B-SMART

-WE EXPLORE WE EXHIBIT-

VISHNU
UNIVERSAL LEARNING
BVRIT H
Estd. 2012

OPTUM

Google

Flipkart

accenture

VISA

amazon

AI

IoT
Internet of Things

Goldman
Sachs

Microsoft

Python

React

paloalto
NETWORKS

Java

Blockchain

C
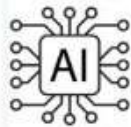
NAME TO FAME
HACKATHON STORIES
TECHNICAL TRENDS

B-SMART

(**B**VRITian **S**tudent **M**agazine on **A**dvanced **R**esearch & **T**echnologies)

VISION

To emerge as the best among the institutes of technology and research in the country dedicated to the cause of promoting quality technical education.

MISSION

At BVRITH, we strive to

- Achieve academic excellence through innovative learning practices.
- Enhance intellectual ability and technical competency for a successful career.
- Encourage research and innovation.
- Nurture students towards holistic development with emphasis on leadership skills, life skills and human values.

B-SMART is here to keep the students and the faculty members informed with the latest development in the area of science, engineering & technology. It also inculcates the habit of reading among students about new trends in technology and emerging areas and to provide a platform to the student for sharing knowledge.

**Dr. K. V. N. Sunitha,
Principal, BVRITH**

*"Success is the sum of small efforts, repeated day in and day out."
– Robert Collier*

With immense pride and heartfelt appreciation, I extend my greetings through this edition of our Technical Magazine. The achievements of BVRIT HYDERABAD College of Engineering for Women in the past academic year stand as a true reflection of Collier's words.

Our students and faculty continue to set benchmarks across various domains. The Rotaract Club's remarkable haul of awards – Best Club, Best Membership Development, and Best Club Administration Project – showcases the leadership and social commitment nurtured on our campus. Global alumni meets in the US and the vibrant Milan 2K25 gathering underscore the lasting bonds our institution forges.

We celebrate the Commendable Performance Award from IEI, the prestigious Academic Credentialing recognition by MathWorks, and our 3.5-star rating in IIC 6.0 – all affirming academic excellence. Strategic collaborations with QNX, Capgemini, and XR initiatives with IIT Madras keep our learning ecosystem at the forefront of innovation.

The TEDx event with 9 speakers added vibrancy to our academic environment. The launch of the XR Club in association with XTIC IIT Madras adds more value to the technical enthusiasm prevailing here. Accolades from Data Quest which gave us a ranking of 63 among T schools in India and the AAAA ranking by Career360 reaffirm our rising stature.

Let us continue to strive with commitment and creativity, for the journey of excellence has only just begun.

I warmly invite you to delve into the 10th Volume (Issue 1) of our technical magazine, BSMART. In every edition, we spotlight one student article that stands out as the most promising contribution. In the previous issue, this recognition was awarded to the article 'Human Augmentation and Brain-Computer Interfaces' authored by Ms. Sania Iqbal of 2nd Year, CSE(AIML).

Warm Regards

Dr. K.V.N. Sunitha

As You Turn the pages….

' Name to Fame '

BVRIT HYDERABAD proudly introduces its star of the year and wishes her 'The Best in Life'

A Journey to acheive Gold Medals : Celebrating Excellence and Gratitude

I am Sathwika Viswanadharao, a proud alumna of BVRIT HYDERABAD College of Engineering for Women, from the Department of Computer Science and Engineering, Class of 2024.

Achieving a gold medal in Mathematics is not just a personal milestone—it's a reflection of the unwavering support, guidance, and inspiration I received throughout my academic journey at BVRIT HYDERABAD College of Engineering for Women. I take this opportunity to express my heartfelt gratitude to everyone who played a vital role in shaping this success.

First and foremost, I owe a special note of thanks to my beloved faculty member, Ms. Kavitha Mam. Her deep knowledge, clarity in teaching, and constant encouragement made Mathematics

Achieving a gold medal is a moment of immense pride. I'm being humble to say that this year, I could bag the University Gold medal for Affiliated Colleges under JNTU. My sincere gratitude goes to my college, its remarkable faculty, and every individual who contributed to this success.

While the medal may bear my name, it stands as a testament to the nurturing academic environment and the incredible individuals who stood by me at every step. I extend my heartfelt gratitude to my college, its visionary leadership, dedicated faculty, and every peer and mentor who contributed to this success.

From day one, the college fostered a culture of excellence and encouragement. The faculty

not just a subject but a passion for me. Her approachable nature, willingness to clear doubts at any time, and belief in my potential gave me the confidence to push my boundaries.

BVRIT HYDERABAD has helped me evolve into a more confident and capable version of myself. From the state-of-the-art facilities to the dedicated faculty and supportive peer community, every part of this college played a role in helping me reach new heights.

The opportunities for hands-on learning, and constant mentoring helped me develop not only technical skills but also the professional attitude needed to succeed. Thanks to the strong placement support and training provided by the college, I was able to secure a wonderful job that aligns with my aspirations. Immense gratitude to our Visionary management who made sure that the students get the best training in the campus.

As I step forward into the next phase of my journey, I carry with me the values, knowledge, and memories from BVRIT. I am immensely proud to be an alumna of this esteemed institution and grateful to every faculty, mentor, friend, and guide who has walked this path with me.

Thank you!!

members went beyond the conventional role of educators. Their tireless efforts to provide academic clarity, emotional support, and consistent encouragement played a transformative role in my growth - both personally and professionally. Each classroom session was not just a lecture, but a gateway to deeper understanding and critical thinking.

What truly elevated my learning experience was the institution's emphasis on practical exposure. Well-equipped laboratories, industry-focused training programs, technical workshops, and insightful seminars bridged the gap between theory and real-world application. These opportunities not only honed my technical skills but also instilled confidence and problem-solving abilities that will serve me well in the years to come.

This gold medal reflects perseverance, yes - but more importantly, it reflects a community that believed in me. I am deeply grateful for the platform my college provided to explore, learn, and excel. This achievement fuels my passion to contribute meaningfully to society and continue the journey of lifelong learning.

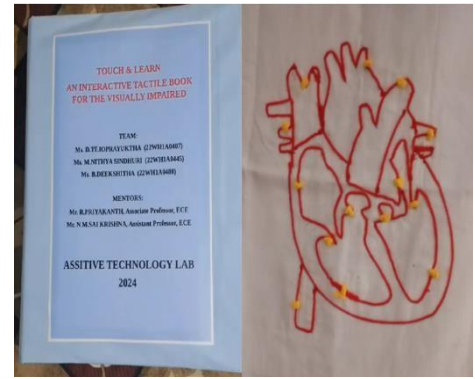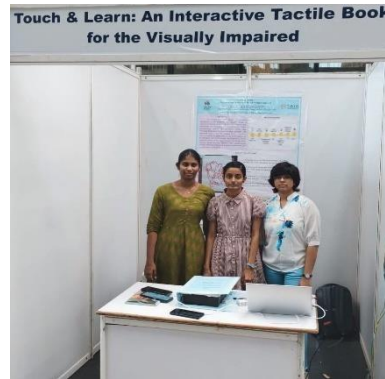**Sathwika Viswanadharao**
(CSE – 2020 Batch)

Pothanagari Renusree
(CSE – 2020 Batch)

"Success is not final, failure is not fatal: It is the courage to continue that counts."

2

COVERSTORIES

3RD Prize in Udhbhav24

(Prototype/Product Expo) at

St. Paul's College of

Pharmacy 2024

Title:

TOUCH & LEARN:

AN INTERACTIVE TACTILE

BOOK FOR THE VISUALLY

IMPAIRED

Team Members:

Ms. M. Nithya Sindhuri

Ms. B. Deekshitha

Ms. D. Tejoprayuktha

 (3rd year ECE)

Mentor:

Mr. R. Priyakanth

Associate Professor, ECE

Mr. N. M. Sai Krishna

Assistant Professor, ECE

Our team developed the Touch & Learn Tactile Book, a creative and inclusive learning tool designed especially for visually impaired children. This project was built to help them understand scientific concepts through touch and sound, making STEM education more accessible, interactive, and enjoyable. Each page of the book features embossed diagrams representing key science models. These diagrams were hand-crafted by drawing on paper, attaching them to cardboard, and stitching them with different textured threads to help distinguish shapes and labels by feel.

Under important parts of the diagram, we embedded TTP223 touch sensors with silicone buttons, which trigger audio feedback using a DFPlayer Mini and Arduino. When a user touches a specific area, they hear a related explanation, allowing them to learn independently and with clarity and the prototype comes with a rechargeable battery for repeated use.

The circuit was arranged on a sturdy base to ensure durability and was presented in a book format, so that users can flip through and explore multiple concepts. This setup effectively bridges the gap between static tactile tools and dynamic learning methods.

