Shivalik College
Dehradun, Uttarakhand

NAAC GRADE A+

TECHFRONT

Technical Magazine

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

JULY 2024- JUNE 2025

DEPARTMENT VISION, MISSION, PEOs & PSOs

VISION

To cultivate engineers with a worldwide employability, a strong entrepreneurial aptitude, a dedication to research, and a sense of social responsibility.

MISSION

M1. To create top IT engineers with industry-aligned education.

M2. To boost the technical skills of students as well as faculty.

M3. To inspire students to pursue higher education and launch entrepreneurial ventures.

M4. To provide exposure of latest tools and technologies in the area of Engineering and Technology.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Graduates will have the ability to be employed in industries, academia, the public sector, or work as entrepreneurs.

PEO 2: Graduates will apply tools, technologies, and research to provide innovative solutions.

PEO 3: Graduates will have capabilities in identifying, conceptualizing, designing, developing, and implementing logical solutions for real-life challenges.

PEO 4: Graduates will have good communication skills, leadership skills, ethical values, and time management.

DEPARTMENT PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO-01: Analyze and implement Web-based technology for developing projects as per social and Industry needs.

PSO-02: Ability to develop various applications using open-source software tools extensively.

ABOUT THE DEPARTMENT

The Computer Science & Engineering Department was established in the year 2008 and has graduated many qualified engineers, working at very well-known organizations in India and abroad. The Department currently offers Bachelor's Degree in Computer Engineering, Bachelor's Degree in Artificial Intelligence and Machine Learning (AIML) and Data Science. In addition to core courses, electives are provided in various Computer Science cutting-edge subjects that generate opportunities for absorption in frontier fields of Computing. Students are involved in diverse technical events and cognitive activities to explore their creativity as well as problem-solving skills. This accredited course fulfills the growing needs of the industry and would equip students with an in-depth understanding of the principles of Computer Science. The Computer Science and Engineering department at the Shivalik College possesses a unique center- the Shivalik Computation and Automation Society (SCAS). Also, it has collaboration with ICT Academy which provides real-life practical learning methodologies. A well-designed system to assess every student's performance. Value Added courses, Case Studies & Projects, Seminars, Student Development Programs, and Induction Programs delivered on cutting-edge technology impart hands-on experience and skill enhancement in students. Students are advised and assisted in their project work and Industry-relevant course material is provided.

MESSAGE BY
VICE CHAIRMAN

MR. AJAY KUMAR

It gives me immense pleasure to extend my warmest congratulations to the Department of Computer Science and Engineering on the release of its technical magazine. This magazine stands as a testament to the innovation, dedication, and relentless pursuit of excellence that define our students and faculty.

In today's fast-paced digital era, platforms like this magazine play a vital role in fostering a culture of creativity, critical thinking, and collaboration. I am delighted to see the magazine encompass diverse sections such as the Student Corner, Faculty Corner, Best Project Abstracts, as well as glimpses of Tech Fests and Hackathons. These highlights not only showcase the technical prowess and accomplishments of our department but also inspire the academic community to dream bigger and reach higher.

The featured student innovations and faculty contributions reflect our institution's commitment to academic excellence and industry relevance. Such initiatives are instrumental in preparing our young minds to become future leaders in technology and innovation.

I extend my heartfelt appreciation to the editorial team, faculty mentors, and all contributors who have made this magazine a reality. May this publication continue to serve as a beacon of knowledge, creativity, and inspiration for the entire Shivalik College community.

With best wishes for continued success and innovation.

DIRECTOR'S MESSAGE

PROF. (DR.) PRAHLAD SINGH

It is a matter of immense pride to witness the release of the Technical Magazine of the Computer Science and Engineering Department. This publication is a vibrant reflection of the department's academic excellence, technical innovation, and collaborative spirit.

Featuring diverse sections such as Student Corner, Faculty Corner, Best Project Abstracts, and glimpses of Tech Fests and Hackathons, the magazine beautifully captures the intellectual energy and creative endeavors of our students and faculty.

In today's rapidly evolving technological landscape, such initiatives play a vital role in encouraging critical thinking, innovation, and knowledge sharing. This magazine serves not only as a platform to showcase talent but also as a source of inspiration for all readers.

I commend the editorial team, contributors, and faculty mentors for their dedication and vision. May this magazine continue to grow as a beacon of learning and excellence.

MESSAGE BY COD/HOD

MR. SARTAJ KHAN

It is with great pride and enthusiasm that I present to you the latest edition of the **Technical Magazine of the Department of Computer Science and Engineering.** This publication is not just a collection of articles and achievements—it is a reflection of our collective spirit, creativity, and commitment to academic and technological excellence.

The magazine captures the vibrant essence of our department through various segments such as the Student Corner, Faculty Corner, Best Project Abstracts, and glimpses of our Tech Fest and Hackathons. These sections showcase the intellectual curiosity, innovative thinking, and collaborative efforts that define our department.

In an era where technology evolves rapidly, it is essential that we continuously learn, share, and grow. This magazine serves as a platform for our students and faculty to express their ideas, demonstrate their skills, and celebrate their accomplishments. From insightful technical articles to award-winning project abstracts, this edition is a testament to the high standards and progressive mindset of our academic community.

I take this opportunity to thank all contributors—students, faculty members, and the editorial team—for their dedication and hard work in bringing this publication to life. Your efforts not only enrich the department but also motivate others to pursue excellence.

Let us continue to innovate, collaborate, and inspire. May this magazine ignite new ideas and foster a culture of learning that reaches far beyond the pages.

MESSAGE BY
EDITORIAL BOARD MEMBERS

We are delighted to present this edition of the **Technical Magazine of the Computer Science and Engineering Department**, a platform that brings together the creativity, innovation, and academic spirit of our department.

This magazine features a rich blend of content—Student Corner, Faculty Corner, Best Project Abstracts, and snapshots from Tech Fest and Hackathon events—each reflecting the vibrant and dynamic culture of CSE at Shivalik College of Engineering.

As editorial board members, it has been a rewarding journey curating the thoughts, ideas, and accomplishments of our students and faculty. We believe this magazine will not only inform but also inspire all readers to push the boundaries of knowledge and innovation.

We thank everyone who contributed and supported this effort. Let this magazine be a voice for ideas and a celebration of excellence.

