomes a critical focus. Innovations in low-power embedded systems are enabling longer battery life and reducing energy consumption.

5. Security: With the increasing connectivity of embedded systems, ensuring their security is paramount. Future embedded systems will incorporate advanced security features to protect against cyber threats and ensure data privacy.

Conclusion

Embedded systems are fundamental to the advancement of modern technology. As an ECE student, mastering embedded systems opens up numerous career opportunities in diverse industries. By understanding the principles and applications of embedded systems, you can contribute to the development of innovative solutions that enhance efficiency, safety, and user experience in various fields. The future of embedded systems is exciting, and as technology continues to evolve, so too will the potential for these vital systems to transform our world.

TECHNICAL ARTICLE-2

Internet Of Things

Nandana V, S8 ECE

THE INTERNET OF THINGS: REVOLUTIONIZING CONNECTIVITY

In an age where digital connectivity is ubiquitous, the Internet of Things (IoT) stands as a testament to the remarkable integration of technology into our daily lives. Defined as the network of interconnected devices embedded with sensors, software, and other technologies for the purpose of exchanging data, IoT has transformed various aspects of both consumer and industrial landscapes

THE EVOLUTION OF IOT

The concept of IoT traces its roots back to the early 1880s when a group of researchers at Carnegie Mellon University connected a Coke machine to the internet, allowing them to check the status of the machine and determine whether the drinks were cold or not without leaving their desks. Since then, the proliferation of internet connectivity, coupled with advancements in miniaturization and sensor technology, has paved the way for the exponential growth of IoT devices.

APPLICATIONS ACROSS INDUSTRIES

The applications of IoT span across a myriad of industries, ranging from healthcare and agriculture to manufacturing and transportation. In healthcare, IoT-enabled devices such as wearable fitness trackers and remote patient monitoring systems empower individuals to take control of their health while enabling healthcare providers to deliver more personalized and efficient care.

APPLICATIONS ACROSS INDUSTRIES

The applications of IoT span across a myriad of industries, ranging from healthcare and agriculture to manufacturing and transportation. In healthcare, IoT-enabled devices such as wearable fitness trackers and remote patient monitoring systems empower individuals to take control of their health while enabling healthcare providers to deliver more personalized and efficient care.

In agriculture, IoT sensors deployed in fields can monitor soil moisture levels, temperature, and humidity, allowing farmers to optimize irrigation schedules and maximize crop yields. Similarly, in manufacturing, IoT-enabled sensors integrated into machinery can provide real-time insights into equipment performance, thereby facilitating predictive maintenance and minimizing downtime.

CHALLENGES AND CONCERNS

Despite its tremendous potential, the widespread adoption of IoT is not without its challenges and concerns. Chief among these are issues related to data privacy and security. With billions of interconnected devices collecting and transmitting data, the risk of cyberattacks and unauthorized access looms large. Ensuring robust encryption protocols and implementing stringent access controls are imperative to safeguard sensitive information.

Moreover, interoperability and standardization remain key hurdles in the IoT ecosystem. The proliferation of proprietary protocols and communication standards often leads to compatibility issues, hindering seamless integration and interoperability between different devices and platforms.

FUTURE OUTLOOK

Looking ahead, the future of IoT appears promising, with continued advancements in artificial intelligence, edge computing, and 5G technology poised to further accelerate its growth. Edge computing, in particular, holds the potential to address the latency and bandwidth constraints inherent in traditional cloud-based IoT architectures by processing data closer to the source.

Furthermore, the advent of 5G networks promises to revolutionize IoT connectivity by delivering ultra-low latency and high-bandwidth communication capabilities, unlocking new possibilities for real-time applications such as autonomous vehicles and augmented reality.

CONCLUSION

The Internet of Things represents a paradigm shift in the way we interact with the world around us. From smart homes and cities to connected cars and industrial automation, IoT has permeated virtually every aspect of modern society, reshaped industries and enhancing our quality of life. As we continue to harness the power of IoT, it is essential to address the associated challenges and concerns while embracing the transformative potential it offers to create a more connected and efficient world.

TECHNICAL ARTICLE-2

SEDIGI

Dileep Kumar, S8 ECE

Sedation Digitalization

SEDIGI: Pioneering the Digital Frontier in Sedation

In the dynamic landscape of modern healthcare, where innovation serves as the cornerstone of progress, our mini-project, SEDIGI (Sedation Digitalization), emerges as a beacon of transformation. Commissioned by an esteemed external company, our mission was clear: to revolutionize sedation equipment by embracing digitalization. As we proudly announce the successful completion of the first phase of our project, we stand on new era in medical procedures, where technology seamlessly intertwines with patient care.

Digitalizing Analog Sedation Equipment: A Paradigm Shift in Healthcare SEDIGI epitomizes our collective endeavor to bridge the gap between conventional analog sedation equipment and the digital age. Through meticulous planning, innovative design, and relentless dedication, we have succeeded in integrating cutting-edge technology to enhance the vital process of patient monitoring during sedation.

Driving Forces Behind SEDIGI's Vision

Enhanced Sedation Safety: SEDIGI is not just a project; it's a commitment to patient safety. By incorporating advanced features such as alarms and flow oxygen mechanisms, we aim to fortify safety measures during sedation procedures, ensuring optimal care and minimizing risks.

Accurate Vital Signs Monitoring: In the realm of medical procedures, accuracy is paramount. With the addition of SpO2 and heart-rate sensors, SEDIGI elevates the usefulness of sedation equipment, enabling precise and timely monitoring of vital signs crucial for patient well-being.

Advancement in Medical Technology: SEDIGI represents more than just an innovation; it's a testament to our unwavering dedication to pushing the boundaries of medical technology. By digitizing analog sedation equipment, we bridge the gap between traditional practices and modern advancements, ultimately improving patient outcomes and reshaping the future of healthcare.

Optimization of Sedation Process: Efficiency is the cornerstone of progress. Through SEDIGI, we strive to optimize the sedation process, reducing adverse events, streamlining medical procedures, and ultimately enhancing the efficacy of patient care.

Methodology: The Blueprint for Success

Our methodology embodies a systematic approach to innovation, encompassing data collection from sensors, calculation of vital signs, and real-time monitoring through the HMI display. Leveraging state-of-the-art hardware components such as Arduino Mega 2560, HMI Display, Pulse Oximeter MAX30102, and Gas Pressure Sensor, we have laid the foundation for a robust framework that redefines the boundaries of sedation procedures.

Building Blocks of Innovation

1. Arduino Mega 2560: The backbone of our hardware setup, Arduino Mega 2560, provides the versatility, performance, and scalability necessary to drive the digital revolution in sedation equipment.
2. HMI Display: With its intuitive interface and advanced functionalities, the HMI display serves as a window into the digital realm, empowering healthcare professionals to monitor vital signs with unprecedented clarity and precision.
3. Pulse Oximeter MAX30102: Compact yet powerful, the pulse oximeter enables accurate measurement of oxygen saturation levels and heart rate, enhancing the effectiveness of sedation monitoring and ensuring patient safety.
4. Gas Pressure Sensor: Designed for durability and precision, the gas pressure sensor facilitates reliable monitoring of gas pressure during sedation procedures, minimizing risks and optimizing patient care.

