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AI&DS INSIGHTS

"What we achieve inwardly will change outer reality." — Plutarch

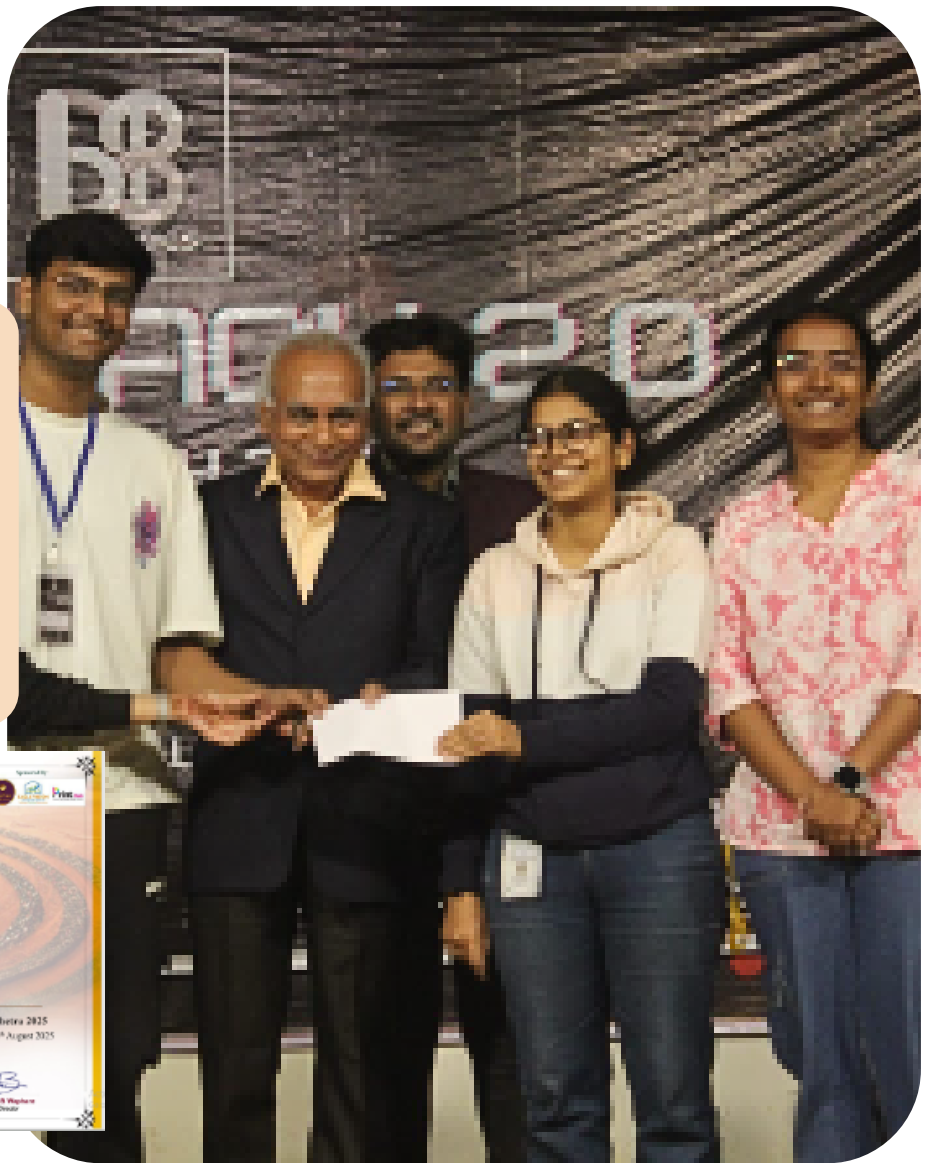
Agentic AI Workshop

A hands-on session on building AI-powered agents using LLMs, Gemini API, Tavily API, and LangChain

To read refer pg 3.

Achievement Spotlight

We are delighted to announce that Krishna Narkhede (TY B) has proudly emerged as a Finalist at Kurukshetra 2025, a prestigious national-level technical event!

