Shell Newsletter

Department of

Computer Science & Engineering

Volume 10 | Issue 1 | Jan 2025

Vision and Mission of the Institute

To be one of the premier institutions of Engineering and Management education through excellence in academics, research, innovation and entrepreneurship with global standards.

MISSION

To impart world class value-based education in Engineering and Management.

To establish centres of excellence in sustainable technologies by collaborating with industries to carry out interdisciplinary research and innovation activities.

To generate highly skilled and competent manpower with societal concerns and ethical standards.

Vision and Mission of the Department

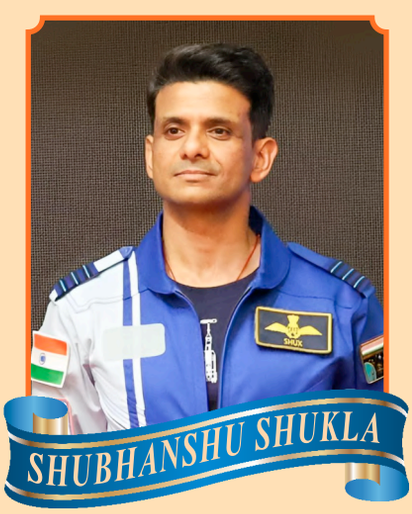
Vision

- To be a premier department for education in Computer Science & Engineering through excellence in academics, research, innovation and entrepreneurship.

Mission

- A learning environment that promotes academic excellence by delivering comprehensive curriculum as per the industry requirements and encourage higher learning.
- Cultivate a culture of innovation and research in cutting edge technologies to meet societal needs with environmental concerns.
- Providing opportunities for professional career, skill development, entrepreneurship and lifelong learning.

Dedicated to



Shubhanshu Shukla *is a group captain and test pilot with the Indian Air Force (IAF) and gaganyatri (astronaut) with the Indian Space Research Organisation (ISRO). In July 2025 Shukla became the first ISRO astronaut to visit the International Space Station (ISS) while participating in Axiom Mission 4, a privately organised spaceflight. He is the second Indian to travel to space. Shukla holds the rank of group captain with the IAF. He is a qualified test pilot with over 2,000 hours of flying experience on a wide variety of aircraft.*

Inside Shell

B. N. M. Institute of Technology

An Autonomous Institution under VTU.

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From Editor's Desk

"Learning is the only thing the mind never exhausts, never fears, and never regrets." -Leonardo da Vinci.

Dear Readers,

With immense joy and excitement, we present to you the latest edition of our newsletter from the Computer Science and Engineering Department – 'SHELL Volume 10 Issue 1'! This edition is a testament to the talent, creativity, and vibrant spirit that defines our institution.

Our newsletter reflects the collective aspirations and diverse perspectives of our student body and faculty. Through prose, poetry, photography, and art, this magazine captures the essence of our community—its achievements, dreams, and the journey we all share.

The editorial team extends its heartfelt gratitude to everyone who contributed their work, ideas, and support to bring this publication to life. A special thank you to our faculty mentors, contributors, and the design team for their unwavering dedication.

Department Profile

The Department of Computer Science & Engineering started in 2001 with an intake of 60 students and the present intake is 180. The department is renowned for imparting quality education with well-qualified and dedicated faculty members, who are experts in various domains of Computer Science &Engineering and strive for an exceptional career growth for the students. The department offers undergraduate and postgraduate programs in Computer Science & Engineering. A well-equipped Research & Development (R&D) Center, affiliated to VTU, has been set up to cater to the needs of the research scholars, as they conduct cutting-edge research towards doctoral degrees. The Teaching-learning process put in place by the department is well defined to help students explore the trending technologies via Skill Development Programs organized by the industry-institute Interaction Cell. Students are also encouraged to improve their performances in the University examinations through Performance Enhancement Classes. The Innovative Project Labs (IPL) of the R&D Center encourages and equips the faculty and students to uncover innovative ideas, which are also funded through the Innovation & Entrepreneurship Development Cell.

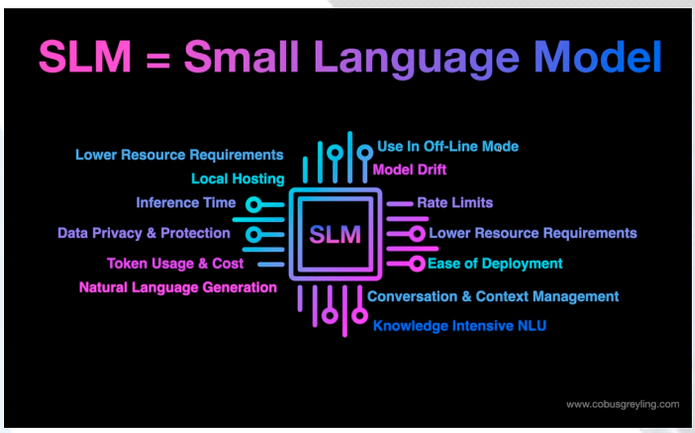
Department overview

Message From The HOD

Welcome to the Department of Computer Science and Engineering, BNMIT, Bangalore. The department is well-supported by seasoned faculty members with an average experience of 10 years. It also boasts of a state of- the-art infrastructure facility that supports and encourages students to acquire knowledge and gain practical experience. During the course, students mould their careers, polish their technical skills and inculcate team spirit with exceptional oral and written communication skills. The department also extends financial and technical support to the students to participate in competitions and hackathons at state, national and international levels. The faculty members are encouraged to acquire higher degrees and conduct research in the areas that benefit the society. They are also supported in conducting and participating in workshops, symposium and conferences at national and international levels. Last but not the least, they are motivated to adopt innovative teaching methodologies and best practices to make classroom a pursuit of learning.

Dr. Chayadevi M L

The Rise of Small Language Models (SLMs): Why 1B–3B Models Matter More Than Huge Models



Over the last decade, AI has seen an arms race toward larger and larger language models — GPT-3 with 175B parameters, PaLM with 540B, and massive multimodal systems crossing the trillion-parameter threshold. But the landscape is shifting. A new wave of Small Language Models (SLMs), typically ranging from 1B to 3B parameters, is emerging as the most practical and impactful direction for widespread AI adoption. Models like Llama 3B, Phi-3, and Gemma 2B are redefining what "efficient intelligence" means.