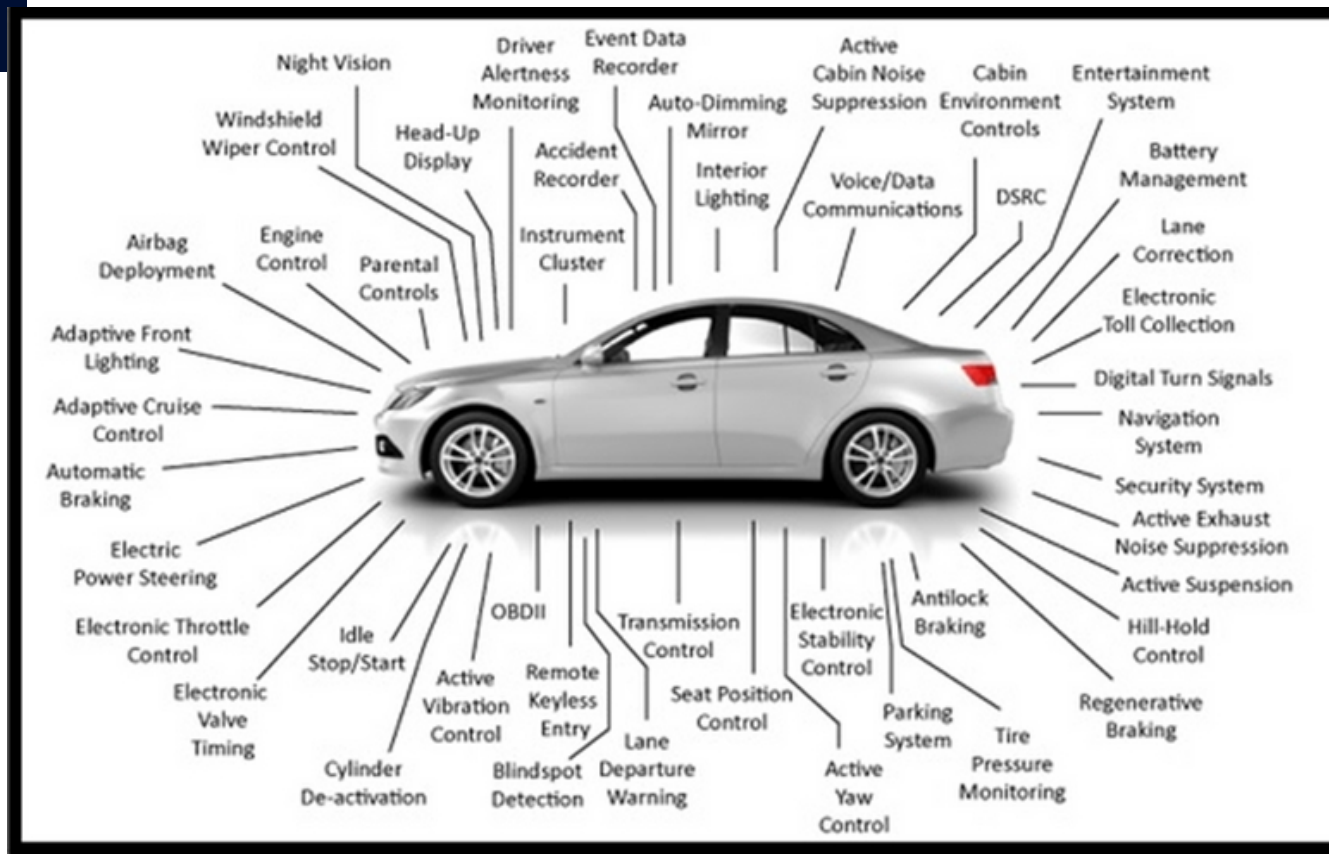
In addition to NextionEditor, the Arduino IDE serves as a vital software component in our project, providing the programming environment necessary for the seamless integration and operation of SEDIGI.

In conclusion, SEDIGI represents a paradigm shift in the field of sedation procedures, where innovation, technology, and patient care converge to shape the future of healthcare. As we embark on this transformative journey, we are driven by a shared vision of excellence, commitment to patient safety, and unwavering dedication to pushing the boundaries of what's possible. With SEDIGI, the future of sedation is not just digital – it's brighter, safer, and more promising than ever before.

TECHNICAL ARTICLE-2

Automotive Electronics

Lakshmi Nandakumar, S2 ECE



Automotive Electronics serves to regulate and supervise a car's internal workings, encompassing the process of transforming conceptual car ideas into tangible, real-world products with added functionalities like robust engines, electromechanical systems, and fuel or battery capabilities. The future of the automotive industry points towards electric vehicles and intelligent self-driving cars, equipped with features such as GPS for live location tracking, LIDAR technology, and intelligent LED systems. Discussing electric vehicles like Tesla, their emergence is beneficial for our future world as they contribute to pollution reduction, preservation of natural resources, and increased power efficiency. The integration of the Internet of Things (IoT) will establish connectivity among cars, allowing real-time transmission of data, including battery status, location, and car temperature to your smartphone for convenient monitoring of your vehicle's well-being. In summary, Automotive Electronics is experiencing rapid growth, reshaping the trajectory of the automotive industry

PROJECTS

PATHWAY PRO

DileepKumar A, Badusha Ali, Basil Paul (ECE)

Our project aims to develop a receptionist robot that can bring significant societal benefits in an ever-changing worldwhere technology plays a centralrole in our daily lives. The robot we are building aims to solve the common problem of navigating complex indoor spaces for people who are not familiar with a facility. By doing so, it significantly improves accessibility and convenience, empowering users, including the elderly and visitors, across different settings such as hospitals, corporate offices, universities, and more.

This receptionist robot will be equipped with advanced voice recognition and natural language processing capabilities, allowing users to quickly and easily find the room numbers and names they need. The robot's database will be pre- programmed with this information, ensuring that it can guide users efficiently and accurately. This technology aims to improve accessibility and streamline navigation for people of all abilities, making interior navigation not only more efficient but also more inclusive. This receptionist robot is highly versatile and can be used in a wide range of environments.

PROJECTS

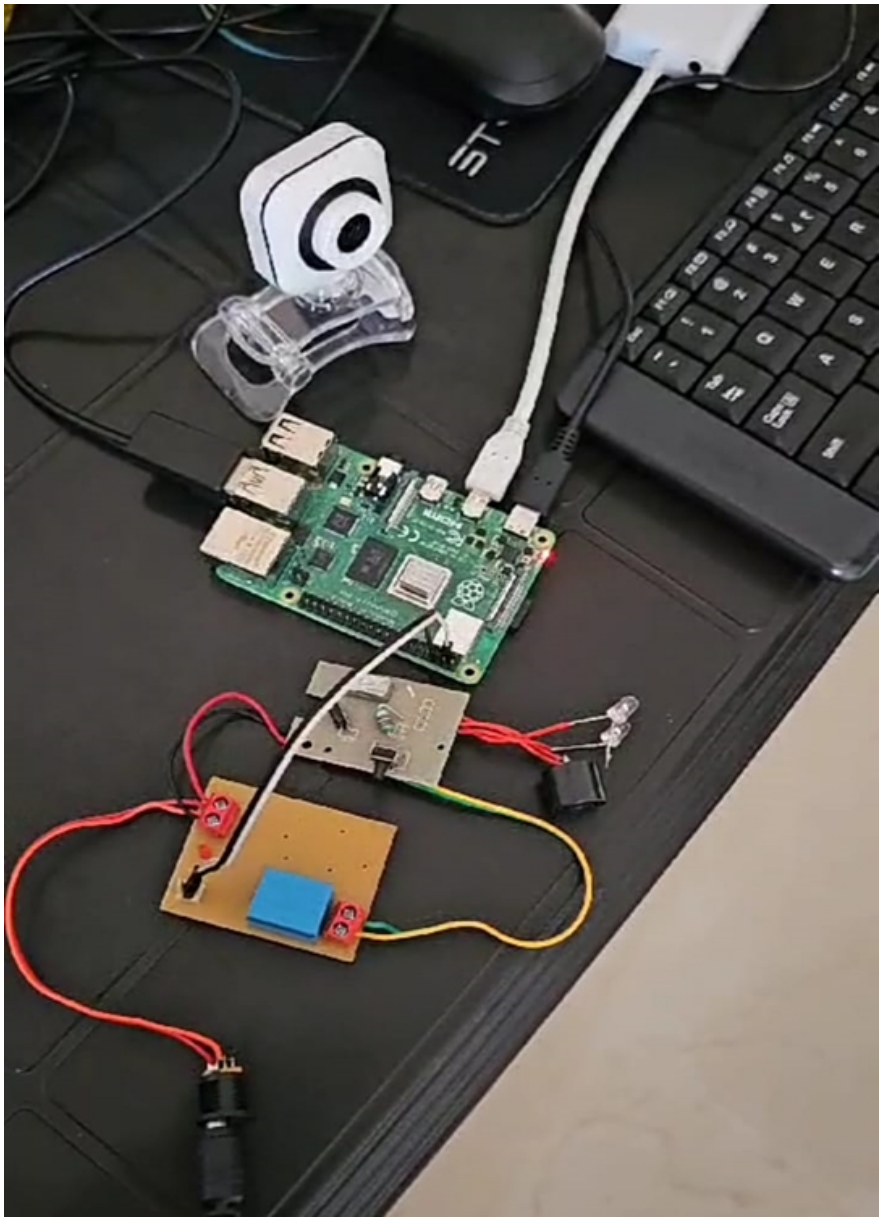
CANINE EMOTION RECOGNITION DEVICE (CRED)

