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ADDING VALUE TO ENGINEERING
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DEPARTMENT OF INFORMATION TECHNOLOGY

VAJRA '25

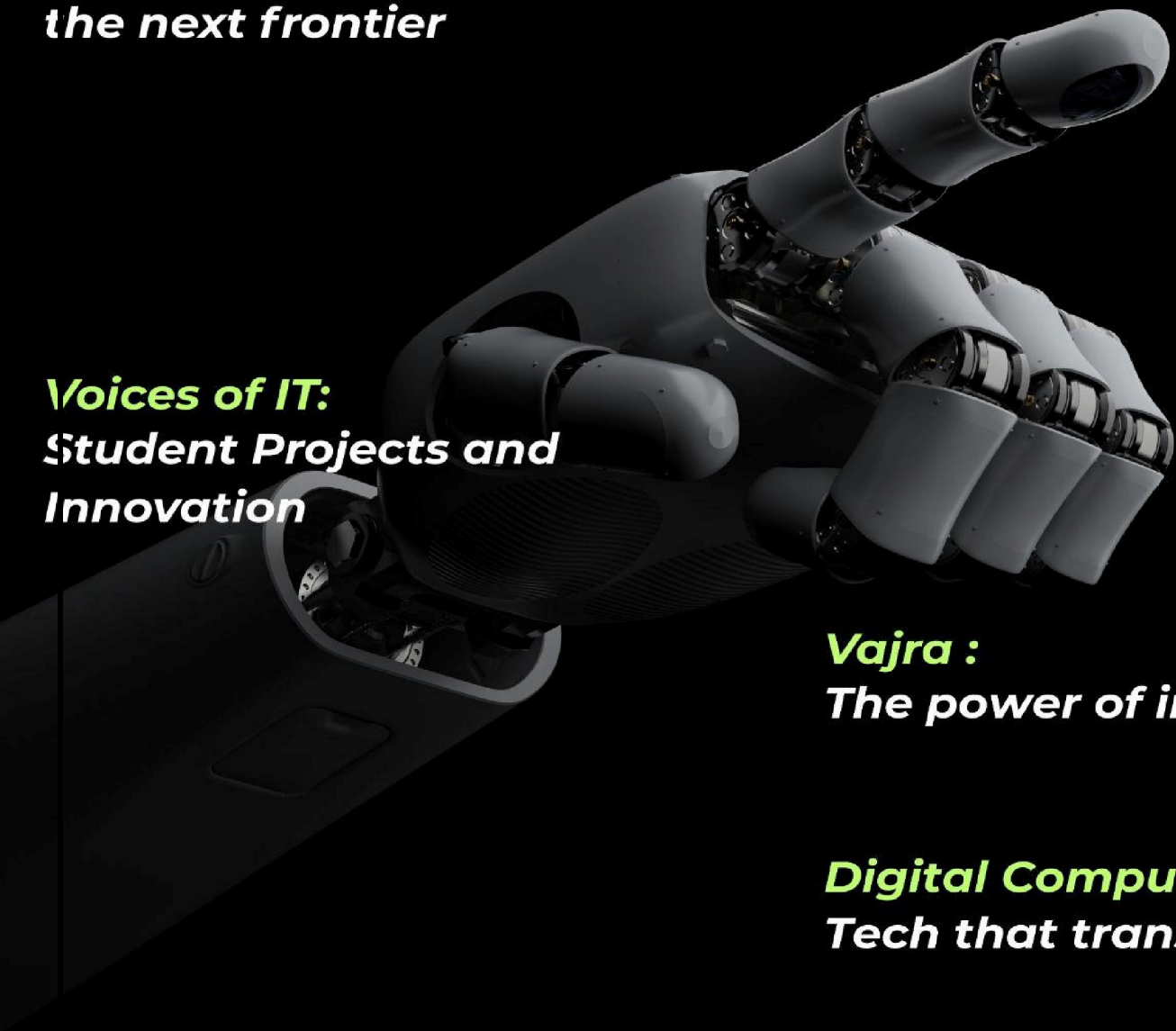
Annual Technical Magazine - 2025

*AI and Machine learning:
the next frontier*

*Voices of IT:
Student Projects and
Innovation*

*Vajra :
The power of innovation*

*Digital Computing :
Tech that transforms!*

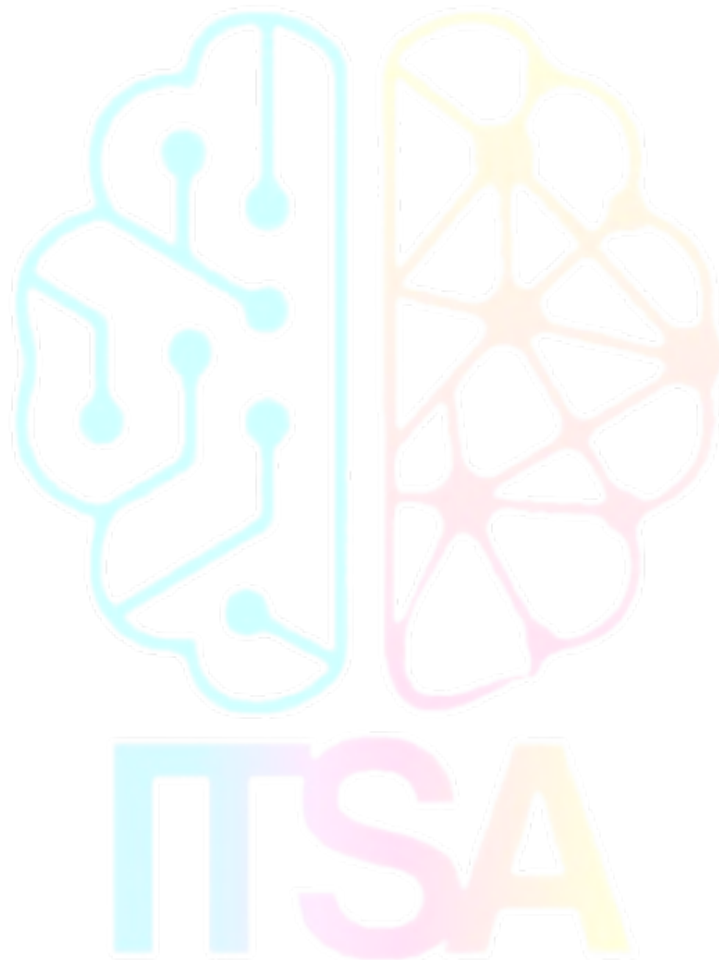


DEPARTMENT OF INFORMATION TECHNOLOGY

Welcome to the Department of Information Technology!

In today's dynamic world, Information Technology is the backbone of our daily lives. From the devices we use to the expansive internet and mobile networks, IT has revolutionized our existence. Our department is committed to equipping students with cutting-edge technological skills while instilling strong ethical values, preparing them to tackle the ever-evolving challenges of the IT industry.

To realize our vision of providing exceptional education, we offer a diverse range of activities including expert lectures, seminars, workshops, and industrial visits. These initiatives ensure an engaging and effective learning experience. We also encourage our students to participate in various technical and non-technical contests, promoting their overall personality development. We believe in the holistic growth of our students. By providing numerous platforms for extracurricular activities, we help shape their personalities, fostering creativity, teamwork, and leadership skills.



MESSAGE FROM HOD



It gives me immense pleasure and pride to present the 12th Annual Technical Magazine, “VAJRA 2025” of the Department of Information Technology. This magazine is not merely a collection of writings but a reflection of the creativity, technical insight, and innovative spirit of our budding engineers. It provides a vibrant platform for our students to express themselves through thoughtful articles, research perspectives, poems, and artistic contributions, showcasing their hidden talents beyond academics. This achievement is possible due to the visionary guidance of **Shri Malojiraje Chhatrapati**, Hon. Secretary of the All India Shri Shivaji Memorial Society, and the inspiring leadership of **Dr. P. B. Mane**, Principal of AISSMS Institute of Information Technology, whose constant encouragement motivates us to strive for excellence. I extend my heartfelt appreciation to the Chief Editor, **Mrs. Gunjan V. Ukalkar**, for her relentless efforts in bringing out this edition with utmost dedication and quality. My sincere gratitude also goes to the entire editorial board for their meticulous planning, teamwork, and commitment to nurturing a culture of innovation and expression. A special word of thanks to all the faculty and student authors and contributors for enriching this magazine with their knowledge and creativity. I am confident that “VAJRA 2025” will inspire readers and continue to serve as a platform for igniting curiosity, enhancing technical acumen, and celebrating the holistic development of our students.

Dr. Pragati P. Mahale
HOD, I.T
AISSMS IOIT, Pune

MESSAGE FROM STAFF EDITOR-IN-CHIEF



It is with immense pride and joy that the Department of Information Technology unveils the 12th edition of our annual technical magazine 'VAJRA 2025'. This year , we are delighted to present a collection that highlights the innovative ideas and hidden talents of our brilliant students. Our magazine serves as a platform for students to explore and expand their technological skill with a special focus on the remarkable advancements in technology within India. On behalf of the entire magazine team , I extend my heartfelt gratitude to our respected Principal , **Dr .P. B. Mane** for entrusting me with the role of editor .Your faith in our capabilities has been a driving force behind this effort. I am also deeply thankful to our Head of Department **Dr. Pragati P. Mahale** , for her unwavering support and invaluable guidance. I congratulate the entire editorial board for excellent team work and tireless efforts in successfully compiling the magazine. I hope you enjoy reading the magazine as much as we have compiled it.Flip through the pages for a journey to get inspired and encouraged by reading articles.

Ms.G.V.Ukalkar
Chief Editor and Magazine coordinator
Assistant Professor

ALL INDIA SHRI SHIVAJI MEMORIAL SOCIETY'S INSTITUTE OF INFORMATION TECHNOLOGY

Department of Information Technology

VISION

To be a leader in preparing technically competent and skillful IT Graduates to address the needs of industry and society.