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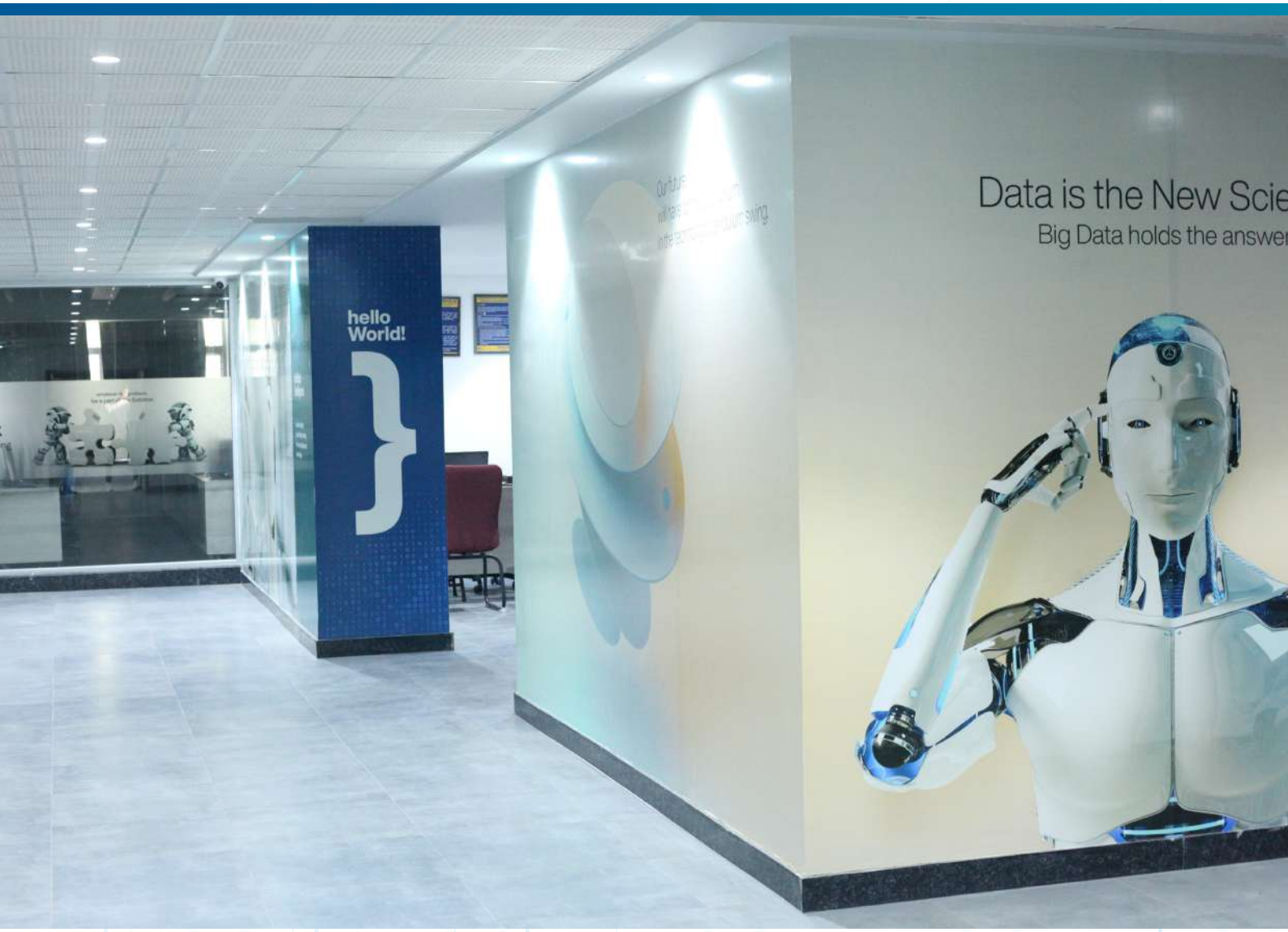


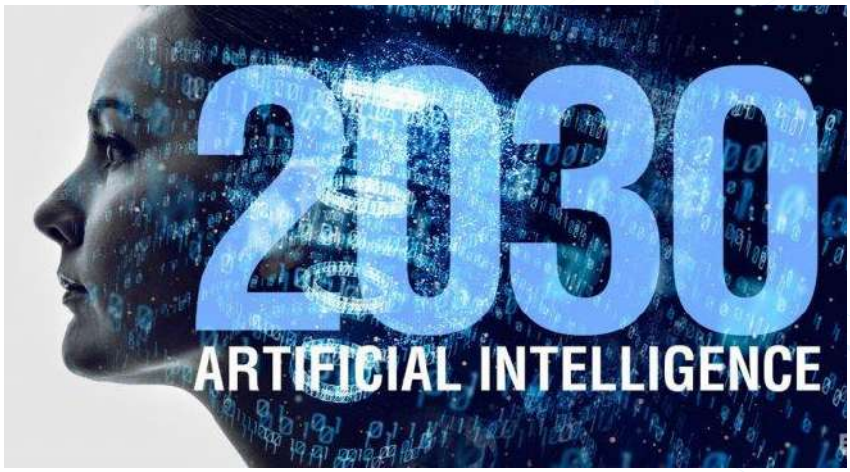
FACULTY ARTICLES

AI IN 2030- “THE FUTURE WE'RE BUILDING TOGETHER”

Sudhir Kumar
Assistant Professor - CSE

Source - https://www.boldbusiness.com/digital/ai-will-change-four-major-industries-by-2030/

THE TRANSFORMATION AHEAD



By 2030, artificial intelligence won't just change how we work—it will redefine what it means to be human in a connected world. We're not just witnessing technological evolution; we're architecting a future that will echo through generations.

The numbers tell an extraordinary story: AI is expected to contribute $15.7 trillion to the global economy, with 70% of companies adopting AI technology and 30% of new drugs discovered through AI-powered research. But behind these statistics are human stories—like Sara, a rural doctor in India who will soon diagnose rare diseases using AI trained on millions of medical images, or Marco, a Brazilian logistics manager whose AI system will cut shipping emissions by 40% while optimizing global supply chains.

Sector-by-Sector Revolution

Healthcare

Predictive diagnostics will identify diseases years before symptoms appear. AI-powered mental health companions will provide 24/7 support, while robotic surgeons perform operations with impossible precision. Every patient will receive personalized treatment based on their unique genetic profile.

Education

Every child will have an AI tutor adapting to their learning style and pace. These systems will identify learning disabilities early and suggest optimal career paths based on individual talents and interests.

Transportation

Fully autonomous vehicles will eliminate the 1.35 million annual traffic deaths caused by human error. Smart traffic systems will optimize flow in real-time, making transportation safer, cleaner, and more accessible.

Climate

AI will become our most powerful weapon against climate change through advanced weather prediction, precision agriculture that uses less water and fertilizer, and carbon tracking systems that make environmental impact as visible as financial budgets.

Governance

AI will revolutionize public service through predictive resource allocation and personalized citizen assistance, making government more efficient and responsive.

The Impossible Becomes Possible

AI will enable breakthroughs that seemed like science fiction just years ago:

Universal Communication: Real-time translation preserving cultural nuances will eliminate language barriers. A grandmother in rural China will video chat seamlessly with her grandson in New York, each speaking their native language.

Democratized Healthcare: Smartphone apps will diagnose tuberculosis and heart problems with specialist-level accuracy, bringing world-class medical expertise to the remotest corners of Earth.

Accelerated Discovery: AI will run millions of molecular simulations simultaneously, discovering new materials for clean energy and identifying disease cures in months rather than decades.

Predictive Protection: Early warning systems will forecast earthquakes, hurricanes, and floods days in advance, potentially saving millions of lives annually.

Technology Convergence: When quantum computing merges with AI, we'll see unprecedented processing power. 6G networks will enable instant global AI communication, while edge computing brings intelligence to every device.

The Responsibility Challenge

With unprecedented power comes unprecedented responsibility. The choices we make today about AI development will determine whether it becomes humanity's greatest achievement or its greatest regret.