Ajay P S, Alex Sojan, Allen Thomas George, Aparna V (ECE)

This project report unveils the development and implications of an innovative device designed to revolutionize our comprehension of stray dog behaviour. Emerging from a critical need across diverse scientific disciplines from evolutionary zoology to affective neuroscience and comparative psychology this ground-breaking system seeks to decipher the intricate world of animal emotions. Focused on the acoustic parameters of non-human mammals, particularly stray dog vocalizations, the project introduces a novel approach using affective computing based acoustic features to decode context, emotion, and intensity within sequences of canine barks.

The project's meticulous investigation showcases promising advancements in understanding and analysing stray dog vocalizations. By exploring the potential of these commonly employed acoustic features, the study reveals their remarkable capability in discerning nuanced aspects of dog communication, including context and emotional nuances. Leveraging machine learning techniques, the device surpasses human-level performance, accurately pinpointing the context behind a dog's bark, representing a pivotal leap in interpreting complex behaviours.

This project's significance lies in bridging the gap between animal emotions and technological innovation, promising a deeper understanding of stray dog behaviour, emotional landscapes, and communication patterns. It heralds a shift in perceiving and interacting with stray dogs, fostering a more empathetic approach to their welfare and coexistence within communities. Ultimately, this report presents a pioneering initiative poised to reshape our understanding and engagement with stray dogs, emphasizing the potential for compassionate and informed interactions.



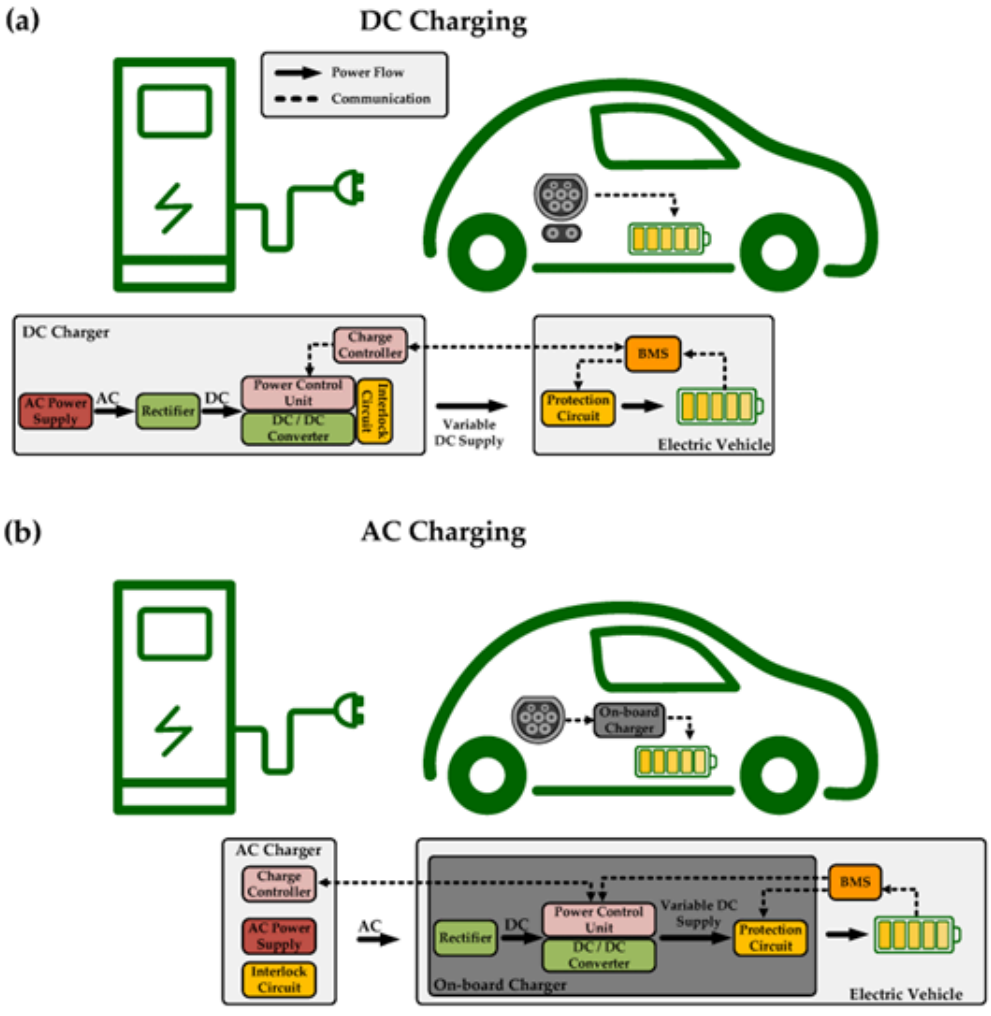
CONFERENCE PAPER

Research on A-LSTM Based EV Charging Warning System

Electric vehicle fire accidents have risen with the recent growth in electric vehicle numbers, posing a significant challenge to the sector's expansion. Charging safety emerges as a critical hurdle due to substantial financial losses incurred by vehicle owners and charging facility operators. This research proposes a solution to address the safety concerns associated with electric car charging through the implementation of an Electric Vehicle Charging Safety Warning System which will significantly help for the growth of electric vehicle market. The recommended approach employs an Adaptive Optimization of Long Short-Term Memory Neural Network (A-LSTM) to predict voltage changes throughout the entire charging process, utilizing the vehicle's historical daily charging data. A dynamic adjustment of the warning threshold is established based on the variance between predicted and actual voltage data, adapting continuously as the charging process unfolds. The study concludes by presenting a real-time warning model for vehicle charging alerts. Validation of the proposed model is conducted using daily charging data from electric vehicles to assess the precision of data prediction, as well as the accuracy and timeliness of the developed model. The results proves that the early warning model outlined in this paper efficiently uses timely signals to ensure the safety of car charging and also effectively identifies abnormal charging data through this process. Thus mitigates the chances of accidents due to vehicle charging.