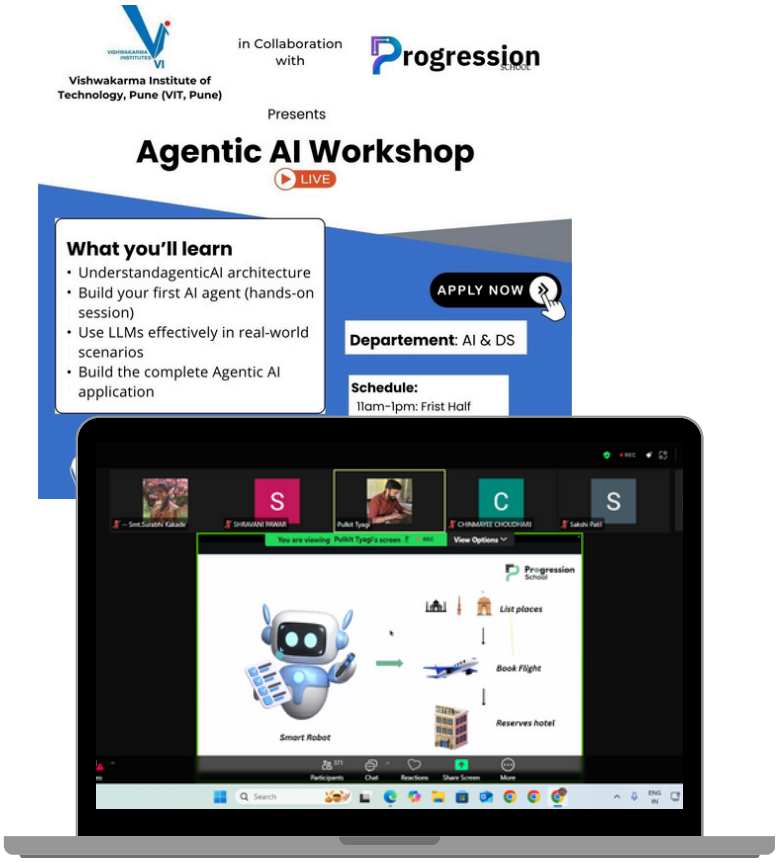


Thisremarkable achievement took place on 25th August 2025 at MIT,Pune,Maharashtra, where Krishna showcased outstandingskills, innovation, and determination. His success is a moment of pride and inspiration for the entire VIT Pune community!

Shivani Bhosale and Shruti Dwivedi, a Second Year (SY) student from Division F in the academic year 2025-26, participated in the prestigious InnoHack 2.0 held on 30th July at the National level. She showcased excellent technical skills and creativity, securing a place in the Top 5 finalists. This remarkable achievement at VIT highlights her innovative approach and problem-solving abilities, further strengthening her profile for technical internship applications.

Workshops and Events Archives

Agentic AI Workshop



The Department of Artificial Intelligence and Data Science, in association with Progression School, conducted a one-day Agentic AI Workshop focused on practical learning and skill development in the emerging field of intelligent AI systems.

The workshop was designed to help students gain hands-on experience with Large Language Models (LLMs) and understand how these models can be integrated into real-world applications through API-based workflows. Participants explored the functioning of modern AI agents and learned how to create modular, goal-driven systems capable of reasoning, decision-making, and automation.

By applying their newly acquired skills, participants were able to prototype innovative solutions and gain a deeper appreciation for the potential of LLMs in diverse domains