1. Why Smaller Models Now Outperform Expectations

SLMs today punch far above their weight due to three major advances:

- **Better training data curation:** Instead of massive scraped datasets, SLMs learn from cleaner, higher-quality corpora. Microsoft's Phi-3, trained heavily on textbook-style reasoning data, demonstrates that data quality beats data quantity.
- **Improved architectures:** Modern transformer variants, smarter attention mechanisms, and optimized tokenization allow SLMs to use their parameters more efficiently.
- **Efficient training objectives:** Techniques like knowledge distillation and synthetic data generation compress "big-model intelligence" into smaller networks.

2. Practical Advantages of SLMs

SLMs deliver something the giant models simply cannot:

a) On-Device Deployment

SLMs can run directly on laptops, smartphones, and edge devices with minimal or no cloud dependency. This unlocks privacy-preserving AI for healthcare, finance, and personal productivity.

b) Lower Cost, Higher Accessibility

Running a 3B model requires a single consumer GPU — or even CPU-only for slower use cases. This democratizes AI research and development for students, startups, and universities.

c) Faster Inference

Small models respond quicker, making them ideal for real-time applications, from coding assistants to robotics to conversational agents.

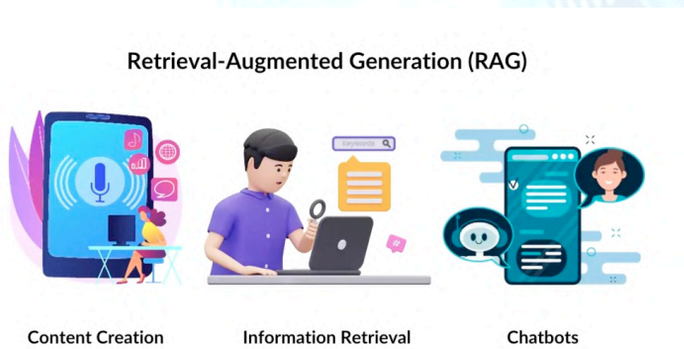
3. The Future: Smarter, Not Bigger

The industry is learning that scaling quality matters more than scaling size. Instead of building massive, cloud-dependent models, companies are focusing on:

- Hybrid systems (SLM + RAG)
- Specialized domain-tuned small models
- Multimodal SLMs that run natively on devices
- Efficient quantization and sparsity

Nishit R Kirani
1BG22CS099

Retrieval-Augmented Generation (RAG): Beyond ChatGPT-Style Models



As Large Language Models (LLMs) become central to modern AI applications, enterprises are facing a critical challenge: these models are powerful, but not always accurate or up-to-date. Traditional fine-tuning — retraining the model on custom datasets — was once the preferred solution. But it is expensive, slow, and often unnecessary. This is where Retrieval-Augmented Generation (RAG) has become the new standard in real-world enterprise AI.

RAG offers a simple but transformative idea: instead of storing all knowledge inside the model's parameters, let the model retrieve relevant information from an external knowledge base and generate responses based on that context.

1. Why Fine-Tuning Is No Longer Enough

Fine-tuning modifies the model's internal weights, allowing it to learn new patterns or domain-specific knowledge. However, it has serious limitations:

Data becomes outdated quickly — updated company policies, regulations, or product details require re-training.

High cost — GPU training hours make large-scale fine-tuning expensive.

Risk of hallucination — the model may still generate incorrect or unverifiable answers.

Security concerns — sensitive enterprise data must be fed into the training pipeline.

In industries like healthcare, finance, and legal services, these issues become deal-breakers.

2. RAG: A Smarter, Modular Alternative

RAG solves these problems by separating knowledge from reasoning.

How RAG Works

- ***Retrieve:*** A vector database (like Pinecone, pgvector, or Milvus) is searched using embeddings to find the most relevant documents.
- ***Augment:*** These documents are inserted into the LLM's prompt.
- ***Generate:*** The model produces a grounded, context-aware response.

3. Why Enterprises Prefer RAG

a) Always Up-to-Date

Knowledge bases can be updated instantly without touching the model. This is critical for rapidly changing fields.

b) Lower Cost, Higher ROI

No expensive GPU cycles. No massive training runs. Just scalable retrieval.

c) High Accuracy & Reduced Hallucination

Grounding the model in factual documents drastically improves reliability.

d) Greater Security & Compliance

Sensitive company data stays in internal systems — never exposed during training.

4. Real-World Use Cases Where RAG Wins

- Customer support chatbots grounded in company documentation
- Legal and compliance assistants referencing statutes and case laws
- Financial research tools reading reports, filings, and market data
- Internal search engines replacing outdated keyword search
- Healthcare assistants referencing medical guidelines safely

RAG becomes especially powerful when combined with agent frameworks that reason, plan, and chain multiple queries.

Rohan M R
1BG22CS126

Privacy-Preserving AI on the Web: The New Era of Secure Intelligence

As AI becomes deeply embedded into everyday web applications — from chat assistants to recommendation engines — safeguarding user data has become a mission-critical priority. Traditional cloud-based AI systems often require sending raw data to servers, creating risks around surveillance, data leaks, and misuse.

To counter this, the field is rapidly shifting toward privacy-preserving AI, a set of techniques that allow intelligent computation without exposing sensitive user data. Three major pillars power this movement: Zero-Knowledge Proofs (ZKPs), Differential Privacy, and Homomorphic Encryption.

1. Zero-Knowledge Proofs (ZKPs): Proving Without Revealing

ZKPs allow a user to prove a statement is true without revealing the underlying data.

In web-based AI systems, this is incredibly powerful:

- Users can authenticate themselves without sharing passwords.
- AI systems can verify data inputs (like identity documents or financial details) without seeing the actual data.
- Web apps can validate AI outputs in sensitive workflows—such as KYC, fraud detection, or voting—without exposing any private information.

ZKPs are especially important in decentralized systems, blockchain integrations, and privacy-centric identity verification pipelines.

2. Differential Privacy: Protecting Individuals in Large Datasets

Differential privacy ensures that the inclusion or exclusion of a single person's data does not change the AI model's output in any meaningful way.

This offers strong protections:

- Data can be used for training without exposing individuals.
- Web apps can collect analytics without leaking user patterns.
- AI models become resistant to inference attacks, where attackers try to reverse-engineer sensitive information.

Companies like Apple, Google, and Meta already rely heavily on differential privacy in their large-scale web services.