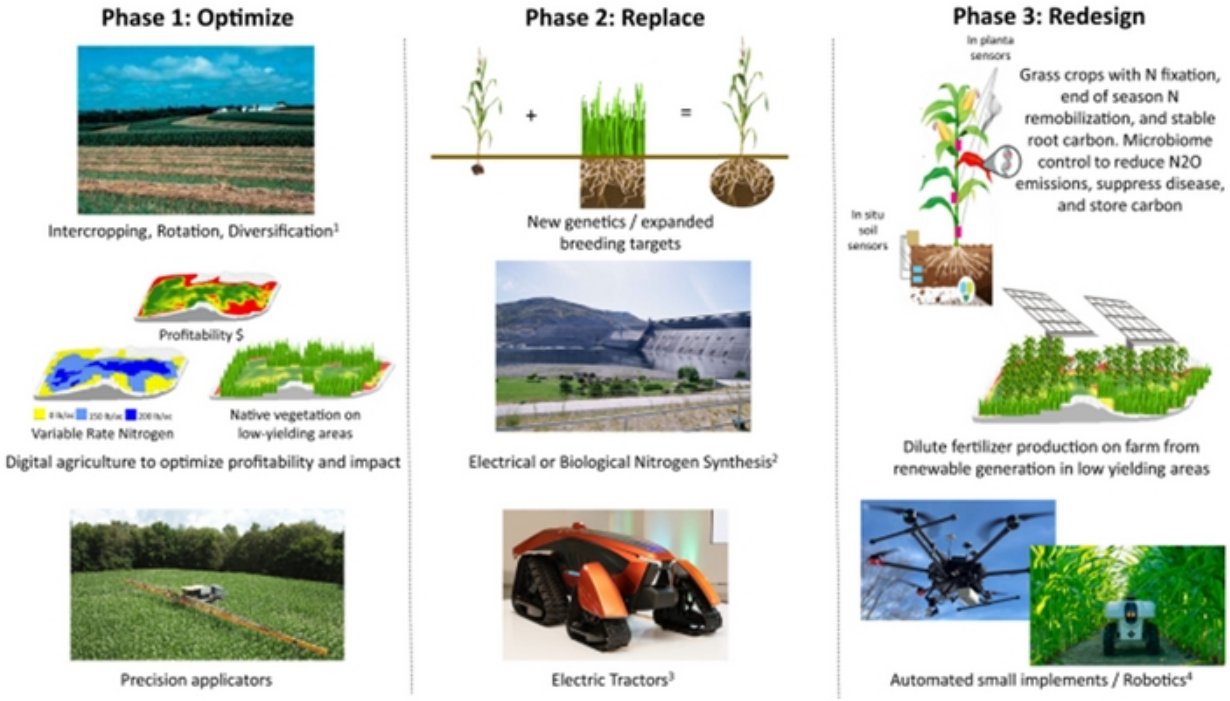
The paper proposes a method for monitoring and detecting faults during electric vehicle (EV) charging processes using deep learning techniques. This aims for the safety of the charging process by integrating with already existing technologies and data resources. The suggested approach keeps track of different physical amount data related to EV charging, enabling warnings for charging faults and averting false alarms brought on by inaccurate charging data. The study does, however, have certain shortcomings, mainly related to the collection of SOH data and the absence of full life cycle data on EV charging. To get over these restrictions, future studies ought to focus more on these topics. Sensor malfunctions and transmission problems can make it challenging to obtain charging data for electric vehicles (EVs), leading to unexpected or inaccurate results.

However, data preprocessing techniques can eliminate these anomalies, significantly improving the accuracy of algorithms for predicting EV behaviour. An A-LSTM algorithm has been developed for time-series data prediction problems, specifically designed to improve EV voltage prediction. This algorithm has been compared with three other commonly used algorithms, demonstrating its accuracy and applicability for EV voltage prediction problems. Dynamic thresholds have been found to be a valuable technique in enhancing the accuracy and timeliness of prediction models. These results emphasize the significance of meticulous data preprocessing and algorithm selection when predicting EV behaviour. Moreover, they demonstrate the potential advantages of utilizing dynamic thresholds in similar applications. In summary, the construction of dynamic thresholds is a promising approach to improve the effectiveness of EV behaviour prediction models.



Abhijith Rajendran
S8 ECE

Artificial Intelligence And Internet Of Things For Sustainable Smart Farming



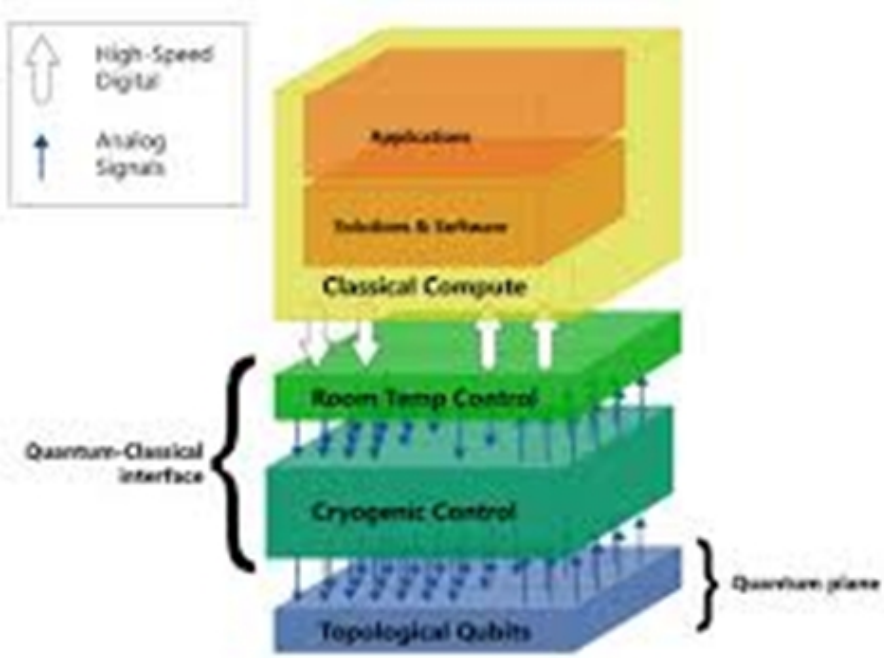
This study underscores the essential role of contemporary and advanced computer technologies, specifically Artificial Intelligence (AI) and the Internet of Things (IoT), in ensuring the success of the agricultural industry. Given agriculture's pivotal role in sustaining human existence, there is potential for enhancing the efficiency, quality, and quantity of produce in traditional farming by integrating modern IoT and AI technology into existing agricultural processes. The study conducted a comprehensive analysis of current IoT and AI technologies, drawing insights from primary research journals in the agricultural field. Additionally, it provided a systematic categorization of crucial aspects within intelligent and sustainable agriculture, covering areas such as crops, human resources, soil, weather, fertilizer, agricultural products, pests, irrigation/water, animals, machinery, and fields. The principal contribution of this paper lies in presenting an AI and IoT technology framework tailored for Smart and Sustainable Agriculture (SSA). Consequently, there is a heightened emphasis on investigating and advancing an integrated AI and IoT platform specifically designed for SSA, addressing challenges stemming from the fragmented nature of farming production.

The incorporation of advanced technologies like AI and IoT in agriculture has marked a transformative shift in traditional farming practices. For millennia, agriculture has been a crucial source of sustenance, benefitting from effective methods. The recent introduction of sophisticated IoT capabilities has enabled the monitoring of agricultural ecosystems, ensuring enhanced production quality. However, the implementation of Smart Sustainable Agriculture (SSA) faces challenges, including the widespread dispersion of agricultural procedures, such as managing IoT and AI devices, data sharing, interoperability, and handling extensive data volumes. This study delves into the existing Internet of Things technologies applied in SSA, seeking to identify key architectural components conducive to SSA platform development. The research assesses the current state of information in SSA, underscoring the importance of streamlined data management. Additionally, the study proposes a comprehensive framework that integrates Internet of Things (IoT) and artificial intelligence (AI) as a foundational strategy for advancing Smart Sustainable Agriculture. This study underscores the essential role of contemporary and advanced computer technologies, specifically Artificial Intelligence (AI) and the Internet of Things (IoT), in ensuring the success of the agricultural industry. Given agriculture's pivotal role in sustaining human existence, there is potential for enhancing the efficiency, quality, and quantity of produce in traditional farming by integrating modern IoT and AI technology into existing agricultural processes. The study conducted a comprehensive analysis of current IoT and AI technologies, drawing insights from primary research journals in the agricultural field. Additionally, it provided a systematic categorization of crucial aspects within intelligent and sustainable agriculture, covering areas such as crops, human resources, soil, weather, fertilizer, agricultural products, pests, irrigation/water, animals, machinery, and fields. The principal contribution of this paper lies in presenting an AI and IoT technology framework tailored for Smart and Sustainable Agriculture (SSA). Consequently, there is a heightened emphasis on investigating and advancing an integrated AI and IoT platform specifically designed for SSA, addressing challenges stemming from the fragmented nature of farming production.

Alvin Joseph
S8 ECE

QUANTUM COMPUTING: AN OVERVIEW

The appeal of transforming modern computing has attracted more and more scholars to this area. However, beginners would find the subject difficult due to the complex nature of quantum characteristics. To fill this void, this research note offers researchers, scientists, and quantum engineers a thorough introduction to many aspects of quantum computing. The study begins with a clear explanation of the background material and basic ideas that are necessary to understand quantum computing and information processing.