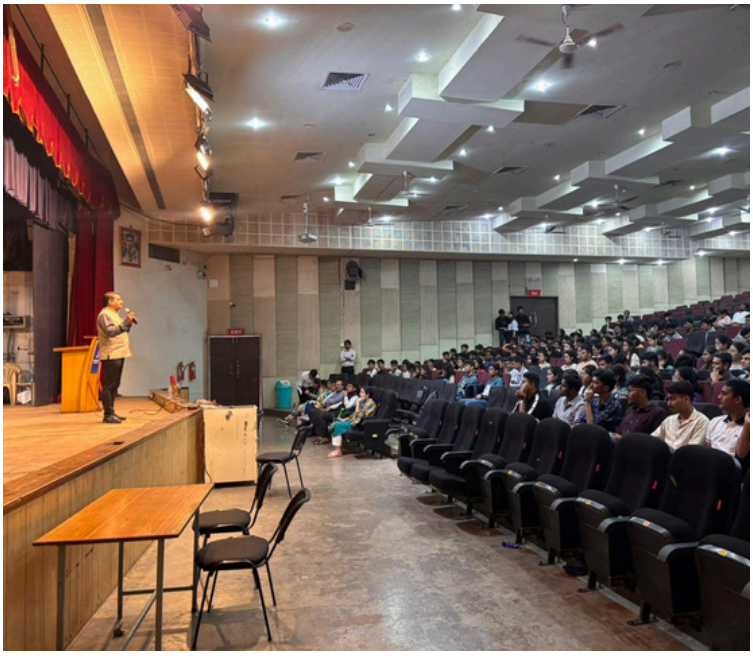
A major highlight of the session was the introduction to Agentic AI Pipelines — a framework that enables the development of AI systems capable of performing complex tasks autonomously. Students were guided through practical demonstrations and implementation exercises using key technologies such as Gemini API, Tavily API, and LangChain.

The workshop emphasized a project-based learning approach, where participants built small-scale prototypes integrating multiple APIs and LLMs to simulate intelligent agent behavior. Through these exercises, students developed a deeper understanding of prompt engineering, API communication, and workflow automation.
By the end of the workshop, attendees had a clear picture of how Agentic AI bridges the gap between theoretical AI models and real-world problem-solving. The session provided a solid foundation for students interested in exploring advanced AI development, automation tools, and modern application architectures involving LLMs.

Overall, the workshop served as an informative and practical learning experience, helping students strengthen their technical skills and understand the evolving landscape of intelligent AI systems.

AI Integration and Ayurveda

The Department of Artificial Intelligence and Data Science organized an insightful awareness session titled “AI Integration and Ayurveda” as part of the AI&DS Insight: Monthly Awareness Bulletin 2025–26. The event aimed to highlight the intersection of modern artificial intelligence technologies with India’s time-honored Ayurvedic medical practices, showcasing how data-driven systems can complement traditional wisdom to improve healthcare outcomes.



The session focused on how AI is transforming Ayurvedic research and practice through applications such as personalized diagnosis, herbal compound analysis, and predictive wellness models. Discussions included the use of machine learning algorithms for analyzing patient data, identifying body constitution types (Prakriti), and recommending customized treatment plans based on real-time health indicators.

Experts emphasized that AI does not replace Ayurveda but rather strengthens its approach by offering analytical precision and scalability. Through the integration of natural language processing, computer vision, and medical data analytics, AI systems can process ancient Ayurvedic texts, classify herbs based on their properties, and even simulate treatment outcomes using predictive modeling.

The event provided valuable insights into how technology and tradition can coexist to promote holistic well-being. It also encouraged students to explore interdisciplinary projects that combine healthcare, data science, and traditional medicine systems.

Overall, the session was well-received by attendees, who gained a broader understanding of how Artificial Intelligence can be responsibly applied to enhance and preserve the essence of Ayurveda in today’s digital era.

Student Article

Rajnandini Patil
SY AI&DS-E

Technology of the Month

The New Frontiers in AI, ML, and Data Science: TinyML, AutoML, and Generative AI

Artificial Intelligence (AI), Machine Learning (ML), and Data Science are the cornerstones of modern technological innovation. As we approach 2026, three emerging technologies—TinyML, AutoML, and Generative AI—are redefining the way intelligent systems are designed, deployed, and utilized.

These technologies are not only enhancing efficiency and creativity but also making advanced AI more accessible and sustainable. For engineering students, particularly in the domain of Artificial Intelligence and Data Science (AIDS), understanding these frontiers is crucial for academic growth and industry readiness.

TinyML (Tiny Machine Learning) is the practice of deploying machine learning models on low-powered and resource-constrained devices such as microcontrollers, sensors, and IoT systems. Unlike traditional AI systems that depend on cloud computing, TinyML enables computation directly on the device, leading to faster processing, reduced latency, and improved privacy. Since data is processed locally, it eliminates the need for constant internet connectivity and protects sensitive information. Moreover, TinyML devices are highly energy-efficient, making them ideal for battery-operated systems like wearables and smart sensors.

