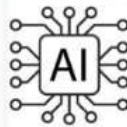


B-SMART

-WE EXPLORE WE EXHIBIT-



NAME TO FAME
HACKATHON STORIES
TECHNICAL TRENDS

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B-SMART

(**B**V**R**ITian **S**tudent **M**agazine on **A**dvanced
Research & **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.



Principal's Message



“The best way to predict the future is to invent it.” — Alan Kay

It gives me immense satisfaction to welcome you to the Volume 11, Issue 1 of our Technical Magazine - BSMART, which captures the transformative journey of learning, innovation, and achievement that defines BVRIT HYDERABAD College of Engineering for Women. Every page of this magazine reflects the curiosity of our students, the commitment of our faculty, and the shared vision that continues to shape our institution into a centre of academic excellence.

In our institution, I have always witnessed our students and faculty embrace challenges with confidence and convert opportunities into meaningful accomplishments. And the outcomes speak for themselves- with our students emerging victorious at the Smart India Hackathon, receiving recognition at the SAEINDIA REEV competition, securing substantial funding through the MSME IDEA Hackathon etc., each success demonstrating that innovation flourishes when creativity is combined with perseverance.

Our journey has been further strengthened by several institutional milestones. The recognition of our ECE and CSE departments as Research Centres by JNTUH, the NPTEL Best Faculty Performance Award, the launch of the NCC Unit and the Society of Women Engineers student chapter, the Gold Sustainable partnership Award for our sustainable initiatives, the grant of 5 patents and the COPE Award for promoting student mental well-being- All these collectively highlight our commitment to nurturing competent professionals as well as responsible citizens. I am deeply honoured to add the IETE Women Achiever Award & CII-Indian Women Network Leadership (IWN) award to my existing record, which I humbly dedicate to the continued growth and excellence of our institution.

As you explore this edition, I encourage you to look beyond the achievements and discover the stories of determination and continuous learning that made them possible. I hope these accomplishments inspire every student to dream with confidence and embrace innovation with responsibility. Together, let us build a future driven by knowledge, integrity, and excellence.

Each issue honours a student article that stands out for its originality and technical excellence. In this edition, the chosen article is 'From Satellites to Selfies: The Journey of a Signal', by Ms. S. Cynthana of ECE 3rd Year.

Warm Regards

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

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‘Name to Fame’

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



There are times in life when you are putting in effort every single day, but you are not really sure where it is leading you. That was how my journey felt for a long time. It was filled with small steps, uncertainty, and moments where progress was not clearly visible. Hi, I am Veda Sree Konka, and this is my journey of learning, patience, and consistency that led me to join Google as a Software Engineering Intern in my third year, and receive a full-time offer from Google.

In the beginning, I did not have a clear idea of what exactly I should be doing or how to reach big companies. I was exploring, trying to understand things step by step, and sometimes

feeling stuck when results did not match the effort I was putting in. There were phases where things did not go as expected. I faced setbacks and moments where I felt I could have done better. But even during those times, I decided not to stop.

I started focusing more seriously on coding and problem solving. It was not easy. There were days when I would spend a lot of time on a single problem and still not get it right. It felt frustrating, but I kept coming back and trying again. Slowly, I understood that improvement does not happen instantly. It happens when you stay consistent, even when it feels like nothing is changing. Along with this, I also explored

"Knowledge is the only wealth that grows when shared."

different areas and kept learning new skills, which helped me build a better understanding and confidence over time. These small efforts added up and supported my overall growth.

I made it a habit to show up every day. Some days were good, some were not, but I continued anyway. Instead of worrying too much about results, I focused on understanding things better and learning from my mistakes. Over time, this made a big difference. I became more comfortable with challenges and more confident in my ability to solve problems.

There were still ups and downs in the journey. Not everything worked out the way I expected. But each of those experiences helped me grow. They made me more patient and helped me realize that setbacks are just a part of the process, not the end of it.

At one point, I stopped thinking too much about outcomes and started focusing fully on my effort. I learned to trust the process and stay consistent, even when things were uncertain. That shift in mindset changed everything for me.

Then came a moment that made all the effort worth it. I joined Google as a Software Engineering Intern in my third year, and today, I hold a full-time offer from Google. It felt unreal at first, but more than anything, it felt meaningful. It was not just about getting into a company, but about seeing how far consistent effort can actually take you.

When I look back now, I realize this journey was not just about achieving one goal. It was about becoming someone who keeps going, even when things are not clear. It taught me patience, discipline, and belief in my own growth.

If I had to share one thing, it would be this. We do not need to have everything figured out in the beginning. It is okay to feel lost or slow at times. What matters is that we keep showing up and keep trying.

Consistency may feel small in the moment, but over time, it creates results that once felt impossible.



Ms. VEDA SREE KONKA
(CSE – 2022 Batch)

Legacies of Excellence – Our Young Promising Engineer Awardees

Driven by Passion, Defined by Excellence

Ms. B. Purnima – YPEA – CSE Dept



I am Purnima Billa of IV CSE and I am honoured to have received the Young Promising Engineer Award in recognition of my achievements and contributions throughout my B.Tech journey in Computer Science and Engineering. During my journey, I successfully completed internships as a Software Engineering Intern at Google and a Product Intern at Adobe, where I later received a full-time offer with a CTC of ₹53.35 LPA. I actively participated in national-level hackathons and coding competitions such as Google Girl Hackathon, Flipkart GRID and HackOn with Amazon, which strengthened my problem-solving and technical skills. Along with academics, I took leadership roles in multiple technical projects and innovation programs, enhancing my teamwork,

planning and project execution abilities. This award reflects my dedication to continuous learning, consistency and my passion for technology and innovation throughout my B.Tech journey. I believe this recognition will further motivate me to keep exploring new opportunities, improve my skills and contribute meaningfully to the field of technology in the future.

Ms. B. Purnima

22WH1A0519



"Small efforts, repeated daily, create great achievements."

Ms. Anusha Sridhar – YPEA – ECE Dept



My journey at BVRIT Hyderabad has been one of learning, growth and continuous self-improvement. Alongside academics, I actively explored co-curricular and extracurricular opportunities to create an all-round impact. Receiving the Young Promising Engineer Award is a meaningful milestone that reflects this journey. Academically, I focused on strengthening my technical skills through training programs in Synopsys and Full Stack Development, which provided valuable practical and industry-oriented exposure. Beyond academics, my Toastmasters journey played a major role in shaping my leadership and communication skills. Serving as Vice President Public Relations, Vice President Education and later President of the BVRIT Hyderabad Toastmasters Club, along with becoming the youngest Area Director of District

126, were some of the most memorable experiences of my journey.

Organizing TEDxBVRIT Hyderabad 3.0 and hosting multiple events further helped me build confidence and leadership skills. I sincerely thank our Principal Mam, ECE HOD, faculty members and mentors for their constant encouragement and support. These four years taught me resilience, discipline and self-belief and I am grateful to have left behind a meaningful impact through my journey at BVRIT Hyderabad.

Ms. Anusha Sridhar

22WH1A0449



Ms. Janani Natarajan – YPEA – EEE Dept



Receiving the **Young Promising Engineer Award** from the Department of Electrical & Electronics Engineering is one of the most cherished milestones of my engineering journey. I accept this honour with immense gratitude to my parents, faculty members, mentors, and the Department, whose unwavering support and encouragement have shaped me into the person I am today.

Looking back, I realize that my transformation from a first-year engineering student to this moment was never a matter of chance. It was built through consistent effort, resilience, and an eagerness to learn from every success and setback. Every classroom lecture, laboratory experiment, project, and challenge contributed to strengthening my technical foundation and shaping my perspective as an engineer.

Beyond academics, I actively pursued opportunities through certification courses, internships, technical competitions, and projects in embedded systems, IoT, and power electronics. My passion for automobiles and electric mobility led me to national-level motorsport competitions. From earning recognitions at the AGKC Go-Kart Championship to representing our college in its maiden participation at **BAJA SAE India 2025**,

every experience taught me the value of teamwork, perseverance, and innovation. Our journey continued at SAE REEV 2026, where developing a range-extended electric vehicle earned us the prestigious Team Grid Recognition from SAE India.

For three years, I dedicated myself wholeheartedly to the field of electric vehicles with the dream of building a career in it. That dream became a reality when I successfully cleared the BAJA Aptitude Test (BAT) and secured a placement at TVS Motor Company - a moment that reaffirmed the power of passion, persistence, and purpose.

This award is not merely a recognition of my achievements; it is a reminder that growth begins with determination and every challenge is an opportunity to evolve. I accept it with humility and remain committed to learning, innovating, and contributing with the same enthusiasm in the years ahead.

Ms. Janani Nagarajan
22WH1A0218



Ms. Anamitra Joshi – YPEA – IT Dept



Hello friends, I'm Anamitra Joshi, recipient of the Young Promising Engineer Award from the Information Technology branch. Through this article, I'd like to share my journey as an engineering student at BVRIT Hyderabad College of Engineering for Women.

I joined the college as a curious 18-year-old with a simple mission: speak up, ask questions and keep learning. From my first year, I actively participated in academics, classroom discussions and extracurricular activities, which helped me build confidence and meaningful connections.

My interest in programming began with C programming classes and grew stronger after joining the Women Engineers Program by TalentSprint, supported by Google. The program strengthened my technical, communication and professional skills while connecting me with inspiring peers.

Motivated by these experiences, I participated in hackathons and coding competitions, becoming a finalist in the GLC HP Hackathon and later participating in the Google Girl Hackathon, which

led to recruiter outreach and my selection as a Software Engineering Intern at Google.

At Google, I worked with the Google Cloud Platform Backup and Disaster Recovery team, gaining valuable exposure to large-scale systems. I also had opportunities through the Dell STEM Aspire Program, PALS Workshop at IIT Madras and an AI/ML internship at Youngsoft India.