4. Why Privacy-Preserving AI Is Becoming Essential

With rising concerns around data sovereignty, AI regulation, and cybersecurity threats, privacy-preserving techniques are no longer optional. They enable:

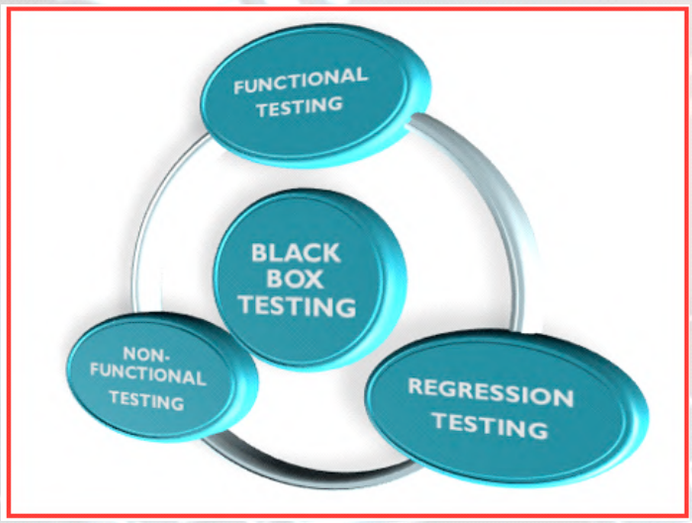
- Secure AI-driven personalization
- Safer biometric and identity verification
- Enterprise compliance with global privacy laws
- Trustworthy AI adoption across finance, healthcare, and education

Conclusion

Privacy-preserving AI represents the next major leap in web technology. By combining ZKPs, differential privacy, and homomorphic encryption, developers can build AI systems that are powerful, secure, and trustworthy. As more applications shift toward on-device inference and encrypted processing, the future of AI on the web will be defined not only by capability — but by confidentiality.

Parikshit M Rao
1BG22CS104

Inside the Black Box: Deconstructing the ATS Process



Introduction:

In today's job market, talent alone isn't enough. Your resume's first reviewer isn't human—it's an algorithm. Applicant Tracking Systems (ATS) filter applications based on strict formatting and keyword rules, often rejecting qualified candidates for technical mismatches. To clear this critical hurdle, you must understand how ATS works. This issue provides a focused, technical examination of the ATS core functions.

Technical Foundation:

ATS converts your resume into structured data using Natural Language Processing (NLP). It reads linearly, so complex visuals often break the process. Parsing scans your file and turns it into a raw spreadsheet—name in one column, job titles in another. Overly complex formatting confuses the system, misplacing data and making your experience unsearchable. Think of parsing as the ATS taking your stylized resume and turning it into a simple, raw spreadsheet. It extracts your name, puts it in the 'Name' column, extracts your job titles, and puts them in the 'Title' column. If your formatting is too complex, the ATS gets confused and dumps your text into the wrong columns, making your experience unsearchable.

The Keyword Algorithm:

Data Matching is how ATS compares your experience, skills, and job titles to the job description. Using semantic analysis, it checks if your resume language aligns with the posting. The Data Matching algorithm goes beyond a simple "find and replace" text search. It functions as a sophisticated relevance engine, utilizing weighted criteria to determine your fit for the role.

1. Keyword Weighting and Scoring

Not all keywords are treated equally. The ATS assigns a different weight or point value based on the term's importance as defined by the recruiter and the job description (JD).

- High-Value Keywords: Core skills, mandatory certifications (e.g., CPA, PMP), or specific software explicitly marked as "Required" in the job description. Missing these leads to a rapid decline in score.
- The Scoring System: The algorithm aggregates these points to generate a total score. If your score falls below the recruiter's minimum match threshold (often 70-80%), the application is automatically filtered out.

2. Semantic Analysis and Context

Modern ATS platforms use Semantic Analysis to understand the context and relationship between words, attempting to interpret meaning, not just exact matches.

- Understanding Relationships: While systems can often recognize basic synonyms (e.g., matching "managed" with "led"), relying on this is a risk.
- The Job Description Rule: You must use the exact language present in the job posting. Do not rely on the algorithm to guess your intent; ensure every critical keyword is mirrored precisely.

3. Positional Relevance

The location of the keyword on your resume can influence its weight and scoring impact.

- ***High Relevance Areas:*** Keywords found in the Professional Summary or within the first three bullet points of your most recent job are often given higher priority.
- ***Strategy:*** Place the most critical, high-value keywords in these immediately visible areas to maximize your initial relevance score.

4. The Critical Acronym Failure

This is the most common and easily fixable error in the matching process:

- ***The Trap:*** If the job description lists "Search Engine Optimization (SEO)," and you only write "SEO," the algorithm may only match the three-letter acronym, missing the full-phrase match.
- ***The Solution:*** Always use both the spelled-out term and the acronym the first time it appears (e.g., "Project Management Professional (PMP)"), ensuring you capture all potential match variations.

Scoring, Ranking, and the Human Hand-off :

After parsing and matching, the ATS calculates your final score, determining if your application ever reaches a human recruiter. The algorithm generates a Compatibility Score (a percentage). Recruiters set a minimum threshold (often 70-85%). Only applications scoring above this mark are presented in the priority reviewlist. Before applying for your next role, you must perform this critical test to check for hidden technical errors by copy-pasting the text from your resume into a plain-text editor and notice for if the text is messy, scrambled, or sections are missing, that is exactly how the ATS reads yourapplication.

Conclusion :

Understanding the three stages of the ATS—Parsing, Matching, and Scoring—you move from being a passive applicant to a strategic candidate. Technical failures often cost applicants the interview before they even compete on skill. Take immediate control over your application's first reviewer.