Five Critical Pillars:

1. **Inclusiveness:** AI must serve everyone, not just those with resources. This means eliminating bias and ensuring diverse representation in training data.
2. **Transparency:** People deserve to understand how AI systems affecting their lives make decisions. We need explainable AI, especially in healthcare, finance, and criminal justice.
3. **Global Governance:** AI doesn't recognize borders, so our frameworks shouldn't either. International cooperation is essential to prevent an AI arms race.
4. **Human-Centered Development:** As AI automates jobs, we must invest in reskilling programs that develop uniquely human skills like creativity, empathy, and critical thinking.

5. **Environmental Stewardship:** AI systems consume enormous energy. We must prioritize efficient algorithms and renewable power sources—the future can't be smart if it's not sustainable.

From UNESCO's AI Ethics Guidelines to the EU's AI Act, the world is racing to establish responsible frameworks. These aren't bureaucratic exercises—they're blueprints for ensuring AI serves humanity.

India's Model for the World

India's AI journey offers valuable lessons for emerging economies. Building on digital infrastructure successes like Aadhaar and UPI, India is creating AI solutions for its 1.3 billion citizens.

The country's **Responsible AI for Social Empowerment (RAISE)** initiative demonstrates AI as a force for social justice—from crop advice for farmers to healthcare diagnostics in rural clinics. With 22 official languages, India is pioneering multilingual AI that preserves cultural nuances while enabling communication.

Source - https://www.telecomreviewasia.com/news/network-news/4056-india-boosts-ai-and-semiconductor-sectors/

Indian companies are developing "frugal innovation"—AI solutions that work on basic smartphones with limited connectivity. These innovations could benefit billions globally who lack access to high-end devices.

Key Lessons:

- Start with problems, not technology
- Build inclusive systems from the ground up
- Leverage diversity as an asset
- Prioritize human welfare over pure economic growth

Our Shared Future

The future of AI isn't predetermined—it's a choice we must make together.

As Alan Turing might say today, "The question is not whether machines can think, but whether humans can still lead."

Our Mandate:

- Empower citizens, not just corporations
- Preserve human dignity, not just efficiency
- Build AI with humanity at the center
- Ensure benefits reach the most vulnerable first
- Never lose sight of our shared humanity

By 2030, a child born anywhere will have access to world-class personalized education. A farmer in rural Africa will have the same agricultural insights as commercial operations. An elderly person will live independently with AI systems that understand their needs.

But this future requires conscious choice and deliberate action. We must be not just consumers of AI technology but active participants in shaping its development.

The Choice Before Us

AI in 2030 will shape the next chapter of human civilization. Every algorithm trained, every policy drafted, and every ethical decision made today determines our trajectory. We have an unprecedented opportunity to ensure AI enhances human flourishing, expands opportunity, and solves our greatest challenges.

The future is being built right now—in research labs and boardrooms, in policy discussions and classroom conversations. Each of us has a role in ensuring this future reflects our highest human aspirations.

As we stand on the threshold of 2030, we face a defining moment. The choices we make about AI will echo through generations. Will our descendants look back on this as the moment humanity reached its full potential, or as a turning point we failed to navigate wisely?

The answer depends on us. The future is not predetermined—it's a choice. And that choice is ours to make, together.

Key Statistics

- **$15.7 trillion:** AI's projected economic contribution by 2030
- **70%:** Companies expected to adopt AI technology
- **30%:** New drugs that could be AI-discovered
- **85 million:** Jobs displaced by AI by 2025
- **97 million:** New jobs created by AI by 2025

Global AI Readiness Leaders: Singapore (9.2/10), United States (8.8/10), Denmark (8.6/10), Sweden (8.4/10), UK (8.2/10)

CYBERSECURITY AWARENESS: PROTECTING YOUR DIGITAL FOOTPRINT

Kalpeshwar Pokhriyal
Assistant Professor- CSE

Introduction

In today's hyperconnected digital world, cybersecurity awareness is no longer optional—it is essential. Our increasing dependence on digital platforms, whether for communication, commerce, banking, education, or social interaction, means that each action we take online contributes to a growing collection of data known as our digital footprint. This footprint is a reflection of our identity, behavior, and interests, and it can be leveraged for both positive and malicious purposes. Cybersecurity awareness is about understanding the risks associated with our digital presence and taking proactive steps to minimize vulnerabilities.

Understanding the Digital Footprint

A digital footprint refers to the trail of data that users leave behind while using the internet. This can be categorized into two types: active and passive. An active digital footprint is created when users intentionally share information, such as social media posts, emails, or form submissions. A passive footprint, on the other hand, is collected without the user's knowledge, such as browsing habits, location data, and cookies. Both types of data are valuable and can be exploited if not properly safeguarded. Cybercriminals can use this data for identity theft, social engineering attacks, or surveillance.

AI will become our most powerful weapon against climate change through advanced weather prediction, precision agriculture that uses less water and fertilizer, and carbon tracking systems that make environmental impact as visible as financial budgets.

Why Cybersecurity Matters

Cybersecurity encompasses practices, technologies, and processes designed to protect systems, networks, and data from attacks, damage, or unauthorized access. In recent years, cyber threats have grown more complex and frequent, ranging from phishing scams and ransomware attacks to large-scale data breaches. The consequences of compromised cybersecurity can be devastating—financial losses, damaged reputations, legal repercussions, and in extreme cases, national security threats. Thus, individuals, organizations, and governments must work collectively to improve cybersecurity resilience.

Common Threats to Your Digital Footprint

1. There are several ways in which cyber threats can target your digital footprint: Phishing: Deceptive emails or messages trick users into revealing personal information.
2. Malware: Malicious software infiltrates systems to steal or destroy data.
3. Social Engineering: Manipulative tactics used to deceive individuals into disclosing confidential data.
4. Data Breaches: Unauthorized access to databases containing sensitive user information.
5. Public Wi-Fi: Unsecured networks that make it easier for hackers to intercept communications.

Best Practices to Safeguard Your Digital Presence

To ensure a secure digital presence, individuals can adopt the following practices:

- Use strong, unique passwords for different accounts and change them regularly.
- Enable two-factor authentication (2FA) wherever possible.
- Limit the amount of personal information shared on social media.
- Clear browser cookies and history frequently to reduce passive data collection.
- Install reliable antivirus and firewall software to protect devices.
- Be cautious of clicking on links or downloading attachments from unknown sources.
- Keep operating systems and applications up-to-date with the latest security patches.

The Role of Education and Awareness

Cybersecurity is not only a technical issue but also a human one. Many security breaches occur due to a lack of awareness or simple negligence. Education and awareness play a critical role in creating a culture of security. Schools, colleges, and workplaces should incorporate cybersecurity training into their curriculum. Workshops, webinars, and awareness campaigns can help demystify technical jargon and provide practical guidance on maintaining online safety. When individuals are empowered with knowledge, they are better equipped to make informed decisions and recognize potential threats.

Emerging Trends and Technologies

As technology evolves, so do the threats and the tools to combat them. Artificial intelligence (AI) and machine learning are increasingly being integrated into cybersecurity solutions to detect and respond to threats in real time. Blockchain technology offers new possibilities for securing transactions and verifying digital identities. Meanwhile, the Internet of Things (IoT) introduces new challenges as more devices become interconnected, increasing the attack surface. Cybersecurity strategies must continuously adapt to these trends to stay ahead of adversaries.