Through this project, we learned the importance of designing with the user in mind. We faced challenges in integrating components and aligning sensors, but with teamwork and guidance, we created a working prototype that brings learning to life—one touch at a time. Looking ahead, we plan to expand the content and explore more subjects, hoping to make this tactile book a valuable educational tool in schools for the visually impaired.

"Don't limit your challenges. Challenge your limits."

COVER STORY – 2

Secured 2nd Prize at Ideapop: Engineers' Day Innovation Challenge

Title:

GHAR SE GHAR TAK: The Adaptive Travel Planning Guide

Team Members:

Ms. K.Sadhana

Ms. K.Vaidehi

Ms. V.Sahithi

(2nd year CSE)

Participating in the Ideapop event on the occasion of Engineers' Day was an exhilarating journey from start to finish. Our team of three, each bringing unique strengths to the table, worked together to pitch GHAR SE GHAR TAK: The Adaptive Travel Planning Guide, a project aimed at transforming the way people travel. As we stood before the panel of judges and an engaged audience, a blend of excitement and nervousness filled the air. We began by highlighting the challenges travelers face—rigid itineraries, unexpected disruptions, and the overwhelming complexity of planning. Then, we introduced our solution: a dynamic, personalized travel guide that adapts in real time. This guide, designed to ensure a hassle-free journey "from home to home," offers real-time adaptability, tailored recommendations, offline accessibility, and an eco-friendly focus. The judges' sharp and insightful questions pushed us to delve deeper into both the technical and practical aspects of the guide. They seemed particularly intrigued by its potential to redefine travel experiences while emphasizing sustainability. What made the event unforgettable was the enthusiasm and feedback we received from both the judges and fellow participants. Hearing other innovative ideas and feeling the creative energy in the room was truly inspiring. Securing the 2nd prize was a moment of immense pride and validation for our team. Holding the trophy and certificate, we felt a profound sense of accomplishment, knowing our idea had resonated with others. More than just a competition, this experience was about learning, growing, and sharing a vision as a team. It reaffirmed our belief in the power of innovation and collaboration.

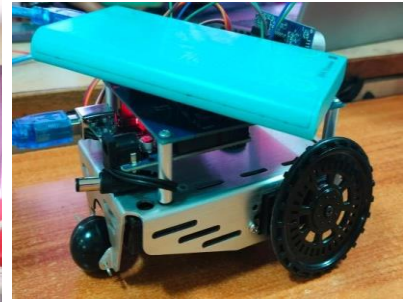**"Every accomplishment starts with the decision to try."**

COVER STORY – 3

First Place in Arduino
Hackathon 2025 – BVRIT
Narsapur

Title:

SMART OBSTACLE DETECTION SYSTEM

TeamMembers:

Ms. S. Cynthana

Ms. B. Thanmayee

Ms. K. Vishalakshi

Ms. C. Kavya

(2nd year ECE)

The Arduino Hackathon 2025, which took place on 21st and 22nd of March as part of the Arduino Day 2025 celebrations at BVRIT Narsapur, took our team on an incredible journey in the ever-evolving world of technology and innovation. Through practical projects and group challenges, this eagerly awaited event gave participants a dynamic stage on which to demonstrate our creativity and problem-solving abilities.

Our group created the Smart Obstacle Detection System, a cutting-edge solution meant to improve automation and security in a number of fields. This system's applications in industrial safety systems, autonomous robotics, and assistive devices demonstrate our dedication to leveraging technology to improve the real world.

We felt the excitement of turning concepts into reality through quick prototyping, coding, and testing during this thrilling adventure. By encouraging cooperation, resiliency, and flexibility, the hackathon enabled us to take on obstacles head-on and improve our solution to satisfy practical requirements. Our project made use of Arduino's adaptability and sensor integration capabilities, which allowed us to construct a sturdy and useful prototype in the short amount of time allotted for the hackathon. In addition to sharpening our technical abilities, this experience highlighted how crucial teamwork, creativity, and clear communication are to advancing innovation.

We are immensely grateful to BV Raju Institute of Technology (BVRIT) for organizing this inspirational event and for providing the resources and support that enabled us to be successful and we are eager to advance our project, investigate new possibilities, and keep adding to the quickly changing technological landscape.

"A bad workman always blames his tools"

Title:

BACKTRACK BRAIN: OUR JOURNEY TO VICTORY AT DEVASTRA'25

Team Members:

Ms. Anvitha Rao Pinninti

Ms. Laya Yeldandi

Ms. Vishista Kulkarni

Ms. Nigama Peddi

   (2nd year IT-B)

On March 13, 2025, we proudly participated in *DevAstra'25*, a prestigious 24-hour national-level hackathon organized by BVRIT Hyderabad College of Engineering for Women and G. Narayanamma Institute of Technology and Science, under the ACM student chapters. The event brought together 55 teams from over 30 colleges across India, offering an intense and competitive platform to innovate.

Our project, *Backtrack Brain*, emerged as the winning idea with its unique approach to quizzing. Instead of answering questions, players are given answers first and must construct valid, relevant questions — a reverse quiz format that promotes creativity, critical thinking, and lateral reasoning. Gemini AI was integrated to evaluate user responses for correctness and relevance, adding intelligence and fairness to the game mechanics. Categories included science, history, mathematics, English, and coding.

The tech stack included Python for backend logic, Streamlit for an intuitive frontend, and Gemini AI for natural language processing and validation. We adopted a fully collaborative approach, with every team member contributing to all development phases — frontend, backend, AI integration, and testing.

The 24-hour hackathon tested our time management, resilience, and teamwork. A major highlight was when our AI successfully validated complex inputs late at night — a breakthrough that energized us. DevAstra'25 gave us more than a win — it empowered us with technical growth and confidence.

"Be fearless in the pursuit of what sets your soul on fire."

COVER STORY – 5

Runner-Up in Devastra Hackathon – 2025

Title:

WEARABLE SAFETY DEVICE

Team Members:

Ms. Anjani suta Settipalli

Ms. Poojitha Garrepalli

Ms. Jyothirmayee Chippada

(3rd year ECE-B)

Mentor:

Dr. R. Vishwanadham

Associate Professor, ECE

In the ever-evolving domain of technological innovation, our team, Phoenix, emerged as Runner-Up in the Devastra Hackathon 2025, a 24-hour intensive innovation challenge. Among several impactful themes, we selected the one focused on safety, with a strong intent to address women's safety, an area that often lacks accessible and people-focused solutions.

We designed a wearable safety device — compact, discreet, and efficient — in the form of a locket or accessory to avoid drawing the attention of potential attackers. This form factor ensures it remains easily accessible in emergencies without being obvious.

Our prototype integrated a GSM module that allows the user to send an emergency message and initiate a call to the user-designated contact. By using a SIM-based system, we ensured reliable connectivity, even in areas where Wi-Fi and Bluetooth might fail.

With a single button press, the device sends the geolocation of the user in distress. To attract nearby help, we included a strobe light that activates to draw attention and alert others visually.

To make our device more context-aware, we conducted a survey among college students, collecting data about their sense of safety in areas around our campus. We combined this with local crime rate data to notify users whether they are in a potentially unsafe area — creating a device that offers both real-time support and situational awareness.

The hackathon experience tested our creativity, teamwork, and technical skills. It also deepened our belief in designing inclusive, real-world solutions that empower and protect. We are motivated to continue refining our device and hope it becomes a valuable tool in personal safety for all.

"It always seems impossible until it's done."
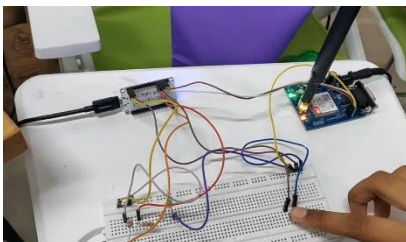
COVER STORY – 6

Title:

AI-DRIVEN SUSTAINABLE HEALTHCARE: REAL-TIME HUMAN ACTIVITY CLASSIFICATION USING KINECT SENSOR AND STM32L4 IOT KIT

Team Members:

Ms. P. Sahasra Rao

Ms. P. Hasini

Ms. S. Sri Harshini

   (2nd year ECE)

Mentors:

Dr. Pardhu Thottempudi,
Assistant Professor, ECE

Dr. Nagesh Deevi,
Associate Professor, ECE

This project aims to develop a real-time human activity recognition system that supports smart and sustainable healthcare. It uses the Microsoft Kinect Sensor to capture 3D motion data, such as body movements, joint angles, and posture, which helps in understanding how a person moves. This data is processed to remove any noise and is converted into useful features that describe different types of activities. These features are then used to train a machine learning model to identify common human actions like walking, sitting, standing, or falling.