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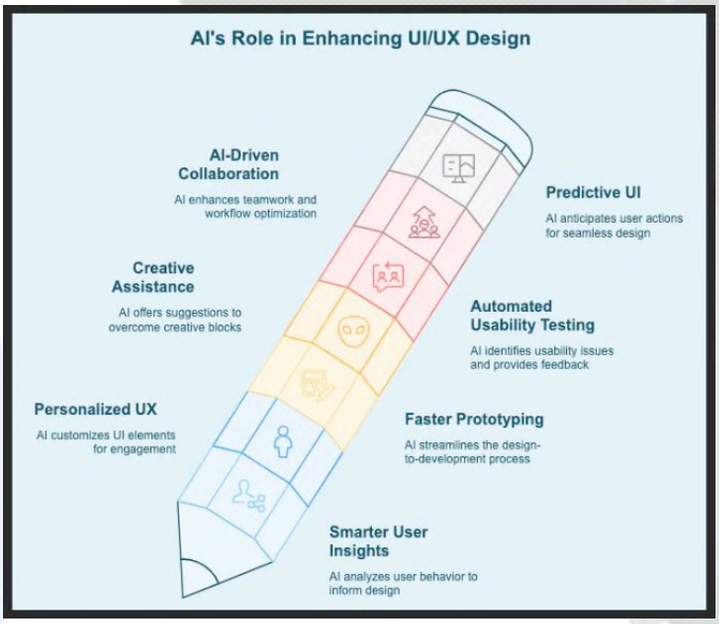
The Human Touch in UI/UX: Why Design Still Matters in the Age of AI

In recent years, artificial intelligence has reshaped almost every field, including design. With tools that can generate layouts in seconds and automate entire screens, it may appear that UI/UX has become simpler or even mechanical. However, despite these rapid advancements, the core of good design still relies on something distinctly human: intuition, creativity, and emotional awareness.

AI may accelerate processes, but the essence of meaningful design continues to come from human understanding.

Traditional UI/UX: The Foundation of Effective Design

Long before AI-assisted tools became popular, UI/UX design grew from established principles such as colour theory, visual hierarchy, alignment, spacing, and user psychology. These fundamentals remain the backbone of most successful digital experiences.



It is important to recognize that design is not merely about creating visually appealing screens. It is about understanding how users think, what they feel, and how they respond. Good design guides a user effortlessly through a product. It builds trust. It forms an emotional connection.

In many ways, UI/UX is a form of storytelling — and meaningful stories require human insight.

AI Tools Are Fast, But Not Always Purposeful

AI undoubtedly improves efficiency. It can speed up prototyping, assist with repetitive tasks, and generate multiple design variations instantly. Yet, its limitations become clear the moment nuance is required.

- Designers often encounter issues such as:
- AI missing the true intention of the project
- Visually appealing outputs that lack emotional depth
- Suggestions that distract from the original goal
- Difficulty making small, specific adjustments
- Designs that fail to capture user expectations

Speed alone cannot guarantee a well-designed product. Thoughtful design requires context, sensitivity, and judgement — qualities AI cannot replicate.

Human-Centered Success: Duolingo and Spotify

Some of the most widely admired digital products demonstrate the lasting value of traditional, human-led design.

Duolingo uses bright colors, playful animations, and a friendly mascot to encourage learning. These choices were made deliberately to reduce anxiety and increase motivation — not because they were auto-generated.

Spotify, with its dark theme, clean layout, and clear typography, prioritizes immersion and ease of use. The interface feels intentional because it was crafted with precise user experience goals, not produced by a template.

These platforms succeed not just because they function well, but because they resonate with their users.

UI/UX and Backend Development: A Necessary Balance

A common misconception in the tech community is that UI/UX is "easier" than backend development. While backend systems do carry immense responsibility — from data handling to application logic — design comes with a different kind of challenge.

Designers must interpret complex systems and translate them into interfaces that feel simple, intuitive, and approachable. Users rarely notice the backend; they primarily judge an application based on what they see and interact with.

A well-built backend can lose its value if paired with poor UI. Conversely, a simple backend can shine when supported by excellent design. Both roles are essential, and both deserve equal recognition.

When Poor UI/UX Leads to Failure

Several major companies have experienced setbacks due to design decisions that did not align with user expectations.

- Windows 8 introduced a tile-based interface that confused users, hid basic functions, and made navigation unnecessarily complex. Microsoft eventually had to restore the familiar Start Menu.
- Snapchat's 2018 redesign blended chats and stories in a way that frustrated millions. The backlash was so strong that many users requested a return to the older layout.

These cases demonstrate that even robust technology can falter when the user experience is neglected.

Why Design Still Needs the Human Touch

AI may assist in the creative process, but it cannot understand context, emotion, culture, or human behavior. It cannot sense hesitation, comfort, confusion, or delight. It cannot predict how subtle visual choices shape user engagement.

Design succeeds when it connects—not just when it functions.

The future of UI/UX will not be defined by replacing designers with AI, but by using AI responsibly while preserving the depth and empathy that human designers bring. As technology continues to evolve, the human touch will remain central to creating products that are not only usable but meaningful.

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Faculty Development Program on Deep Learning and Gen AI Applications

The Department of Computer Science and Engineering in association with EICT Academy IIIT Roorkee conducted a Faculty Development Program on "Deep Learning and Gen AI Applications" from 20th to 25th Jan, 2025. A total of 294 participants took part in the program. The FDP covered fundamentals of deep learning concepts, state-of-the-art GenAImodels, and practical applications across various domains. The program featured interactive sessions, real-world case studies, and practical coding exercises to enhance participants' understanding and application of deep learning and generative AI. The FDP concluded with the positive feedback

Immersive Innovations: Hands-on Workshop on AR&VR

A workshop titled "Immersive Innovations: Hands-On Workshop on AR & VR" was conducted for the 6th-semester CSE students on 8th Feb, 2025, in M-309. The session was led by Mr. Karan Kaushik, Senior Product Designer at Almabase, Bangalore, who brought a wealth of knowledge and practical experience to the session. The workshop was designed to introduce the students to the world of Augmented Reality (AR) and Virtual Reality (VR). A total of 180 students participated in the workshop. Through the workshop the students had the opportunity to design basic 3D objects and learn how to manipulate them within a virtual space. The students explored various features of Spline, such as creating textures, adjusting lighting, and exporting the 3D models to AR and VR platforms.