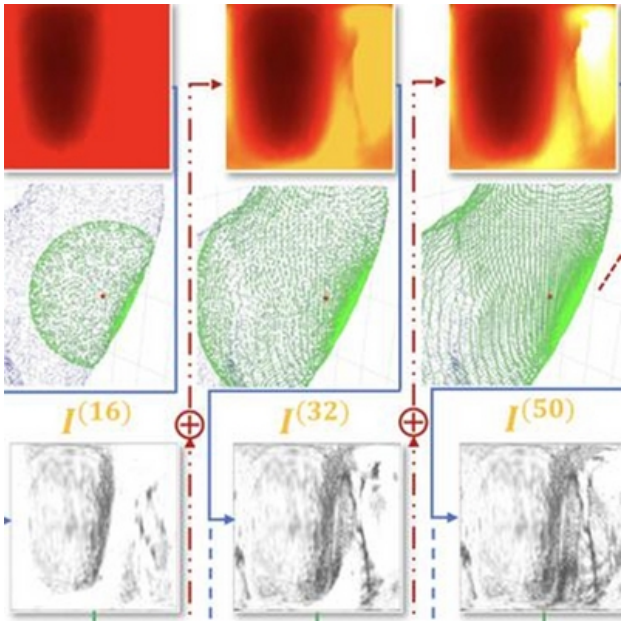


The objective is to enable individuals new to the topic to have a deeper grasp by making this core knowledge easily understandable. The research paper also explores the many physical realizations of quantum computing and clarifies possible use cases. In addition, the report carefully reviews current developments in the realizations of quantum computing, adhering to the strict standards outlined by DiVincenzo. The paper emphasizes that the realization of a practical quantum computer is a matter of time. Quantum computers demonstrate unparalleled capabilities by solving applications deemed impossible with current computing paradigms. This impending leap in scientific advancement is poised to revolutionize the practical computing world, with quantum computing technologies holding immense potential for future computations and communications. As advancements continue, the transformative impact of quantum computing on science and technology is inevitable, heralding a new era in information processing .

Amrutha M U
S8 ECE

BSANET: HIGH-PERFORMANCE 3D IMAGE SEGMENTATION

In this paper the development of the proposed network architecture tailored for 3D segmentation of medical images, particularly from modalities like CT and MRI scans, marks a significant stride in the intersection of artificial intelligence and healthcare. As medical imaging increasingly adopts 3D models, the specialized nature of our network aims to enhance the precision and efficiency of image segmentation processes. The advent of deep learning in smart medicine underscores the transformative impact of artificial intelligence on medical research, promising novel approaches for analyzing complex data and assisting healthcare professionals in their diagnostic endeavors. Looking ahead, we envision our network playing a pivotal role in the healthcare landscape, offering valuable support to medical practitioners in the accurate and prompt diagnosis of various conditions. By leveraging the power of artificial intelligence, we anticipate contributing to improved patient outcomes, reduced diagnostic errors, and ultimately advancing the overall quality of healthcare. To see that most medical images, such as CT and MRI scans, are available in 3D models, we propose a network architecture specifically adapted for 3D segmentation. The impact of deep learning in smart medicine continues to grow, highlighting the importance of artificial intelligence in medical research. Going forward, we hope our network will contribute to the healthcare environment, helping doctors diagnose patients accurately and in a timely manner.



Abhiami Aji
S8 ECE

APPROACH TO MANAGING IOT SMART DEVICES THROUGH DIGITAL TV VIDEO SCENES

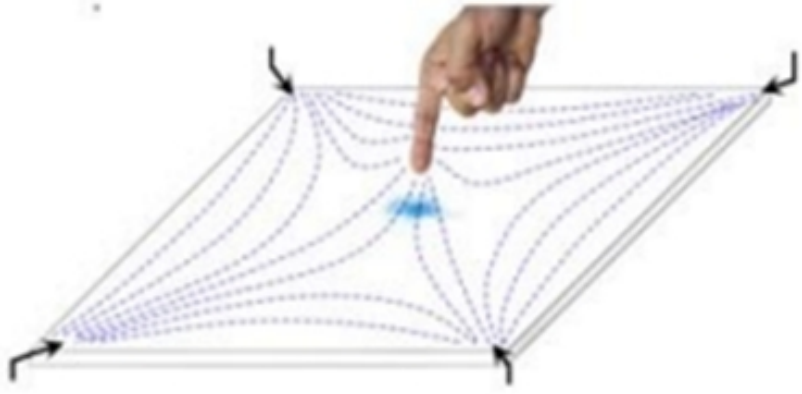
This system synchronizes IoT devices during digital TV scenes through timestamped IoT commands, ensuring seamless playback. Real-world broadcast tests confirm robust handling of IoT commands for novel home entertainment environments and innovative business models. Ongoing research expands the range of compatible IoT devices, develops advanced interaction methods, and prioritizes security and privacy measures. Scalable solutions aim for broader compatibility and industry standards, while a comprehensive content ecosystem enables synchronized IoT-DTV control for innovative opportunities in entertainment, education, and advertising. The recent pandemic has changed how we enjoy entertainment, especially with more people choosing to watch movies and shows at home. Smart TVs, which play a big role in this, are now in 1.7 billion households globally, and it's expected that 51 percentage of homes will get a new Smart TV by 2026.

Alongside this, there's a growing trend of connecting different devices in our homes through the Internet of Things (IoT), like smart lights, clocks, and more. These devices communicate with each other, creating a kind of network that can be connected to the internet, gathering a lot of data. Now, imagine bringing all these devices together to make our home entertainment even more exciting. This is where the idea of multi-dimensional entertainment comes in. While big cities often have these cool setups, small cities in developing countries and rural areas miss out on such experiences. This project wants to change that by making it easier for everyone to have multi-dimensional entertainment at home. By using the signals from our digital TVs and syncing them with our IoT devices, we can create immersive experiences for everyone, not just those in big cities. The project explains the steps to make this happen, from studying different methods to testing how well it works in a real digital TV setup.

Dileep Kumar A
S8 ECE

DEVELOPMENTS IN TOUCH SENSORS FOR FLEXIBLE DISPLAYS

The integration of touch sensors into flexible displays has revolutionized the world of consumer electronics, giving rise to a new era of interactive and bendable screens. This paper go through the review of related literatures. Their research takes a journey through the cutting edge innovations and breakthroughs in touch sensor technologies that are paving the way for a future of flexible, responsive, and immersive display experiences. In an era where smartphones, wearables, and various smart devices have become unavoidable companions, the demand for displays that can transform to different shapes and sizes while retaining high touch sensitivity is paramount. This paper addresses this demand by highlighting the latest advancements in touch sensor designs, materials, and manufacturing processes. It explores how these innovations not only enhance the user experience but also open up exciting possibilities for the design and functionality of nextgeneration electronic devices. As we go through the content of this paper, we will discover the various touch sensor technologies, their advantages and limitations, and the promising applications they offer. From flexible OLED displays to foldable smartphones, from medical devices to automotive displays, this paper explores the diverse landscape of touch sensor advancements and their impact on multiple industries. It is a excellence in engineering and materials science that fuels the evolution of touch sensors for flexible display .



Badusha Ali
S8 ECE

WASTEWATER MANAGEMENT IN REAL TIME USING IOT DEVICES

This study explores the critical field of wastewater treatment, recognizing its critical significance in environmental health protection. The difficulties biological treatment systems have been highlighted in the research, particularly when industrial contaminants find their way into municipal wastewater systems. Bacterial growth rates are strongly influenced by variables such as temperature, pH, oxygen levels, and toxins. For microbial development to be at its best, these components must be effectively managed. Keeping pH values between 6 and 9 is crucial for sustaining beneficial organisms and guaranteeing effective wastewater treatment. The impact of temperature on chemical and biological processes is examined, recognizing its dual function in eliminating pollutants and possible oxygen constraints. The article discusses the introduction of utilizing the Industrial Internet of Things for wastewater control and management. Emphasizing both security problems and the technology's transformative potential. In light of this, the study suggests an integrated cloud-based Internet of Things model for ongoing inlet wastewater monitoring to sewage treatment facilities, providing a step forward toward improved and sustainable wastewater management.