Once the model is trained, it is deployed on the STM32L4 IoT Kit, a small and energy-efficient microcontroller. With the help of X-Cube AI tools, the system can now recognize activities directly on the device without needing an internet connection or powerful computer. This makes the solution perfect for real-time use in places like hospitals, homes, and elderly care centres.

The project is especially helpful for monitoring patients or elderly people, where detecting sudden movements like falls can trigger timely alerts. It also supports rehabilitation and exercise tracking, giving healthcare providers better insights into a person's daily activity. Because the device uses very little power, it can be used in wearables or portable healthcare systems, making it both practical and sustainable. In the future, this system could be expanded to track more complex actions, connect to cloud storage for data analysis, and use more sensors for higher accuracy. Overall, the project combines AI, IoT, and healthcare to create a smart solution that improves safety, supports independent living, and promotes better health monitoring.

"Believe you can and you're halfway there."

Collective Spotlight

I am D. Khyathi from the Department of Electrical and Electronics Engineering, and I have had the unique honor of serving as the first President of the Student Affairs Council (SAC) at our college. The SAC was envisioned and established as a platform to empower students beyond academics—encouraging them to lead, initiate, and drive campus life through clubs, fests, and innovative student-led activities. At its core, SAC believes in providing students with real-world leadership opportunities, fostering collaboration, and promoting holistic development. The more students engage with their peers, take initiative, and gain hands-on exposure, the more confident, competent, and career-ready they become. Involvement in these activities doesn't just build

Resumes - it strengthens time management, communication, and problem-solving skills, all of which translate into better academic performance as well.

One of the biggest milestones during my tenure was leading *Synergia 2025*—the first-ever fully student-organized fest in the history of our college. With no existing blueprint or precedent to follow, it was both a challenge and a blessing. We had a blank canvas, and it was up to us to bring a vision to life from scratch. My very first step as President was to reach out to every council member personally. I made it a point to understand each person's strengths, interests, and aspirations, and used those insights to assign roles that would bring out their best. This created a strong, enthusiastic,

and cohesive team, united by a shared sense of purpose.

Planning Synergia was a whirlwind of activities—brainstorming unique technical and cultural events, managing logistics, crafting a promotional strategy, designing the event brand and creatives, coordinating sponsorships, and executing the entire fest. Each stage was handled entirely by students, and I was constantly amazed by the creativity, discipline, and work ethic of our team. From late-night meetings to handling last-minute surprises, we gave our all—sometimes sacrificing sleep, but never our spirit.

Initially, our promotional efforts didn't yield the response we hoped for. There were moments of uncertainty, self-doubt, and criticism. But instead of getting discouraged, we regrouped. We studied what wasn't working, restructured our strategy, expanded our outreach, and adapted quickly. With renewed energy and a sharper approach, the buzz around Synergia steadily grew—and soon, excitement swept across the campus.

The inaugural ceremony was a moment of immense pride. Day one featured intellectually stimulating technical events like hackathons, coding contests, and AI-based challenges, which showcased our college's technological talent. As the sun set, we relaxed with a movie carnival night that brought the campus together. Day two was a celebration of art, culture, and expression—filled with vibrant music, dance, and performances that truly captured the spirit of our diverse student community.

Though unexpected rain led to the postponement of our musical night and annual day, we returned ten days later with even greater energy. The grand finale was nothing short of magical—a joyful celebration that reflected months of dedication and unity.

While I had the responsibility of steering the vision and making key decisions, the real success of Synergia 2025 came from the unwavering commitment, passion, and unity of every SAC member. None of this would have been possible without the constant guidance and encouragement from our Principal Ma'am, Vice-Principal Sir, and our supportive faculty mentors. Together, we didn't just organize a fest—we created a legacy.

D. Khyathi

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TECHNICAL TRENDS – From Faculty

Diffusion & Generative Models Beyond Images

Introduction

Generative AI models, especially diffusion models, have emerged as powerful tools in artificial intelligence. These models initially gained recognition for their ability to create highly detailed and realistic images from textual prompts. However, recent developments have significantly expanded their capabilities. Today, diffusion models are capable of generating complex forms of media such as full-motion videos, rich audio tracks, dynamic 3D objects, and even action sequences for robotic systems. This evolution reflects a broader trend toward multimodal AI systems — intelligent agents that can process, generate, and understand multiple forms of data simultaneously. The rise of such technology is closely tied to advancements in deep learning, larger and more diverse datasets, and increased computational power. Industries such as gaming, film production, healthcare, virtual reality, and robotics are already beginning to integrate these generative capabilities into their workflows. As this technology matures, it promises to fundamentally transform creative processes, speed up product development, and enable new forms of digital expression. Generative models have evolved rapidly, moving beyond image creation to now generate videos, music, 3D objects, and even robotic actions. These new capabilities are reshaping industries such as gaming, entertainment, robotics, healthcare, and product design. The advent of multimodal AI — models that can understand and generate across multiple types of media — is driving the next wave of intelligent applications.
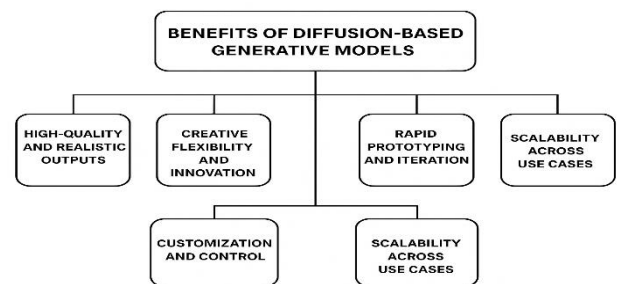
What are Diffusion Models?

Diffusion models work by reversing noise. They start with random noise and gradually denoise it, step-by-step, to form coherent data such as an image, video, or audio sequence. Originally developed for generating high-quality images, they are now being extended to multiple data modalities.

Drivers of Growth

The key factors contributing to the rapid growth of diffusion-based generative models are: Multimodal AI convergence: Unified models that handle text, image, audio, and video. Demand for content automation in games, advertising, media. Advancements in GPU/TPU hardware acceleration. Open-source models (e.g., Stable Diffusion, Shap-E) democratizing innovation.

Applications Across Modalities

1. Video Generation

Video diffusion models have opened up new possibilities in content creation. Tools such as OpenAI's Sora and Pika Labs transform simple text inputs into full-fledged short video clips. These models simulate realistic motion, backgrounds, lighting, and transitions with impressive accuracy. This capability is invaluable for previsualization in film, automated video ads, educational animations, and game cinematics. As models become more context-aware, they can also understand emotional tone and narrative flow, enhancing storytelling through AI.

2. Audio & Music Generation

Audio diffusion models like MusicLM and Meta's AudioCraft enable users to create music or sound effects from text descriptions. These models understand tempo, instrumentation, rhythm, and genre. They are particularly valuable for independent creators, game developers, and

content producers who need royalty-free or custom audio. Future developments may also allow real-time voice synthesis for dubbing and interactive experiences.

3. 3D Object Generation

Generating 3D models from text or 2D references is now possible using diffusion models like Shap-E and DreamFusion. These models are helpful in game design, product prototyping, and AR/VR content creation. Designers can bypass manual modeling workflows and iterate on concepts rapidly. Some systems can also integrate physics-aware models to test object behavior in simulated environments.

4. Robot Motion & Action Synthesis

Diffusion models in robotics generate motion patterns for machines by learning from real-world data of human or robotic movement. Applications range from factory automation to assistive robots in healthcare. These models can predict the safest, most efficient motion paths and adapt in real time. This approach improves autonomy and decision-making in robots across complex tasks.

Benefits of Diffusion-Based Generative Models

High-quality outputs: Realistic visuals, audio, or motion.

Creative flexibility: Allows open-ended generation.

Low-latency prototyping: Fast idea-to-asset conversion.

Cross-modality: Same model framework for various data types.

Conclusion

The rise of diffusion-based generative models marks a significant shift in how we create, interpret, and interact with digital content. These models are no longer limited to producing static images; they now generate dynamic video content, immersive audio, lifelike 3D objects, and even intelligent behaviors for robotic systems. Their impact spans across a wide range of industries — from media and entertainment to healthcare, manufacturing, and education. As these models become more advanced, accessible, and integrated with other technologies, we are moving toward a future where AI becomes a true creative and operational partner. Businesses, researchers, and creators who adopt and invest in these technologies early will not only gain a competitive edge but also help shape the next wave of human–machine collaboration. The convergence of creativity, automation, and intelligence through diffusion models is laying the foundation for a new digital era — one that is more efficient, expressive, and responsive to human needs.