MISSION

1. To prepare students for employment/entrepreneurship/higher studies through curricular, extracurricular and extension activities.
2. To promote research and professional activities through industry involvement and professional bodies
3. To instill professional ethics and lifelong learning skills with concern for the society.

PROGRAM EDUCATIONAL OBJECTIVE

Graduates will

1. Excel in diverse career paths with core professional skills.
2. Engage in multi domain research/professional activities
3. Cater to the needs of society with IT solutions/applications.

PROGRAM SPECIFIC OUTCOMES

Graduates will be able to

1. Use database, networking and programming technologies for solving real life problems
2. Develop applications in the field of computing, networking, security and analytics.

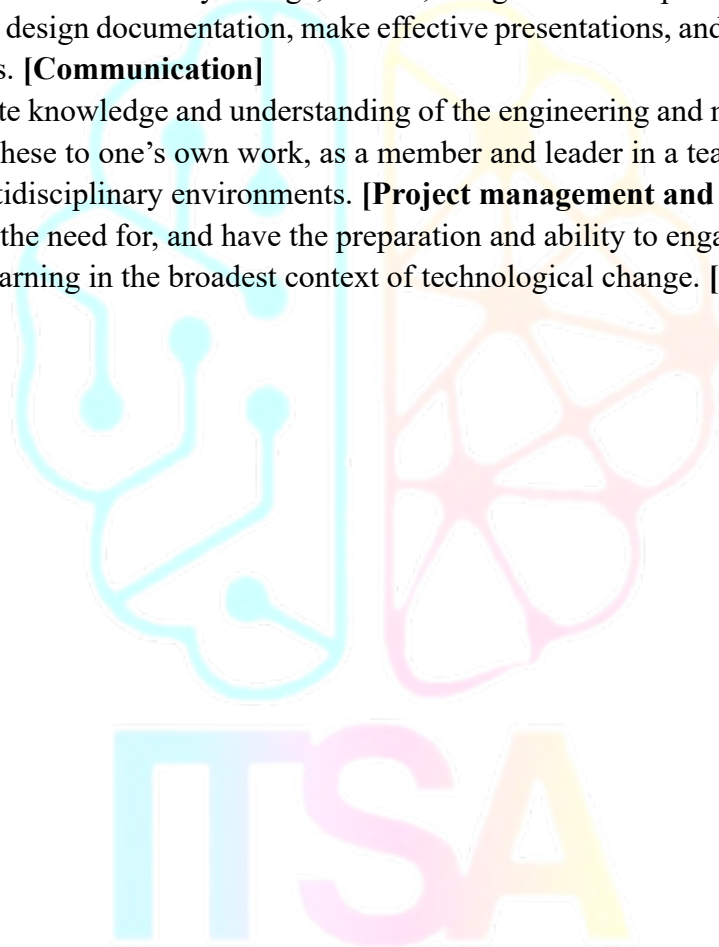
PROGRAM OUTCOMES

Graduates will be able to

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. **[Engineering knowledge]**
2. Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. **[Problem analysis]**
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. **[Design/development of solutions]**
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. **[Conduct investigations of complex problems]**
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an

understanding of the limitations. **[Modern tool usage]**

6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. **[The engineer and society]**
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. **[Environment and sustainability]**
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. **[Ethics]**
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. **[Individual and team work]**
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. **[Communication]**
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. **[Project management and finance]**
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. **[Life-long learning]**



MESSAGE FROM ITSA COMMITTEE



The Information Technology Students' Association (ITSA) extends its greetings to all readers of "VAJRA 25". As a student body, ITSA is committed to nurturing technical excellence, leadership, and holistic development among the students of our department. Each year, through diverse initiatives—be it academic, cultural, or co-curricular—we strive to create a platform that not only enhances skills but also builds collaboration and innovation. The magazine stands as a reflection of the creativity, dedication, and achievements of our student community, and we take pride in being a part of this journey.

We express our gratitude to the faculty, students, and contributors whose consistent support makes every milestone possible. With the same spirit, ITSA looks forward to another year of learning, growth, and impactful endeavors. Together, we aim to uphold the values of teamwork, innovation, and excellence while continuing to make ITSA a platform that empowers every student.

— ITSA Committee 2025

MESSAGE FROM EDITORIAL TEAM



It gives us great pride and excitement to present our very own departmental technical magazine, **VAJRA-2025**. Just as a spark can ignite countless ideas, this magazine is our attempt to illuminate the creativity, innovation, and knowledge that thrive within our IT community. Behind every page lies the effort, dedication, and passion of our students, who have poured their skills and imagination into making this edition a reality. VAJRA-2025 is not just a collection of articles—it is a reflection of curiosity, learning, and the ever-evolving spirit of technology. Within these pages, you will explore insightful articles on the latest advancements in the IT sector, the role of technology in shaping India's future, and the exciting trends driving global innovation. At the same time, it celebrates the hidden talents of our student community, proving that creativity and technology can go hand in hand. We believe this magazine will inspire readers to think, explore, and innovate, just as it inspired us while creating it. With immense joy and pride, we present to you VAJRA-2025, a true showcase of talent, vision, and the limitless possibilities of the digital world.

-Editorial Team

- 1. Shriya Kulkarni**
- 2. Purva Bhambere**
- 3. Riya Laddha**
- 4. Sujal Singh**
- 5. Shivam Varpe**
- 6. Siddhesh Khiratkar**
- 7. Bushra Shaikh**

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Generative AI with LLMs and Transformers: A Detailed Overview

Introduction

Generative Artificial Intelligence (Generative AI) has emerged as one of the most transformative technologies of the 21st century. Unlike traditional AI systems that classify data or make predictions, generative AI is capable of creating new content—including text, images, code, music, and even videos—by learning from massive datasets. At the heart of this revolution are **Large Language Models (LLMs)** and the **Transformer architecture**, which together power applications like ChatGPT, Google Gemini, and Claude.

What is Generative AI?

Generative AI refers to machine learning systems that can create novel data resembling their training data.

Key Capabilities:

- Text Generation: essays, code, stories.
- Image & Video Synthesis: tools like DALL·E and Stable Diffusion.
- Audio & Speech Generation: synthetic voices, music.
- Multimodal Generation: models that combine text, images, and audio.

Among these, text generation through LLMs is the most widely used and commercially successful.

Large Language Models (LLMs)

LLMs are massive neural networks trained on billions or even trillions of parameters. They predict words in context, enabling human-like text generation.

Key Features of LLMs:

1. Scale: Larger models capture nuanced language patterns.
2. Pre-training & Fine-tuning:
 - Pre-training uses diverse datasets.
 - Fine-tuning adapts models for specific tasks like summarization or coding.
3. Emergent Abilities: reasoning, translation, summarization, few-shot learning.
4. Contextual Understanding: ability to manage long-range dependencies for coherent generation.

The Transformer Architecture

Introduced by Vaswani et al. (2017) in "Attention Is All You Need", Transformers revolutionized natural language processing.

Why Transformers Matter: Older models like RNNs and LSTMs struggled with long sequences and parallelization. Transformers solved this with **self-attention**.

Core Components of a Transformer:

- Input Embeddings – converting tokens into vectors.
- Positional Encoding – adding order information.
- Self-Attention & Multi-Head Attention – dynamic context understanding.
- Feed-Forward Networks – processing attention outputs.
- Stacked Layers – hierarchical comprehension.
- Decoder – sequential output generation.

How LLMs Generate Text

1. Input text is tokenized.
2. Tokens are embedded and passed through transformer layers.
3. Self-attention captures context.
4. Next-token probabilities are predicted.
5. A decoding strategy (greedy, beam search, top-k, nucleus sampling) selects the output.
6. Steps repeat until completion.

This enables contextually relevant, grammatically correct, and meaningful text generation.

Applications of Generative AI

- Conversational AI: chatbots, tutors, assistants.
- Content Creation: blogs, marketing copy, news summaries.
- Programming: code generation, debugging (e.g., GitHub Copilot).
- Research & Knowledge Work: paper summarization, report generation, drug discovery.
- Education: personalized learning materials, automated grading.
- Multimodal AI: combining text with images, audio, and video.

Challenges & Ethical Concerns

- Bias & Fairness: inherited from training data.
- Hallucinations: generating false but plausible information.
- Data Privacy: risk of sensitive data leakage.
- Energy Consumption: high computational costs.
- Misinformation: risk of misuse for fake news or spam.

Researchers are working on mitigation using **RLHF (Reinforcement Learning with Human Feedback)**, better metrics, and alignment techniques.

The Future of Generative AI

- Smaller, Efficient Models: optimized for edge devices.
- Multimodal Fusion: unified models for text, images, audio, and video.
- Explainability: improving interpretability.
- Customization: industry-specific fine-tuned models.
- Human-AI Collaboration: combining human creativity with AI assistance.

Conclusion

Generative AI powered by LLMs and Transformers has transformed how machines interact with language and creativity. While ethical and technical challenges remain, its potential across industries is immense.

Transformers truly live up to their name—they have transformed AI itself.

Dr. P.P. Mahale
Head Of Department
IT Department

Generative AI Next: Transforming Research into Reality

Generative Artificial Intelligence (GenAI) has rapidly evolved as one of the most significant breakthroughs in the world of technology. Unlike traditional AI, which focuses on analyzing and classifying data, GenAI is capable of producing new knowledge, designs, and content. This makes it a vital link between academic research and driving innovation across multiple domains, turning theoretical concepts into real-world outcomes. In the field of research, GenAI is accelerating discoveries by reducing the time required for experimentation. These systems enable researchers to simulate, test, and validate complex ideas with efficiency that was unimaginable a decade ago. Engineering design too is being revolutionized with generative tools that optimize structures, circuits, and systems for better performance and sustainability.