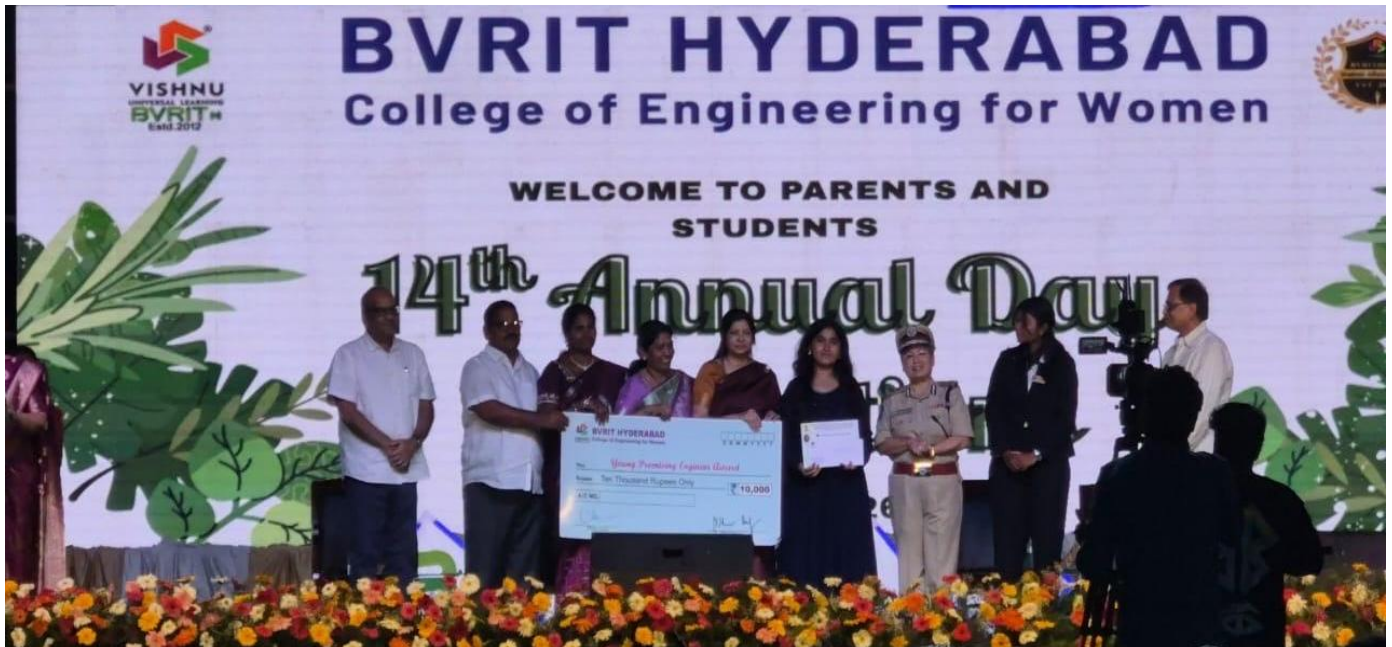
I am grateful to my professors, mentors, family and friends for their constant support throughout my journey. These four years shaped me with confidence, resilience and curiosity and as I begin my career at HSBC, I look forward to continuing this journey of learning and growth.

Ms. Anamitra Joshi

22WH1A1275



“A sharp mind is forged through challenges.”



My journey has been a blend of consistency, learning and self-improvement. As a student deeply interested in technology and problem-solving, I focused on building a strong foundation in programming, particularly in Data Structures and Algorithms (DSA). Over time, I worked on practical projects such as an automated price drop alert system, which fetches the latest product prices and notifies users via email when prices drop.

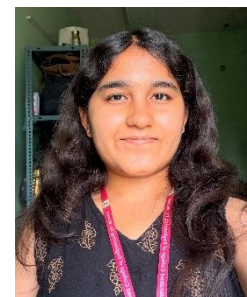
I strongly believe that consistency is the key to growth. This mindset helped me achieve milestones like maintaining a long streak on coding platforms, which significantly strengthened my problem-solving skills and confidence. Preparing for core computer science subjects such as Data Structures, DBMS, Operating Systems and Computer Networks further enhanced my understanding of fundamental concepts.

A major turning point in my journey was securing an internship at Visa. During this period, I set clear goals for myself and worked diligently to achieve

them. My efforts paid off when I was offered a full-time position at Visa after the internship.

My placement journey was not just about securing an opportunity, but about evolving through the process, learning from challenges, improving with every step and staying focused on my goals. I embraced failures as learning experiences and continuously worked on enhancing my technical skills, communication and confidence.

This journey has taught me that success is not an overnight achievement; it is built through consistent effort, curiosity and the courage to keep moving forward.



Ms. G. Nikitha

22WH1A6601



COVERSTORIES

COVER STORY – 1

Team Accelerators at AGKC

Season-3

Won 5 Awards including

(i) Best Women Team

(ii) Lightest Vehicle Award

(iii) First Team to Complete

- **Brake Test**
- **Acceleration Test**
- **Technical Inspection**



Participating in AGKC Season-3 marked a significant milestone for Team Accelerators, offering an exceptional platform to demonstrate engineering excellence, teamwork, and perseverance. Competing against talented teams, we transformed our technical knowledge into real-world performance, overcoming challenges with confidence and earning multiple accolades through dedication, innovation, and collaborative effort.

AGKC Season-3 was a great experience for our team, Team Accelerators. It helped us learn how to work better together, improve our coordination, and use our knowledge in a real motorsports event. It also gave us a chance to test our skills in a practical and competitive environment.

We participated with our electric kart, driven by B. Pavithra with S. Shivani as the co-driver. We maintained clear communication and supported our driver to stay focused and confident during every run. The track had both simple and challenging sections, so teamwork and coordination were very important. During the event, there were moments when our kart needed quick repairs and adjustments. We worked together, identified the issues, and fixed them as quickly as possible. These situations taught us the importance of staying calm, thinking clearly, and acting quickly as a team.

In rounds like acceleration, braking, and manoeuvrability, we carefully observed our performance and kept improving step by step. This helped us understand how the driver and the kart should work together smoothly. Our hard work paid off as we won five awards, including Best Women Team. We were also the first to complete the brake test, acceleration test, and technical inspection. Our kart was awarded the lightest vehicle, showing our focus on simple and efficient design. Overall, we grew stronger together.

TEAM ACCELARATORS

- 1. Ms. Konda Rohitha Varma**
- 2. Ms. Challa Ruchira Yadav**
- 3. Ms. Shivani Sonar**
- 4. Ms. Bhupathiraju Pavithra**
- 5. Ms. Kancharapu Renuka**
- 6. Ms. Mantri Hasini**
- 7. Ms. K Nandini**
- 8. Ms. A Shirisha**
- 9. Ms. N. Ravi Chandana**
- 10. Ms.T. Grishma Chowdary**
- 11. Ms. Priyadharshini**
- 12. Ms. Akshaya Goud**

COVER STORY – 2

Winners of TECHSYNAPSE GREENAMP 24-Hour National Level Hackathon



Team Members :

1. Ms. K. Vishalakshi

2. Ms. C. Kavya

3. Ms. R. Sarayu

(3rd year ECE)



Our team is thrilled to share our experience from the TECHSYNAPSE GREENAMP 24-Hour National Level Hackathon conducted by the Department of Electrical and Electronics Engineering at Geethanjali College of Engineering and Technology, Hyderabad, where we secured 1st place.

We developed an Elderly Health Monitoring System aimed at continuously tracking vital health conditions of elderly individuals and enabling caregivers to monitor real-time data for quicker response and better care. The hackathon was conducted in three rounds, each testing different aspects of innovation and implementation.

In the first round, we presented our idea, emphasizing the importance of continuous health monitoring and its role in handling emergency situations. After being shortlisted, we proceeded to the second round, where we built a working prototype using ESP32. We integrated sensors such as MPU6050 for fall detection, MAX30100 for heart rate and oxygen levels, DHT22 for temperature monitoring, and a GPS module for location tracking, along with an SOS feature and web application. In the final round, we demonstrated our solution. It was an intense and rewarding experience that strengthened our technical, teamwork, and problem-solving skills.

COVER STORY – 3

1st prize in SIH-Hardware Edition 2025 Grand Finale



Team Members:

- 1. Ms.K. Sphoorti**
- 2. Ms.I. Mounika**
- 3. Ms.D.S.S. Vaishnavi**
- 4. Ms.G. Yashaswini**
- 5. Ms.K. Yasaswini**
- 6. Ms.D. Vyshnavi**

(3rd year ECE)

Mentors:

Dr. Y. Alekhya
(Assistant Professor,
ECE)
Dr. T. Thammi Reddy
(Professor, ECE)

Our team developed a radiation- resilient CubeSat system designed to protect satellite operations from the harmful effects of solar flares and space radiation. CubeSats, while popular for their low cost and compact size, are highly vulnerable to radiation-induced issues such as bit flips, data corruption, unexpected resets, and communication failures, which can reduce satellite lifespan and cause loss of mission data. To address this challenge, we designed a fault-tolerant architecture using FPGA technology, which can later be extended into an ASIC for improved efficiency. The system continuously monitors radiation levels and detects anomalies in real time to prevent errors from affecting overall satellite performance.

Our design incorporates Error Detection and Correction (ECC) techniques to identify and correct bit-level errors, along with Fault Detection, Isolation, and Recovery (FDIR) mechanisms to stop faults from spreading through the system. During severe radiation exposure, the CubeSat automatically switches to a safe fallback mode where only essential operations are maintained while critical subsystems remain protected. This ensures stable functioning even under adverse space conditions.

During communication with the ground station, if corrupted data is detected, the system avoids transmitting unreliable information and instead stores it safely in onboard memory. Once the satellite exits the radiation-affected region and reaches the next communication window, the stored data is corrected and transmitted along with current data. This store-and-forward approach ensures data integrity and prevents information loss during radiation events.

Compared to existing CubeSats that mainly rely on slower software-based recovery methods, our approach provides faster hardware-level response, improved data protection, and reduced dependency on system resets. It also optimizes power usage by minimizing unnecessary reboots and maintaining stable operation during radiation exposure. Through this project, we gained valuable insights into space system design, radiation effects on electronics, and hardware-based fault tolerance. In the future, this system can be implemented as a dedicated ASIC, making it more power efficient and suitable for large-scale deployment in next-generation satellite missions.