Nikitha P,
Assistant Professor,
Department of IT

Identifying Criminal at the Crime Spot Using Airborne DNA: A Futuristic Forensic Technique

In the evolving world of forensic science, the idea of "airborne DNA detection" is no longer science fiction. Traditionally, DNA collection relied on physical traces such as hair, blood, or skin cells. However, scientists are now exploring how human DNA, shed through breath, skin flakes, and sweat particles, can be retrieved from the air. This groundbreaking approach has the potential to transform how crime scenes are analysed, particularly in sealed or indoor environments. With the rise of smart surveillance and bio-detection systems, using airborne DNA to

"The early bird catches the worm."

identify individuals in a room even after they've left adds a new dimension to crime investigation. It aligns closely with the growing need for contactless forensic technologies in an era of advanced biosecurity and criminal intelligence.

Use Case: Solving Crimes in Closed Environments

Imagine a scenario: A high-profile robbery takes place in a secured research lab. Surveillance cameras were disabled, no fingerprints or footprints were left, and the criminals wore gloves and full suits. Traditionally, this case might hit a dead end.

Enter airborne DNA analysis.

By sampling the air in the room shortly after the crime, forensic experts can extract trace amounts of human DNA floating in aerosol form. Advanced DNA sequencing techniques can then identify and match this biological information to known profiles in national or international criminal databases. Even if the suspects are not directly in the system, investigators can narrow down suspects through familial DNA links.

This approach is particularly effective in:

- Robbery or assault cases in controlled environments like labs, banks, or private offices.
- Post-terrorist incident analysis, where suspects might have already fled the scene.
- High-security zones where conventional evidence collection is minimal or impossible due to safety concerns.

Pros & Cons:

Pros:

- Contactless Evidence Collection: Airborne DNA removes the need for physical evidence, making it highly non-invasive and ideal in contaminated or sensitive environments.
- Time-Efficient: Air sampling can be done quickly, and sequencing technologies have become faster and more accurate.
- Increased Crime Scene Accuracy: Helps identify people present in the room even if they did not leave visible evidence behind.
- Can Complement Other Technologies: Can be integrated with CCTV, infrared, and AI-based threat detection systems for real-time crime scene analysis.

Cons:

- High Sensitivity Can Lead to False Positives: Airborne DNA can come from secondary sources (e.g., someone who previously entered the room but had no connection to the crime).
- Privacy and Ethical Concerns: Passive DNA collection without consent may raise legal and ethical challenges.
- Cost and Complexity: Requires advanced laboratory equipment and skilled professionals for DNA extraction and interpretation.
- Environmental Factors: Temperature, ventilation, and time-lapse after the event affect DNA quality and recovery rate.

Conclusion

- The use of airborne DNA to identify individuals at a crime scene marks a significant leap in forensic science. Though still in the experimental and pilot stages in most countries, this technology offers immense potential to enhance criminal investigations, especially in high-stakes or sealed environments. As methods become more accurate and legally recognized, we can expect airborne DNA forensics to play a central role in future law enforcement and counter-terrorism strategies.

"All that glitters is not gold."

However, with such power comes responsibility. Stringent ethical standards, data privacy laws, and validation studies must accompany its adoption. Balancing innovation with accountability will determine whether airborne DNA becomes a trusted pillar in the forensic toolkit or a controversial technology under scrutiny.

References
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Dr. S. Prasanth Vaidya,
Associate Professor,
Department of CSE

Role of Artificial Muscles in the Evolution of Soft Robotics

Nowadays, soft robots have been developing extremely across different fields including soft sensors, soft manipulators and even some mobile robots. Among these, soft actuators are the excellent of their actuation method, good motion repeatability and high operational stability.

Artificial muscle is the one of the primary category of soft actuators. Moreover, Twisted and coiled artificial muscles (TAMs) is the one of the widely studied artificial muscle due to their unique properties like high energy density, high load-to-weight ratio and those were structurally similar to human muscles which are originated from the single-walled carbon nanotube. Moreover, the materials mostly used in TAMs includes, organic, inorganic and composite fibers. And basic configurations of TAMs are single, parallel and braided structures.
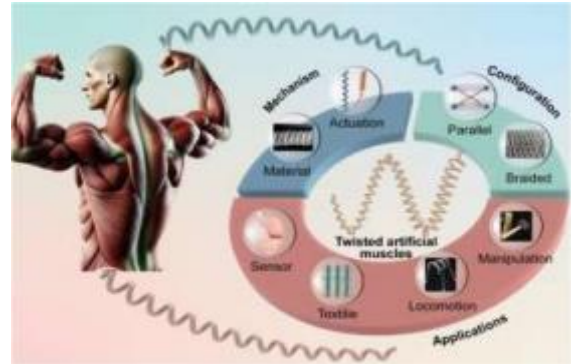
Fig. 1. the mechanism, structure, and applications of TAMs

TAMs applications in the soft robots were based on the sensing, functions, locomotion and smart textile. This soft robots usage in the lifting tasks needs to actuate heavier objects quickly and achieve maximum stroke. And TAMs usage in the twisting or bending robots, accuracy determined by the controlling the contraction accuracy of TAMs. Additionally, TAMs also employed to various flexible and stiffness skeleton structures made of shape memory polymers, it adapts to the objectives of different shapes. Mobile robots are the extremely focus in the field of soft robots, it is essential to locomotion in specialized conditions such as rugged environments and confined terrains.

Fig.2. Prototypes of soft robots and their applications

"Better late than never."

Reference:

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Dr. Ch. Bharath Kumar,
Assistant Professor,
Department of BS&H

Agentic AI: The Dawn of Autonomous Intelligence

Agentic AI marks a transformative shift in artificial intelligence, enabling systems to operate autonomously with minimal human intervention. Unlike reactive AI, which relies on explicit prompts, agentic AI perceives environments, reasons, plans, and adapts dynamically, powered by Large Language Models (LLMs). These models allow agents to process complex queries, break tasks into actionable steps, and integrate with tools to achieve goals. Agentic AI holds immense potential to revolutionize industries like healthcare (diagnosing rare conditions), finance (detecting fraud), logistics, customer service, and manufacturing by automating complex tasks. In 2025, agentic AI is in its early stages, managing simple to moderately complex tasks. Frameworks like Microsoft Auto-Gen, with its event-driven architecture, excel in solving issues like server misconfigurations. Lang Chain offers modular components and memory for conversational and retrieval-augmented systems. Lang Graph supports sequential tasks in healthcare and supply chains with graph-based workflows, while Microsoft Semantic Kernel enhances decision-making in customer service and IT. However, agentic AI poses risks, including misalignment with human values, LLM hallucinations causing errors in critical
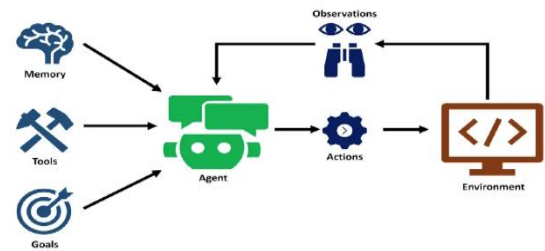

Fig. Framework of a simple AI Agent

applications like trading or diagnostics, and vulnerability to adversarial attacks. Transparent design, robust safety measures, and governance frameworks are essential to mitigate these risks. Collaboration among governments, industry, researchers, and civil society is crucial to ensure responsible development. If managed well, agentic AI could drive unprecedented innovation and efficiency, reshaping how we interact with technology and tackle complex challenges.

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B. Shanmukha Priya,
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## Using Deep Learning Responsibly: Predicting Grid Stability in Renewable-Powered Smart Systems

As the energy sector rapidly embraces renewables, smart grids are evolving into complex ecosystems where energy flows both ways. In this new era, traditional grid models—built on predictable, centralized power generation—are no longer sufficient. This shift brings a serious concern: how do we ensure the

"Knowledge is power."

stability of the grid when both supply and demand are unpredictable?

A research team from BVRIT HYDERABAD College of Engineering for Women has developed a deep learning-based method to address this question—realistically and transparently. Rather than claiming artificial intelligence (AI) is a silver bullet, the team acknowledges that deep learning is a powerful statistical tool, not an omniscient system.

Fig.1 Integrated Process for smart grid stability
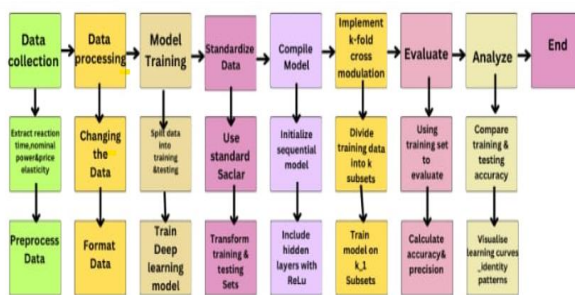
The study used a carefully prepared dataset of 60,000 examples, with 12 key features such as reaction time, nominal power, and price elasticity—variables already known to affect power balance. A neural network was built using Keras, incorporating standard practices like ReLU activation in hidden layers and softmax in the output for classification. Accuracy was tested using 10-fold cross-validation, achieving a performance of 97.73%—a notable improvement over basic mathematical models, but not a guarantee of perfection.