The applications of TinyML are vast and transformative. In healthcare, it powers smart wearables that monitor vital signs such as heart rate and oxygen levels in real time. In industries, TinyML helps predict machine failures before they occur, enabling predictive maintenance and reducing downtime. Smart home devices also benefit from TinyML through voice recognition, energy management, and automation features. Technically, recent innovations like quantization-aware training, model pruning, and the use of lightweight neural networks such as MobileNet and Tiny-YOLO have made it possible to run powerful AI models even on small embedded chips, marking a significant step toward truly intelligent edge devices.

Generative AI: The Creative Engine of AI

Generative AI refers to a class of artificial intelligence models capable of producing new and original content such as text, images, music, software code, and even synthetic datasets. With the emergence of large language models (LLMs) like GPT and diffusion models such as Stable Diffusion, generative AI has become a major force driving creativity, innovation, and automation across industries. It powers a wide range of applications, including automated text and content generation for writing reports, summaries, and chatbots; software development tools like GitHub Copilot that assist developers; and synthetic data creation for training machine learning models where real data is scarce or sensitive. Additionally, it has transformed design and creative fields through AI-generated art, product designs, and simulations.

From a technical standpoint, generative AI leverages advanced models such as Generative Pre-trained Transformers (GPT), Diffusion Models, and Generative Adversarial Networks (GANs) to learn patterns and generate realistic outputs. When integrated with other AI domains like TinyML and AutoML, it forms a unified and powerful AI ecosystem.

TinyML brings intelligence to the edge by enabling smart decision-making on devices, while AutoML streamlines the creation of optimized models. Generative AI complements them by adding creativity and adaptability, allowing AI systems to not just analyze but also innovate. In real-world scenarios, such as healthcare, wearable devices with TinyML can track vital signs, AutoML can personalize treatment predictions, and Generative AI can simulate new therapies. Similarly, in smart cities, TinyML-enabled IoT devices can process data locally, AutoML can refine traffic control systems, and Generative AI can design adaptive, data-driven urban environments.

Generative AI represents one of the most transformative frontiers of artificial intelligence, enabling machines not just to analyze data but to create entirely new content. It encompasses AI systems that can produce text, images, audio, video, software code, and even synthetic datasets that mimic real-world data. This branch of AI relies on models trained on vast amounts of information to learn patterns, relationships, and structures within data, allowing them to generate original and contextually relevant outputs. With the evolution of large language models (LLMs) such as GPT, image-based diffusion models like Stable Diffusion and DALL·E, and music generation systems like Jukebox, generative AI has unlocked new possibilities in creativity, automation, and innovation. It has become a key player in industries ranging from entertainment and education to healthcare and software engineering.

Relevance for Students in AI & Data Science

For 2nd-year AIDS engineering students, these technologies open immense opportunities: Projects & Research: Build IoT-based TinyML prototypes, AutoML-powered prediction systems, or Generative AI chatbots.

Hackathons: Use AutoML for rapid prototyping, TinyML for smart devices, and Generative AI for creative solutions.

These technologies also enhance interdisciplinary learning and real-world problem-solving.
Students gain hands-on experience integrating AI with IoT, cloud, and edge computing.
They develop critical thinking, creativity, and innovation skills through practical applications.
Knowledge in these domains also opens doors to research, startups, and global collaborations.
Mastering them early empowers students to become future-ready AI professionals.

As students face complex challenges—like optimizing energy usage, ensuring data privacy, or improving model accuracy—they learn to think analytically and creatively to develop effective solutions. Engaging with these technologies also encourages teamwork, problem-solving, and an entrepreneurial mindset, helping them innovate beyond conventional academic boundaries. Gaining expertise in AI, IoT, and cloud-edge ecosystems opens vast opportunities for research, startups, and global collaborations, allowing students to contribute to cutting-edge developments in industries and academia alike. Mastering these domains at an early stage empowers them to become future-ready AI professionals, capable of leading technological advancements and driving digital transformation in the modern world.