Conclusion

Protecting your digital footprint is a shared responsibility. While governments and organizations must implement robust security infrastructures, individuals must also take charge of their digital lives. By cultivating good cyber hygiene, being vigilant online, and staying informed about evolving threats, we can collectively build a safer and more secure digital environment. Cybersecurity awareness is not just about protecting data—it's about preserving trust, privacy, and freedom in the digital age.

THE FUTURE OF DATA SCIENCE: TRENDS TO WATCH IN 2025 AND BEYOND

Ms. Priyanka Garg
Assistant Professor- CSE

Data science continues to evolve rapidly, reshaping industries, redefining business models, and revolutionizing decision-making. Beyond, several emerging trends are set to influence the trajectory of data science, making it more powerful, accessible, and integral to innovation.

1. Rise of AI-Augmented Data Science

The integration of Artificial Intelligence (AI) and Machine Learning (ML) into the data science workflow is transforming how data is collected, processed, and analyzed. Automated machine learning (AutoML) tools are enabling non-experts to build predictive models with minimal coding, while AI-driven analytics platforms are helping businesses uncover insights faster and more efficiently.

2. Greater Emphasis on Explainable AI (XAI)

As AI systems are increasingly used in critical applications like healthcare, finance, and legal systems, the demand for transparency and accountability is growing. Explainable AI will become essential in 2025 and beyond, allowing data scientists to interpret model decisions, reduce biases, and build trust with stakeholders.

3. Data Governance and Ethical Considerations

With the rise in data privacy regulations such as GDPR, CCPA, and India's DPDP Act, organizations must prioritize data governance. Ethical data sourcing, usage, and storage will become central to data science practices, along with the need for robust frameworks for handling sensitive data securely and responsibly.

4. Democratization of Data Science

Low-code and no-code platforms are empowering non-technical users to perform data analysis and build models. This democratization will broaden the reach of data science beyond data professionals, fostering a data-literate workforce and encouraging collaboration across departments.

5. Expansion of Edge and Real-Time Analytics

As IoT devices proliferate, there's a growing need to process data at the source—on the "edge." Edge computing and real-time analytics will play a crucial role in areas like autonomous vehicles, smart cities, and industrial automation, where decisions must be made instantly and reliably.

6. Quantum Computing and Advanced Analytics

Quantum computing, still in its early stages, promises to revolutionize data science by solving complex problems that are currently intractable. In the coming years, advancements in quantum algorithms and hardware could enable breakthroughs in optimization, drug discovery, cryptography, and more.

7. Focus on Interdisciplinary Skills

The future data scientist will need more than just coding and statistical knowledge. Skills in domain expertise, communication, ethics, and design thinking will be crucial to translate data insights into impactful decisions. Cross-disciplinary collaboration will become a hallmark of successful data science teams.

8. Data-Centric AI and Synthetic Data

With the understanding that high-quality data is more valuable than complex algorithms, data-centric AI is gaining momentum. In addition, synthetic data—artificially generated data that mimics real-world data—will become more prevalent in training models where real data is scarce, sensitive, or costly.

Conclusion

Data science is set to become more inclusive, intelligent, and impactful. As tools become more accessible and AI continues to mature, organizations and individuals alike must stay informed and adaptable. Embracing the latest trends and addressing ethical, legal, and technological challenges will ensure that data science remains a driving force in shaping a smarter, fairer future.

WOMEN IN DATA SCIENCE: EMPOWERING DIVERSITY IN TECH

Ms. Aakanksha Pundir

Assistant Professor- CSE

In recent years, the field of data science has grown exponentially, becoming one of the most sought-after domains in the technology sector. Yet, despite this surge, women remain underrepresented in data science and related tech roles. Promoting gender diversity is not only a matter of equity—it is a strategic imperative that drives innovation, creativity, and better problem-solving across industries.

The Importance of Diversity in Data Science

Data science is inherently interdisciplinary, involving statistics, machine learning, computer science, and domain expertise. A diverse workforce introduces varied perspectives, reduces unconscious bias in algorithms, and ensures more inclusive solutions. When women participate actively in data-driven decision-making, the technology built becomes more reflective of the society it serves.

Current Landscape and Challenges

Although many women are entering STEM education, a significant gender gap persists in actual workforce participation in data science roles. Key challenges include:

- **Lack of mentorship and role models**
- **Gender bias in hiring and promotion**
- **Workplace culture that lacks inclusivity**
- **Fewer networking opportunities and support systems**

These barriers contribute to a leaky pipeline where talented women often exit the field before reaching leadership positions.

Initiatives and Progress

Globally, several initiatives are working to bridge this gap:

- **Women in Data Science (WiDS)** conferences and communities provide platforms for visibility, learning, and mentorship.
- **Scholarship programs** for women in AI, data analytics, and machine learning help in upskilling and access to education.
- **Corporate diversity programs** and **inclusive hiring practices** are increasingly being adopted to ensure fair representation.

Additionally, universities and ed-tech platforms are promoting gender-inclusive environments, encouraging more women to pursue careers in data science.

Success Stories that Inspire

Women like **Fei-Fei Li**, co-director of the Stanford Human-Centered AI Institute, and **Cathy O'Neil**, author of Weapons of Math Destruction, have significantly influenced the field. Their work not only advances data science but also highlights the social and ethical implications of data-driven technologies. Showcasing such role models is essential to inspire the next generation.

The Way Forward

To truly empower women in data science, the industry must:

- **Foster mentorship networks and communities of practice**
- **Promote gender-sensitive policies and family-friendly work environments**
- **Encourage girls in early education to explore STEM fields**
- **Celebrate the achievements of women in data science through media and events**

Conclusion

Empowering women in data science is more than a diversity initiative—it's about building a more ethical, inclusive, and effective tech ecosystem. By breaking down barriers and creating supportive pathways, the tech industry can unlock the full potential of its talent pool and ensure that data science serves everyone, equally and justly.

AI IN AGRICULTURE: PREDICTING CROP YIELDS WITH MACHINE LEARNING

Ms. Richa Mishra
Assistant Professor- CSE

In an era marked by climate uncertainty and rising food demand, the fusion of agriculture and artificial intelligence (AI) is no longer futuristic—it's essential. Among AI's transformative capabilities, predicting crop yields using machine learning (ML) stands out as a vital innovation for ensuring food security, improving agricultural planning, and empowering farmers with actionable insights.

The Agricultural Challenge

Traditional farming has always been at the mercy of unpredictable factors like rainfall, soil conditions, pests, and diseases. Crop yield—arguably the most important metric for farmers and policymakers—has long been difficult to forecast accurately. Inaccurate predictions often lead to resource mismanagement, post-harvest losses, and financial distress for farmers.

Machine Learning to the Rescue

Machine Learning, a branch of AI, thrives on patterns in data. By analyzing historical agricultural records, weather patterns, satellite imagery, soil health metrics, and even real-time IoT sensor data, ML models can make highly accurate predictions about crop performance.

Popular algorithms such as Random Forests, Support Vector Machines (SVM), Gradient Boosting, and Neural Networks are trained on vast datasets to estimate yields well before harvest. These models consider multiple dynamic variables, making their predictions more robust than traditional statistical approaches.