What makes this work credible is its clear workflow and transparency. Data preprocessing, feature standardization, training, and evaluation were all methodically performed and documented. The team openly analyzed potential overfitting, ensured model generalization with cross-validation, and reinforced insights with traditional differential equation-based assessments.

Visualizations of reaction time and power balance reveal practical realities: while supplier nodes tend to respond predictably, consumer behavior remains highly variable and influenced by price sensitivity. The model helps identify such patterns, but it does not replace human expertise—it augments it.

Crucially, the research avoids AI hype. The deep learning model doesn't "understand" the grid. It doesn't make autonomous decisions. It detects patterns in historical data and helps forecast likely stable or unstable states. That insight can support—but not replace—the decisions made by grid operators.

Looking ahead, the authors advocate for realistic improvements: using recurrent or convolutional neural networks for better time-series analysis, and integrating Explainable AI (XAI) to clarify how predictions are made. They stress that such tools must be interpretable, testable, and continuously updated—not blindly trusted.

Reference:

Sujatha.Banka, Chava.Sunil Kumar, T. Anupriya, J. Vineela, A. Harshitha and B. Poojitha, "Deep Learning Models for Predictive Stability in Renewable Energy," 2025 International Conference on Automation and Computation (AUTOCOM), Dehradun, India, 2025, pp.40-46, doi: 10.1109/AUTOCOM64127.2025.10956657.
https://ieeexplore.ieee.org/document/10956657

Ms. Banka Sujatha
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"You learn more from failure than from success."

Gearing Up for the Future: VSSC's Training on Professional Networking & Resume Building

In response to evolving industry expectations and placement trends, the Vishnu Student Success Centre (VSSC) rolled out a focused training session for second-year B.Tech students across all branches. Designed to bridge the gap between academic life and professional readiness, this 90-minute session offered valuable insights into professional networking and resume building—two essential skills in today's competitive landscape.

The training curriculum, thoughtfully curated by Dr. Sinjini Chakraborty and Dr. Torsa Saha, began with an engaging ice-breaker titled *"Professional Who?"*. This interactive game introduced students to the idea that every career path comes with its own set of expectations, setting the tone for deeper reflection and discussion.

Dr. Sinjini led the segment on professional networking, exploring its role in career advancement and the various platforms—both online and offline—that professionals use to connect and grow. She also emphasized the importance of networking etiquette, equipping students with the dos and don'ts of professional interactions.

In the second half of the session, Dr. Torsa guided students through the essentials of resume writing. From understanding different resume formats to identifying key components of a strong student resume, the session offered practical tips that students could apply immediately. She also introduced the concept of Applicant Tracking Systems (ATS), explaining how automation impacts hiring and how students can tailor their resumes accordingly.

The sessions, held across all departments, engaged over 300 students, many of whom found the training highly beneficial. With an average feedback score of 4.2 out of 5, students praised the relevance of the content and the clarity of delivery, while also finding the space to offer feedback and suggestions for similarly engaging sessions to be conducted in the future.

This initiative reflects VSSC's ongoing commitment to nurturing well-rounded, industry-ready graduates—one skill at a time.

Dr. Torsa Saha,
Assistant Professor, BS&H

Dr. Sinjini Chakraborty
Assistant Professor, BS&H

"Experience is the best teacher."

College of Engineering for Women
(UGC - Autonomous)

BVRITHCEW
SYNERGIA
THE LEGACY REBORN
2025

EXPERIENCE THE MAGIC

TECHNICAL TRENDS – From Students

Integrating Artificial Intelligence (AI) with Digital Twin

Integrating Artificial Intelligence (AI) with Digital Twin technology is revolutionizing industries by creating virtual replicas of physical assets, processes, or systems. These digital twins are continuously updated with real-time data from sensors and IoT devices, enabling organizations to simulate scenarios, analyze performance, and predict outcomes without physical interventions. AI enhances digital twins by facilitating predictive maintenance, real-time monitoring, and process optimization. In predictive maintenance, AI algorithms analyze data from digital twins to forecast equipment failures before they occur, reducing downtime and maintenance costs. Real-time monitoring allows AI to process vast datasets rapidly, providing insights into system performance and supporting informed decision-making.

Additionally, AI-driven digital twins can simulate various operational scenarios, helping organizations identify inefficiencies and optimize processes, leading to enhanced productivity and reduced operational costs. This integration finds applications across various industries, including manufacturing, healthcare,

and urban planning. The benefits of combining AI with digital twins include enhanced efficiency, cost reduction, and improved decision-making. However, challenges such as data integration, security concerns, and the need for specialized expertise must be addressed to fully leverage this technology.

In summary, the fusion of AI and digital twin technology offers transformative potential across various sectors, allowing organizations to anticipate issues, optimize operations, and make data-driven decisions, leading to improved performance and competitiveness.

Reference:
https://bit.ly/4llPO1V

**Ms. Sania Iqbal
CSE(AI&ML) 2nd Year**

Li-Fi: Lighting Up the Future of Wireless Communication

In a world with ubiquitous wireless communications, the demand for faster, safer, and more efficient data transmission continues to mount. Li-Fi, or Light Fidelity, meets that demand. Li-Fi is a sophisticated wireless data transfer technology that operates through light waves rather than radio waves. Originally coined in 2011 by Professor Harald Haas, Li-Fi demonstrates excellent potential to alter the way

"Success is the sum of small efforts, repeated day in and day out."

we connect to the Internet and information sharing. Li-Fi operates through LEDs that use lightbulbs that flicker at extremely high speeds-- too fast to be seen with the human eye. By varying the flicker rate, data is encoded and sent to a receiver (such as a light sensor), which will decode it into usable data. By communicating through light rather than radio waves, Li-Fi benefits from high speed and high levels of security, especially high speed since radio signals can present issues in certain environments. One of the biggest advantages of Li-Fi technology is the speed demonstrated. Laboratory studies have shown data transfer rates exceeding 200 gigabits per second, an astonishing speed in comparison to regular Wi-Fi technologies.

Additionally, it minimizes interference because light will not interfere with sensitive medical or aviation equipment. Another significant benefit is its security - the fact that light cannot penetrate walls means data is restricted to a certain area making it more difficult to intercept. Li-Fi will be particularly beneficial in places like hospitals, planes, or factories where RF communication may be unsafe or unreliable. In smart city situations, streetlights could provide lights and internet connectivity. This technology could also support underwater communication to some

extent since radio waves do not work very well in that scenario. These potential uses demonstrate how adaptable and effective this new technology could be. Li-Fi does have its limitations. To be effective it requires a clear line of sight, and the transmission of data generally works best when the receiver is at some distance to the light source. Even at some distance from the light, the connectivity is contingent on the working of the LED light which means it will not be as useful in daylight situations or complete darkness. It is clear that work is being done to address these limitations, and research is ongoing to improve this technology. Hybrid systems that combine Li-Fi and Wi-Fi have been proposed as some of the first steps to better enable this technology.

In conclusion, Li-Fi is a significant advancement in wireless communications. With its high speed, strong security, and potential to operate in specialized environments, Li-Fi is a great possibility for the future. As we continue to make devices smart and connected, the uptake of technologies enabling technologies like Li-Fi will be essential in developing faster, safer, and more efficient communication systems.

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**Ms. Yejju. Sai Keerthi
ECE-A 2nd Year**

Sand: The New Power Bank

As the global demand for clean energy rises, storing intermittent renewable energy remains a major challenge. A novel yet simple innovation—sand batteries—is now gaining momentum as a sustainable thermal energy storage solution.