Conclusion

TinyML, AutoML, and Generative AI represent the next wave of AI-driven digital transformation. Together, they are making AI faster, more accessible, energy-efficient, and creative.

For students of Artificial Intelligence and Data Science, these technologies are not just academic concepts—they are practical tools to innovate, build impactful projects, and prepare for the future industry demands.
As young engineers, embracing these frontiers will help us contribute to solving real-world challenges, whether in healthcare, smart cities, sustainability, or industry automation. The future of AI is already here—our role is to understand, innovate, and lead with it.

Faculty Article

Agentic AI refers to AI systems with agency — they can accept high-level goals, plan multi-step actions, use tools, monitor outcomes, and adjust their behavior autonomously. Unlike chatbots that need constant prompting, agentic systems reason across steps, remember context, and act persistently across APIs, browsers, and databases.

Agentic AI

Agentic AI is gaining importance now because large language models (LLMs) have become capable of long-form reasoning and planning when paired with retrieval and memory systems. Modern orchestration tools, APIs, and vector databases have made it practical to build agents that can operate across browsers, software systems, and enterprise applications. Major technology vendors and research institutions are already experimenting with autonomous agents in domains like customer service, software development, and research automation. Analysts predict that the period from 2024 to 2027 will see rapid experimentation and pilot deployments of such systems across industries.

Technically, an agentic AI system is built from multiple interconnected modules. The perception or input layer uses LLMs and multimodal encoders to interpret data, while the planner generates subgoals and maps out task sequences. The executor layer performs real actions using APIs, browsers, or code sandboxes. Memory systems, such as vector databases, enable the agent to remember past interactions and learn from them over time.

A verifier checks and corrects outputs, and the controller manages retries, error handling, and escalation. Understanding this modular design helps engineers design, debug, and optimize intelligent agents effectively.

Learning and adaptation are key to agentic behavior. These systems often rely on reinforcement learning to improve through feedback, imitation learning to copy safe behaviors, and fine-tuning for specific domains. Memory and retrieval mechanisms allow the agent to retain contextual knowledge across sessions. In more advanced setups, multiple agents can coordinate and divide responsibilities, making complex tasks more manageable and efficient.

A central strength of agentic AI lies in its safe integration with external tools and systems. Since these agents often interact with sensitive environments like databases and web services, secure execution through sandboxing, permission controls, and activity logging is essential. Human oversight ensures that such systems act responsibly and within ethical boundaries.

Conclusion:

Agentic AI represents a major evolution in artificial intelligence — moving beyond passive chatbots to proactive, goal-oriented systems capable of autonomous decision-making and real-world action. As this technology rapidly integrates into education, engineering, business, and research, it will redefine how humans and machines collaborate.

For engineering students, understanding agentic AI's architecture, safety mechanisms, and ethical principles is essential. By combining technical mastery with responsible innovation, they can ensure that the next generation of AI systems remains transparent, trustworthy, and aligned with human values.

Prof Surabhi Kakade.

Assistant Professor
AI & DS Department

Faculty Publication

Faculty Member	Paper / Patent Title	Summary
Dr.Minal Barhate, Dr.Parikshit Mahalle	A RADAR-INTEGRATED OBSTACLE DETECTION SYSTEM WITH PIEZOELECTRIC ENERGY HARVESTING (Patent Application No. 202521086143 A)	Published in The Patent Office Journal No. 39/2025 (Dated 26/09/2025). This invention integrates radar-based obstacle detection with piezoelectric energy harvesting to enhance safety in autonomous and defense applications. The system converts vibrations into usable electrical energy to power an ultrasonic radar sensor for real-time obstacle detection, enabling sustainable, off-grid operation.
Dr.Minal Barhate, Dr.Parikshit Mahalle	AN AGRICULTURAL PEST DETECTION AND MONITORING SYSTEM (Patent Application No. 202521086144 A)	Published in The Patent Office Journal No. 39/2025 (Dated 26/09/2025). This patent presents an AI-enabled pest detection and monitoring system that uses PIR sensors, ESP32-CAM, and a YOLOv11 deep learning model for real-time pest identification. Data is transmitted to a centralized web dashboard, offering farmers actionable insights for crop protection and reduced pesticide misuse.

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