Key Features of Crop Yield Prediction Models

1. **Data-Driven Decisions:** Inputs like rainfall, temperature, NDVI (Normalized Difference Vegetation Index), soil pH, and crop type are used to predict outcomes.
2. **Early Warnings:** Predictive alerts can help in planning irrigation, fertilizer application, or disease management.
3. **Precision Farming:** Farmers can fine-tune their input usage, reducing waste and increasing profitability.

4. **Policy Making & Market Forecasting:** Governments and agri-businesses use yield predictions for stock planning, exports, and subsidies.

Real-World Applications

Countries like India, the USA, and Brazil are deploying ML-based platforms to assist millions of farmers. Companies such as Microsoft (with AI Sowing App) and startups like CropIn and SatSure are leveraging satellite imagery and ML algorithms to deliver yield forecasts, helping farmers make science-backed decisions.

Challenges and the Road Ahead

While promising, this AI revolution is not without its challenges. Data scarcity, lack of digital literacy among farmers, and limited rural connectivity can hinder adoption. However, with initiatives in open data sharing, mobile-based AI apps, and agricultural extension programs, the future looks fertile.

STUDENT'S ARTICLES

USING DATA SCIENCE TO COMBAT MISINFORMATION AND FAKE NEWS

Ankit Chaudhary
B. tech CSE III-Year

In a world where a tweet can spark panic and a viral video can influence elections, the spread of misinformation and fake news has emerged as one of the most pressing challenges of the digital age. With billions of people consuming and sharing content online every day, **misinformation spreads faster than ever—often outpacing the truth.**

But amid this chaos, a powerful ally has emerged: **Data Science**. Armed with algorithms, statistics, and machine learning, data science is playing a critical role in **detecting, preventing, and combating the spread of fake news.**

The Fake News Epidemic

Fake news is not just about false information—it's a weapon that manipulates opinions, polarizes societies, and erodes trust in institutions. Whether it's doctored images, conspiracy theories, or AI-generated deepfakes, misinformation has grown increasingly sophisticated. Traditional fact-checking methods are too slow and labor-intensive to keep up. What's needed is a scalable, intelligent solution—and that's where data science comes in.

How Data Science Fights Fake News

Data science combines the power of big data, machine learning, and natural language processing (NLP) to analyze, classify, and predict misinformation. Here's how the battle unfolds:

1. Text Classification Using Machine Learning

Machine learning models like **Naive Bayes, SVM, Random Forest,** and **Deep Neural Networks** are trained on labeled datasets of real and fake news. These models learn the linguistic patterns and stylistic cues of misinformation—such as sensational language, lack of credible sources, or emotional tone—and classify new articles or posts accordingly.

2. Natural Language Processing (NLP)

NLP helps in:

- **Detecting clickbait** by analyzing titles and headlines.
- Checking factual consistency between headlines and article bodies.
- Extracting named entities (people, places, organizations) to compare with verified databases.

3. Network Analysis

Fake news often spreads in clusters. By analyzing social media networks, retweet patterns, or WhatsApp forwards, data scientists can **map the flow of misinformation**, detect coordinated behavior, and identify influential spreaders or bot accounts.

4**. Sentiment and Emotion Analysis**

Fake news tends to exploit strong emotions—anger, fear, outrage. Data science models can flag posts that evoke **unusual sentiment spikes**, indicating potential misinformation.

5. Image and Video Forensics

With computer vision and deep learning, data scientists can detect:

- **Manipulated or doctored images**
- **Deepfake videos**
- **Visual inconsistencies in viral media**

Tools and Technologies at Work

Some of the most widely used tools in this fight include:

- **Python and R** for machine learning and NLP.
- **TensorFlow, Keras, and PyTorch** for building deep learning models.
- **Scikit-learn and NLTK** for data processing and classification.
- **Botometer and Hoaxy** for detecting bots and visualizing misinformation on social media.

Real-World Initiatives and Success Stories

- **Facebook and Twitter** now use AI-driven tools to automatically detect and label misleading content.
- **Google's Fact Check Explorer** helps journalists and users verify claims using a growing database of fact-checked articles.
- Startups like **Logically, Blackbird AI,** and **Full Fact** use AI to monitor and debunk misinformation in real time.
- During the COVID-19 pandemic, WHO and tech companies partnered to use AI for tracking and countering infodemics—false health information spreading online.

AI ETHICS: CAN WE BUILD TRUSTWORTHY ARTIFICIAL INTELLIGENCE?

Mukul Negi
B.tech CSE III-Year

Source - https://becominghuman.ai/the-ethics-of-ai-how-can-we-ensure-its-responsible-use-35ac3cf76ae5

As artificial intelligence (AI) continues to grow into a powerful force in modern life, its ethical implications have become one of the most pressing concerns of our time. In India, a country rapidly emerging as both a consumer and developer of AI technologies, the question isn't just “can” we build trustworthy AI—but also, “how” do we ensure its development aligns with both our socio-economic reality and global standards of ethics?

The Indian Context

India's digital transformation is among the fastest in the world, with government initiatives like Digital India, Make in India, and IndiaAI Mission catalyzing public and private sector interest in AI. NITI Aayog has emphasized ethical AI development with focus areas in healthcare, agriculture, education, and smart mobility. However, with vast socio-economic diversity, low digital literacy in rural areas, and limited regulatory infrastructure, ethical AI development faces unique hurdles. Unlike the West, where ethical debates often center around individual privacy and algorithmic transparency, India must also address caste, language diversity, income disparity, and access equity.

What is Trustworthy AI?

Trustworthy AI is not just about safe and secure systems. According to global standards—such as those proposed by the European Commission and OECD—trustworthy AI must fulfill the following principles:

1. Lawfulness – Adhering to laws and regulations.

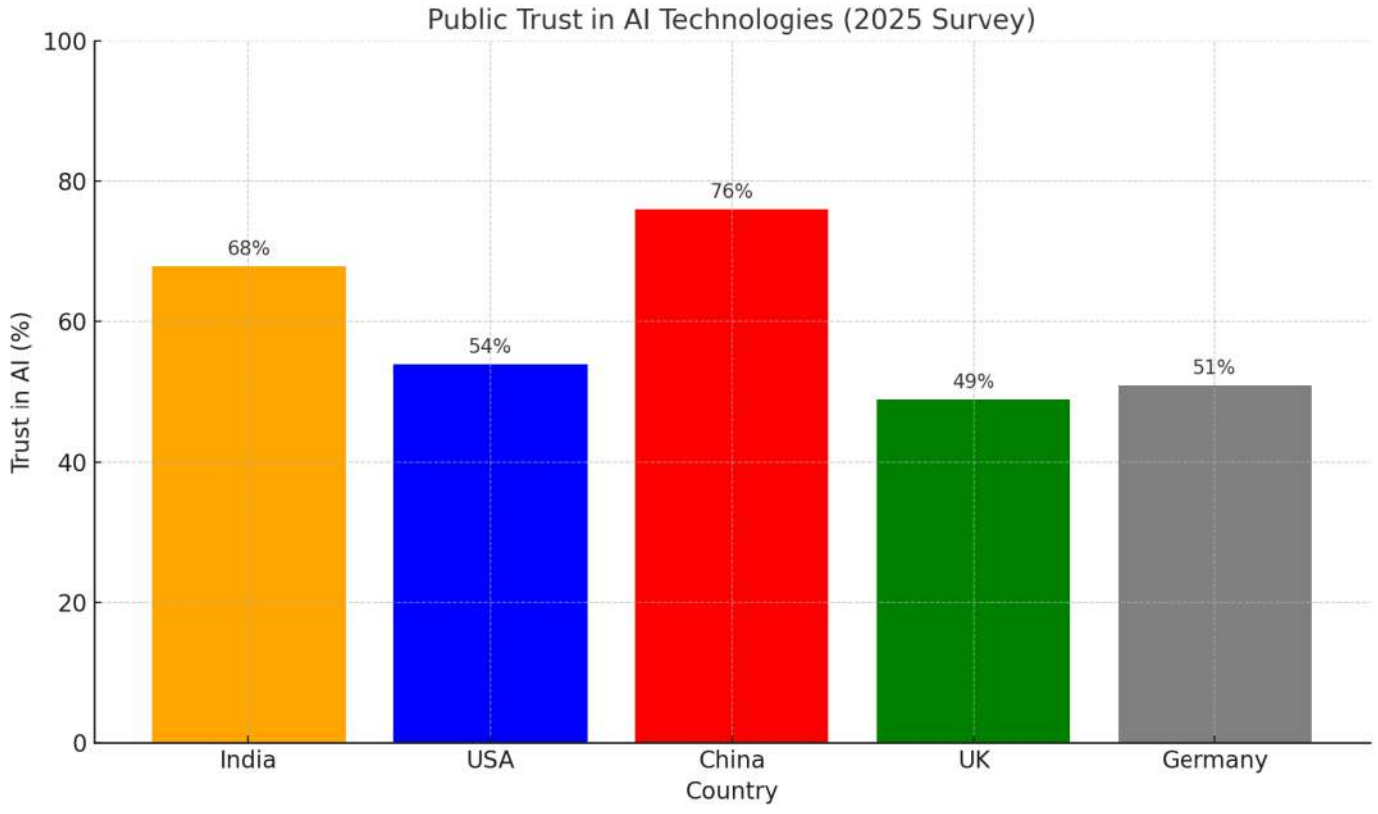
2. Ethical alignment – Respecting human rights and values.

3.Robustness – Technically reliable and resilient to risks.India has endorsed many of these principles, but translating them into action in India's complex environment requires nuanced approaches.

Trust Levels: India vs the World

A 2025 global survey found that India leads in public trust in AI technologies, with 68% of respondents expressing confidence—compared to 54% in the USA and 49% in the UK. This trust is attributed to India's tech-optimistic youth and use of platforms like UPI, Aadhaar, and CoWIN.

But this trust can be a double-edged sword. Without robust ethical practices and public awareness, blind trust can lead to misuse, data exploitation, and marginalization of communities.



Source - OECD AI Trust Barometer 2025, MeitY& NITI Aayog reports.

Ethical AI Practices in Indian Industry

Several Indian and global companies are investing in responsible AI development-

IT Companies	Investments in Responsible AI
Tata Consultancy Services (TCS)	fairness-aware AI models
Infosys	includes explainability and auditability
Wipro	AI for Social Good initiatives
Google India and Microsoft Research India	Responsible AI framework

However, a 2024 NASSCOM survey showed that while 72% of Indian enterprises use AI, only 21% had formal ethical governance structures.

Regulatory and Policy Landscape

India is making strides toward ethical oversight:

- IndiaAI Mission: includes a segment for Responsible AI.
- Digital Personal Data Protection Act (2023): initial data regulation.
- AI Stack (proposed): modular, ethical AI infrastructure.
- Compared to the EU's AI Act, India lacks a comprehensive framework. A central AI ethics regulator could help standardize compliance.

Cultural Nuance

Trustworthy AI in India must consider the following nuances

- Linguistic Diversity: AI must support multiple Indian languages.
- Caste and Gender Bias: Algorithms must avoid historical prejudices.
- Public Awareness: Low digital literacy must be addressed.
- Ethical AI requires technical solutions and public participation.

Academia's Role in Ethical AI

Institutions like IITs, IISc, and IIIT-H are researching explainable AI and fairness. Initiatives like RESPONSIBLE AI Hub and AI4Bharat focus on bias mitigation. Yet, ethics is still lacking in core curricula. Mandatory AI ethics modules are essential.

Key Data Points

Indicator	Value
% of Indian enterprises using AI (2024)	72%
% with AI ethics governance frameworks	21%
Trust in AI among Indian population (2025)	68%
Trust in AI among US population (2025)	54%
Trust in AI among US population (2025)	Healthcare, Agriculture, Education, Fintech

Source - NASSCOM AI Adoption Survey 2024, NITI Aayog IndiaAI Strategy, WEF Responsible AI Index 2024, and OECD AI Trust Barometer 2025.

Recommendations

I. Mandate regular AI audits and bias testing, especially for public-facing systems like healthcare, education, and banking. This ensures that AI behaves reliably and fairly across use cases.

II. Promote the development and use of diverse datasets that represent India's linguistic, regional, gender, and socio-economic diversity. This helps reduce bias and makes AI systems more equitable.

III. Require organizations to disclose when and how AI is being used in decision-making—such as in recruitment, credit scoring, or public services—so users are aware of its influence.

IV. Integrate AI ethics into school and university curricula across disciplines. This builds ethical awareness and prepares future developers and users to approach AI responsibly.

V. Launch nationwide awareness campaigns to educate the public on AI technologies, their benefits, potential risks, and user rights. This builds informed trust and encourages responsible adoption.

Conclusion

India has a unique opportunity to become a global leader in building ethical, inclusive, and trustworthy AI. With its large pool of skilled professionals, rich data diversity, and strong digital infrastructure, India can create a new kind of AI—one that is driven not just by technology, but by strong values. However, building trustworthy AI is not something that happens once and is done. It requires continuous effort, regular checks, and a deep understanding of social and cultural needs. India should take inspiration from global best practices while also developing solutions that are tailored to its own people and challenges.Only by doing this can we ensure that the future of AI in India—and around the world—is not just smart and powerful, but also fair, responsible, and truly beneficial for everyone.

BLOCKCHAIN BEYOND CRYPTOCURRENCY: REAL-WORLD USE CASES

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B.Tech CSE III-Year

Introduction

When most people hear the word 'blockchain,' their minds immediately go to cryptocurrency—Bitcoin, Ethereum, and other digital currencies. While it's true that blockchain technology underpins the operation of cryptocurrencies, its potential extends far beyond financial transactions. At its core, blockchain is a distributed ledger system that ensures transparency, security, and immutability of data. This means that once information is recorded, it cannot be altered retroactively. These attributes make blockchain an ideal solution for various industries seeking to enhance trust, accountability, and efficiency. In this article, we explore how blockchain is transforming real-world sectors beyond cryptocurrency

Supply Chain Management

One of the most promising applications of blockchain lies in supply chain management. In traditional supply chains, tracking the journey of a product from origin to consumer can be complex and opaque. Blockchain introduces end-to-end visibility and traceability. Each step in the supply chain is recorded as a transaction on a blockchain, creating a tamper-proof history of the product. For instance, a retailer can verify the ethical sourcing of coffee beans, or a pharmaceutical company can confirm the authenticity of its medicines. IBM's Food Trust blockchain, used by major retailers like Walmart, showcases this in action.