Unlike chemical batteries, sand batteries store energy as heat. They use dry, high-silica sand housed in large, insulated steel containers. During periods of excess solar or wind power, electric heaters warm the sand to over 500°C. This stored heat is then extracted using hot air circulation and used for district heating or industrial processes.
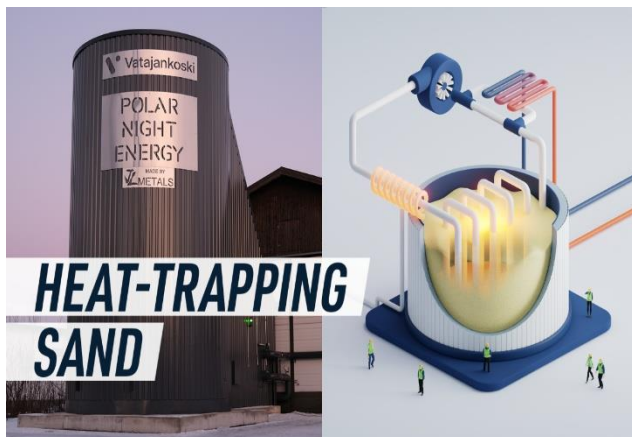
What sets sand batteries apart is their affordability, efficiency, and durability. With thermal efficiencies of up to 95%, low-cost materials, and no chemical degradation, these systems can operate for decades with minimal maintenance. While converting stored heat back to electricity remains inefficient (20–30% round-trip), ongoing research into thermophotovoltaics and heat engines may soon change that.

A standout real-world application is in Finland, where Polar Night Energy has implemented a commercial-scale sand battery. It's already supplying reliable, renewable district heating at competitive rates—demonstrating both technical and economic viability.

From seasonal energy storage to decarbonizing industrial heat, sand batteries are emerging as a versatile and scalable tool in the clean energy transition. Their simplicity, use of local materials, and integration potential with renewable energy farms make them a promising solution in the race toward net-zero emissions.

Reference:
https://polarnightenergy.com/sand-battery/

Ms. Aishwarya Nagothu
CSE 1st Year

Future of sustainable computing

At Mobile World Congress 2025, Lenovo turned heads with its most eco-forward concept –**The Yoga Solar PC.** While the idea of solar powered electronics isn't new, Lenovo's execution brings it closer to something you'd actually want to use daily.

The yoga solar PC features a lid integrated with high-efficiency Back contact solar cells – those are the ones where all the wiring sits on the back so they can absorb more sunlight. Lenovo claims up to 24% energy conversion, which is top-tier for current solar tech. That means on a sunny day,

20 minutes of sunlight could get you an hour of video playback.

Complementing this, The Dynamic Solar Tracking System continuously monitor's the solar panel's current and voltage, working in tandem with the Solar-First Energy system. This setup automatically adjusts the charging settings to prioritize energy delivery, ensuring optimal performance even in low-light conditions.

The Yoga Solar PC is more than just a laptop, it's a vision of future where technology and sustainability coexist harmoniously. As Lenovo continues to explore and develop this concept, it sets a precedent for the next generation of eco-conscious computing solutions.

Reference:
https://youtu.be/px1iEW600Pk?feature=shared

Ms. Esha Shaganti
CSE-B 1st Year

Wireless Charging Roads: Powering the Future of Electric Vehicles

Electric cars are becoming more popular as the world seeks cleaner and greener ways to get around. But one of the biggest drawbacks of EVs is how to charge them. While gasoline-powered vehicles can be refuelled in minutes, electric vehicles tend to have to pull over and plug into a charging station for anywhere from 30 minutes to many hours. This can be problematic and results in what has come to be described as "range anxiety" – fear of a lack of battery power when on the move.

Wireless roads of charging are specially fabricated roads containing electric coils underneath their surface. When an electric vehicle travels over the coils, the coils generate a magnetic field that sends electricity wirelessly to an inductively coupled receiver coil mounted underneath the car. In this inductive charging, the car recharged its battery without being required to stop or plug in.

Sweden and a number of European nations are collaborating on implementing wireless charging lanes for trucks and buses. These endeavors prove that wireless charging roads are increasingly becoming a reality in our daily lives.

Even though wireless charging roads are filled with advantages, there are still some challenges to be addressed. Wireless charging roads are costly to build and must be carefully installed. Also, the coils at the bottom of the roads should be made in a way that they can handle high traffic and weather effects. Despite these obstacles,

wireless charging roads have the potential to transform how we charge electric cars. It holds out a vision of a future where vehicles can be kept charged while in motion, allowing cities to achieve cleaner skies and reduce pollution and make the transportation system cleaner and greener.

Reference:
https://electreon.com/
https://worldrecord.electreon.com/

Ms. Ch. Bhanu Teja
EEE 2nd Year

NVIDIA's GR00T N1: Inventing the Era of Generalist Robots

NVIDIA has made a leap towards the future of robotics with the introduction of Isaac GR00T N1, a revolutionary foundation model aimed at enabling general-purpose humanoid robots. GR00T, short for Generalist Robot 00 Technology, is the firm's first open-source vision-language-action (VLA) model that allows robots to interpret instructions, analyze environments, and execute sophisticated physical tasks in diverse domains.

GR00T N1, announced at NVIDIA's GTC 2025 conference, is the company's vision of giving robots both quick reflexes and considered reasoning—how humans experience the world in an instinctive and rational way. Having been trained on enormous real-world and synthetic datasets, it can move objects around, operate both hands in coordination, and perform multi-step tasks with exceptional generalization.

What differentiates GR00T N1 is its open-source character, enabling developers, researchers, and robotics firms to modify and incorporate it into their own robot platforms. NVIDIA adds to this with tools such as Isaac Sim for sim training and Jetson Thor for fast onboard AI processing.

In initial protests, firms such as 1X Technologies leveraged GR00T to energize humanoids that autonomously tidy and arrange residences. This is an important milestone to developing real-world solutions in logistics, eldercare, hospitality, and home environments.

With GR00T N1, NVIDIA isn't launching a model—it's unleashing a movement. As robots start to think and act more human-like, NVIDIA is leading the charge to bring generalist humanoid robots into daily life.
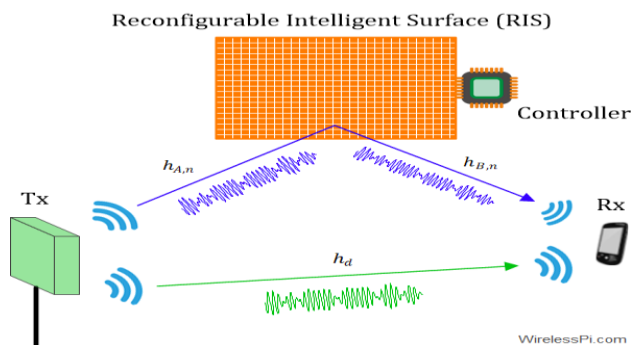
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Ms. Veda Sathvika M
CSE(AI&ML) 2nd Year

Reconfigurable Intelligent Surfaces (RIS): The Smart Walls of 6G Communication

As we move beyond 5G into the world of 6G wireless networks, Reconfigurable Intelligent Surfaces (RIS) have emerged as a key innovation. RIS are engineered surfaces embedded with many passive or semi-passive meta-material elements that can control electromagnetic waves. They can dynamically reflect, refract, or scatter radio signals, reshaping wireless communication environments. In conventional systems, signals often weaken due to obstacles like walls or buildings. RIS transforms these surfaces into intelligent reflectors that guide signals around obstructions,

Reconfigurable Intelligent Surface (RIS)

improving coverage and reducing interference. By adjusting the phase and direction of incoming waves, RIS ensures that signals reach their target more reliably.

RIS is expected to be a foundational part of 6G technology, which promises terabit-per-second speeds, sub-millisecond latency, and connectivity for billions of devices. These capabilities are critical for futuristic applications like holographic communication, remote robotic surgery, smart cities, and immersive AR/VR. Technically, RIS involves disciplines such as electromagnetic theory, antenna design, signal processing, and AI, making it an exciting field for ECE students. It is also energy-efficient and scalable, ideal for sustainable communication infrastructures.

When combined with AI, RIS can learn and adapt in real-time, optimizing wireless environments for robust connectivity. Several countries including the USA, China, and India are now investing in RIS-based research as part of their national 6G strategies. Leading universities and companies like Nokia, Samsung, and Huawei are also experimenting with RIS testbeds.

In conclusion, Reconfigurable Intelligent Surfaces represent a paradigm shift in how we design and use wireless systems. Rather than simply improving transmitters and receivers, RIS focuses on shaping the space in between making our environment an active participant in communication. This technology holds promise not just for faster internet but for intelligent, efficient, and context-aware.

Reference:

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Ms. T.sanjana
ECE 2nd Year

The Rise of Brain-Computer Interfaces

Brain-Computer Interfaces (BCIs) allow new forms of interaction between humans and technology by facilitating direct communication between the brain and external devices. BCIs interpret electrical brain signals usually non invasively through Electroencephalography and

"Genius is one percent inspiration and ninety-nine percent perspiration."

translate them into commands that programmatically control computers, wheelchairs or robotic limbs.

While BCIs initially developed in medical use, they are now providing opportunities for patients with paralysis or other speech related disorders to achieve autonomy by allowing them tocommunicate in a thought driven manner and use mobility devices. Neuralink and Synchron are at the forefront of developing brain implants that can provide better accuracy and real time interaction. Emotiv and OpenBCI are creating non-invasive technologies that allow students and developers to conduct BCI research.