At the completion of this research project, the main goal was to create a small, affordable, and flexible system that could be used to monitor and regulate the flow of industrial wastewater into treatment facilities. The main goal was to protect workers who weren't experienced with managing this kind of wastewater and reduce the risk of harm to the treatment infrastructure. The system proved to be a stronghold of viability and dependability, providing a versatile and manageable method for verifying water parameters and issuing alerts. The study is conducted with the goal of protecting natural water ecosystems and giving priority to the conservation of water resources. The suggested approach outperformed similar works and its current equivalent in a comparison analysis, indicating a major advancement in wastewater monitoring. Future improvements will include creating a custom dashboard using a mobile application that will provide user networks with the best possible interface. Dissolved oxygen (DO), turbidity, conductivity, residual chlorine, and wastewater flow are among the physical parameters that will be incorporated. The goal is to create a comprehensive SCADA system that seamlessly integrates IoT technologies for real-time monitoring throughout pumping stations and treatment plants. The direction of this research is toward a time when environmental stewardship and technical advancements will combine to provide a sustainable paradigm for wastewater monitoring and control.

As the system develops further, its influence should be seen much outside lab walls, pointing the way toward a future that is more resilient and environmentally conscious.The direction of this research is toward a time when environmental stewardship and technical advancements will combine to provide a sustainable paradigm for wastewater monitoring and control. As the system develops further, its influence should be seen much outside lab walls, pointing the way toward a future that is more resilient and environmentally conscious.

Basil Paul
S8 ECE

BLOCKCHAIN FOR V2X: APPLICATIONS AND ARCHITECTURES

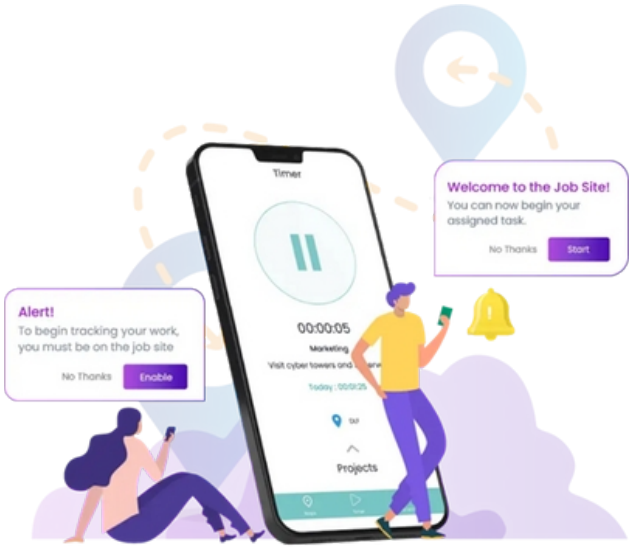
Modern cars are dependent on information collected by a wide range of sensors, including GPS and radar, which may be shared with other cars and interested parties. The group of systems known as "vehicleto-everything" (V2X) makes this kind of communication possible. It promotes the development of autonomous cars and improves traffic efficiency and road safety. V2X enables solutions like traffic management, rescue vehicle assistance, and collision prevention by utilizing standards like IEEE 802.11p and Cellular V2X. Vehicle economy and safety might both be increased by this data exchange, but it is still difficult to guarantee that the information hasn't been changed, erased, falsified, leaked, or otherwise interfered with. These days, blockchain technology provides a decentralized, trustless consensus-building process among system participants upon the condition of the network and its contents.

Together with potentially allowing additional helpful V2X services like payments, this new technology could also be able to secure V2X data. But the V2X ecosystem presents a number of special difficulties that make applying blockchain technology more difficult. Notable among them is the tremendous number of interactions in which any blockchain system that is recommended would have to manage. Therefore, the article recommends new courses of investigation for additional blockchain development research.

Alex Sojan
S8 ECE

OPTIMIZED MOBILE LOCATION MONITORING AND PROXIMITY AWARENESS WITH DATA MINIMIZATION

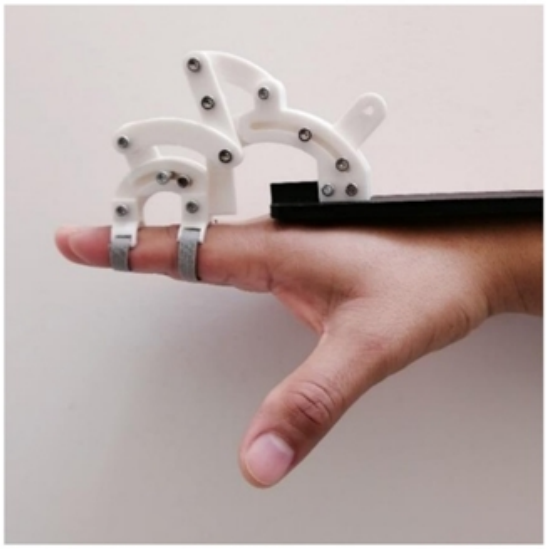
This research paper investigates methods for mobile location tracking and trajectory data reduction in the context of applications involving mobile communications and data discovery in wireless cellular networks. Initial analysis involves applying an unscented Kalman filter with reduction of non-visual influence to ensure that the estimate of cell numbers is robust. This paper then presents a method to model and analyze proximity and multiple motions using the theoretical foundation. Run a performance test to test parameters and measure parameters. Factors such as proximity, time delay, accuracy and bias analysis are taken into account in the evaluation. For real-life situations, studies have shown that greater than 70% to 80% proximity test accuracy can be achieved while keeping the lowest alarm. To solve the data retention problem, this paper uses the Haar classifier to reduce data. An analysis is presented to investigate the trade-off between degree of reduction and relative reliability.



The plan demonstrates the flexibility and power of mitigation. Additionally, this paper makes further comparisons to evaluate the effects of distance measurements and wavelet modes. Research results show that Chebyshev distance increases detection accuracy compared to Euclidean distance and Manhattan distance. In contrast, this study shows that the wavelet transform does not affect the result when the support is preserved. All results demonstrate the possibility of the proposal to achieve data reduction while maintaining closeness to be reliable, providing an understanding of the operation of various parameters.

Anjaly Jayan
S8 ECE

DEVELOPMENT OF A FINGER EXOSKELETON TO ASSIST STROKE PATIENT'S FINGER MOVEMENTS



(a)

(b)

The assessment and mechanical design of a low-profile, lightweight exoskeleton that allows stroke sufferers to lift their hands without placing excessive axial stress on them are the focus of this study. The customer's index finger is joined to the exoskeleton, which is made of a flexible structure, and the thumb is constantly in a hostile stance. Holding devices requires pulling on a cable to extend the flexed index finger joint. This device is at least seven centimeters near to the hand. During the contralateral hand's frame-powered exoskeleton operation, an average growth of forty-six inches became noticeable in the index finger MCP joint. This increase became constant when a feasibility study included four stroke victims. In the sixty-second Box & Block Test, participants may draw almost and transfer up to six blocks. Zero blocks without an exoskeleton compared to 1 block with one. The findings demonstrated that a complex exoskeleton might help stroke victims who have lost certain finger extension skills to restore part of their hand function. To make the exoskeleton appropriate for daily sporting activities, further advancements in the technology will need the inclusion of an actuation mechanism that eliminates the contralateral hand.