COVER STORY – 4

1st Prize at Smart India Hackathon (SIH) 2025 Grand Finale

Team Members:

- 1. Ms.V. Akshaya Reddy**
- 2. Ms.S. Sai Sruthi**
- 3. Ms.Ch. Lakshmi Rasagna Priya**
- 4. Ms.K. Lakshmi Yasasvi**
- 5. Ms. R. Bhanu Sri Rathod**
- 6. Ms. S. Sathvika**

Mentors :

Mr K. Bhargav Ram

Mr K. Naresh

(3rd year CSE)



The Participating in the Smart India Hackathon (SIH) 2025 Grand Finale was a memorable and enriching experience. Our team developed "Gamified Learning Platform for STEM Subjects in Rural Areas (Classes 6–12)", with the aim of making STEM education engaging and accessible for students in rural schools through interactive learning.

We built the platform using HTML, CSS, and JavaScript. During the hackathon, we continuously improved the application by fixing bugs, optimizing the user interface, and incorporating suggestions from mentors and evaluators. One of the most valuable technical experiences was working under strict time constraints while making real-time modifications to the project. We learned how to debug efficiently, improve application performance, and ensure that all features worked smoothly before the final demonstration. This strengthened our skills in front-end development, problem-solving, teamwork, and time management.

Presenting our solution to the jury and receiving expert feedback helped us understand the importance of building user-centric applications and continuously refining them based on practical requirements.

The announcement of the results was an unforgettable moment, bringing immense joy and a sense of accomplishment. This achievement was made possible through the guidance of our mentors and the unwavering support of our institution. The SIH 2025 journey has inspired us to continue developing innovative technology-driven solutions that create a meaningful impact on society.

COVER STORY – 5

Participant at Dubai ISF Unicorn Summit

Experienced

(i) Global Startup Pitching Sessions

(ii) Networking with Entrepreneurs & Mentors

(iii) Innovation, Leadership & Startup Exposure



Ms.B. Hasini Reddy
(3rd year CSE)

Attending the Dubai ISF Unicorn Summit was an exciting and eye-opening experience for me. From the very first day, the event was filled with energy, ideas, and opportunities to learn. The startup pitching sessions were especially interesting, as I got to see innovative ideas from participants around the world and understand how they were evaluated based on creativity and impact.

The keynote speeches and panel discussions were equally inspiring. Listening to experienced entrepreneurs and industry leaders share their journeys, challenges, and success stories gave me a deeper understanding of what it takes to build a successful startup. It also motivated me to think bigger and more creatively.

One of the most memorable parts of the summit was the networking experience. I interacted with mentors, founders, and fellow students, and even received valuable guidance for my own startup idea, which boosted my confidence significantly.

Apart from the learning sessions, the event also included fun and cultural experiences like the desert safari and visits to iconic places such as the Museum of the Future.

Overall, the summit was a perfect blend of learning, exposure, and enjoyment, leaving me inspired and more confident about my future goals.

COVER STORY – 6

From Question to Solution:

Our Codestorm 2026

**Journey with a first place in
the Gen AI & LLMs category**



Team Members:

- 1. Ms. Vijaya Bhaskara Lakshmi Yeditha**
- 2. Ms. D Lakshmi Aishwarya**
- 3. Ms. T Grishma Chowdary**
- 4. Ms. K Seshadri Hansika**

(2nd year CSE)

Mentors:

Mr. M. Sugnan

(Assistant Professor, CSE)

Dr. M. Shanmuga Sundari

(Associate Professor, CSE)

Most people walk into a hackathon hoping to build something that works. We walked into Codestorm 2026 with a question: what comes next for us as students?

Thirty-six hours later, Team Vector Minds - Aishwarya, Grishma, Hansika, and I - walked out with first place in the Gen AI & LLMs category at Narsimha Reddy Engineering College. The event brought together participants from 52 engineering colleges across 5 states, with 500+ shortlisted competing in multidisciplinary teams. Clearing all 3 rounds and evaluations to come out on top among that many talented teams still feels surreal.

What made the difference wasn't just those 36 hours - it was what we carried into them. With strong support from our college, we stopped second-guessing and built without holding back, even at 2 AM when logic blurred and bugs fought back.

Our project, MentorX, reflects that mindset - a unified AI-powered platform that views a student's journey holistically. It offers personalized career roadmaps through intelligent assessment, smart mentor matching using multi-factor algorithms, and an adaptive study system that evolves with performance. Built with React, Vite, and TypeScript on the front end, and Tailwind CSS, Post CSS, shaden/ui, and Radix UI for styling and UI. It also integrates an AI chat with sentiment awareness, real-time opportunity matching, and health monitoring - because academic success cannot exist without well-being.

Codestorm wasn't just intense coding - it was an experience. From problem-solving to moments of pause, even a tug of war reminded us what teamwork truly means.

Standing on stage didn't feel like a sudden win - it felt earned. Grateful to our college, mentors, and each other. Codestorm gave us more than a win - it gave us clarity, confidence, and direction.

"An honest heart fears no truth."

COVER STORY – 7

First prize in Think, Create, Engineer Programme conducted by PALS, India

Participant at IIT Hyderabad Residential Workshop

Worked on

(i) Net Zero Energy Building Design

(ii) Renewable Energy & Waste-to-Energy Solutions

(iii) Sustainable and Smart Engineering Practices

Ms. C. Kavya

Ms. K. Vishalakshi

(3rd year ECE)



Grateful I am grateful for the opportunity to be a part of a three-day residential workshop at IIT Hyderabad, organized under the PALS India initiative by IIT alumni. It was a truly memorable experience that gave me a fresh perspective on engineering, innovation, and sustainable development.

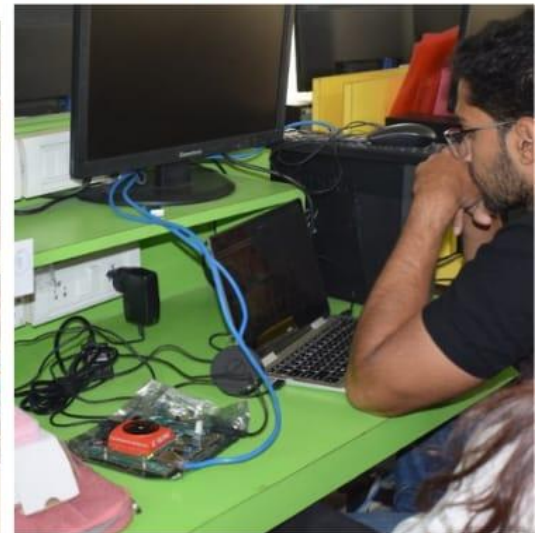
During the workshop, our team worked on designing a Net Zero Energy Building. We focused on reducing energy consumption by using renewable energy sources like solar power, incorporating waste-to-energy concepts, and applying smart building design principles. Through this project, I gained practical knowledge about sustainable engineering and understood how innovative solutions can be used to solve real-world environmental challenges. The hands-on activities and interactive sessions made the learning process even more engaging and helped me connect classroom concepts with practical applications.

One of the best parts of the workshop was working as a team. We discussed ideas, shared different perspectives, and solved challenges together. The guidance and encouragement from the mentors and IIT alumni motivated us to think creatively and approach problems with confidence. This experience not only improved my technical understanding but also strengthened my teamwork, communication, and critical thinking skills.

A proud and unforgettable moment for our team was winning First Prize for our project. This achievement made all our hard work worthwhile and encouraged us to continue exploring innovative ideas that can contribute to a more sustainable future.

Overall, this workshop was much more than just a learning program. It was an inspiring journey that boosted my confidence, expanded my knowledge, and encouraged me to think beyond textbooks. I sincerely thank PALS India, IIT Hyderabad, the mentors, and the organizers for giving us such a wonderful opportunity to learn, collaborate, and grow. I will always cherish this experience and the valuable lessons I gained throughout the workshop.

“Every mistake is a lesson wearing a disguise.”



Collective Spotlight – Message from President, SAC



I am Itta Sarah Samyuktha from the Department of Computer Science Engineering, and I have had the privilege of serving as the President of the second Student Affairs Council (SAC) at our college. Having previously been a student member in the very first SAC, this journey has been especially meaningful-growing from being part of the foundation to now leading the council. The Student Affairs Council was created to give students a space to explore their potential beyond the classroom. It acts as a vital bridge between students, faculty, and the administration, ensuring better communication, collaboration, and understanding across all levels. SAC serves as a platform where students can take ownership of initiatives, work as a team, and bring ideas to life. Being a part of SAC is not just about organizing events-it is about learning responsibility, building confidence, and experiencing growth through real-world challenges.

During our tenure, we had the opportunity to co-host Milan and organize our annual techno-cultural fest, *Synergia 2026 – The Legacy Reborn*. Synergia stands as a celebration of talent,

innovation, and unity, bringing together students from diverse backgrounds onto one vibrant platform.

The previous SAC set a strong benchmark with their vision and execution, and as the second council, we carried forward that legacy with great responsibility. Today, we are proud to say that we have risen to that benchmark, building upon it with our own ideas, efforts, and achievements.

Organizing Synergia 2026 was an ambitious and rewarding experience. This edition witnessed participation from 65+ colleges, making it one of the most expansive editions yet. With over 40 stalls, 10 technical events, 5 cultural events, and 4 workshops, the campus was transformed into a hub of energy and creativity. One of the major highlights was the Drone Expo, which drew immense attention and excitement from participants and visitors alike.

From conceptualization to execution, every aspect of the fest was driven by students. It involved meticulous planning-designing event structures, managing logistics, building partnerships,

coordinating teams, and ensuring seamless execution. Alongside leading the council, I also had the opportunity to anchor various events as part of Synergia, which allowed me to connect with the audience and contribute to the fest in a more dynamic and engaging way. While there were challenges along the way, each obstacle became an opportunity to learn, adapt, and grow stronger as a team.