Workshop on Cloud Computing

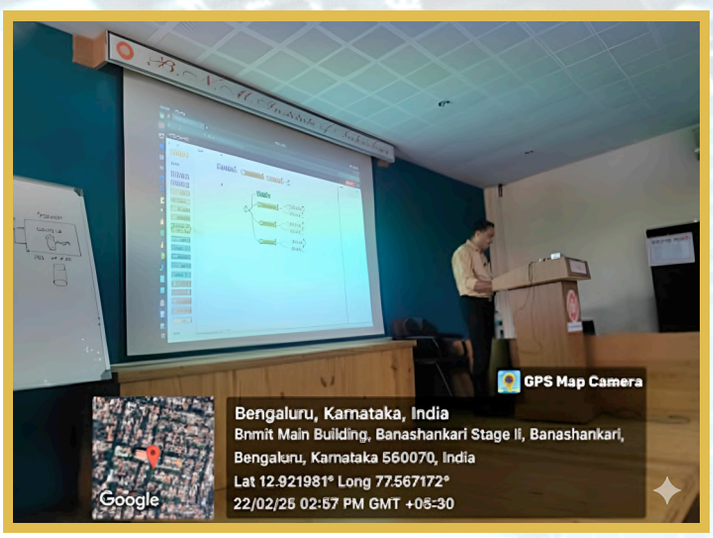
The Department of Computer Science & Engineering had organized a workshop on “Cloud Computing” for 6th semester CSE students on 22nd Feb, 2025. Mr. Rahul Kumar, Principal Solutions Architect, Antstack Technologies, Bengaluru, was the resource person for the event. There were 70 participants in the workshop. The objective of the workshop is to provide an exposure to gain “hands-on” experience on cloud computing with real-world experience in working with cloud platforms and tools, which helps students to gain the skills and confidence to implement cloud-based solutions effectively. The workshop covered serverless computing, where participants learned about AWS Lambda, API Gateway, and DynamoDB.

Industrial Visit to PWC

A one-day industrial visit to Price WaterhouseCoopers (PwC) was conducted for the B.E. computer science students on 14th Feb, 2025. PwC is an industry-focused network designed to anticipate and address your business needs. The sessions were handled by the PwC team. 24 students visited the PwC Acceleration Center (PwC AC). The program was hosted at the Training Rooms, third floor, by Seekha Pattnaik. The students also had the great opportunity to meet Mr. Sharath Baburaj, the driving force behind the PwC Launchpad Program. The students were graced with the chance to engage with PwC interns who were previously trainees at PwC Launchpad.

IoT Code Connect creates workshops.

The IoT: Code Connect Create workshop was conducted by the Department of Computer Science & Engineering (CSE), BNMIT, in association with the Computer Society of India (CSI) and Indian Society for Technical Education (ISTE). The session was led by Mr. Sudhakar Gopal Rao, a Senior Principal Architect (IIoT) and Freelance IoT Mentor. A total of 205 participants took part in the event. The workshop introduced participants to IoT fundamentals, device communication protocols, and data handling techniques. It emphasized practical implementation, allowing students to connect sensors, transmit data via MQTT, and visualize it using Node-RED. The hands-on approach helped bridge the gap between theory and real-world IoT applications, preparing students for future innovations in smart systems and connected devices.



Project Exhibition

The Computer Science and Engineering Department organized a Project Exhibition on 4th Apr, 2025, at M309 & M205, attracting participants including students, professionals, and industry experts. The exhibition aimed to showcase innovative projects, foster collaboration, and provide a platform for participants to present their creative solutions to real-world challenges. A total of 52 project batches were exhibited, covering various domains such as artificial intelligence, machine learning, cloud computing, IoT, networks, and security. Each team or individual had the opportunity to present their work to an enthusiastic audience. Outstanding projects were given the Best Project Award and the Best Presentation Award.

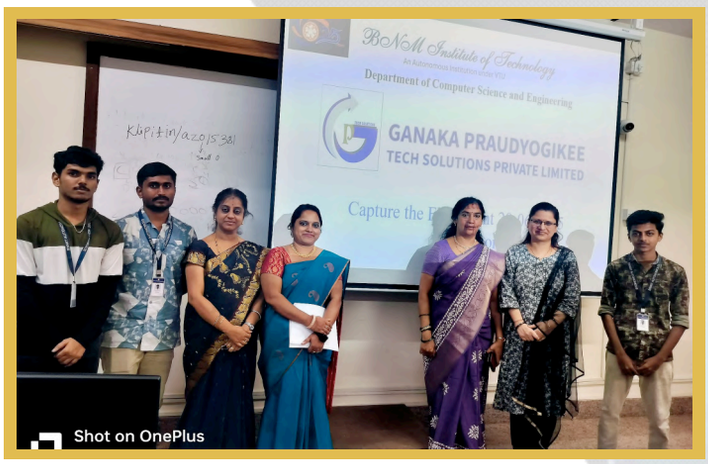
FDP on Celonis Process Mining

A three-day FDP on "Celonis Process Mining" was organized by the Department of Computer Science & Engineering, BNMIT, in association with ICT Academy between the 7th and 9th of May 2025 at the M209 Laboratory. The aim of the workshop was to introduce faculties to process mining. 30 faculty across various colleges participated in the FDP. Ms. Poornima Dhall, Lead Partner Manager, Academic Alliance - APAC Region, was invited as the expert member to conduct the FDP. The FDP began with an introduction to the Celonis platform, covering the fundamentals of process mining, business use cases, and hands-on exploration through the Academic Alliance platform and Pizza dataset. Finally, they focused on best practices for version control, building dashboards to interpret process visualizations, and applying theoretical process mining knowledge using Celonis platform resources. The overall feedback from the faculties was very positive.

Workshop on the basics of generative AI with hands-on examples to generate text content using Python.

Basics of Generative AI with Hands-on Examples to Generate Text Content Using Python," a workshop was organized by the Dept. of CSE, BNMIT, on 9th May 2025. Total of 190 students participated in the workshop.The objective of the workshop was to introduce the participants to the fundamental concepts of generative artificial intelligence and demonstrate the use of Python for generating textual content. The session aimed to bridge theoretical AI concepts with real-world applications and provide students with hands-on experience using relevant tools and libraries. The workshop provided participants with a strong foundation in generative AI by blending theoretical understanding with practical coding exercises. By combining vision and language, leveraging pre-trained networks, and understanding practical coding nuances in Colab, participants were equipped with valuable skills relevant to both research and industry applications.

Internship on Penetration Testing: Concepts, Tools, and Techniques in Cybersecurity



The Skill Development Program on Penetration Testing: Concepts, Tools, and Techniques in Cybersecurity was conducted for the B.E. third-year 5th-semester CSE students. The sessions were handled by Dr. Rajashree Soman, Director, Ganaka Praudyogikee Tech Solutions Pvt. Ltd. A total of 69 students attended the program. Students got insight on cyber security, penetration testing, and also various ethical hacking tools. The event ended with a 12-hour hackathon. The Hackathon was conducted covering topics such as information gathering, enumeration, scanning, basic Linux commands, password cracking, exploitation, and privilege escalation

Internship on Deep Learning and Reinforcement Learning

A skill development program on deep learning and reinforcement learning was conducted for the third-year B.Tech students of the CSE department. The sessions were handled by Mr. Vijay Dwivedi, Senior Technical Trainer, E2E Management Services. Students learned concepts of machine learning, deep learning, and its applications. The internship helped students to learn powerful libraries such as NumPy, Pandas, and Matplotlib. The internship concluded with a hackathon and a mini-capstone project.