The positive impacts of GenAI on human life are visible everywhere. In healthcare, AI-generated molecular structures are speeding up new treatments. In education, personalized tutoring systems are empowering students to learn at their own pace. Creative industries such as art, music, and media are leveraging GenAI to expand human imagination. In finance, agriculture, and manufacturing, GenAI is making processes more intelligent, cost-effective, and adaptive. These advances are transforming not only industries but also everyday life. However, every technological revolution brings challenges. Generative AI can produce biased, misleading, or even harmful content if not trained responsibly. The rise of deepfakes and synthetic media raises concerns about misinformation, privacy, and trust. Automation powered by GenAI could disrupt traditional jobs, creating anxiety about employment. Sustainability is another concern, as large generative models consume enormous computing resources and energy.

For engineering students and future innovators, the path ahead lies in balancing opportunities with responsibility. Mastering the algorithms is only one part of the challenge—the greater task is to apply them ethically, ensuring that GenAI benefits society as a whole. As we step into the era of Generative AI Next, we witness technology moving from abstract research to real-world transformation. Its power to create, innovate, and revolutionize is undeniable. Yet, its safe and sustainable integration into human life will determine whether it becomes a tool of empowerment or a source of disruption. The future of Generative AI is in our hands—shaping it wisely will define how research truly becomes reality.



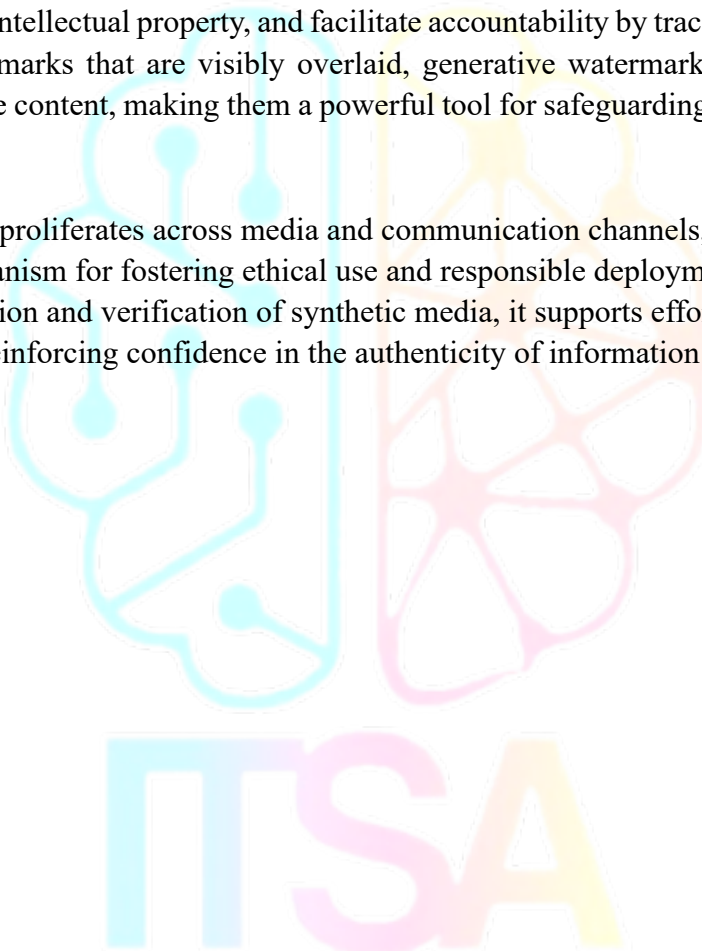
Dr. Mrunal K. Pathak
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IT Department

Generative Watermarking: Building Trust in an AI-Driven World

Generative watermarking is an emerging technology designed to embed invisible, verifiable markers within AI-generated content, helping to authenticate its origin and maintain trust in digital media. As AI tools become increasingly capable of producing realistic images, text, and videos, distinguishing human-created from machine-generated content grows more challenging. Watermarking provides a technical solution that allows creators and platforms to assert the authenticity and provenance of AI-generated works, promoting transparency.

This technology works by integrating subtle patterns or codes directly into the AI output during the generation process, which are imperceptible to humans but detectable by algorithms. These watermarks can help combat misinformation, protect intellectual property, and facilitate accountability by tracing content back to its source. Unlike traditional watermarks that are visibly overlaid, generative watermarks maintain the aesthetic and functional integrity of the content, making them a powerful tool for safeguarding trust without disrupting user experience.

As AI-generated content proliferates across media and communication channels, generative watermarking stands as a critical mechanism for fostering ethical use and responsible deployment of AI technologies. By enabling clear identification and verification of synthetic media, it supports efforts to mitigate manipulation and misuse, ultimately reinforcing confidence in the authenticity of information in an increasingly AI-driven world.



Dr. Reshma Yogesh Totare
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Deep Learning in Healthcare: Transforming Diagnosis and Treatment

Deep learning, a subset of artificial intelligence (AI), has emerged as a transformative technology in healthcare. By leveraging large volumes of medical data, including imaging, clinical notes, and electronic health records (EHRs), deep learning algorithms can uncover complex patterns that often remain hidden from human experts. These models mimic the functioning of the human brain through multiple layers of artificial neural networks, enabling machines to perform tasks such as disease detection, outcome prediction, and personalized treatment planning with remarkable accuracy. One of the most impactful applications of deep learning lies in medical imaging. Convolutional Neural Networks (CNNs) have been extensively used to analyze X-rays, CT scans, and MRI images for the early detection of diseases such as pneumonia, cancer, and neurological disorders. These models can differentiate subtle variations in tissue structures and highlight anomalies, assisting radiologists in making faster and more precise diagnoses. For example, CNN-based systems have demonstrated diagnostic performance comparable to or even surpassing experienced radiologists in certain domains.

Beyond imaging, deep learning is advancing predictive analytics in healthcare. Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) networks are being applied to analyze time-series medical data, such as heart rate, blood pressure, and glucose levels. These models can predict disease progression and patient outcomes, allowing clinicians to intervene proactively. Such predictive insights play a vital role in managing chronic conditions like diabetes, cardiovascular diseases, and respiratory disorders. Deep learning also enables personalized medicine. By integrating genomic data with clinical profiles, algorithms can suggest tailored drug therapies for individual patients. This reduces trial-and-error in treatment, minimizes side effects, and improves therapeutic outcomes. Additionally, deep learning has been applied to drug discovery, where it accelerates the identification of potential compounds and shortens the development cycle for new medications.

Despite its immense promise, deep learning in healthcare faces challenges such as data privacy, model interpretability, and the need for large, high-quality datasets. Ethical concerns regarding bias, accountability, and fairness also need to be addressed. Nevertheless, ongoing research in explainable AI and federated learning is paving the way for more transparent and secure systems. In conclusion, deep learning is revolutionizing healthcare by enhancing diagnostic accuracy, enabling predictive modeling, and supporting personalized treatments. As the technology continues to mature, it has the potential to reshape patient care, reduce healthcare costs, and ultimately save lives.

Ms. Supriya More
Assistant Professor
IT Department

Impact of Blockchain Technology on Cryptocurrency

The rapid growth of Cryptocurrency in the past decade has been fueled by one groundbreaking innovation Blockchain Technology. Blockchain acts as the backbone of digital currencies like Bitcoin, Ethereum, and many others, ensuring secure, transparent, and decentralized transactions across the globe. Let's explore how blockchain has shaped the Cryptocurrency landscape and why it continues to be a driving force behind its evolution.