While I had the responsibility of leading the council and guiding the vision, the true success of our tenure lies in the collective effort, passion, and dedication of every SAC member. Their commitment and resilience turned ideas into reality.

I am deeply grateful to our Principal Ma'am, Vice-Principal Sir, Malathi Ma'am, and our faculty mentors for their constant support, guidance, and belief in us. Together, we didn't just organize events- we strengthened a culture of leadership and created experiences that will inspire many more to come.

**Ms. Itta Sarah
(22 Batch)**



TECHNICAL TRENDS – From Faculty

Synergistic Integration of Blockchain and AI for Healthcare Systems

Blockchain and AI are changing the healthcare industry by addressing big problems such as data security, inefficiency, and interoperability. Healthcare systems create a lot of private information, such as patient records, diagnostic reports, and data from wearable devices. This information, on the other hand, is often broken up and easy to hack. Blockchain is a safe and decentralized way to store medical information. It keeps data secure from tampering and allows only authorized users to view it, increasing trust and transparency.



Fig 1. Integration of Blockchain and AI in healthcare system

Artificial intelligence makes blockchain better by letting you intelligently analyse healthcare data. AI algorithms can look through huge amounts of data to find diseases early, look at medical images, and suggest treatments that are right for each person. It is used a lot in predictive analytics, drug discovery, and clinical decision-making, which helps doctors make diagnoses faster and more accurately. AI makes healthcare systems much better by reducing human error and automating complicated tasks. This leads to better patient outcomes and more efficient operations.

Blockchain and AI work together to make a strong and safe healthcare system. Blockchain protects data and keeps it private, while AI finds useful information in that data.

This integration makes it safer for hospitals to share data, makes it easier to find fraud in medical billing, and makes clinical research more reliable. It also lets AI systems work together without having to share data, which keeps patient privacy while still allowing for new ideas. Also, adding new consensus mechanisms to the system to make blockchain more scalable.

In the future, smart healthcare systems, remote patient monitoring, and global health data networks will be powered by the combination of blockchain and AI. Even though there are problems with scalability, rules, and high implementation costs, this combination is making the healthcare system safer, more efficient, and more focused on patients. As technology keeps changing, blockchain and AI will be very important in shaping the future of digital healthcare.

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Machine Learning Optimized VO₂ Metamaterial Absorber for THz Biomedical Sensing and Cancer Detection

Abstract: This work presents a reconfigurable terahertz metamaterial absorber (MMA) based on vanadium dioxide (VO₂) utilizing its thermally induced phase transition. The absorber adopts a Metal–Insulator–Metal (MIM) structure with VO₂ closed hexagonal ring resonators, a paper substrate, and a gold ground plane. It achieves near-perfect absorption of 99.99% at 4.667 THz with a bandwidth of 0.204 THz. The resonance frequency shifts with refractive index variations, providing sensitivities of 0.195–0.255 THz/RIU. This enables detection of multiple cancer cell types including breast, cervical, blood, tongue, adrenal gland, and skin cancers. Machine learning is used to optimize design parameters and accurately predict absorption characteristics, enhancing sensing performance.

1. Layout of the THz Absorber

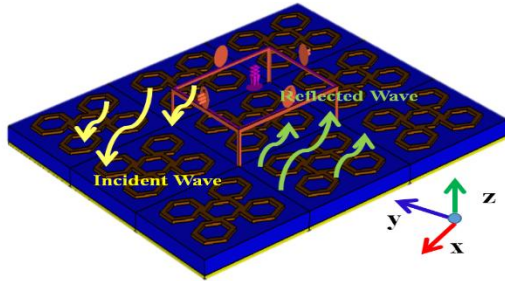


Fig. 1(a) THz absorber Right-handed coordinate system showing incident ($-z$) and reflected ($+z$) THz waves

Fig. 1 (a) shows the 3D perspective layout of the proposed VO₂ based MMA with coordinate axes, demonstrating the interaction of incident terahertz waves with the absorber array. Fig. 1(b) depicts the geometry, layer composition, and EM response of VO₂ based metamaterial absorber. Fig. 1(c) illustrates the cross-sectional schematic of the three-layered configuration comprising the VO₂ CHRR layer, a paper substrate, and a gold

ground plane with corresponding thicknesses of t_p , h , and t_g .

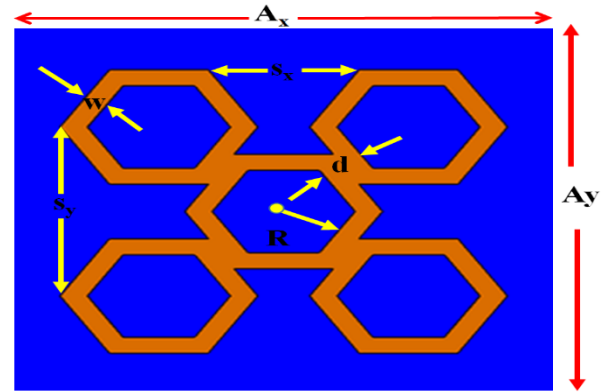


Fig.1(b) THz absorber CHRR Unit cell Layout

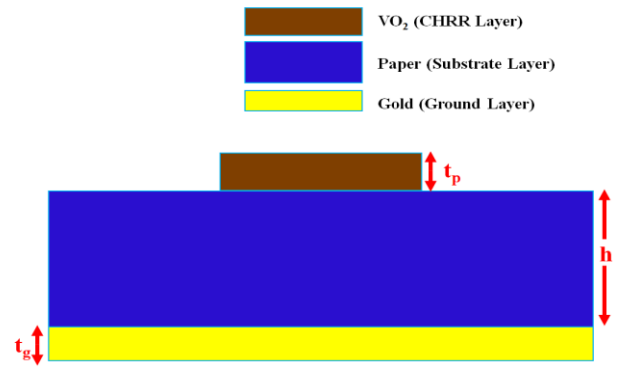


Fig. 1(c) THz absorber Side-view of MMA unit cell

2. Efficiency Assessment Standards for Predictive Models

The flowchart in Fig. 2 illustrates a framework based on machine learning for predicting the performance of the MMA. Initially, a high-fidelity parametric modeling of absorber elements is performed, and the data is collected from CST simulations. A synthetic dataset is generated to form the source dataset, which is then splitted into training (20%) and testing (80%) sets for supervised learning. Various regression approaches including Random Forest, Gradient Boost, XGB, Decision Type Tree, and Extra Tree Regressors are trained on the training data to generate predictions.

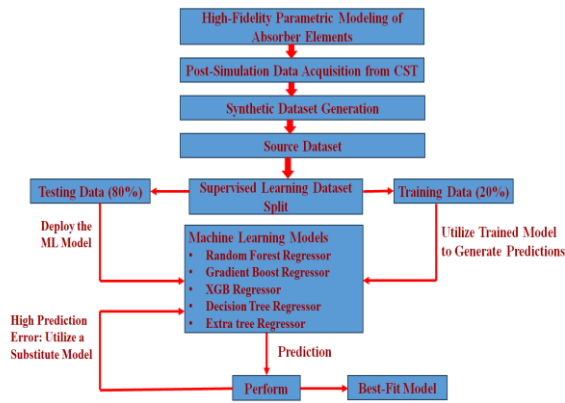


Fig. 2 Flow chart related to optimization technique procedure

The bar chart representation in Fig.3 compares the performance of five regression models like Decision Tree model, Random Forest model, Gradient Boosting model, Extra Trees model, and XGB Regressor model using key error metrics and scores. It displays Mean Absolute Error (MAE) value, Mean Squared Error (MSE) value, Root Mean Squared Error (RMSE) value, R^2 value, and Variance of each model.

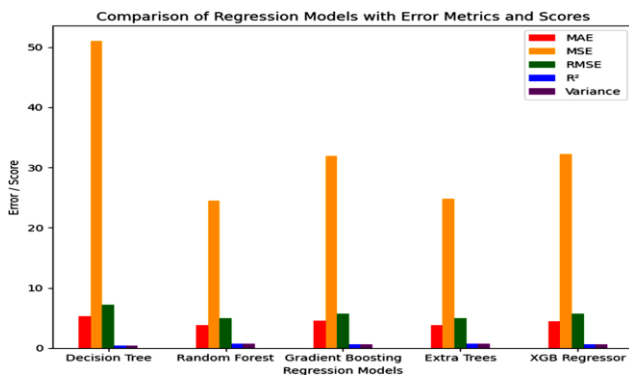


Fig. 3 Performance comparison among regression models error scores and metrics

Reference

<http://linkedin.com/in/dr-k-vasu-babu-856a2616b>

Dr. K. Vasu Babu,
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Efficient SC-MCC Test Case Generation Using a Meta-Program Approach

Introduction

Ensuring software reliability is essential in modern computing systems, particularly in safety-critical domains such as automotive software, healthcare devices, and embedded control systems. Structural testing techniques help verify whether internal decision logic in programs is thoroughly exercised. Among these techniques, Short-Circuit Multiple Condition Coverage (SC-MCC) is especially effective for detecting hidden logical faults.

To improve the efficiency of SC-MCC test-case generation, this research proposes a Meta-Program Generator (MPG) framework that works with a Dynamic Symbolic Execution (DSE) engine to enhance structural testing performance.

Proposed Methodology

Traditional symbolic execution approaches generate multiple intermediate program representations for evaluating SC-MCC coverage. Each representation must be executed separately, which increases execution time and computational complexity. To overcome this limitation, the proposed methodology introduces a single Meta-Program generation strategy. In this approach, SC-MCC sequences corresponding to predicates are embedded directly into the source program using assertion statements. These assertions guide the symbolic execution engine to explore meaningful execution paths efficiently.

Instead of executing several annotated program versions repeatedly, the Meta-Program Generator integrates all SC-MCC sequences into one executable meta program. The symbolic execution engine KLEE then analyzes this program in a single execution workflow and

computes the SC-MCC score based on feasible sequences discovered during execution.