Asritha Sadanandan
S8 ECE

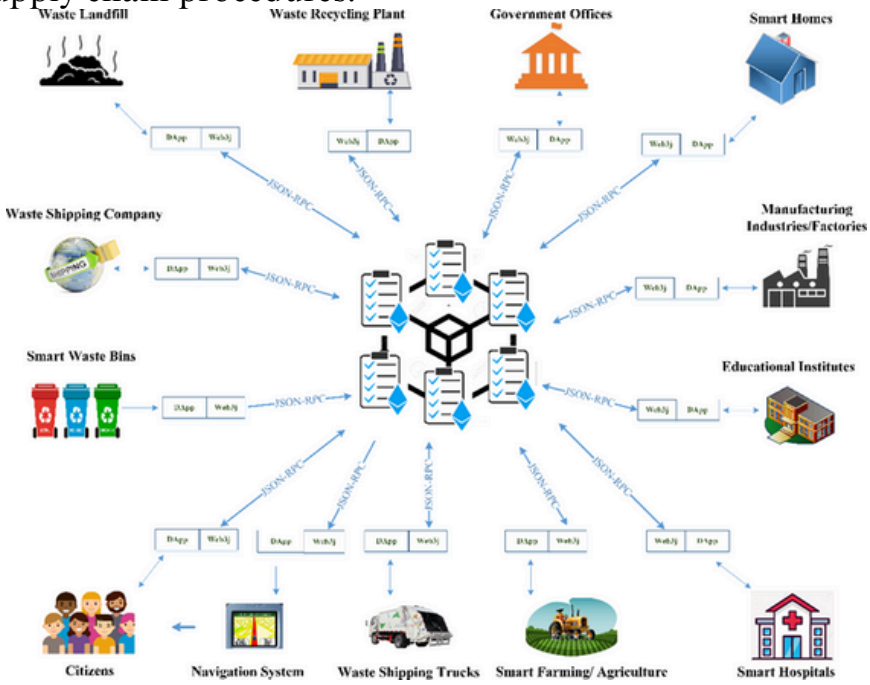
OPTIMIZING UAV SCHEDULES FOR IDENTIFYING INDUSTRIAL AIR POLLUTION SOURCES

Within the realm of unmanned aerial automobiles (uavs), tracking air great has become critical, in particular in business areas with multiple pollution assets like chimneys. This studies specializes in addressing the project of detecting unknown pollution assets in industrial settings the use of uavs. 3 center issues are studied: the detection of pollutants sources the usage of a unmarried UAV (APSD-SUAV), the identical trouble with multiple uavs (APSD-MUAV), and the situation where UAV deployment locations aren't predetermined (UAVD-APSD). To address these problems, 3 heuristic algorithms, namely IGBA, EIGBA, and HBA,are proposed. Those algorithms purpose to optimize seek time by means of leveraging interference graphs and the Hungarian set of rules for UAV routing and deployment. The importance of this research lies in its centered approach to deal with the complexity of identifying unknown pollutants resources in commercial regions thru UAV-based totally monitoring. Via specializing in unmarried and a couple of UAV situations and thinking about uncertainty in UAV deployment locations, this take a look at aims to offer green answers for optimizing UAV routes and deployment techniques. The introduced IGBA, EIGBA, and HBA algorithms provide modern ways to limit search time and enhance pollutants supply detection the use of uavs in various commercial environments.

Haleena Jaimon
S8 ECE

IoT-POWERED BLOCKCHAIN-BASED E-WASTE TRACKING AND TRACING SYSTEM FOR SMART CITIES

Electronic waste recycling is a fast-emerging worldwide problem that necessitates careful tracking and monitoring of electronic equipment as well as stakeholder business operations. Most of the existing centralized systems that oversee electronic devices at every level of the supply chain lack the traits of data security, transparency, and immutability. In particular, these systems cannot address issues such as thorough coverage of the e-product life cycle, access control to ensure data security, stakeholder selection based on reputation, and massive volumes of data produced at different phases of the supply chain procedures.

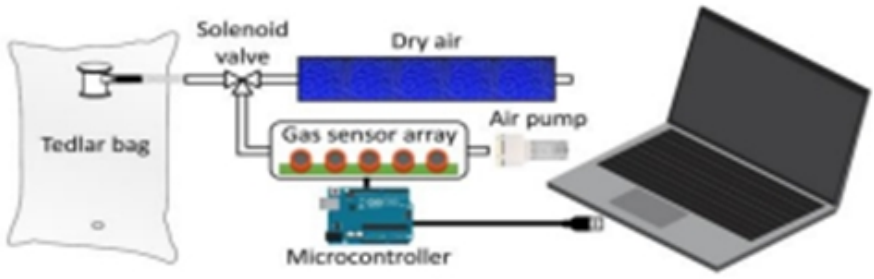


In this work, we provide an Internet of Things (IoT) system that leverages blockchain technology to monitor all postproduction commercial operations, activities, and procedures carried out on a digital device. The system is supported by five smart contracts that record user activities on the immutable distributed ledger, helping to guarantee that the business processes carried out by those involved are transparent, known, as well as secure. The above technique has been coupled by researchers with an online storage platform to store large amounts of data, such as product images, stakeholder licences, and e-waste materials. The suggested approach is put to the test on the Ethereum blockchain in order to measure how much gas is used while the smart contracts operate. The suggested solution is workable, according to the cost and security analysis.

Kavya Biju
S8 ECE

FINE-TUNNING THE PARAMETERS OF AN ELECTRONIC NOSE SENSOR ARRAY FOR ASTHMA DETECTION BY EMPLOYING GENETIC ALGORITHM-BASED OPTIMIZATION APPROACH

Asthma, a chronic respiratory condition characterized by inflamed and narrowed airways, affects over 339 million people globally. Identification methods involve analyzing blood cells, urine, and exhaled breath, the latter containing various chemical compounds. While gas chromatography is traditionally used, it is time-consuming and expensive, limiting its application to laboratories. An alternative solution is the E-nose, widely utilized in diverse fields. However, optimizing its sensor array for accurate and cost-effective performance poses challenges. Current methods, involving correlation coefficients and performance differentiation value are difficult to implement. Here, Genetic Algorithm (GA), inspired by natural selection, emerges as a promising tool. GA's selection, crossover, and mutation operators help find the optimal number of sensors, ensuring the electronic nose's efficiency in predicting both healthy individuals and asthma suspects. This approach presents a potential breakthrough in asthma detection, leveraging GA's global searching optimization to enhance the electronic nose's practicality and accuracy.



(a)

Safa Subair
S8 ECE

REVOLUTIONIZING SKINCARE MONITORING: UNLEASHING NFC POWERED BATTERY-FREE SOLUTION INTEGRATED WITH ADVANCED DEEP LEARNING TECHNIQUES

Within the realm of dermatological research, a pioneering smart skincare device has emerged, placing significant emphasis on monitoring skin health. This innovative apparatus capitalizes on near field communication (NFC) to harvest energy from smartphones, ushering in a battery-free design philosophy. The device seamlessly integrates two sensors dedicated to evaluating skin moisture and ultraviolet (UV) radiation. Rigorous experimental trials were conducted with a diverse group of subjects in both indoor and outdoor settings, simultaneously measuring skin moisture and temperature alongside ultraviolet A and ultraviolet B radiations with humidity and temperature, underwent analysis through a deep learning technique called artificial neural network model.

This model is utilized for forecasting outputs and calculating mean square error. Notably, the Ultraviolet Index outputs were meticulously categorized into 'less harmful,' 'moderately harmful,' and 'burn,' achieving an outstanding overall classification accuracy of 99.8% . Distinctive features of this skincare device include a cutting-edge 3D flexible design, intelligent functionality, battery-free operation, seamless integration with an Android application , and heightened portability compared to existing commercial alternatives.

Nandana A V
S8 ECE

FACIAL POINT GRAPHS FOR AMYOTROPHIC LATERAL SCLEROSIS IDENTIFICATION

Amyotrophic Lateral Sclerosis (ALS) stands as a formidable challenge due to its progressive and devastating nature. Timely identification of ALS is crucial for initiating interventions that can potentially enhance the quality of life for affected individuals. In this context, the exploration of facial point graphs emerges as a cutting-edge approach, offering a noninvasive and nuanced perspective for early detection. Facial point graphs involve the precise mapping of key facial landmarks and their dynamic relationships over time. By leveraging advanced computer vision and graph-based analysis, researchers aim to discern subtle alterations in facial expressions that may serve as early indicators of ALS progression. This method capitalizes on the intricate connection between neural degeneration and its manifestation in facial musculature. The potential significance of facial point graphs in ALS identification lies in their ability to capture nuanced changes that may precede overt clinical symptoms.