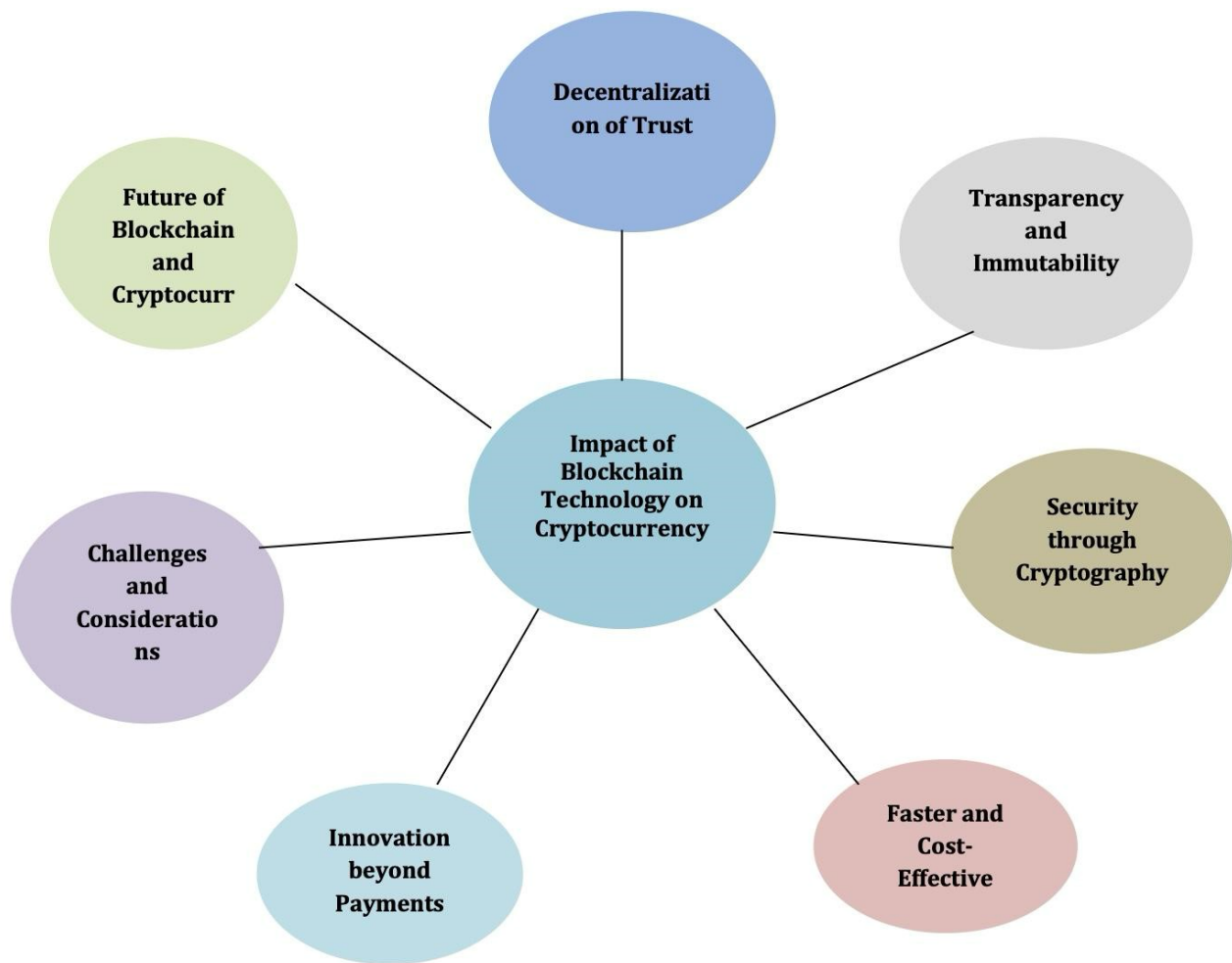


Fig 1: Impact of Blockchain Technology on Cryptocurrency

1. Decentralization and Trust

One of the biggest impacts of blockchain on Cryptocurrency is the removal of intermediaries. Traditional financial systems rely on banks or payment gateways to verify transactions, whereas blockchain uses a decentralized network of nodes. This decentralization builds trust among users, as no single entity controls the system.

2. Transparency and Immutability

Every Cryptocurrency transaction is recorded on the blockchain as a “block” and linked to the previous ones, creating a chain of records that cannot be altered. This immutability ensures that transactions are permanent, while transparency allows anyone on the network to verify them. Together, these features make fraud and manipulation nearly impossible.

3. Security through Cryptography

Blockchain leverages cryptographic algorithms to secure data and validate ownership of assets. Digital signatures, hashing, and consensus mechanisms (like Proof of Work or Proof of Stake) guarantee that Cryptocurrency transactions remain safe from tampering and cyber-attacks.

4. Faster and Cost-Effective Transactions

Cryptocurrencies powered by blockchain enable **peer-to-peer transactions** across borders without the delays of traditional banking systems. By cutting out intermediaries, blockchain reduces transaction fees and processing time, making it ideal for global trade and remittances.

5. Innovation beyond Payments

The impact of blockchain on Cryptocurrency goes beyond simple money transfers. The technology has introduced **smart contracts** (self-executing agreements coded on the blockchain) and decentralized finance (DeFi) platforms. These advancements are redefining how people invest, borrow, and trade in a trustless environment.

6. Challenges and Considerations

While blockchain strengthens Cryptocurrency, it also faces hurdles: Scalability issues with high transaction volumes. Energy consumption in Proof of Work networks like Bitcoin. Regulatory uncertainties that affect mainstream adoption. These challenges highlight the need for continuous innovation and collaboration between technologists, policymakers, and businesses.

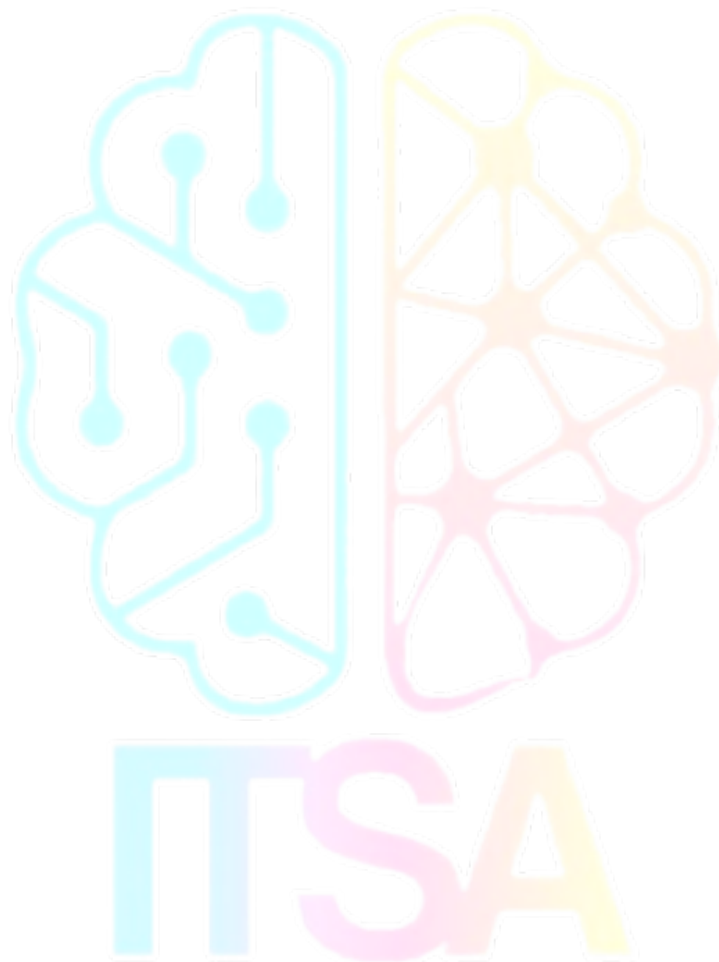
7. The Future of Blockchain and Cryptocurrency

Blockchain’s impact on Cryptocurrency is still evolving. With emerging technologies like Layer-2 scaling solutions, central bank digital currencies (CBDCs), and green consensus models, the synergy between blockchain and crypto is set to reshape financial systems worldwide.

Conclusion

Blockchain technology is the lifeblood of Cryptocurrency. Its features decentralization, transparency, immutability, and security have transformed how we perceive and exchange value in the digital era. Despite challenges, the integration of blockchain into Cryptocurrency ecosystems promises a future where finance is more open, secure, and inclusive.

Ms. J.C. Pasalkar
Assistant Professor
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Power BI: Transforming Data into Decisions

In today's digital age, data is often called the "new oil." Every organization, big or small, produces huge volumes of information on a daily basis. But data by itself is not very valuable until it is converted into valuable insights. This is where Microsoft Power BI comes in. Power BI is a data visualization and business intelligence solution that transforms raw data into precise, interactive reports and dashboards. Due to its simplicity, scalability, and integration, it is widely accepted. Anyone can create visuals, monitor performance, and share insights with teams.

Some of the prominent concepts in Power BI are:

- Datasets – raw data gathered from various sources such as Excel, databases, or cloud environments.
- Reports – in-depth visualizations rendered through datasets, which emphasize trends and performance.
- Dashboards – set of visuals positioned on a single page for instant decision-making.
- Data Modeling – the mechanism of organizing relationships between data so that it will be accurate and consistent.
- DAX (Data Analysis Expressions) – a formula language that is applied to execute complex calculations and construct unique measures.

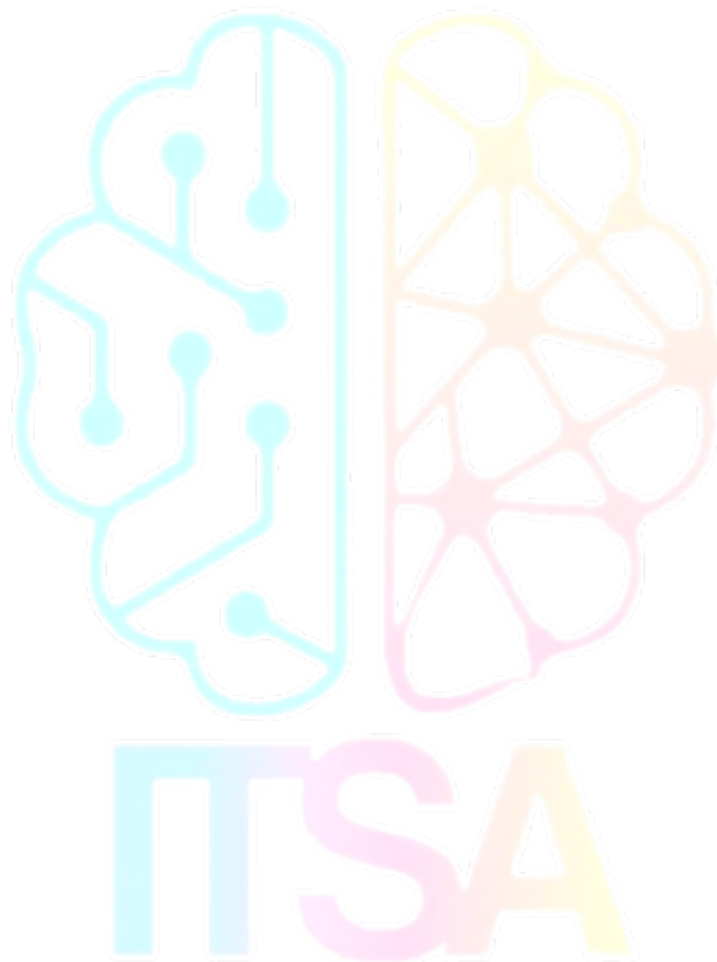


Fig 2: Transforming Data into Decisions

The relevance of Power BI to industries today cannot be overemphasized. By allowing companies to analyze and visualize data in real-time, it enhances decision-making, detects trends, and assists with future projections. Whether finance, healthcare, marketing, or retail, Power BI clarifies data complexity. Professionally, learning Power BI gives the scope to work as a Data Analyst, Business Intelligence Developer, or Visualization Specialist. With more and more companies going for data-driven approaches, the need for professionals in Power BI is only growing. Gazing into the future, the horizon of Power BI will only widen with digital transformation. It is not a tool—it is a career-shaping skill that closes the gap between data and decisions.