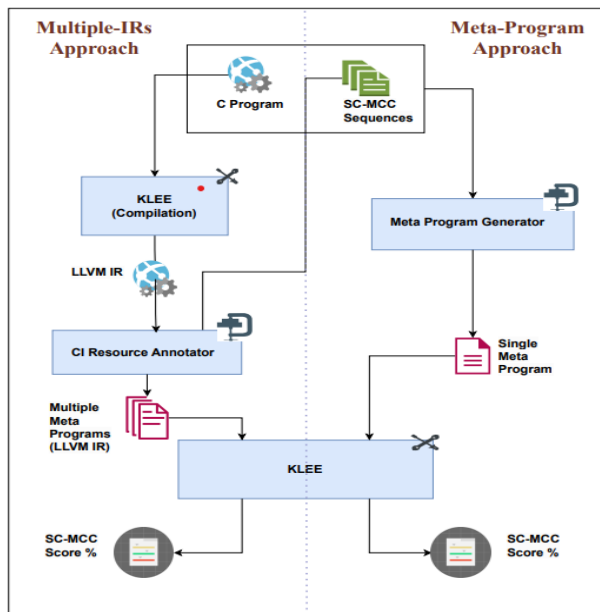


Fig.1. Framework comparison between Multiple-IR approach and Meta-Program approach.

In Fig.1, the architecture highlights how the proposed approach simplifies the testing workflow by replacing multiple intermediate executions with a single structured meta-program execution. Here, the Meta-Program Generator automatically inserts SC-MCC sequences before corresponding predicates using assertion statements. These assertions help the symbolic execution engine systematically explore feasible execution paths and identify valid SC-MCC sequences required for coverage computation. By guiding path exploration through assertion-based constraints, the proposed framework improves symbolic execution efficiency and simplifies structural coverage evaluation compared to traditional techniques.

Experimental Results (Summary):

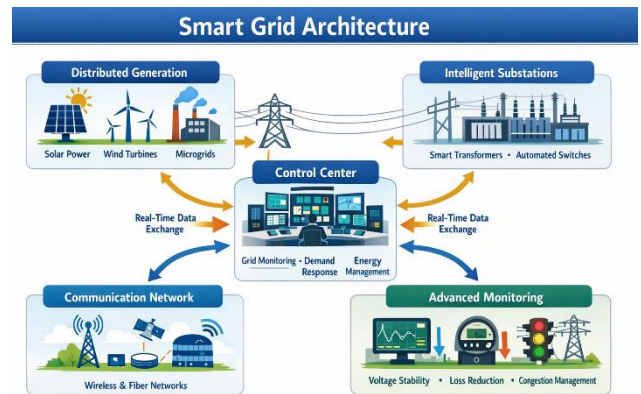
The effectiveness of the Meta-Program approach was evaluated using 75 benchmark programs from the Rigorous Examination of Reactive Systems (RERS) dataset.

The experimental study demonstrated that:

- the Meta-Program approach generated more feasible SC-MCC sequences in 41 out of 75 programs
- symbolic execution explored more execution paths within the same timeout

Although the execution time increased slightly due to the larger size of the generated meta program, the improvement in feasible sequence detection makes the approach more effective for automated structural testing. Overall, the results confirm that the Meta-Program Generator enables better exploration of decision logic compared to traditional Multiple-IR approaches.

Research Impact



The proposed Meta-Program Generator framework improves symbolic execution-based testing by enabling efficient SC-MCC sequence generation within a single execution workflow. This contributes to enhanced fault detection capability and supports the development of reliable software systems used in safety-critical applications.

Reference:

<https://sl1nk.com/tobe9w9>

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Intelligent Optimal Power Flow for Smart Grids: Meta-Heuristic Approaches and Emerging Trends

The evolution of traditional power systems into smart grids has revolutionized energy management through digital control, automation, and real-time communication. A smart grid integrates distributed generation, intelligent substations, and advanced monitoring systems to achieve coordinated operation between supply and demand. Within this framework, Optimal Power Flow (OPF) serves as a key analytical tool to determine the most economical and technically feasible operating conditions, ensuring system reliability and efficiency.

Smart Grid Architecture:

The conceptual architecture comprises distributed generation units, intelligent substations, communication networks, and automated control centers. These components exchange real-time data to maintain voltage stability, minimize losses, and manage congestion. Two-way communication enables adaptive decision-making and supports automated energy management, forming the backbone for intelligent OPF implementation.

Smart Grid-Based OPF Framework

The OPF model in smart grids integrates multiple generation sources and flexible loads under operational constraints. Its objectives include minimizing generation cost, reducing transmission losses, improving voltage profiles, and enhancing system security. Due to the nonlinear and large-scale nature of power flow equations, meta-heuristic optimization techniques—such as evolutionary algorithms and swarm intelligence—are employed to efficiently locate global optima.

Role of Meta-Heuristic Optimization

Meta-heuristic algorithms excel in handling complex, multi-objective, and constrained optimization problems. Their adaptive search

mechanisms prevent entrapment in local minima and ensure robust convergence, making them ideal for dynamic smart grid environments. These methods enhance real-time dispatch and system resilience.

Emerging Research Directions

Recent advancements emphasize AI-driven predictive OPF, IoT-enabled monitoring, cloud-based energy management, electric vehicle integration, and cyber-secure communication frameworks. These innovations promote decentralized control, self-healing capabilities, and improved grid flexibility.

Conclusion

Smart grid-oriented OPF using meta-heuristic optimization represents a transformative approach to intelligent power system management. By combining advanced communication, real-time monitoring, and adaptive optimization, future smart grids will achieve superior reliability, efficiency, and sustainability.

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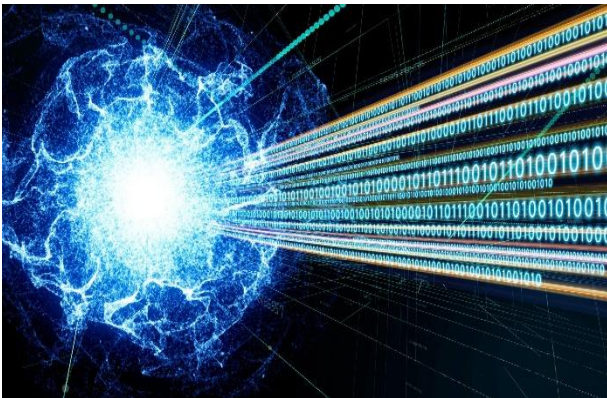


Future of Quantum Computing

Introduction

Quantum computing is one of the most revolutionary advancements in modern technology. Unlike classical computers that process information using bits (0 and 1), quantum computers use qubits, which can exist in multiple states simultaneously through superposition. Another important concept, entanglement, allows qubits to be interconnected, enabling powerful computations.

This emerging technology is expected to transform industries such as healthcare, cybersecurity, artificial intelligence, and finance.



What is Quantum Computing?

Quantum computing uses principles of quantum mechanics to process information.

- **Superposition:** A qubit can exist in multiple states at once.
- **Entanglement:** Qubits are interconnected and influence each other.

These properties make quantum computers far more powerful than classical systems for specific tasks.

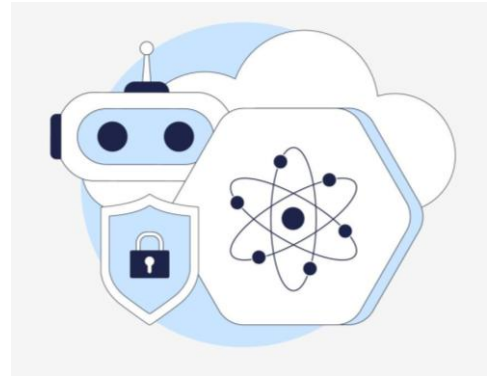
Drivers of Growth

The rapid development of quantum computing is driven by:

- Advances in quantum hardware
- Increasing demand for high-performance computing
- Investments by companies like IBM, Google, and Microsoft
- Growth in quantum algorithms and tools.

Applications of Quantum Computing

1. **Cybersecurity:** Enables ultra-secure communication
2. **Healthcare:** Helps in drug discovery and disease prediction
3. **Artificial Intelligence:** Improves optimization and learning models
4. **Climate Research:** Enhances environmental predictions



Benefits of Quantum Computing

- Faster problem-solving capabilities
- Ability to handle complex data
- Drives innovation across industries
- Supports advanced research and development

Conclusion

Quantum computing is rapidly evolving from a theoretical concept into a practical technology with real-world impact. It will complement classical computers in solving complex problems more efficiently. This advancement will create new opportunities in fields like healthcare, cybersecurity, and artificial intelligence.

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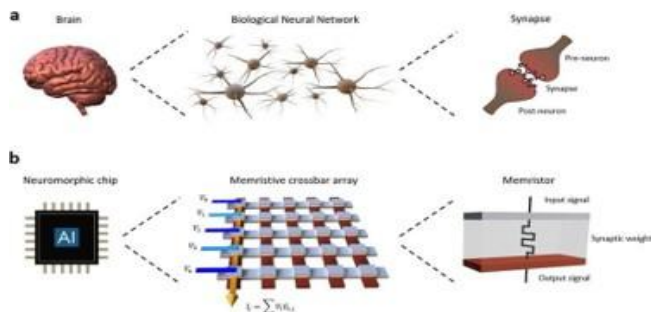


TECHNICAL TRENDS – From Students

Neuromorphic Computing

Neuromorphic computing mimics the structures and functions of the human brain. It uses artificial neurons and synapses to process information in an event-driven way.

Spiking Neural Networks (SNNs) model neurological and biological mechanisms. These are artificial neural networks made up of spiking neurons and synapses. Neurons work through axon charge, delay, and threshold values that are programmed into the system. Synapses serve as pathways connecting neurons, with weighted values. The setup uses transistor-based synaptic devices and circuits to send electrical signals. When the neuron charge reaches the threshold value, it fires pulses; if not, the energy dissipates. These devices are made from silicon and CMOS. Neurons use Ferro-electric, phase-changing materials, and memristors.