Healthcare and Medical Records

Blockchain can revolutionize how patient records are stored, shared, and secured in the healthcare industry. Currently, patient data is scattered across various providers, often in incompatible formats. With blockchain, patients could own their medical data and share it securely with any doctor or hospital. Each data transaction is logged and encrypted, ensuring privacy and integrity. Furthermore, this would streamline patient care, prevent errors due to inaccessible or outdated records, and reduce administrative costs. Startups like Medicalchain and projects like Estonia's eHealth system are already pioneering this shift.

Voting and Governance

Blockchain technology offers a secure and transparent platform for electronic voting. Voter fraud and tampering are major concerns in traditional voting systems. Blockchain can mitigate these

issues by creating an immutable record of each vote cast, which can be independently verified and audited without compromising voter anonymity. This ensures a higher level of trust in electoral processes. Several pilot programs, including Voatz in the United States and other blockchain-based elections in Europe and Africa, have demonstrated its potential.

Real Estate and Property Transactions

Real estate transactions typically involve cumbersome paperwork, long processing times, and third-party verification. Blockchain streamlines these processes by digitizing property titles and enabling smart contracts. A smart contract is a self-executing contract with terms directly written into code. It eliminates intermediaries and ensures that transactions are automatically executed once conditions are met. Countries like Sweden and Georgia have experimented with blockchain-based land registries to increase transparency and reduce fraud in property dealings.

Intellectual Property and Digital Rights Management

Creators in music, art, writing, and other domains often struggle to maintain ownership and monetize their work in the digital age. Blockchain can provide a decentralized system to register and verify intellectual property. Artists can use blockchain platforms to publish their work, set licensing terms, and receive payments directly through smart contracts. This reduces reliance on intermediaries and enhances control over digital rights. Projects like Audius (for musicians) and Ascribe (for digital art) are already making strides in this space.

Energy Sector and Peer-to-Peer Trading

The energy industry is another area where blockchain is gaining traction. Decentralized energy grids can allow consumers to generate and sell excess energy using blockchain platforms. This peer-to-peer energy trading model enhances sustainability and reduces dependence on central utilities. Smart meters connected to a blockchain can track energy production and consumption in real time. Platforms like Power Ledger in Australia are leading the way by enabling such energy marketplaces using blockchain technology.

Education and Credential Verification

Academic fraud and unverifiable qualifications are pressing issues in education. Blockchain can provide a secure, permanent ledger for academic credentials. Universities and institutions can issue digital degrees on a blockchain, allowing employers to instantly verify a candidate's qualifications without needing to contact the issuing body. This system also benefits students by giving them permanent and secure access to their records. The MIT Media Lab and the University of Melbourne have already launched blockchain credential initiatives.

Conclusion

Blockchain's potential stretches far beyond the realm of cryptocurrencies. Its core attributes—decentralization, immutability, and transparency—make it a transformative tool across industries. From securing patient records and simplifying real estate transactions to revolutionizing voting systems and enhancing intellectual property rights, blockchain technology is reshaping how we interact with data and conduct business. As adoption grows, we can expect to see even more innovative applications emerge. Understanding and embracing blockchain's broader capabilities can prepare individuals and organizations for a more secure, efficient, and equitable digital future.

FROM COLLEGE PROJECT TO STARTUP

Saurabh Diwedi

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Every great idea begins with a question: "*What if*?" In the world of computer science, many of these ideas originate from humble college classrooms, group assignments, or final-year projects. While some projects fade after evaluation day, others evolve into impactful startups—changing lives, industries, and sometimes, the world.

The College Project: A Seed of Innovation

For Computer Science students, project work is more than just an academic requirement—it's a hands-on experience in solving real-world problems using technology. It's the first time many students explore the complete development lifecycle—from ideation and research to coding and deployment.Often, students don't realize that this initial spark can be nurtured into something much bigger: **a startup**.

Inspiring Success Stories

1. **Facebook-The Dorm Room Revolution** It all started as a simple networking platform for Harvard students. Created by Mark Zuckerberg in his college dorm room, Facebook quickly grew to become a global social media giant. What began as a project became a platform that connects over 3 billion users today.
2. **RedBus – From Traffic Trouble to Travel Tech** Founded by BITS Pilani graduate Phanindra Sama, RedBus emerged from a personal experience of missing a bus during a festive rush. His project evolved into one of India's largest online bus ticketing platforms, now acquired by the Ibibo Group.
3. I**nternshala – Bridging the Opportunity Gap** Sarvesh Agrawal, an IIT Madras alumnus, started Internshala as a blog offering career advice and internship listings. It grew from a college project into

What Makes a Project Startup-Worthy?

Not every college project becomes a startup. But certain factors increase its potential:

- **Real-World Relevance:** Solving an actual problem that people face
- **Simplicity & Usability:** Easy to use solutions that fill a clear need
- **Scalability:** The ability to expand across users, platforms, or regions
- **Innovation:** A unique approach or use of technology that sets it apart

From Project to Product: The Transformation Journey

1. **Identify a Real Problem** Focus on solving problems that matter. Look around your college, community, or city—there are countless areas where tech can make a difference.
2. **Form the Right Team** Partner with peers who complement your strengths. Great startups are often born from strong, balanced teams.
3. **Seek Mentorship and Feedback** Discuss your idea with faculty, alumni, and industry experts. Constructive criticism is key to refining your project.
4. **Start Small, Dream Big** Build a minimum viable product (MVP) first. Then, iterate based on user feedback.
5. **Explore Funding Opportunities** Many colleges now offer incubation support. Also, platforms like Startup India, angel investors, and government grants can help fuel your startup.

The next big thing doesn't always come from a boardroom. Sometimes, it starts with a college project submitted the night before the deadline. The stories of Facebook, RedBus, and Internshala remind us that innovation can come from anywhere—even a final-year submission. All it takes is passion, persistence, and the belief that your idea matters.

So, the next time you start a college project, ask yourself: Could this be the beginning of something bigger?

DIGITAL TWIN: TRANSFORMING THE FUTURE OF COMPUTER SCIENCE AND ENGINEERING

Pritisha Kumari
B.Tech CSE II-Year

In the age of smart systems, automation, and real-time decision-making, the Digital Twin is emerging as a revolutionary concept that bridges the physical and digital worlds. Originally developed for aerospace and manufacturing, the Digital Twin has evolved to become a core technology in Computer Science and Engineering (CSE), driving innovation across domains such as IoT, AI, cybersecurity, and healthcare.

Digital twins versus simulations

Although simulations and digital twins both utilize digital models to replicate a system's various processes, a digital twin is actually a virtual environment, which makes it considerably richer for study. The difference between a digital twin and a simulation is largely a matter of scale: While a simulation typically studies 1 particular process, a digital twin can run any number of useful simulations to study multiple processes.

The differences don't end there. For example, simulations usually don't benefit from having real-time data. But digital twins are designed around a two-way flow of information that occurs when object sensors provide relevant data to the system processor and then happens again when insights created by the processor are shared back with the original source object.