BCIs have transitioned from solely health care industries into gaming, education, even mental wellness' domains. BCI development future may open up brain-to-brain communication, cognitive enhancement, or virtual worlds completely controlled by the brain.

Despite the promising developments of BCIs to date, the technology faces barriers in thoughtful resolution such as signal noise, ethics, and data privacy. Grounded deep in ethical apprehension and science fiction culture, BCI technology as it continues to be developed will require appropriate, interdisciplinary cooperation of engineers, neuroscientists, and ethicists.The silent revolution is already underway, however, and it's powered by human thought, not hands.

Reference:

https://neuralink.com

https://spectrum.ieee.org/braincomputer-interfaces

Ms. J. Pavithra
IT 2nd Year

## Understanding Model Context Protocols

Imagine trying to bake a cake without a recipe. You might guess the ingredients or steps, but the results could be very different each time. In computing and artificial intelligence, a Model Context Protocol (MCP) is like that recipe. It is a structured way to explain what data a model uses, how it makes decisions, and why certain choices are made. This helps anyone understand, trust, and reproduce the model's results.MCPs are particularly critical in Agentic Artificial Intelligence (Agentic AI), which is AI that acts autonomously, makes decisions, and learns over time to get to their objectives. Since such AI systems learn and evolve, they require explicit "recipes" for them to trace their reasoning and decisions. MCPs provide that transparency and accountability.

Over time, MCPs have evolved from informal notes to formal, detailed methods. For example, the Overview, Data, Model, Assessment, and Prediction (ODMAP) protocol helps the ecologists clearly report how they predict where

species live. In software development, use case specifications describe what a system should do, helping engineers design and test it better. In smart environments, the Online Resource for Adaptive Context-aware Networks (ORACON) chooses the best algorithm to predict changes accurately.

Practical uses include improving ecological research quality with ODMAP, increasing accuracy in project risk prediction, customizing visitor experiences in museums using context evolution systems, and enhancing security testing for Internet of Things (IoT) devices.

Model Context Protocol Evolution and Applications
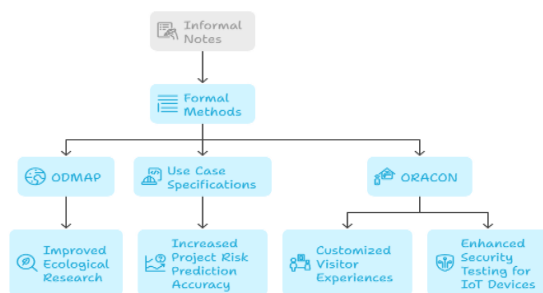
In summary, a Model Context Protocol is a technology framework that organizes and explains the context behind models, making complex, adaptive systems like Agentic AI clearer, more reliable, and easier to manage

Reference:

https://huggingface.co/learn/mcp-course

Ms. Asha Jyothi
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Google I/O 2025 – Ushering in the Era of Everyday AI:-

At Google I/O 2025, innovation took center stage as Google unveiled awave of powerful AI advancements designed to weave artificial intelligence into the very fabric of our daily lives. Leading the charge was Gemini 2.5, the latest and most capable version of Google's AI model. Integrated deeply across Google Workspace and Android, Gemini enables smarter document summarization, code generation, and contextual search.
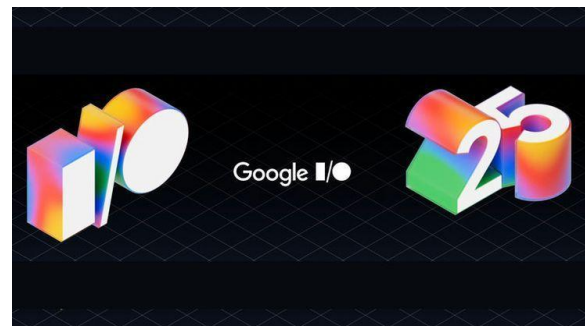
One of the most exciting features announced was AI Overviews - a new way to interact with Google Search. Instead of browsing multiple links, users now get concise, AI-generated summaries at the top of their results. This change aims to turn search into a conversation rather than a scavenger hunt. Project Astra, Google's vision for a universal AI assistant, showcased real-time reasoning through video input, promising future assistants that can understand the world visually and respond intelligently. Meanwhile, Google Beam, a rebrand of Project Starline, introduced hyper-realistic 3D video calling that blurs the line between virtual and physical presence.

The company also teased its upcoming Android XR smart glasses, developed in collaboration with Samsung, hinting at a more immersive and interactive digital experience. Google I/O 2025 wasn't just about innovation—it was a declaration: the future isn't near. It's already here, learning, adapting, and getting smarter with every interaction.

Reference:

https://blog.google/technology/ai/google-io-2025-all-our-

Ms. P. Sri Gayatri Manogna
EEE 2nd Year

Tiny Sensors with Big Impact - Shaping the Future of Technology

The convergence of 5G technology and the Internet of Things (IoT) is driving a new wave of innovation in sensor design, particularly in Micro-Electro-Mechanical Systems (MEMS) and Nano-Electro-Mechanical Systems (NEMS). These miniature devices—ranging from micrometers to nanometers—are valued for their compact size, low power requirements, and high precision. Their capabilities make them ideal for a wide range of modern applications, including healthcare monitoring, smart transportation, advanced communication systems, and consumer electronics. The evolution of these devices is rooted in integrated circuit (IC)fabrication techniques, enhanced by specialized microfabrication processes like etching and bonding. As IC manufacturing advances to nanometer-scale features, NEMS are becoming more prominent, enabling tighter integration between electronics and biological systems. However, the development of MEMS and NEMS faces challenges—especially in devices with moving parts—due to tribological issues such as friction, wear, and adhesion.

These problems are intensified at smaller scales where surface forces dominate. Environmental factors like moisture and contaminants further affect device reliability. Researchers are addressing these issues through novel lubrication techniques and materials, such as PFPE films, SAMs, and Silicon Carbide (SiC). Furthermore, the integration of AI and AR/VR technologies with these sensors is unlocking transformative possibilities in data interaction and smart automation.

References:

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Ms. Y. Roshini
EEE 2nd Year

Artificial Intelligence in Human Brain Processing: Medical Applications

Artificial Intelligence (AI) is revolutionizing medicine, especially in understanding and treating complex brain disorders. AI-powered tools are transforming neurological diagnostics by analysing MRI, CT, and EEG data with greater speed and accuracy, enabling early detection of diseases like Alzheimer's and Parkinson's. In brain-computer interfaces (BCIs), AI interprets neural signals to help patients with paralysis control devices or communicate, restoring autonomy and quality of life. AI also plays a critical role in mental health, identifying signs of depression, anxiety, or PTSD through speech, facial analysis, and neural data.
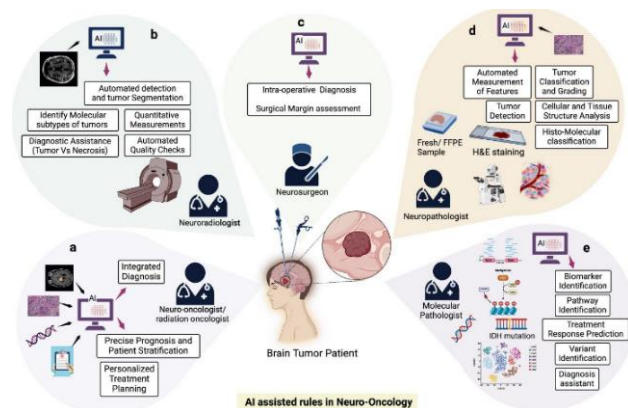
Furthermore, adaptive neurorehabilitation systems use AI to customize recovery programs for stroke and trauma patients, offering real-time feedback based on patient performance. Despite these advancements, ethical concerns such as data privacy, algorithmic bias, and the need for transparency remain important challenges. Integrating human oversight with AI is essential to ensure responsible use in clinical practice. Overall, AI is not replacing physicians but enhancing their ability to diagnose, treat, and rehabilitate brain-related conditions, paving the way for more personalized and effective care in neuroscience.

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Ms. Pasham Meghana
 **CSE 1st Year**

A Smart Mirror for Emotion Monitoring in Home Environments

Is a prototype of a general-purpose smart mirror that integrates advanced features to enhance daily life, surpassing the basic functionalities of existing smart mirrors. Unlike conventional models that focus on displaying weather, news, or calendar updates, this smart mirror incorporates deep learning to enable emotion recognition through visual and audio stimuli. It supports short- and long-term emotional monitoring, facial attribute detection, and multi-user identification, enhancing personalization and interaction.