Internship on AI With Robotics from Robomonthan

An internship on "Robotics with AI and Machine Learning" was conducted by the CSE department from 2nd to 27th Jun, 2025, in the M201/202 Lab. The internship in robotics focused on Artificial Intelligence (AI) and Machine Learning (ML) and was intended to bridge theoretical knowledge with hands-on experience, enabling students to understand how intelligent systems are designed, trained, and deployed in real-world robotic applications. The internship gave the opportunity to visit Robomanthan, Bengaluru. The visit helped the students explore innovative projects and witness cutting-edge applications of robotics and technology.

Students Achievement:

- **Thanmayee M K (1BG23CS169),** a 4th-semester student, participated in the National Level UI/UX Designing Competition (Pixel Craft) held at Presidency University on April 16, 2025, and secured 1st place.
- **Vinay B Antharagatte (1BG23CS185)**, a 4th-semester student, participated in the National Level UI/UX Designing Competition (Pixel Craft) held at Presidency University on April 16, 2025, and secured 1st place.
- **V S Manoj Kumar (1BG23CS173)**, a 4th-semester student, participated in the National Level UI/UX Designing Competition (Pixel Craft) held at Presidency University on April 16, 2025, and secured 1st place.
- **Vismaya M (1BG23CS190)**, a 4th-semester student, presented a project titled "Crop Price Prediction Using Sarima Model" at the State Level Competition-2025 held at BIT on April 12, 2025, and secured 3rd position.
- **Sanchita H (1BG23CS131)**, a 4th-semester student, presented a project titled "Crop Price Prediction Using Sarima Model" at the State Level Competition-2025 held at BIT on April 12, 2025, and secured 3rd position.
- **Thrisha R (1BG23CS170)**, a 4th-semester student, presented a project titled "Crop Price Prediction Using Sarima Model" at the State Level Competition-2025 held at BIT on April 12, 2025, and secured 3rd position.
- **Srusti M (1BG23CS159)**, a 4th-semester student, presented a project titled "Crop Price Prediction Using Sarima Model" at the State Level Competition-2025 held at BIT on April 12, 2025, and secured 3rd position.
- **Karishma S Singh (1BG21CS040)**, an 8th-semester student, presented "You Connect – Where Ambition Meets Industry Experts" at the State Level Competition-2025 held at BIT on April 12, 2025, and secured 2nd position.
- **A R Muthudhanush (1BG22CS002)**, a 6th-semester student, participated in the TechXcelerate National Hackathon held at BITS Pilani Hyderabad on March 22–23, 2025, and secured 1st position.
- **Bhoomika R Gowda (1BG22CS030)**, a 6th-semester student, participated in the CIDECODE2K25 Hackathon held at PES University on March 9, 2025, and secured 3rd position with a cash prize of ₹10,000.
- **Aditya A (1BG22CS007)**, a 6th-semester student, participated in the CIDECODE2K25 Hackathon held at PES University on March 9, 2025, and secured 3rd position.
- **Dumpa Revanth Venkata Sai (1BG22CS043)**, a 6th-semester student, participated in the CIDECODE2K25 Hackathon held at PES University on March 9, 2025, and secured 3rd position.
- **Hanoch Yedidya Karkada (1BG22CS054)**, a 6th-semester student, participated in the CIDECODE2K25 Hackathon held at PES University on March 9, 2025, and secured 3rd position.
- **Karthik G Sharma (1BG22CS064)**, a 6th-semester student, participated in the CIDECODE2K25 Hackathon held at PES University on March 9, 2025, and secured 3rd position.
- **Vidyasagar T M (1BG21CS113)**, an 8th-semester student, participated in the HackQuest 2K25 – National Level CTF Hackathon held at Jamal Mohamed College on February 13, 2025, and secured 10th place at Tiruchirappalli.
- **Sakshi S Maliye (1BG23CS130)**, a 4th-semester student, participated in the HackQuest 2K25 – National Level CTF Hackathon held at Jamal Mohamed College on February 13, 2025, and secured 237th rank at Tiruchirappalli.
- **Namitha (1BG23CS087),** a 4th-semester student, participated in the Radio City Super Singer Season 16 competition held at Radio City on January 31, 2025, and secured 1st prize.

Faculty Achievement:

Journal Publication:

- **N. G. Puttaswamy and Anitha N. Murthy** published a paper titled, "Energy Optimization in Smart Networks using Machine Learning-Driven Fog Computing to Reduce Unnecessary Cloud Data Transmission", Eng. Technol. Appl. Sci. Res., vol. 15, no. 3, pp. 24070–24076, June 2025 (Scopus, Q2)
- **Mona, C. V., M., K., Manikantha., G. V., S., B., R., Ronihal, S.S.** published a paper titled "Smarter secure surveillance: Leveraging AI, IoT, and cryptographic techniques for enhanced public safety" in International Journal of Safety and Security Engineering, Vol. 15, No. 6, pp. 1325-1332., ISSN: 2041-9031 June 2025 https://doi.org/10.18280/ijsse.150620 (Scopus, Q3)
- **Dr. Chayadevi** et.al., published a paper titled "Detection of Stuttered Speech with Repetition Using Wavelet Packet Transformation and Neuro Fuzzy Classifier", in International Journal SN Computer Science, Springer Nature Singapore, SN COMPUT. SCI. 6, 446 (May 2025). https://doi.org/10.1007/s42979-025-03958-7 (Scopus - WoS Q1)
- **Dr. Rajani Shree** published a paper titled "A semantic driven model for extraction of text using TF IDF, SFLA and XGBoost" in the International Journal of Information Technology in May 2025, ISSN: 2511-2104.
- **Prof. Manikantha K.** published a paper titled "Energy-Efficient IoT Network Routing Model Based on Multi-Layer Clustering and Deep Learning" in the Journal Européen des Systèmes Automatisés in May 2025, ISSN: 1269-6935.
- **Prof. Ashwini R. Malipatil** published a paper titled "Energy-Efficient Cloud Computing Through Reinforcement Learning-Based Workload Scheduling" in the International Journal of Advanced Computer Science and Applications in May 2025, ISSN: 2158-107X.
- **Dr. Manujunath S, Swetha M D** published a paper titled "Energy and cost-aware workload scheduler for heterogeneous cloud platform", in Indonesian Journal of Electrical Engineering and Computer Science, Vol. 38, No. 1, April 2025, pp. 546~554, ISSN: 2502-4752, DOI: 10.11591/ijeecs.v38.i1.pp546-554, Vol.38, No. 1, April 2025, pp. 546~554, DOI: http://doi.org/10.11591/ijeecs.v38.i1.pp546-554 (Scopus-Q3)
- **N. G. Puttaswamy and Anitha N. Murthy** published a paper titled, "Optimizing real time data preprocessing in IoT based Fog Computing using ML algorithms", in IAES International Journal of Artificial Intelligence, March 2025, http://doi.org/10.11591/ijai.v14.i3.pp1900-1909, (Scopus, Q2)
- **Dr. Amith Shekhar C, Karthik R, Pranav M, Dandamraju Sri Harshith,** published a paper titled, "A Literature review: Advanced Deepfake Detection Using ResNeXt and LSTM for a Trusted Digital World", in International Journal of Creative Research Thoughts, ISSN: 2320-2882, Vol.13, Issue 3, Page No d920-d930, March 2025 (Non scopus)
- **Dr. Amith Shekhar C, Skanda J, Tejas N Hegde, P Asha Bhat,** published a paper titled, "Literature Analysis: Machine Learning and AI Driven Real Time Waste Classification Technologies", in International Journal of Advanced Engineering Application, ISSN: 3048-6807, March 2025 (Non scopus).
- **Prof. Geetha L. S.** published a paper titled "Challenges and solutions in Agile Software Development: A Managerial Perspective on Implementation Practices" in the International Journal of Advanced Computer Science and Applications in February 2025, ISSN: 2156-5570.
- **Dr. Santhosh Reddy** published a paper titled "AI-Driven Transformer Frameworks for Real-Time Anomaly Detection in Network Systems" in the International Journal of Advanced Computer Science and Applications in February 2025, ISSN: 2156-5570.
- **Raghavendra C. K., Smaran N. G., Spandana A. P., Vijay D., Vishruth M. V.,** published a paper titled "Identifying Patterns and Trends in Campus Placement Data Using Machine Learning", in International Journal of Education and Management Engineering (IJEME), Vol.15, No.1, pp. 10-24, 2025. DOI:10.5815/ijeme.2025.01.02, ISSN: 2305-3623 (Print), ISSN: 2305-8463 (Online) (Non-scopus)
- **Dr. Santhosh Reddy** published a paper titled "A highly secure and stable energy aware multi-objective constraints-based hybrid optimization algorithms for effective optimal cluster head selection and routing in wireless sensor networks" in Peer-to-Peer Networking and Applications in January 2025, ISSN: 1936-6442.

Conference Publication:

- **Chayadevi ML** et.al published a paper titled "Advancing Dermatology: CNN powered skin cancer detection", AI in Healthcare: Revolutionizing patient care beyond diagnostic's International Conference on Artificial Intelligence, Computation, Communication and Network Security (AICCoNS 2025), held on 5th -6th June 2025 at Dubai, UAE Springer Conference, Scopus indexed.
- **Anitha N, Vandana N S**, published a paper titled " Machine Learning techniques for enhanced IOT security" in International Conference on intelligent computing & Knowledge extraction , Bangalore, June 2025
- **Revansiddappa Bandi, Arvind S, Manjunath S, Deepak D J,** published a paper titled "Animal Detection and Cattle Counting using YOLOV5 model", in Second International Conference on Emerging Technologies in Science and Engineering, Tumkur, Karnataka, India, June 2025.
- **Santosh Reddy P, Rohith B, Abhiram BS, Sujay G Kaushik,** published a paper titled "SecureXChain: A Decentralized BlockChain Based Chain of Custody System for Secure And Transparent Asset Management", in First International Conference on Artificial Intelligence, Computation, Communication, and Network Security, Dubai, June 2025.
- **Santosh Reddy P, Saanvi P Gowda, Varshitha Guddappa, Sahana Bhaskar,** published a paper titled "CyberShield Multi-Toolkit: A Unified Framework for Cybersecurity and OSINT", in First International Conference on Artificial Intelligence, Computation, Communication, and Network Security, Dubai, June 2025.
- **Revanasiddappa Bandi, Alfiya Zoya, Harshita Seksaria,** published a paper titled "FarmConnect - from Farm to Fork", in First International Conference on Artificial Intelligence, Computation, Communication and Network Security (AICCONS 2025), University of Wollongong in Dubai, India, June 2025
- **Chaitra. M, Y. E. Sankol,** published a paper titled "Spot Disease Detection in Banana Leaves Using Advanced Machine Learning Techniques," in International Conference on Electronics, Computing, Communication and Control Technology (ICECCC), Bengaluru, India, 2025, pp. 1-6, doi: 10.1109/ICECCC65144.2025.11064224.
- **Revanasiddappa Bandi, Sakeena Bi, Shreeram Kedlaya, Srinisha S J,** published a paper titled "Helm Secrets: Protecting Sensitive Data in Kubernetes", in Second International Conference on Emerging Technologies in Science and Engineering , Tumkur, Karnataka, India, June 2025.
- **Kavitha Jayaram, Abhishek K A, Amogh Krishna, Kashyap Girish Rayas,** published a paper titled "Rubreak: AI-Assisted UI/UX Workflow Implementation" in 1st International Conference on Computing and Intelligent Information Systems (ICCIIS 2024), Bengaluru, Karnataka, India, April 2025.
- **M Rajanishree,K Manikantha , Akshitha Katkeri, K Manjushree,** published a paper titled "An LSTM-based Intent detection system in Hindi to English chatbot model", in International conference on Computing and Intelligent Information systems (ICCIIS) , Bengaluru, Karnataka, India, Jan 2025
- **Santosh Reddy P, Kruthi K Shetty, Apeksha G S,** published a paper titled "Machine Learning Models for Advancing Heart Disease Prediction and Diagnosis" in 3rd International Conference on Intelligent Data Communication Technologies and Internet of Things IDCIoT 2025", 5th – 7th February 2025, Reva University, Bangalore(IEEE).
- **Santosh Reddy P, Abhiram H, K S Archish,** published a paper titled "A Survey of 3D Gaussian Splatting: Optimization Techniques, Applications, and AI-Driven Advancements" in 2025 International Conference on Intelligent and Innovative Technologies in Computing, Electrical and Electronics held on 16th -17th January 2025, BNM Institute of Technology, Bangalore. (IEEE).
- **Laxmi Shabadi, Chaitra M, Monik L** et al. published a paper titled "Real-Time Elderly Fall Detection as Ambient Intelligence in Old Age Homes", in IEEE International Conference on IITCEEE-3 Intelligent and Innovative Technologies in Computing, Electrical and Electronics" 2025, held from 16th to 17th January 2025, organized by BNMIT.
- **Chaitra M, Kushal B, Likhitha H, Priyanka H R** et al. published a paper titled "AI-Powered DeepFake Defense", in IEEE International Conference on "IITCEEE-3 Intelligent and Innovative Technologies in Computing, Electrical and Electronics" held from 16th to 17th January 2025, organized by BNMIT.
- **Samarth M N, Sampriti Gopisetti, Chaitra M** published a paper titled "Smart ANPR: A Checkpoint-Based Toll and Parking Management System Using Hybrid OCR and Blockchain", in IEEE International Conference on "IITCEEE-3 Intelligent and Innovative Technologies in Computing, Electrical and Electronics", held from 16th to 17th January 2025, organized by BNMIT.