Shriya Kulkarni

TY- IT



Model Context Protocol

Introduction

The field of artificial intelligence has seen significant change, with AI agents gaining more complex reasoning skills. The discrepancy between what AI models can conceptualize and what they can accomplish in the real world, however, has remained a persistent problem. A solution to this challenge was essentially addressed in November 2024 by Anthropic when they announced the protocol as an open standard for integrating AI assistants with data systems like development environments, business management tools, and content repositories. The Model Context Protocol has completely changed the way we think about AI integration. Rather than building bespoke connections for each service, MCP provides a standardized framework that acts as the "hardware" or "limbs" of AI agents, enabling them to interact with the digital world through secure, well-defined interfaces.

What is the Model Context Protocol?

MCP standardizes the way applications give LLMs context. Consider MCP as the AI equivalent of a USB-C port. MCP offers a standardized method for connecting AI models to external systems and data sources, much like USB-C offers a standardized method for connecting your devices to different peripherals and accessories. Developers can safely establish a two-way connection between data sources and AI-powered tools using MCP. This architecture preserves security and dependability while doing away with the complexity of custom integrations.

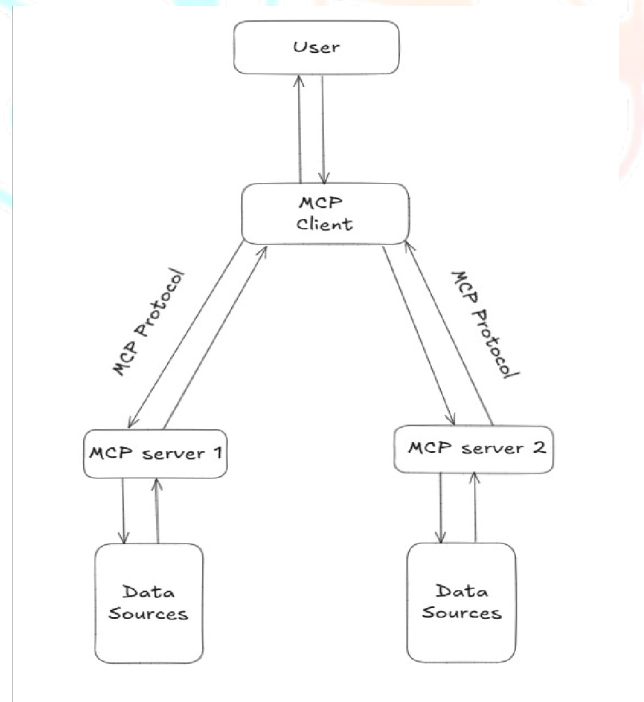


Fig 3:Block Diagram of Model Context Protocol

The Architecture: Servers, Clients, and Protocols

The MCP ecosystem consists of three primary components:

MCP Servers: These act as specialized interfaces to external services, handling authentication, API calls, and data formatting. They expose standardized functions that AI clients can call without needing to understand the underlying service complexity.

MCP Clients: These are AI orchestrators that consume the services provided by MCP servers. Claude, for instance, can act as an MCP client, calling server functions to perform real-world tasks.

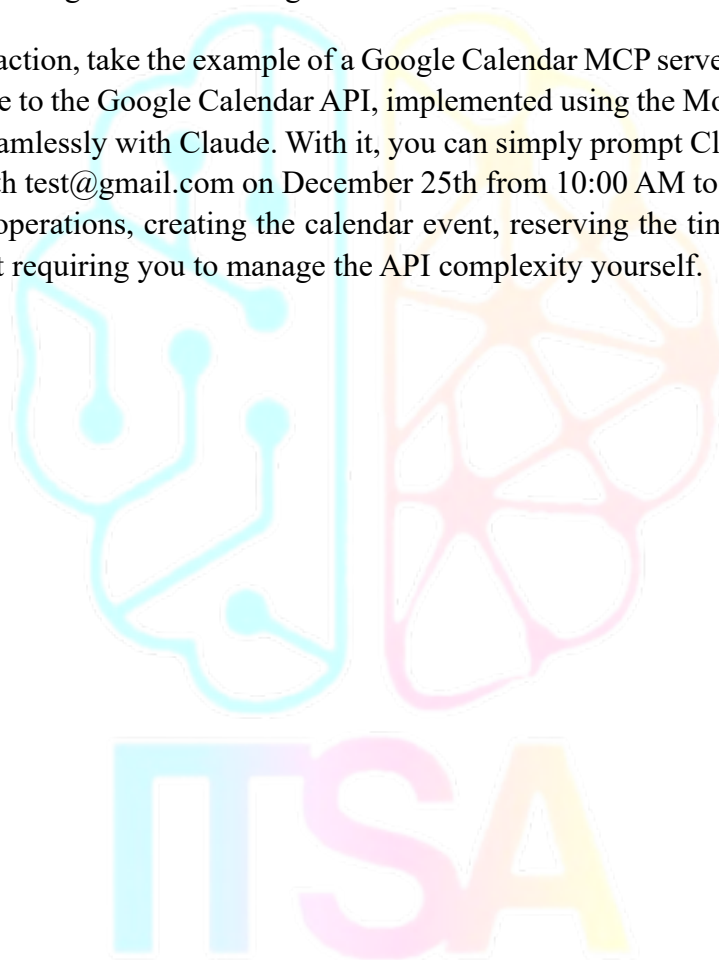
The Protocol: The standardized communication layer that ensures secure, reliable interaction between servers and clients.

Real-World Application: Google Calendar Integration

To demonstrate MCP in action, take the example of a Google Calendar MCP server I recently built. This server acts as a dedicated bridge to the Google Calendar API, implemented using the Model Context Protocol library and designed to work seamlessly with Claude. With it, you can simply prompt Claude with an instruction like “Schedule a meeting with test@gmail.com on December 25th from 10:00 AM to 11:00 AM”. The server then handles the underlying operations, creating the calendar event, reserving the time slot, and even sending an email invitation, without requiring you to manage the API complexity yourself.

Chinmay Nakwa

T.Y- IT



What are AI Agents?

AI agents are software systems designed to perform tasks autonomously by utilizing available tools and data. They can encompass a wide range of functions, including decision-making, problem-solving, and interacting with external environments. These agents leverage advanced technologies, particularly large language models (LLMs), to understand user inputs and execute complex workflows.



Fig 4: Types of AI Agents

Types and Applications

1. **Agentic AI:** This category refers to AI that can act with a degree of independence, planning and responding to new information without needing constant human input. Examples include Google’s Gemini agents and OpenAI’s Operator, which are designed to handle tasks like scheduling and data management.
2. **Business Integration:** AI agents are increasingly becoming integral to enterprise operations. They can automate complex tasks, improve efficiency, and enhance decision-making processes across various sectors, including finance, healthcare, and customer service.
3. **Collaboration with Humans:** By 2028, it is expected that 38% of organizations will have AI agents working alongside human teams, fostering a collaborative environment that drives innovation and productivity.

Economic Impact

The rise of AI agents presents significant economic opportunities. By 2028, they could generate up to **\$450 billion** in value through revenue growth and cost savings across various industries. However, the maturity of

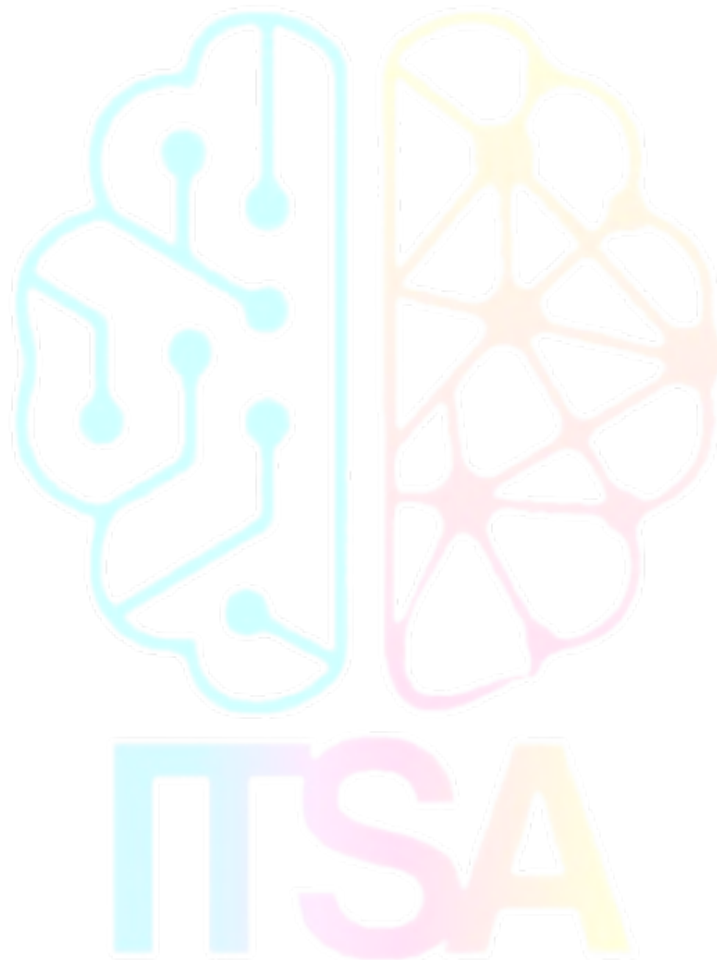
AI agent deployment remains low, with only a small percentage of organizations having fully integrated these systems.

Challenges and Future Outlook

Despite their potential, trust in fully autonomous AI agents has declined due to ethical concerns and a lack of transparency. Organizations face challenges in building the necessary data and technology infrastructure to support these systems effectively. As AI agents continue to evolve, their ability to learn from interactions and adapt to user needs will be crucial for their success in real-world applications.

Vinay Basargekar

B.E-IT



GPT-5: From Tool to Teammate :The Art of Prompt Engineering

“Prompt engineering isn’t about asking—it’s about collaborating.”