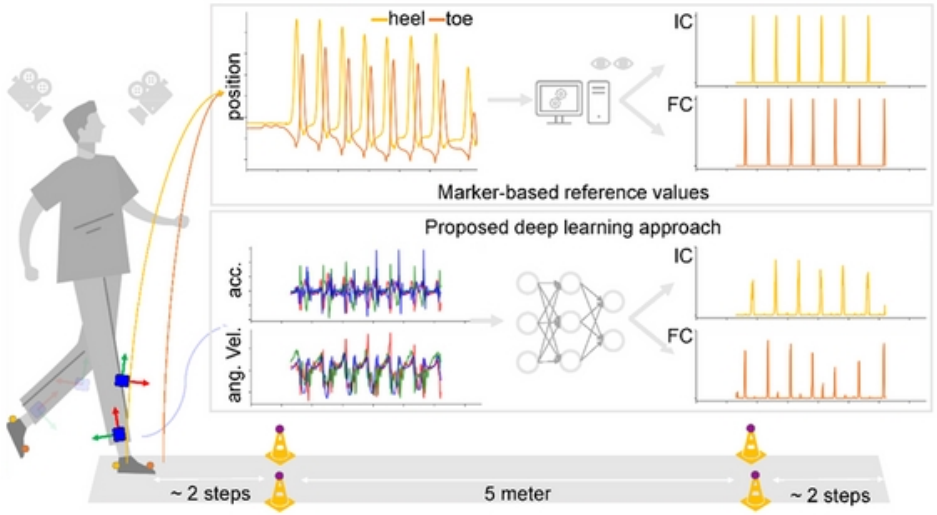
Facial point graphs have shown great potential in various applications, such as ALS identification, emotion recognition, aging assessment, biometric identification, virtual reality, and human-computer interaction. Ongoing research and advancements in this field continue to expand the possibilities of this technology. With further development, facial point graphs could have significant impacts on fields like healthcare, security, and entertainment. Facial point graphs, also known as facial landmarks, are specific points on a person's face that are used to analyze and track facial movements and features. These points are typically identified through computer vision algorithms and can be used to understand various aspects of the face, such as expressions, age progression, and even biometric identification.

In the context of ALS identification, researchers have found that changes in facial point graphs can be indicative of the disease. By analyzing the movements and patterns of these points, it may be possible to detect early signs of ALS and monitor its progression. This could potentially lead to earlier diagnosis and intervention, improving the quality of life for individuals affected by ALS.It's important to note that while facial point graphs show promise in ALS identification, they are still being researched and developed. Scientists are continuously working to refine the accuracy and reliability of this technology.

Nithya V S
S8 ECE

COMPARATIVE ANALYSIS OF GAIT IDENTIFICATION APPROACHES UTILIZING IMU TECHNOLOGY

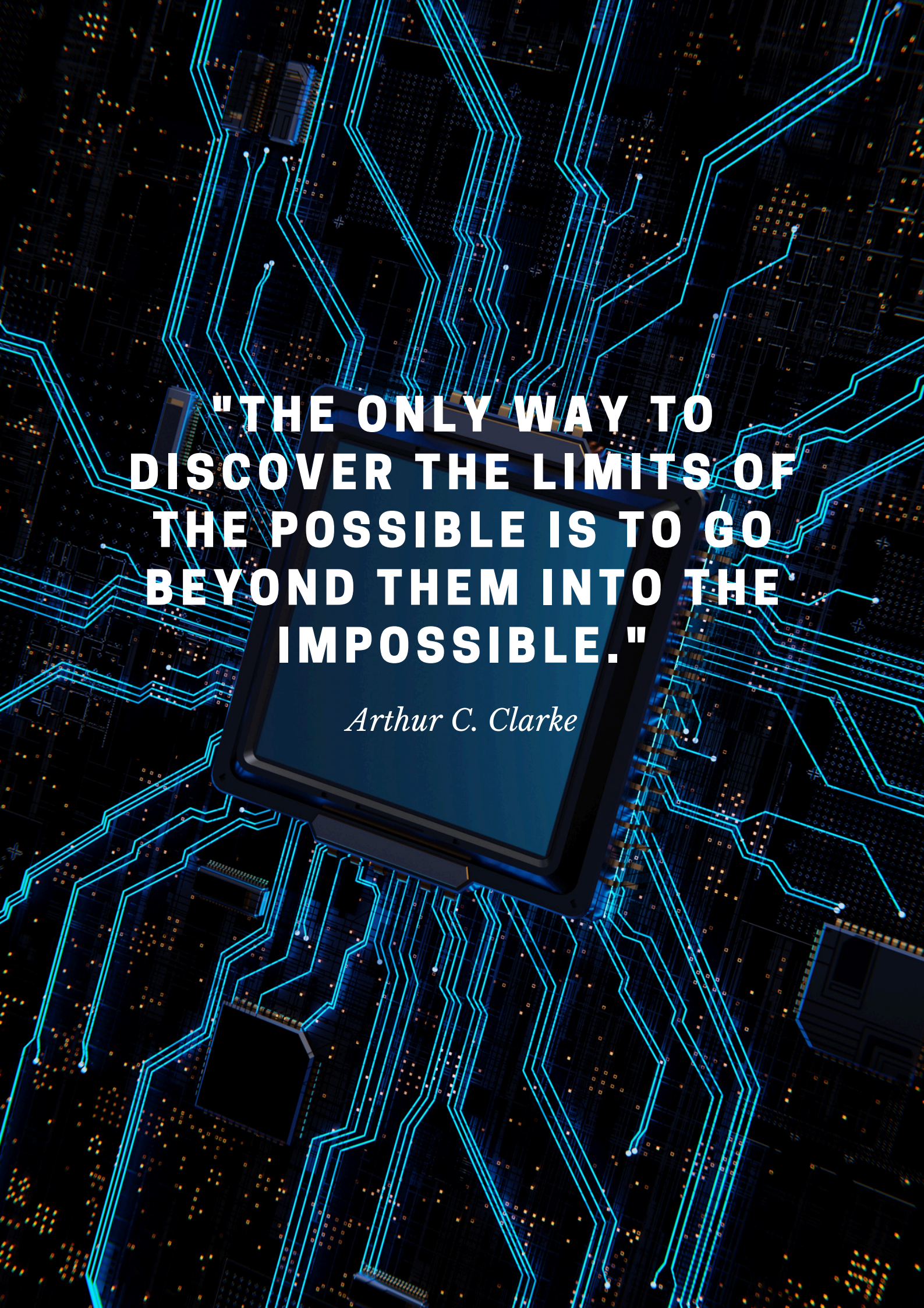
Behavior is an important security issue and can be used to become aware of criminals or missing humans. It has recently been revealed that facial recognition techniques used by law enforcement and defense services around the world provide good results in detecting fake identities. In contrast, journey-based total personal identification has proven to be an easy approach, especially since it can be done remotely, without the participation of the subject, and is a biometric feature that can't be effortlessly hid. in this paper, we suggest a technique for generically identifying male or woman based on gait, which uses limb joint information and deep learning models to discover control people. Use window width to train continuous short-term memory models to identify and extract specific body movement events. The answer reportedly outperformed the main idea, resulting in 98.87% accuracy when measured in blind samples. Similarly, we recommend a easy two-degree filtering procedure to boom the accuracy of the prediction to one hundred% whilst figuring out people from large samples. The findings may want to enhance environmental control and solutions at airports. Within the future, this method could also help remedy the trouble of clogging facts retrieval, because the difference between present studies is that information approximately what turned into completed are not wanted.The test also provides the first data recorded by a digital goniometer, including the hand coordination of members of different races during walking games.



Steve Manual Jomi
S8 ECE

MAR BASELIOS INSTITUTE OF TECHNOLOGY AND SCIENCE (MBITS)

ELECTRONICS AND COMMUNICATION ENGINEERING (2019 - 2023)


"THE ONLY WAY TO DISCOVER THE LIMITS OF THE POSSIBLE IS TO GO BEYOND THEM INTO THE IMPOSSIBLE."
Arthur C. Clarke