Neuromorphic computing architecture inspired by a human brain. (a) The brain computing architecture, built from the collection of neurons, is interconnected by synapses. (b) AI chips developed from brain-inspired architecture using memristors as artificial neurons interconnected in a crossbar array to mimic synaptic connections. Stanford University created a multichip system that simulates 1 million neurons and billions of synaptic connections. The TMEC Research Hub developed a self-learning Neuromorphic chip. Algorithms

used include deep learning, evolutionary algorithms, graphs, plasticity, and reservoir computing. Benefits include adaptability, energy efficiency, high performance, and parallel processing. Challenges involve decreased accuracy, lack of benchmarks, no standards, limited software, and a steep learning curve. Use cases include autonomous vehicles, cyber security, Edge AI, pattern recognition, and robotics.

Neuromorphic computing marks a major shift from traditional computing. It draws direct inspiration from biology, leading to faster, energy-efficient, and intelligent processing for next-generation applications.

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Clean Tide AI: A Conceptual Approach for Microplastic Detection in Oceans

Did you know? India is one of the world's top contributors to marine plastic and microplastic pollution, frequently ranking 2nd globally in annual ocean plastic emissions and within the top 4 for microplastic releases into waterways. For this issue an AI-based coastal microplastic detection system is proposed which is inspired by bio-inspired robotic concepts like Gillbert, but adapted for Indian coastal deployment. The system will use

optical sensors and turbidity sensors to capture water particle data then apply AI-based image classification to identify microplastic particles and generate real-time microplastic density mapping to enable targeted recovery and recycling streams. The system detects the pollution hotspots, and cleanup agencies can use this data to collect the



microplastics efficiently.

This Coastal system reduces microplastic accumulation across India's 7,500+ km coastline in real time, protects marine biodiversity, restores healthier ocean ecosystems, safeguards coastal fisheries and reduces human health risks linked to microplastic contamination in food and water. Current advancements in AI-based image recognition, low-cost water quality sensors, and microcontrollers make this idea technically feasible. India's strong IT ecosystem and marine research institutions provide technical and research support for validating coastal deployment feasibility. The system reduces manual effort and enables data-driven environmental management. Beyond detection, our system can evolve to predict microplastic pollution patterns using AI and ocean data, enabling preventive cleanup strategies. By bridging the gap between advanced AI and local ecological needs, Clean Tide AI offers a scalable blueprint for restoring India's blue economy and protecting our precious marine biodiversity for

generations to come. Current coastal systems only focus on the visible plastic waste but the CLEAN TIDE AI mainly focuses on invisible plastic waste which remain undetected.

References:

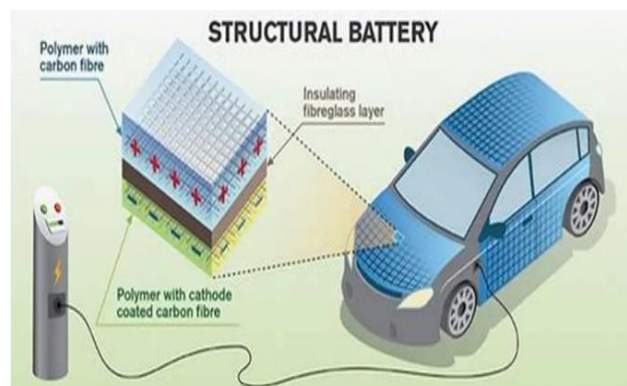
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Ms. J. Aishwarya
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Structural Battery Composites: The Future of Smart Energy Storage

Imagine a battery that not only stores energy but also becomes a part of the structure it powers. This is the idea behind Structural Battery Composites (SBCs), an emerging innovation that combines mechanical strength with energy storage. Unlike traditional lithium-ion batteries, SBCs integrate directly into load-bearing components, allowing structures themselves to act as energy storage systems. In electric vehicles (EVs), batteries are bulky components added to the vehicle. However, with SBCs, parts like body panels can store energy while also providing structural support.



These panels, often made from carbon fiber and epoxy resin, are lightweight yet strong. This dual functionality reduces overall weight while maintaining durability, which is crucial for improving performance. A reduction in vehicle weight by even 10% can improve fuel efficiency by 6–8% and increase EV range substantially.

In addition to transportation, SBCs have potential applications in aerospace, consumer electronics, and renewable energy systems. Researchers are continuously working to enhance the energy density and mechanical performance of these composites to make them more practical for widespread use. Although still in the developmental stage, ongoing innovations suggest that SBCs could play a key role in the future of sustainable engineering and design.

Overall, Structural Battery Composites represent a promising step toward smarter, lighter, and more efficient energy solutions. As technology advances, SBCs could reshape how we think about both batteries and the structures that depend on them.

Reference:

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Ms. Nasreen Umar
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Self-Healing Power Electronics: The Future of Fault-Tolerant Electrical Systems

The rapid development of electrical systems requires higher reliability, efficiency, and tolerance

to faults. Self-healing power electronics is a newly developed technology that allows electrical systems to automatically detect, isolate, and recover from faults without any external assistance. This technology is a major step towards fault-tolerant and intelligent power systems. For self-healing systems, advanced sensors are used in combination with real-time monitoring systems to sense abnormalities in a system, including short circuits, degraded components, or excessive temperatures. If a fault in a system is detected, self-healing systems can automatically change their mode of operation to restore normal working conditions. Additionally, self-healing systems can use smart materials to physically repair damaged circuits. Electricity and Electronics Engineering rely heavily on applications such as smart grids, electric vehicles, renewable energy systems and automatic industrial control. For example, in a power grid, if there were a fault, a self-healing system would reroute the electrical supply automatically with minimal power loss or outage while also enhancing the reliability of the grid. In addition, EVs and/or electric power converters will increase safety and extend the lifespan of these



devices.

Even though it has the power to revolutionize new power systems, several challenges, such as high implementation costs, system complexity, and issues integrating new technologies into existing infrastructure, remain. As technology continues to

develop, especially in the fields of artificial intelligence, embedded systems, and nanotechnology, innovative self-repairing power electronics will transform the way we think about the built environment as it relates to future electrical infrastructure.

Ultimately, this technology represents an opportunity to create smarter, more durable, and independent electrical infrastructures.

Reference:

Meteab, F., Tousi, B., & Omran, M. (2025). Efficient self-healing framework for smart distribution networks. Scientific Reports, 15(1), 31124.



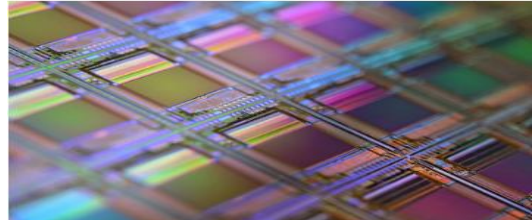
Ms. Harshitha Kanumuri
EEE 3rd Year

Glass-Based Quantum Chips: An Innovation in Safe Communication

Glass-based quantum chips are a significant step toward ultra-secure communication and high-speed computing, thanks to recent developments in quantum technology. These chips process and transmit information using light (photons), in contrast to conventional silicon chips that rely on electrical signals. Laser-written waveguides inside glass, which precisely direct light, are the breakthrough. This makes it possible to build small, three-dimensional optical circuits. Because of this, these chips provide better energy efficiency, increased stability, and reduced signal loss when compared to traditional systems.

Enabling quantum key distribution (QKD), a very secure communication technique, is a major accomplishment of this technology. Any attempt to

intercept the data can be immediately identified because it is based on quantum physics rather than conventional encryption. These chips have many uses outside cybersecurity, such as the creation of the



quantum internet, safe satellite communication, and sophisticated data centers. They are appropriate for practical use because they are compatible with current fiber-optic networks. To sum up, glass-based quantum chips are a potent invention that has the potential to revolutionize data processing and security, opening the door to a more secure and sophisticated digital future. The content of this article is supported by recent research findings and reliable sources in the field of quantum technology.

Reference:

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Smart Grids with AI Integration: Powering an Intelligent Future

Imagine a world where power interruptions are rare, electricity is used wisely, and energy flows exactly where it is needed. This vision is gradually becoming a reality as smart grids powered by Artificial Intelligence (AI) rise. Traditional power

systems operate in a linear, somewhat inflexible way. Electricity is generated at power plants and sent to consumers. While these systems function, they often face problems with inefficiency, overloads, and unexpected outages.

Smart grids offer a better approach. By using sensors, smart meters, and smooth digital communication, they create an interconnected network that can monitor and manage electricity in real time. Adding AI brings a new level of intelligence to this system. AI can quickly process large amounts of data and make informed decisions with great accuracy. It can predict electricity demand at different times and adjust supply accordingly.

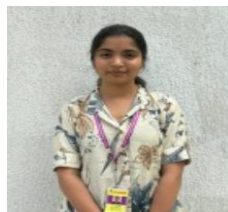
This improves efficiency and cuts down on unnecessary energy use. One of the most impressive features of AI-driven smart grids is their ability to predict problems. Instead of just reacting to faults, they can spot potential issues ahead of time and take corrective action, which greatly lowers the risk of large-scale blackouts. They also help integrate renewable energy sources like solar and wind, despite their variable nature.

In the end, smart grids combine innovation and sustainability. As our need for electricity keeps growing, these smart systems offer a future that is not only efficient and reliable but also designed for the greater good.

Reference:

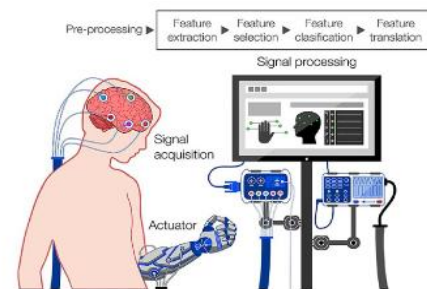
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Ms. Harshini Chittem
EEE 3rd Year



Brain Computer Interfaces: Connecting Mind and Machine

Brain-Computer Interfaces (BCIs), also called neural interfaces or direct brain interfaces, are a new and growing technology that lets people interact directly with devices outside of their brains. BCIs don't use keyboards, screens, or even spoken commands to read brain activity and turn it into machine language. BCIs, on the other hand, let people control things like computers and prosthetic limbs with just their minds. This is a huge step forward in how people have used technology and devices in the past. BCIs read and translate electrical signals from the brain.