Artificial Intelligence has rapidly evolved from being a futuristic concept to becoming a daily companion in our work and creativity. With the release of **GPT-5**, OpenAI has redefined how we interact with machines. What makes GPT-5 stand out is not just its intelligence, but the way it feels less like software and more like a collaborator. Unlike GPT-4, which often amazed us with its raw power, GPT-5 offers something deeper: **contextual memory, reliable reasoning, and adaptive tone**. It remembers ongoing conversations, makes fewer factual slips, and adapts seamlessly whether you want a sharp business draft, a creative narrative, or casual advice. In short—it gets you.

But here’s the catch: the true magic of GPT-5 is unlocked through **prompt engineering**. This skill has quickly become the new digital superpower. A well-crafted prompt can turn the AI into a strategist, a coach, or even a storyteller. Through my own experiments, I’ve found **seven golden steps** that make a huge difference:

1. Define the goal clearly
2. Provide the right context
3. Assign roles to the AI
4. Break big asks into smaller steps
5. Treat first outputs as drafts
6. Balance structure with creativity
7. Experiment with variations

The shift is clear: prompting isn’t about typing questions. It’s about *collaborating with intelligence*. GPT-5 doesn’t replace creativity—it amplifies it.

The rise of GPT-5 makes one thing clear: **prompt engineering is not just a trend, it’s the superpower of tomorrow’s IT professionals**. As coding changed industries in the past, mastering prompts will define who leads in the AI-driven future.

Purva Patil

S.Y -IT

Web3: The Next Evolution of the Internet

Over the last several decades, the internet has changed dramatically. Web1 only provided a way to read, Web2 added an opportunity to interact and socialize, buy goods online. Today, we enter a Web3 world of the internet, which is going to provide more control, ownership and, transparency to users.

As opposed to the Web2, where such big companies control platforms and hold the data of users, Web3 runs on a blockchain technology. This implies it is decentralized- no sole firm controls it all. This is because people can now directly own digital assets, engage in decision making and can interact easily without intermediate parties.



Fig 5:WEB 3.0

These are some of the ways Web3 is already impacting the digital environment:

- Decentralized Finance (DeFi): Open financial systems where individuals lend, borrow and trade without the companies of conventional banks.
- NFTs (Non-Fungible Tokens): Special are digital assets that give creators transparency and equitable remuneration of their work.
- DAOs (Decentralized Autonomous Organizations): Communities run in a democratic fashion with members voting on what is important.
- The hope of Web3 is a more distributed and fair internet. Artists can receive revenue straight out of their admirers, entrepreneurs can open up the planet and users have more control over own data.
- Naturally, there are difficulties. The current issues are scalability, regulation, and education of the users. But, as is the case with the early days of the internet, these are challenges of the natural growth process.

The world of Web3 is not just a fad, it is a structural change in the usage and experience in the online world. Whether you are a businessperson, an artist, or just the average user, being familiar with Web3 in 2023 is letting yourself be ready to tackle possibilities in the future.

Prathmesh Dawkar

T.Y -IT

RAG: Retrieval Augmented Generation: Connection between knowledge and intelligence

Artificial Intelligence (AI) has revolutionized the way it is interacting with information, particularly using Large Language Models (LLMs). Although these models produce fluent and even human like language, generally they have problems with outdated or incomplete knowledge. Limitations such as lack of reliability and accuracy are overcome by RAG where information retrieval and text-generation work cooperatively.

What is RAG?

RAG is a radical framework that supercharges LLMs by linking them to an external knowledge base. Rather than using pure pre-trained data, it parses the most topical documents in either structured or unstructured storage (such as vector databases like FAISS or ChromaDB) and leverages such context to come up with high-quality responses. This will make outputs consistent not only logically but also based on facts.

RAG Works

1. A query is posed.
2. Retrieval: Embeddings and similarity search is used to retrieve relevant documents in a knowledge base.
3. Context Injection: The data pulled is given to the LLM.
4. The model offers a reasoned reply that is true to context.

Benefits

1. Limits hallucinations by making responses based on fact confirmed data.
2. Keeps knowledge accurate without the re-training of large models.
3. Increases efficiency because smaller models are able to utilise outside data
4. Scales inter- and intra-domainally, inter- and intra-datasetally.

Applications

1. Customer Support: Clear on the spot answers to FAQs.
2. Healthcare: Helping with medical publications and instructions.
3. Finance: Offering market- and regulatory-data insights.
4. Education & Research: Providing credible sources and research material.

Conclusion : RAG is an important breakthrough in AI. Its combination of retrieval with generation makes it provide meaningful as well as factually correct outputs. The rising demand of the industries that require stable AI, RAG is evolving into a way of formulating intelligent domain-specific applications, as well as future-proof applications.

Ashish Kharde

TY-IT

Why Everyone Should Use Linux as Their Daily Driver

The Flaws of Windows

Windows felt like a constant uphill battle—frequent updates, persistent bugs, and troubling security issues. A recent CrowdStrike report highlighted how vulnerable Windows systems are to ransomware and zero-day exploits. High telemetry data usage felt invasive, RAM and battery demands were excessive, and bloated AI features only slowed everything down. For coding, Windows was a nightmare: every new tool installation often required a reboot, switching between PowerShell, CMD, and the new Windows Terminal was inefficient, and OneDrive cluttered the home folder with unwanted syncs. Even on college computers, Windows lagged, while Ubuntu ran smoothly, proving how efficient and lightweight Linux can be.

Linux: The Backbone of Technology

Linux isn't just an alternative; it's the backbone of the digital world. It powers over 90% of the world's supercomputers, about 70% of all web servers, and nearly all cloud infrastructure. Tech giants like Google, Facebook, and Amazon rely on Linux for their massive data centers. Even Hollywood uses Linux for its stability and performance; groundbreaking movies like *Avatar* were rendered on Linux-based systems, demonstrating its unmatched power for creators.

User-Friendly and Accessible

Many assume Linux is too difficult or terminal-dependent, but that's a misconception. Modern Linux distributions like Ubuntu, Linux Mint, and Pop!_OS offer intuitive graphical interfaces that rival traditional operating systems, with the terminal serving as an optional power tool. Moreover, you're already using Linux every day without realizing it—Android, the world's most popular mobile OS, is built on the Linux kernel.

The Ideal Daily Driver

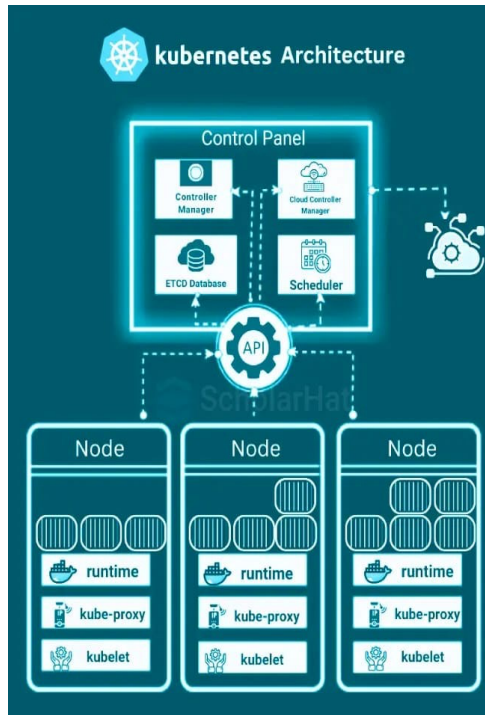
Switching back to Linux was a game-changer. It's not just an operating system; it's a platform that puts you in control without the bloat, costs, or security issues of other systems. For anyone frustrated by the flaws of Windows or the expense of macOS, Linux is the perfect daily driver—secure, fast, and truly built for everyone.

Swaroop Patil
TY-IT

Building workloads on Kubernetes:

Kubernetes, DevOps, and multcloud performance.

Contemporary DevOps looks very different with the popularization of Kubernetes as the container orchestration system. This is an outstanding combination that helps organizations to achieve new levels of deployment velocity, reliability, and scalability across the wide variety of cloud environments.



1.Kubernetes as a DevOps Accelerator - Kubernetes changes historic DevOps pipelines by bringing relevant infrastructure control, automation of roll-out, and maintenance. GitOps can be applied in teams, so that infrastructure and application configuration are version-controlled and automatically redeployed via CI/CD pipelines. Configuration in this case does get rid of drift and makes the environments in development and production to be consistent.

2.Multicloud Advantages - Migrating to Kubernetes installed across multiple clouds has a set of attractive advantages By eliminating single-point-of-failure risks and achieving vendor independence as well as optimized costs, organizations can also leverage the strengths of each provider. AWS EKS, Google GKE, and Azure AKS offer managed services of Kubernetes, and Rancher, and OpenShift tools allow the same management across clouds.

3.Implementation Strategies

In the deployments with Kubernetes, multicloud use requires a standardized networking at the service mesh level such as Istio, centralized monitoring using Prometheus and Grafana, and centralized security policy. Container registries are to be distributed strategically and backup strategies should evidence cross-cloud data replication.