The system features a double authentication protocol (facial and voice recognition) for privacy and security. Integration with Amazon

Alexa extends its capabilities through voice-based services, reducing onboard computational requirements. By offloading intensive tasks to an external server, the prototype handles complex processing without overwhelming the Raspberry Pi, its core device. It also utilizes multimodal interaction, combining audio and visual cues to improve accuracy in emotion recognition and user engagement.
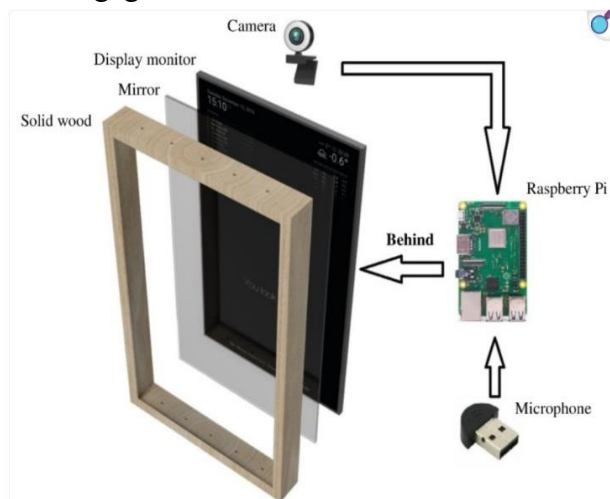
The mirror includes applications for daily tasks, emotional well-being, and smart home control, making it especially beneficial in home settings. Future developments aim to improve hardware by adding a night vision camera and a high-performance microphone, and deploying a Jetson board to localize processing and reduce dependency on cloud servers.

Compared to other smart mirrors—whether for medical, fashion, or hotel use—this prototype stands out due to its comprehensive functionality, modular design, and real-time emotional feedback system. Despite being currently tested only in a lab environment, it demonstrates high usability and adaptability. Plans for real-world testing and further software-hardware optimization are underway to advance the system's readiness level.

In summary, this smart mirror represents a significant leap in the domain of affective computing and intelligent home devices, merging technology and emotional intelligence to support user well-being and interaction.

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A Smart Mirror for Emotion Monitoring in Home Environments - PMC

Ms. Niharika Gowrisetty
 CSE-A 2nd Year

Bharat Rising: From Importer to Global Leader in Defence Technology

India, also known as Bharat, is swiftly transforming from a traditional arms importer into a global innovator in defence technology. Supported by initiatives like *Make-in-India*, *iDEX*, and *Aatmanirbhar Bharat*, domestic military production reached ₹1.27 lakh crore in 2023–2024, accounting for nearly 65% of capital procurement.

Bharat has developed high-impact technologies such as laser-based directed-energy weapons, hypersonic missiles, and MIRV-capable Agni-V rockets—once exclusive to major powers. BEL's *Akashteer*, an advanced air defence system rivaling Israel's Iron Dome, is now being inducted into the Army.

"The harder you work for something, the greater you'll feel when you achieve it."

The private sector is making global strides. Bengaluru's *FWD-LM01*, a loitering munition with a 100 km range and autonomous targeting, debuted at the Paris Air Show. Solar Aerospace's *Rudrastra*, a hybrid-VTOL UAV with a 170 km range and precision strike capability, passed army trials in Pokhran.
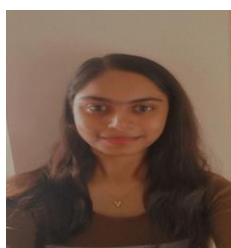
DRDO is advancing next-gen BrahMos, hypersonic naval missiles, and a fifth-gen fighter. Defence exports have surged over 34-fold since 2014, reaching ₹23,622 crore in 2024–2025. Indigenous systems like *Tejas*, *Akash*, and *BrahMos* are now exported to 100+ countries.

Bharat is now seen as a trusted global defence-tech force.

Reference: Drishti IAS

Ms. Y. Meghana
IT- B 2nd Year

3D Printing in Medicine: A Transformative Innovation

3D printing, also known as additive manufacturing, is poised to revolutionize healthcare through diverse applications including tissue and organ fabrication, personalized prosthetics and implants, anatomical models, and pharmaceutical research. This technology builds three-dimensional objects layer by layer using materials like plastics, metals, or even living cells, often guided by computer-aided design (CAD) files. It enables the transformation of 2D radiographic images into 3D print files for precise medical modeling.

In medicine, 3D printing offers several key benefits. It enables customization of medical products tailored to individual patient needs, such as bespoke prosthetics, surgical tools, and even drug dosage forms. It also improves cost efficiency, particularly for low-volume or highly complex products, and minimizes waste by using only the materials necessary. Additionally, the technology enhances productivity by drastically reducing manufacturing time compared to traditional methods.

The democratization of design and manufacturing is another significant advantage. Open-source 3D printers and shared online design files have made it easier for consumers and researchers to innovate and collaborate.

Institutions like the National Institutes of Health promote open access to 3D models for research and education.

Though currently a small part of the medical industry, 3D printing is expected to grow substantially, with medical applications projected to account for a larger share of the market. Despite its promise, challenges such as regulatory approval and technical limitations remain. Still, 3D printing holds immense potential to transform healthcare delivery through personalization, efficiency, and innovation.

References:

Medical Applications for 3D Printing: Current and Projected Uses - PMC

Ms. V. Bhavya Sahithi
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The Rise of Blockchain: A Revolution in Secure Data Management

Blockchain technology is emerging as a transformative force in the realm of data management, providing unparalleled transparency, security, and decentralisation across various industries. Initially developed to facilitate cryptocurrencies such as Bitcoin, blockchain has since evolved to offer viable solutions in finance, supply chain management, and digital identity verification.At its core, blockchain functions as a decentralised ledger of transactions that is distributed across multiple nodes. Each block within the chain comprises a cryptographic hash of the preceding block, a timestamp, and transaction data, thereby rendering it nearly impossible to alter historical records without achieving consensus across the network. This mechanism not only ensures data integrity but also fosters trust in systems that demand high levels of security.In the financial sector, blockchain technology enables expedited cross-border payments while significantly reducing instances of fraud. Within supply chain management, it facilitates real-time tracking of goods, effectively minimising delays and enhancing transparency. Additionally, blockchain-based digital identity solutions empower individuals to securely own and manage their personal information.Governments and enterprises are increasingly allocating resources toward blockchain research, with numerous pilot projects underway in India that explore its potential applications in land registration, voting, and public welfare systems.As this technology continues to mature, it holds the potential to redefine our interactions with data, paving the way for a future characterised by secure, tamper-proof, and transparent digital eco systems.

Reference:

https://www.ibm.com/think/topics/blockchain

Ms. D. Meenakshi Raj
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"Success is not final, failure is not fatal: It is the courage to continue that counts."

My Experience at AGKC Season-2

Attending the Aditya Go-Karting Championship (AGKC) Season-2 was an exciting and valuable experience that helped me learn a lot, test my technical skills, and improve my real-time decision-making on the track. We represented BVRIT HYDERABAD College of Engineering for Women as a Team Accelerators. We participated with two electric vehicles. I was the co-driver of one of our E-Karts, with Janani as a driver and our other vehicle was driven by Triveni.

I participated in two main rounds: the Acceleration and Brake Test and the Manoeuvrability Test. The first one was very important because it was a qualifying round. Only if we passed it could we move on to the next events. In this test, I had to give full throttle to make use of the electric motor's instant torque and then by applying full brake kart had to stop within a given boundary and stay in a straight line without any deviations. It was a bit tense, knowing everything depended on this test, but I focused and did my best. It helped me understand the importance of speed control, braking response, and how electric vehicles behave under pressure.

In the Manoeuvrability Test, I had to drive the kart through a narrow, zig-zag track outlined with stacked tires on both sides. The path was filled with sharp turns, tight corners, and sudden curves, which required complete control over the vehicle. The electric kart was quick to respond to even small movements due to its high torque sensitivity, so I had to be very careful with my steering and tire stack, but I managed to steer carefully and complete the track successfully. This round really taught me how important precision, patience, and quick thinking are while handling an electric kart, especially in tight corners. I also learned how steering control, torque management and balance play a key role during low-speed technical driving.

Being part of this event gave me a lot of exposure to real-time electric vehicle performance and how different systems like throttle control, braking systems, and motor response work together.

In the end, our team from BVRIT HYDERABAD College of Engineering for Women became Overall Champions, followed by titles such as Endurance Winner, Acceleration and Manoeuvrability Winner and Runner-up, Best Women Team and First TI Clear. This journey was not just about competition but also about learning, growing, and proving our abilities in the world of electric vehicle racing.

Ms. Bodige Meghana
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