- **C. Amith Shekhar, M. Sameehana, R. Sangamesh, Vineeth Phadke,** published a paper titled "NextWave mobility: Modernizing city bus services with data-driven insights", in International conference on Computing and Intelligent Information systems (ICCIIS), Bengaluru, Karnataka, India, Jan 2025.
- **Adithya Manjunath, Akhilesh B, Akshay Prasad, Manikantha K,** published a paper titled "Timely Meds: Elevating medical management", in International conference on Computing and Intelligent Information systems (ICCIIS), Bengaluru, Karnataka, India, Jan 2025.
- **H. L. Shamanth Kashyapa, Aryan Patnaile, Ashwini Malipatil,** published a paper titled "A reinforcement learning framework for optimising peer-to-peer energy trading", in First International Conference on Artificial Intelligence, Computation, Communication and Network Security (AICCONS 2025), University of Wollongong in Dubai, India, June 2025.

Awards and Recognition received by faculty

- **Dr. Manjunatha S** received the recognition of Session Chair and Reviewer at the IEEE International Conference on "IITCEEE-3 Intelligent and Innovative Technologies in Computing, Electrical and Electronics" 2025, awarded by the Department of EEE & ECE, BNMIT, Bangalore.
- **Dr. Karthik S** received a Certificate of Excellence for reviewing a paper in the 3rd IEEE International Conference on Intelligent and Innovative Technologies in Computing, Electrical, and Electronics, awarded by the Department of EEE & ECE, BNMIT, Bengaluru.
- **Dr. Swetha M. D.** received the recognition of Session Chair and Reviewer at the IEEE International Conference on "IITCEEE-3 Intelligent and Innovative Technologies in Computing, Electrical and Electronics" 2025, awarded by the Department of EEE & ECE, BNMIT, Bangalore.
- **Dr. Chaitra M** received the recognition of Session Chair and Reviewer at the IEEE International Conference on "IITCEEE-3 Intelligent and Innovative Technologies in Computing, Electrical and Electronics" 2025, awarded by the Department of EEE & ECE, BNMIT, Bangalore.
- **Dr. Chaitra M** received the recognition of Session Chair at the 3rd IEEE International Conference on "Data Science and Information System (ICDSIS)" 2025, awarded by the Department of ISE & CSE, Malnad College of Engineering, Hassan, under the IEEE Bangalore Section.

DID YOU KNOW ?

- **Astronauts grow up to 2 inches taller when they are in space.**
- **The smallest bone in the human body (the stapes) is located inside your ear.**
- **The Eiffel Tower can be up to 6 inches taller during the summer due to thermal expansion.**
- **Mars isn't actually round. Unlike any other rocky planet in the Solar System, Mars is actually shaped like a rugby ball, but with different sizes along all three axes.**
- **The fear of long words is called Hippopotomonstrosesquippedaliophobia.**
- **Mount Everest isn't the tallest mountain on Earth. Mauna Kea and Mauna Loa in Hawaii, the twin volcanoes, are taller than Mount Everest as 4.2 km of their height is submerged underwater. The twin volcanoes measure a staggering 10.2 km in total, compared to Everest's paltry 8.8 km.**

The Metaverse and Industry 4.0 represent two transformative paradigms shaping the future of technology and industry. While the Metaverse is an immersive virtual universe enabling interactive digital experiences, Industry 4.0 marks the Fourth Industrial Revolution, driven by the digitization of manufacturing and industrial processes. Industry 4.0 incorporates several key technologies to enhance efficiency and productivity. The Internet of Things (IoT) enables real-time data collection from interconnected devices, while Big Data Analytics provides data-driven insights for better decision-making. Artificial Intelligence (AI) and Machine Learning drive automation and predictive maintenance, ensuring optimized operations and reduced downtime. Cyber-Physical Systems integrate physical and digital processes seamlessly, creating interconnected ecosystems, while smart factories embody these advancements as self-optimizing facilities powered by intelligent systems. The integration of these technologies with the Metaverse opens new possibilities, enabling the creation of virtual replicas of physical assets, also known as digital twins, which allow real-time monitoring, predictive analytics, and optimization of industrial processes. Through immersive tools like Augmented Reality (AR) and Virtual Reality (VR), the Metaverse enables collaborative design, virtual prototyping, and workforce training in realistic environments, reducing risks and costs. This convergence is set to revolutionize industries, driving human-centric automation in Industry 5.0, where humans and machines collaborate in a symbiotic relationship, further enhancing productivity, innovation, and sustainability.

Industry 4.0: The Fourth Industrial Revolution

Industry 4.0 represents the integration of advanced technologies to digitize manufacturing processes. It is characterized by key pillars such as the Internet of Things (IoT) for real-time data collection, Big Data Analytics for informed decision-making, Artificial Intelligence (AI) and Machine Learning for automation and predictive maintenance, Cyber-Physical Systems for integrating physical and digital operations, and Smart Factories, which are self-optimizing facilities driven by interconnected systems.

The Metaverse: A Virtual Ecosystem

Originally conceptualized for social and gaming applications, the Metaverse has evolved into a versatile platform for industries. It combines technologies like Virtual Reality (VR) and Augmented Reality (AR) for immersive experiences, Digital Twins for virtual replicas of physical assets, blockchain for secure transactions,

D Divya Sree
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