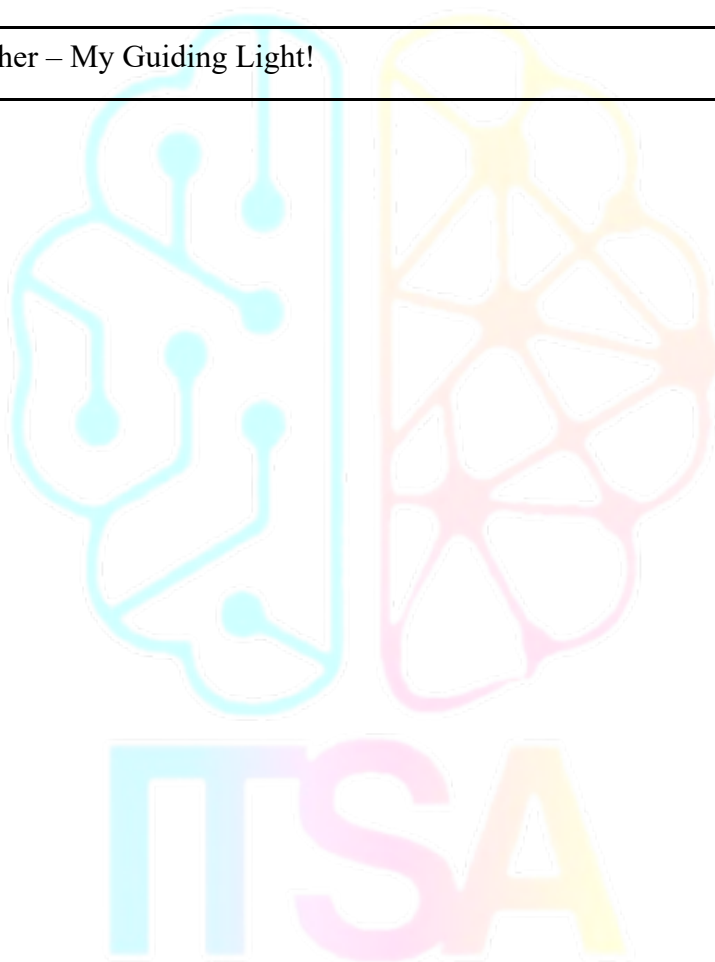
4.Energy Trends - Kubernetes deployments are being changed by cloud-native security scanning, policy-as-code frameworks like Open Policy Agent and edge computing integration. The operation of containers that are serverless (such as AWS Fargate and Google Cloud Run) also simplify operations but leaves compatibility with the Kubernetes. The evolutions of DevOps practices with Kubernetes on multicloud strategies represents the future of scalable and resilient application delivery that will enable organizations to innovate quickly, whilst also sustaining operational excellence.

Omkar Avasare

TY-IT

English Literature Section

Sr No.	Topics	Page No.
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Few But True !!

Many will hear you,
But only few will listen you.

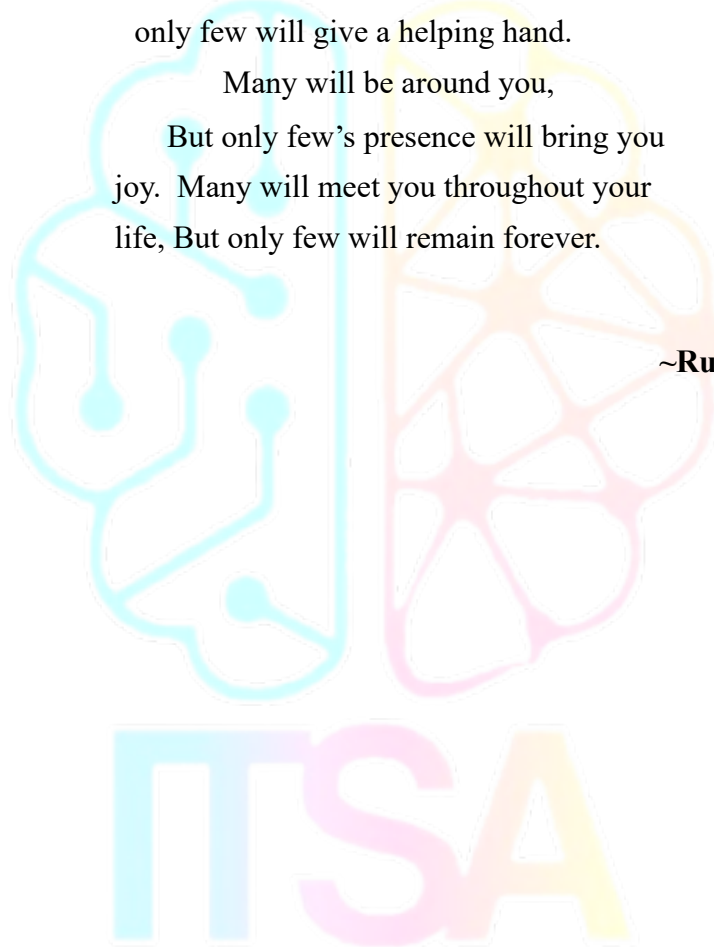
Many will talk to you,
But only few will understand you.

Many will see your smile,
But only few will understand pain behind it.

Many will gossip with you,
But only few will share everything to you.
Many will know about your problems, But
only few will give a helping hand.

Many will be around you,
But only few's presence will bring you
joy. Many will meet you throughout your
life, But only few will remain forever.

~Rushikesh Rajkumar Zanwar
SY-IT



Choices of Life

What is bigger? Sky or Sea?

One holds the clouds , star , the Sun and Moon The
other carries shells, shores, Life and Boon

What is heavier? Guilt or Regret?

One kills you daily for your sinful Past
The other destroys you for losing the chance Last

What is beautiful? Love or Longing?

One worships you for who you are
The other cherishes you in the heart with a scar

What is relevant? Life or Death?

One teaches you the art of Living
The other shows you what you are Leaving

What is more important? Learning or Failure?

One guides on the path already paved
The other makes you realise your courage engraved

~Devika Yogiraj Mule
TY-IT

ITSA

A song is in the air

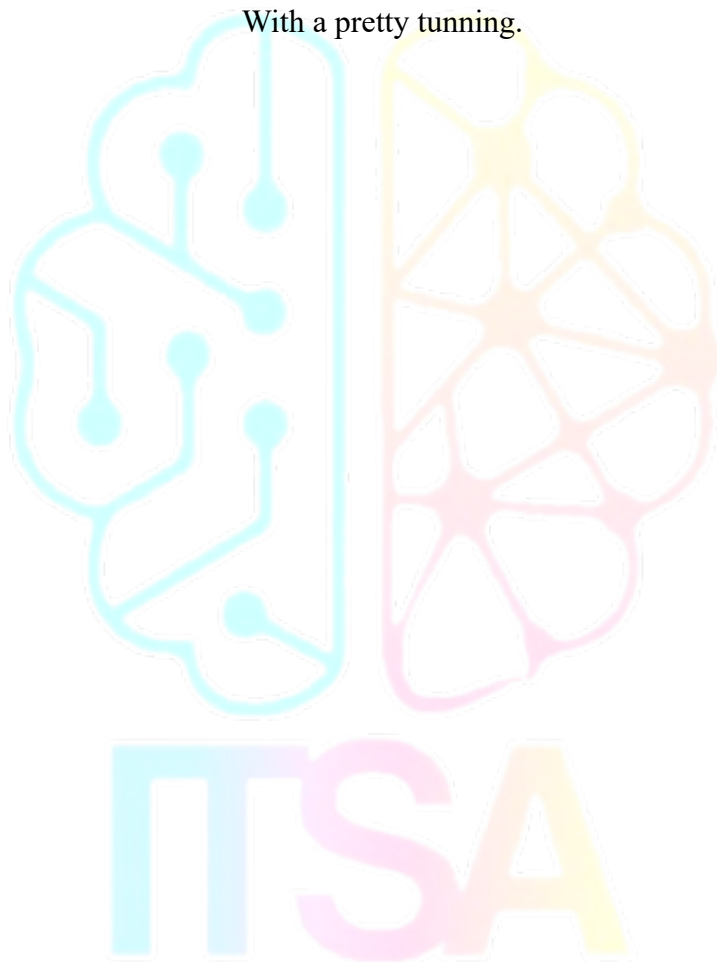
There is a bloom in petals,
Rain droplets falling on metals,

The chirping of little ones,
Makes a melody cherishing even,

A song is in the air,
For a new day to bare,

A new beginning,
With a pretty tuning.

**~Sanaya Kulkarni
TY-IT**



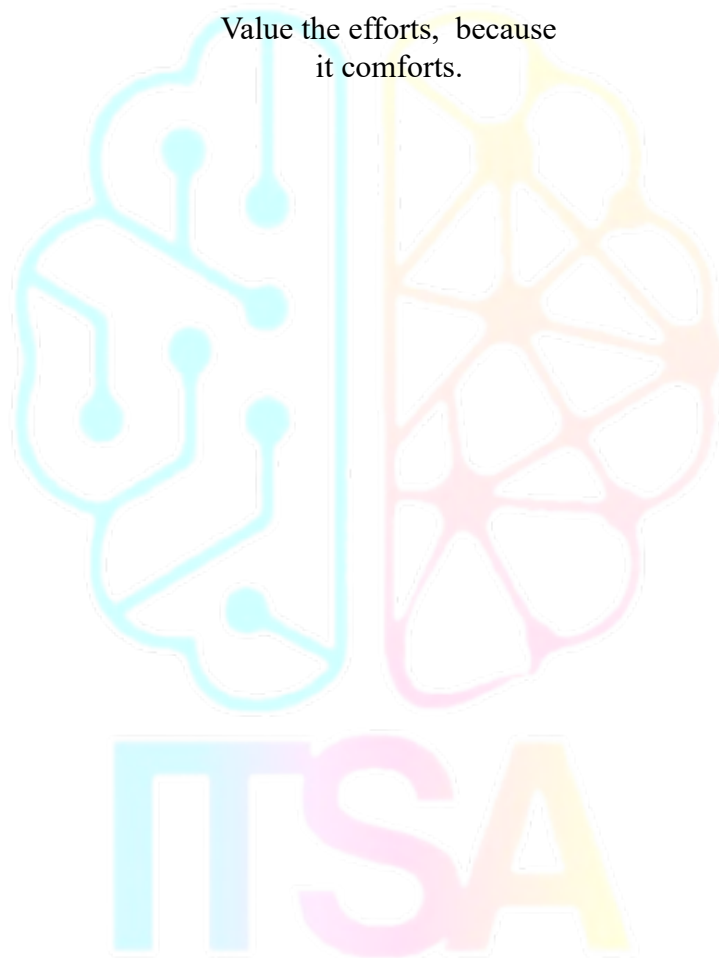
Importance of Clothes

From the hand-made looms,
of the aspirants blooms,

The caring touch of cloth,
from the white silk moth,

Feel how precious,
Be little concious.