Sensors that are either non-invasive and connected to an electroencephalography (EEG) headset or invasive and implanted directly into the brain for better accuracy can pick up on the brain's electrical activity. Then, complex algorithms and programs process the activity and turn it into a command. BCIs serve as a link between thought and action. In the medical field, BCIs are used the most and the best. BCIs are helping people who are paralyzed or have other brain disorders get some of their communication and independence back.

Neuralink and Synchron are two of the most important companies working on BCIs. They have done human trials that have shown that people can control devices with just their brains. BCIs could

change the medical field and the computer industry by making it easier and faster for people to use devices and technology. But one of the biggest problems with BCIs is the risks of surgery and the moral issues that come with keeping data safe and private. BCI technology is a big step forward and a big step toward a future where people and machines are closely linked!

Reference:

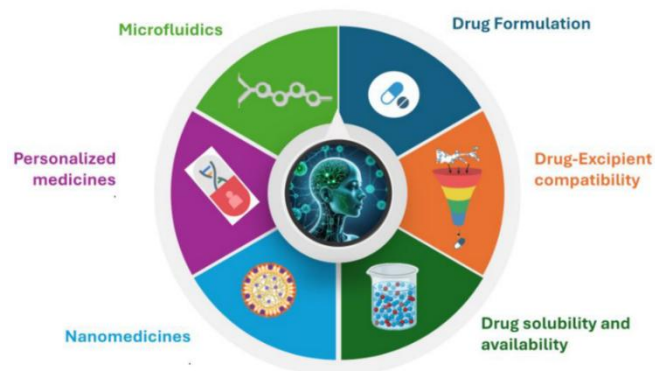
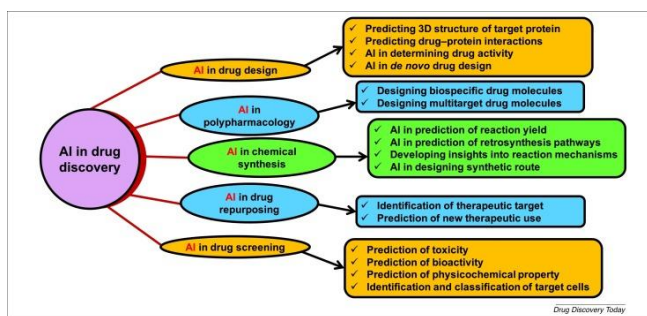
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Ms. Ch. Bhanu Teja
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Artificial Intelligence in Drug Discovery: Revolutionizing Modern Pharmaceutical Research

Artificial Intelligence (AI) is transforming drug discovery by making the process faster, cheaper, and more efficient. Traditional drug development is expensive, often taking over a decade and billions of dollars, while most drug candidates fail during clinical trials. AI helps overcome these challenges by analyzing vast chemical spaces containing more than 10^{60} possible molecules and identifying promising drug candidates. AI techniques such as machine learning (ML) and deep learning (DL) are widely used in virtual screening, drug design, toxicity prediction, and drug repurposing. Tools like QSAR models, DeepVS, and DeepDTA predict molecular properties, drug–target binding affinity, and biological activity.



AI also improves prediction of physicochemical properties such as solubility, permeability, and lipophilicity, which are essential for drug effectiveness. In drug screening, AI models including support vector machines, random forests, and deep neural networks help identify compounds with high efficacy and low toxicity. AI-based tools such as DeepTox, pkCSM, and admetSAR predict toxicity and ADMET properties, reducing dependence on costly laboratory and animal testing. AI also plays a major role in protein structure prediction and drug–protein interaction analysis. Platforms like AlphaFold accurately predict 3D protein structures, enabling structure-based drug design. Additionally, AI supports drug repurposing by identifying new therapeutic uses for existing drugs. Modern AI-driven de novo drug design systems generate entirely new molecules with desired properties and suggest efficient synthesis routes. Overall, AI accelerates

pharmaceutical research, reduces costs, improves prediction accuracy, and increases the likelihood of discovering safer and more effective drugs.

Reference:

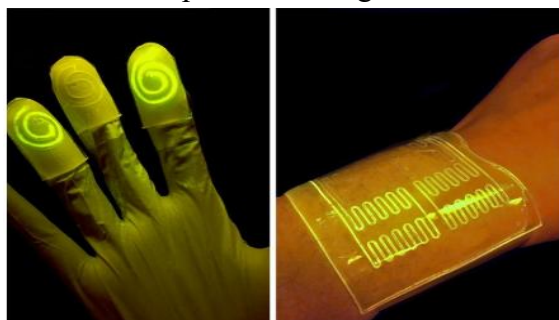
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Living Sensors: When Biology Becomes Technology

What if the most powerful sensor in the world was not made of silicon but of living cells? This is the idea behind living sensors, an innovation that combines synthetic biology with the Internet of Things (IoT). Traditional sensors detect physical signals like heat, pressure, or light.



Living sensors take this further. Scientists engineer microorganisms, such as bacteria or yeast, to respond to specific chemical or biological signals, including pollutants, toxins, or disease markers. When these cells detect a target, they produce measurable outputs like light or electrical signals. These outputs can be captured and transmitted through IoT systems for real-time monitoring.

Recent research is pushing this technology beyond laboratories. Scientists are developing systems that can monitor soil nutrients for smarter agriculture and even detect early signs of disease within the human body. Advances in gene editing and micro-scale devices are making these sensors more precise, flexible, and ready for real-world use. The potential applications are vast. Cities could monitor air quality continuously, farms could track soil health dynamically, and healthcare systems could focus on early and personalized diagnosis. These systems can also be integrated into wearable or flexible devices for continuous health monitoring. Living sensors represent more than just a technological upgrade. They mark a shift toward systems that work with nature rather than against it. After all, biology has spent billions of years perfecting detection; we are only beginning to understand its potential.

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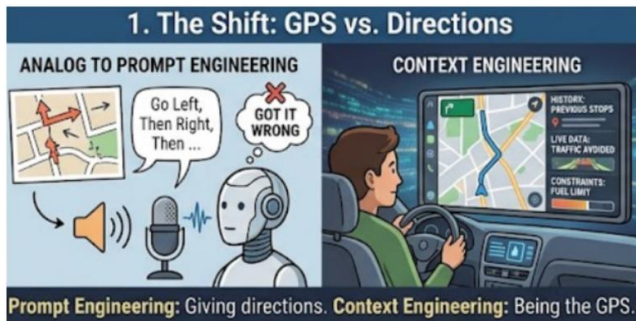
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Context Engineering

You gave the AI all the right instructions and created the perfect prompt. Still, you got the wrong answer. It is clear already in 2026 that it is not about how you ask the question but about the availability of the information available to the AI. The Era of

Prompt Engineering is over; it was replaced by Context Engineering.



Where prompt engineering (2023-24) focused on "whispering" to the AI, Context Engineering is a scalable skill focused on the nature and structure of information provided to the AI. In Andrej Karpathy's words, it is "the art of filling the context window—the finite memory buffer of the AI with the precise set of information it needs for the next step." Four Core Mechanisms When building reliable systems, engineers use four core tools:

Retrieval: Dynamic retrieval of only the relevant information.

Compression: Condensation of historic information to keep only the high-signal parts (for example, the Claude auto-compact functionality).

Isolation: Preventing "bleed-through" between subtasks in different agents.

Offloading: Storing the bulk of the data in external systems while accessing it only when necessary.

Why Context Will Be the New Moat

As models are getting more and more intelligent, the competitive advantage lies in the way organizations architect their context. Companies with advanced context architecture skills have noted up to 40-60% shorter code reviews. On the other hand, bad architecture results in "context rot" or "context poisoning," where hallucinations corrupt memory and lead to degradation. Moving

forward towards multi-agent system coordination, such as in MCP protocol, the management of the information supply chain called "ContextOps" will be the new DevOps. Future engineers will no longer be judged on the basis of how well they write prompts. Instead, they will be evaluated based on their context architecture skills. The Insight: whoever controls the context defines the actions of the AI. Therefore, the crucial question is not "how do I get the right prompt?" but rather "what am I allowed to show my AI?"

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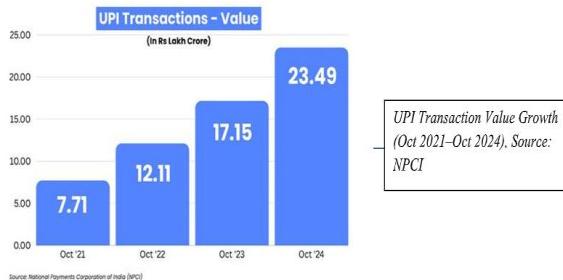
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UPI: From Tea Stalls to Global Halls

We all use UPI almost every day, to split a bill, pay at a tea stall, or send money home. But have you ever stopped to think about how revolutionary this little app actually is? The Unified Payments Interface (UPI), launched in 2016 by the National Payments Corporation of India (NPCI), lets you transfer money instantly between bank accounts using just your phone, no card, no cash, no hassle. But what makes UPI truly special is how far it has come. As of August 2025, UPI processed over 2,000 crore transactions worth ₹25 lakh crore in a single month, that's an average of nearly 7,500 transactions every second. Today, UPI accounts for 84% of all digital payments in India and handles nearly 49% of global real-time digital transactions.

The IMF itself has officially recognized UPI as the world's largest real-time payment system, surpassing even Visa.



To put this growth in perspective, UPI's monthly transaction value tripled from ₹7.71 lakh crore in October 2021 to ₹23.49 lakh crore by October 2024, according to NPCI data, and the numbers have only gone up since. And now, the world wants in. Countries like Singapore, UAE, France, Qatar, Nepal, and Cyprus have already adopted UPI, and Canada and the UK are next in line. NPCI is even helping nations like Peru and Namibia build their own UPI-like systems from scratch. From an engineering perspective, UPI's open API architecture and zero-fee interoperability are what make it truly brilliant. It has also unlocked AI-powered credit scoring and smart fraud detection across India's fintech space.