Value the efforts, because
it comforts.



~Sanaya Kulkarni
TY-IT

Why Do You Smile?

O poor child, why do you smile?
By toiling all day, don't you rest for a while?
Seeing my sister enjoy, her one meal treat
All my hard work for her, is worth it!

O dear grandma, why do you smile?
In your pain of death, why don't you whine?
I have good old days and a heart with shine
With no regrets and wants, I love to smile!

O little kid, why do you smile?
With your leg impaired, don't you feel depressed?
With my loved ones I can walk mile after mile!
By having them in my life, I feel truly blessed!

O dear friend, why do you smile?
With all deterring failures, why don't you quit?
To defeat the failure, is my lifestyle
With weapon of Hope, I conquer the defeat!

O Dear Life, why do you smile?
With all your worries, why don't you cry?
Time is so short, I am a flower too fragile
I bloom for one day, so why should I sigh?

Devika Mule
T.Y IT

MY MOTHER – MY GUIDING LIGHT!

You are the one, who gave me birth And
taught me to realize my worth.

You are the one, who wiped my tears
And soothed me allaying all my fears.

You are the one, whose lap was my shelter Who
kissed my hurts, making them better.

You are the one, who led me through
Life's path always trying to be true.

You are the one, who was the heaven of comfort
When life dealt me blows, or when I was hurt.

You are the one, who reared me tall
Telling me to rise and go, after a fall.

You are the one, who taught me values And
to society pay my dues.

You are the one, whose shoulder I cry on Right
from the day when I was born.

You are the one, who is the anchor of my ship Who
pulls me up when I stray or slip.

You are the one, who listens to my woes And guides
me along when life deals me, with blows.

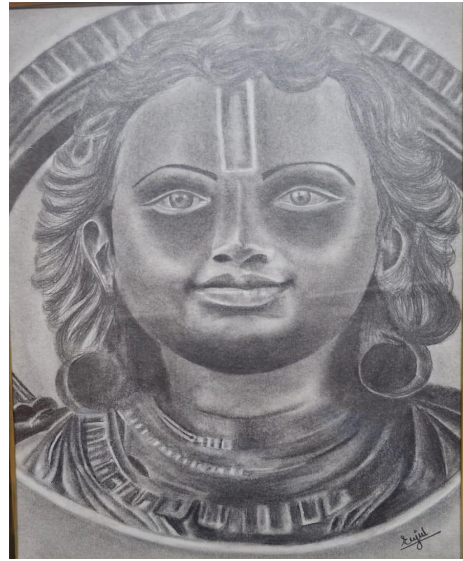
You are my mother, my philosopher, my guide Whose
always there right by my side.

The guiding light I have always felt
Is you, my mother-whose actions speak!

Danish F Homavazir
B.E. IT



Mrunal Kulkarni (TY IT)



Mrunal Kulkarni (TY IT)



Swaroop Karnewar(SY IT)



Swaroop Karnewar(SY IT)



Swaroop Karnewar(SY IT)



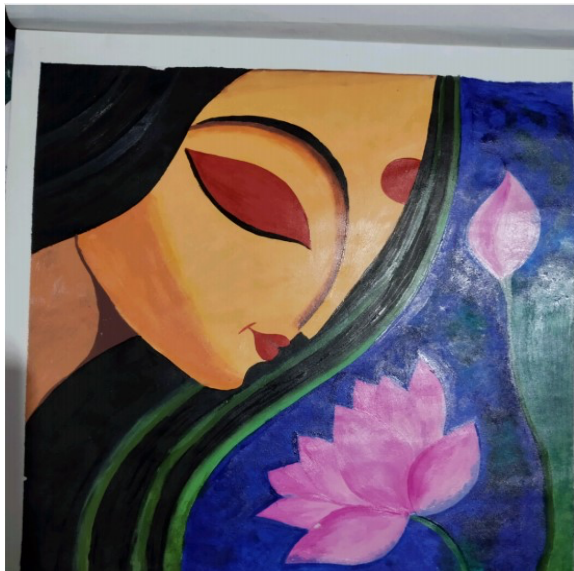
Swaroop Karnewar(SY IT)



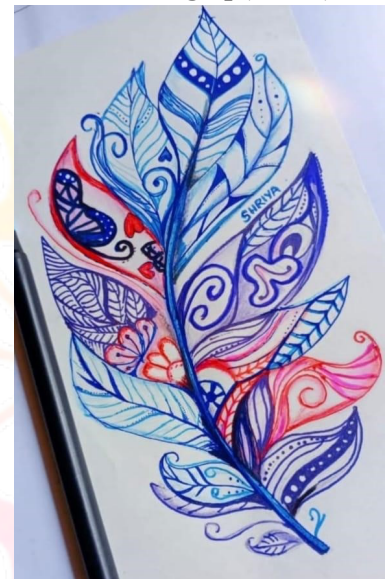
Snehal Jagtap(SY IT)



Snehal Jagtap(SY IT)



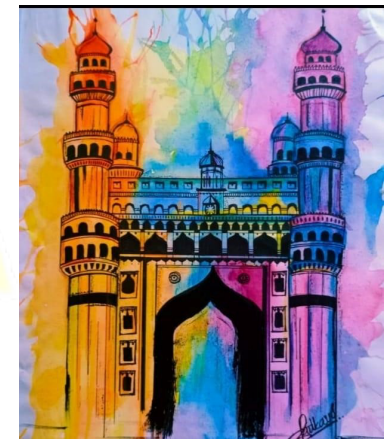
Snehal Jagtap(SY IT)



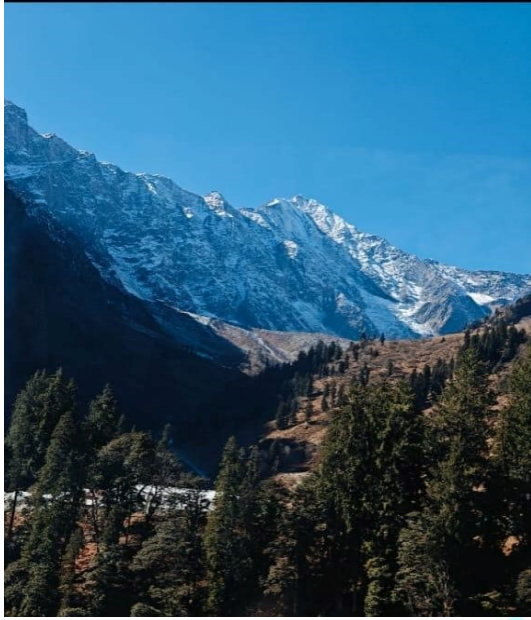
Shriya Kulkarni(T.Y IT)



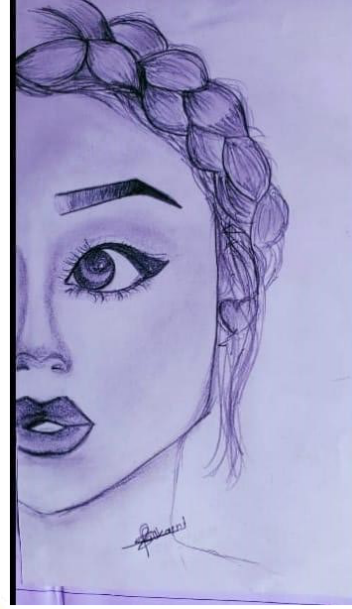
Shriya Kulkarni(T.Y IT)



Shriya Kulkarni(T.Y IT)



Sandesh Shinde(T.Y IT)



Shriya Kulkarni(T.Y IT)



Prathmesh Lokhande(SY IT)



Prathmesh Lokhande(SY IT)

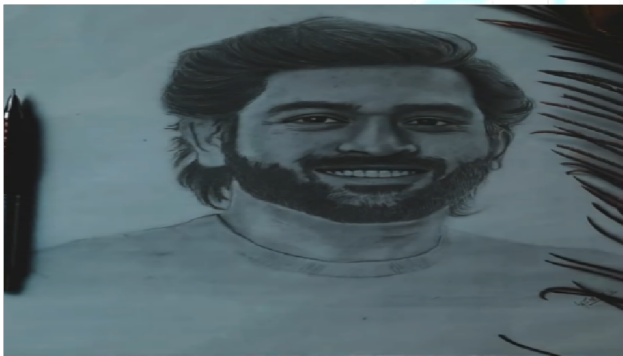




Sharvari Shalgar(T.Y IT)



Sharvari Shalgar(T.Y IT)



Sarita Solaskar(T.Y IT)



My Journey of Race Across India



At the age of 19, I had the privilege of taking part in one of the toughest ultra-cycling challenges in the world – the Indian Oil Race Across India. Along with my father, I pedaled from Srinagar to Kanyakumari, covering 3758 km in just 7 days and 19 hours, becoming the first father–son duo to complete this incredible race. This journey was not only about speed and endurance but also about testing the limits of my body and mind. The toughest moment came in Telangana, where I met with a serious accident on the highway. For a few minutes, everything seemed uncertain – the race, my strength, even my ability to continue. But deep within, I reminded myself why I had started. With courage and determination, I got back on the cycle, despite the pain, and pushed forward. That moment taught me the true meaning of resilience.

Riding day and night through sleepless fatigue, extreme weather, and long lonely highways, I discovered that the human spirit is stronger than any obstacle. What made this journey even more special was sharing it with my father. His presence, encouragement, and strength kept me going, and together we proved that belief and teamwork can overcome any challenge.

Coming from Khed Taluka in Pune district, I wanted my ride to inspire every young athlete to dream big, to stay disciplined, and to never give up, no matter how tough the road becomes. This race has been more than an achievement for me—it has been a lesson for life. I learned that success is not about reaching the finish line; it is about rising every time life tries to knock you down.

Om Korhale
TY-IT

“IT and the entire communications business clearly have the greatest potential for growth.”

-- RATAN TATA



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