India built something the world couldn't and then shared it freely. That's innovation at its finest.

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Spatial Computing: The Next Interface After Screens

The development of spatial computing and how it is likely to revolutionize the way we interact with the world. Instead of interacting digitally using a keyboard, screen or mouse, a user will interact digitally using gestures, voice, and/or eye movements in three dimensional (3D) space. At the heart of spatial computing is the combination of augmented reality (AR), virtual reality (VR), and mixed reality (MR). With devices such as Apple Vision Pro, users can look at physical locations in real time while manipulating virtual objects, thus creating an enhanced experience for users in comparison to traditional flat screen displays.



With each charge and discharge cycle, batteries create minute cracks that degrade the battery's performance. But with self-healing materials, these cracks "heal" on their computing is in creating virtual workspaces for work and collaboration where multiple users can work with three-dimensional (3D) representations of actual objects, as well as hold meetings and develop ideas in real time regardless of geographic locations. In education and training, learners can explore and experiment with 3D representations of complex subjects such as human anatomy or engineering designs through interactive simulations. There are additional ways in which spatial computing will be

useful in transforming the way that companies do business in sectors such as: healthcare, retail stores, and the entertainment industry. For example, a surgeon can use spatial computing to visualize what they will do before performing the actual surgery; in the retail sector, stores can provide customers with a way to interact with their products prior to purchasing them. There are, however, challenges associated with the adoption of spatial computing, such as high cost of devices; low battery life; and privacy issues. Even though there are challenges associated with spatial computing, advancements will increase quickly.

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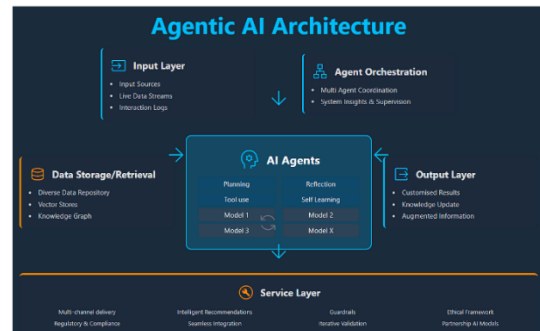
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Agentic AI: The AI That Doesn't Wait to Be Asked

We've all gotten used to asking AI a question and reading the answer back. Useful, yes but you're still doing the thinking. The AI is just helping you phrase it. That changed quietly in late 2025. AI stopped waiting to be asked. Welcome to the era of Agentic AI arguably the biggest leap in artificial intelligence since ChatGPT first stunned the world. So what makes it "agentic"? Think of assigning a task to a capable intern. You give them a goal, not a script and they figure out how to get there, hit roadblocks, find workarounds, and deliver results. Agentic AI works exactly the same way.

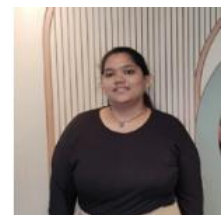


Given an objective, it acts autonomously across as many steps as needed: browsing the web, writing code, calling external services, and coordinating with other AI agents in parallel. Copilots assist. Agents act. The deployments are already real. Valeo rolled out agentic AI across 100,000 employees 35% of their code is now AI-generated. Anthropic's Claude Code reproduced a full year of engineering output in under an hour. AWS launched AI agents to cut hospital paperwork. At GTC 2026, NVIDIA unveiled an open-source Agent Toolkit backed by Adobe, Salesforce, and Cisco. Gartner predicts 40% of enterprise applications will embed AI agents by end of 2026, up from under 5% last year. The market is set to grow from \$7.8 billion to \$52 billion by 2030. Tomorrow's engineers won't just write code they'll orchestrate AI agents. The core skill is no longer syntax. It's systems thinking.

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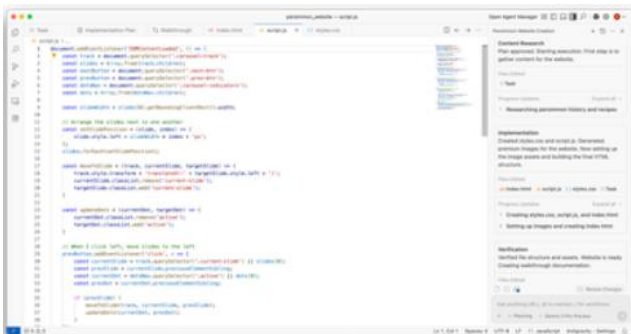
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Google Antigravity: When AI Stops Assisting and Starts Building

Every developer has faced this moment. You have a clear idea in your head. You know what the app should do, how the interface should feel, and what problem it should solve. You open your editor, ready to start. Then the next few hours disappear into creating folders, installing dependencies, configuring environments, and connecting pieces that have little to do with the idea itself.



By the time you finally begin writing meaningful code, the excitement has already faded. Google Antigravity feels like a response to that exact experience. Instead of acting like a smarter autocomplete or a chatbot that suggests fixes, it behaves more like a capable collaborator. You describe what you want in plain English, and the system begins building. It writes code, creates files, runs commands, installs dependencies, and connects frontend and backend components. The setup that once slowed everything down becomes part of an automated flow. What makes this shift interesting is not just speed, but perspective. The focus moves away from syntax and toward intent. You are no longer spending most of your time wiring components together. You are thinking about structure, behavior, and how the pieces should work as a whole. The process starts to feel

less like assembling parts and more like shaping an idea. Google Antigravity does not replace the developer. The idea still begins with you. What changes is how quickly that idea becomes something tangible. Instead of watching the afternoon disappear into configuration, you move directly into building, refining, and experimenting. And for many developers, that is where the real excitement begins.

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Edge AI and Tiny ML: The Future of Smart Devices

Technology is becoming smarter every day, and Edge AI

and

Cloud data centre
• Cloud ML
• DNN on the cloud
• HW, TPU, FP5A, GPU, CPU

Edge computing
• EdgeML
• Optimize alogs and CNN
• Light
• SoC(With NPU/NSP Aaccelerator)



TinyML are playing a major role in this transformation. These emerging technologies allow small electronic devices such as smart watches,

sensors, mobile phones, and microcontrollers to perform Artificial Intelligence tasks on their own without depending completely on the internet or cloud servers. Edge AI helps devices process information locally, making them faster, safer, and more efficient. TinyML, which stands for Tiny Machine Learning, enables machine learning models to run on compact and low-power embedded systems.

Even devices with very small memory and processing power can now recognize voice commands, detect gestures, monitor health conditions, and make smart decisions in real time. Today, Edge AI and TinyML are widely used in smart healthcare systems, home automation, agriculture, robotics, and industrial monitoring. For example, a smart fitness band can continuously track heart rate and health data instantly without sending all information to the cloud. For Electronics and Communication Engineering students, these technologies open exciting opportunities by combining embedded systems, IoT, and Artificial Intelligence. As the world moves toward smarter and more connected devices, Edge AI and TinyML are expected to shape the future of intelligent electronics and modern communication systems.

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AI Phone Agents: Transforming the Future of Communication

AI phone agents are intelligent virtual assistants designed to handle phone calls and conversations automatically using artificial intelligence. These systems can answer customer queries, schedule appointments, provide technical support, and even complete transactions without human intervention. Unlike traditional automated call systems, AI phone agents understand natural language, respond

HOW AI PHONE AGENTS WORK



Businesses are increasingly adopting AI phone agents because they reduce waiting times, lower operational costs, and provide 24/7 customer support. Industries such as healthcare, banking, e-commerce, and customer service benefit greatly from this technology. For example, hospitals use AI phone agents to book appointments and remind patients about medications, while companies use them to manage customer complaints efficiently. This invention is truly remarkable because it combines speed, intelligence, and convenience in a way that was once only imagined in science fiction. AI phone agents can communicate naturally, work tirelessly without breaks, and assist millions of people simultaneously. As technology continues to improve, these systems may become an essential part of everyday life and modern communication.

However, concerns such as privacy, data security, and lack of emotional understanding still remain challenges. Despite these issues, AI phone agents are transforming communication and shaping the future of customer interaction.

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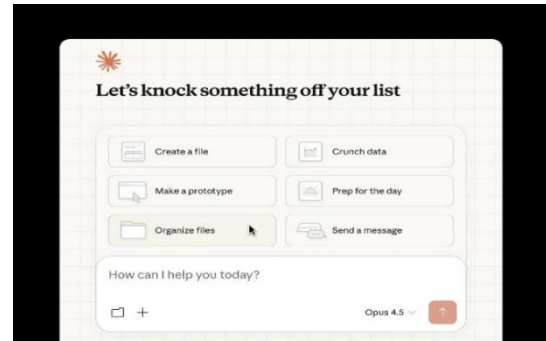


Claude Code: Transforming the Future of AI Coding Assistance

The emergence of Claude Code, the AI-powered coding assistant developed by Anthropic, represents a significant advancement in the field of artificial intelligence and software development. Designed to help programmers write, understand, and debug code efficiently, Claude Code is becoming an essential tool for students, developers, and researchers worldwide.

Claude Code assists users by generating code snippets, explaining programming concepts, fixing errors, and even helping with project organization. Unlike traditional coding tools, it understands natural language instructions, allowing users to communicate with the AI in a simple conversational manner. This makes programming more accessible, especially for beginners who may struggle with complex syntax and debugging processes. One of the major advantages of Claude Code is its ability to improve productivity. Developers can automate repetitive tasks such as documentation, testing, and code refactoring. It also supports multiple programming languages,

enabling users to work across various technologies without constantly switching tools or searching for solutions online. For students, Claude Code serves as an interactive learning companion.



It encourages experimentation, problem-solving, and hands-on learning by providing instant guidance and explanations. Students can better understand algorithms, data structures, and software development practices while building real-world projects. Furthermore, Claude Code highlights the growing collaboration between humans and artificial intelligence. Rather than replacing programmers, it enhances creativity and efficiency by acting as a supportive coworker in the coding process.

In conclusion, Claude Code is reshaping modern software development by making coding smarter, faster, and more accessible. As AI technology continues to evolve, tools like Claude Code will play an increasingly important role in education, innovation, and the future of programming.

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