Evolution of Digital Twin Technology

NASA is widely recognized for pioneering the concept of digital twins, a revolutionary idea demonstrated by the Apollo 13 mission. During this mission, NASA utilized Earth-based simulators connected to the spacecraft via real-time data updates, which allowed engineers to troubleshoot alongside astronauts and ultimately avert a disaster. While the concept of digital twins has been applied in industrial manufacturing since the early 2000s, recent advancements are pushing the boundaries of digital twin technology even further. Digital twins are now benefiting from improvements in data interoperability driven by open data frameworks like OpenUSD, computer graphics, generative AI, and accelerated computing, leading to the emergence of a new class of physically based and AI-enabled digital twins.

Digital Twin

A Digital Twin is a virtual replica of a physical system or process, synchronized through real-time data and powered by simulations, analytics, and machine learning. It enables the monitoring, analysis, and optimization of physical entities without direct experimentation, thereby reducing cost, improving safety, and accelerating innovation.

Applications of Digital Twin in CSE

1. Smart Manufacturing and Industry 4.0

In CSE, Digital Twins play a key role in smart manufacturing environments. Using data collected from IoT sensors embedded in machines, engineers can build digital models of entire factory floors. These twins can simulate production processes, monitor equipment health, and predict breakdowns through AI-driven predictive maintenance. This leads to reduced downtime, efficient resource utilization, and improved product quality.

2. Smart Cities and Urban Planning

Digital Twins are helping cities become smarter and more sustainable. By modeling real-time traffic patterns, utility usage, and environmental data, municipalities can simulate urban dynamics and optimize services. CSE professionals use cloud computing, big data analytics, and simulation engines to create city-scale digital twins that aid in disaster management, energy optimization, and citizen services planning.

3. Healthcare and Digital Patients

One of the most promising uses of Digital Twins lies in healthcare. In this domain, a digital twin of a patient or organ is created using medical imaging and biometric data. This allows doctors and AI models to simulate disease progression, predict treatment outcomes, and personalize healthcare strategies. CSE experts contribute through data processing algorithms, privacy-preserving AI, and secure cloud infrastructure for storing and analyzing patient data.

4. IoT and Cyber-Physical Systems

Digital Twins are essential for the management of complex cyber-physical systems. In smart homes, industrial IoT, or smart agriculture, twins monitor real-world sensors and actuators in real-time. With the help of edge computing and machine learning, engineers can simulate scenarios and respond to anomalies, leading to proactive fault handling and efficient automation.

5. Autonomous Vehicles and Robotics

CSE plays a vital role in building Digital Twins for autonomous systems. In self-driving cars and robotic systems, twins are used to simulate navigation, sensor fusion, and control algorithms before real-world deployment. This significantly enhances safety and speeds up the testing cycle. Moreover, these twins continuously learn from real-world data, allowing autonomous systems to evolve.

6. Cybersecurity and Network Simulation

Digital Twins are being used to simulate IT infrastructures and network environments, allowing organizations to test security protocols, model cyberattacks, and evaluate response strategies. This is particularly beneficial in critical sectors like banking and defense, where CSE knowledge of system security, firewalls, and intrusion detection comes into play.

BEST PROJECT ABSTRACT

LIVE FACE ID MATCH: A REAL-TIME IDENTITY VERIFICATION SYSTEM

Rahul Raj, Shubranshu Anand, Deep Kiran, Faiz Ahmed Faizy
Computer Science & Engineering

With the rapid advancement in biometric authentication technology, facial recognition has emerged as a highly secure and efficient method for identity verification. This project, Live Face ID Match, A Real identity Verification System, aims to develop a real-time facial recognition system that accurately matches a live face with pre-stored data for authentication. Unlike conventional password-based security systems, this approach enhances security by leveraging artificial intelligence (AI). machine learning (ML), and computer vision to detect and verify users with high precision

A key feature of this system is liveness detection, which ensures that the authentication process cannot be bypassed using images, videos, or 3D masks. The system employs deep learning-based facial recognition algorithms to extract and compare unique facial features, distinguishing between real users and spoofing attempts. By integrating real-time processing capabilities, the system offers a seamless, fast, and reliable authentication experience.

The Live Face ID Match project has diverse applications, including access control systems, secure financial transactions, attendance management, and digital identity verification. It enhances security while maintaining user convenience, making it an ideal solution for organizations and industries requiring robust authentication mechanisms.

This project demonstrates the potential of facial recognition as a scalable and efficient solution, paving the way for future advancements in biometric authentication technology.

AI-INTEGRATED STUDENT GRIEVANCE PORTAL:INTELLIGENT AUTOMATION FOR GRIEVANCE REDIRECTION AND FUTURE CHATBOT SUPPORT

Jaya Pandey, Chaurasiya Badal Sanjiv
Computer Science & Engineering

In educational institutions, managing student grievances manually often leads to delays. miscommunication and unresolved issues affect the overall student experience. To address this challenge, the proposed project introduces an AI-Integrated Student Grievance Portal that intelligently automates the redirection of student complaints to the appropriate department using Natural Language Processing (NLP) and Machine Learning techniques.

The system enables students to register and submit grievances through a user-friendly web interface. Each complaint is analyzed using AI algorithms to determine its category and urgency, after which it is automatically routed to the concerned department (c.g Academics, Hostel, Administration). The portal also features real-time grievance tracking and administrative dashboards for improved monitoring and transparency

One of the key future enhancements of this system is the integration of a conversational AI chatbot to assist students with FAQs and grievance status updates, thereby reducing administrative workload and response time. By minimizing manual intervention, this intelligent system aims to improve grievance resolution speed, ensure accountability. and foster trust between students and institutional management

This project provides a scalable, efficient, and tech-driven solution to modernize student grievance redressal processes in academic environments

DETECTING BRAIN TUMORS USING PYTHON

Dilpreet Kaur, Divyanshu Raj, Shivanjal Srivastava, Abhijeet Badhani
Computer Science & Engineering

Brain tumors are one of the most life-threatening conditions that require early and accurate detection for effective treatment. This project focuses on developing an automated system for brain tumor detection using Python. The model utilizes MRI images as input and applies deep learning techniques, particularly Convolutional Neural Networks (CNN), for classification and segmentation. The system is trained on a large dataset of brain MRI scans and achieves high accuracy in distinguishing between tumorous and non-tumorous images. Pre-processing steps such as image resizing, normalization, and augmentation are employed to improve model performance and reliability. The project demonstrates how Python-based AI models can assist radiologists and medical professionals in faster and more reliable tumor detection. In the future, this system can be further enhanced by integrating multi-class tumor detection, real-time detection capabilities, and cloud deployment for broader accessibility

AI-DRIVEN METHODS FOR SEO

Anish Brata Samanta, Abhishek Kumar
Computer Science & Engineering

In the ever-evolving landscape of digital marketing, search engines have come a decisive factor for the success of especially small and medium enterprises (SMEs) and individual content creators Search Engine Op (500) pacters have traditionally been manual, time-intensive, and heavily reliant un experiential SEO tools exist in the market, they are often either too expensive to use effectively. This research introduces a novel modular and accessible AI-driven framework automating key components of the SEO process using Python-based implementations of Google Colaboratory (Colab). The project focuses on three primary pillars of SEO enhancement: keyword extraction, SEO scoring, and AI-powered content generation. Each pillar is a separate, independent yet interlinked Python notebook, contributing to a seamless pipeline designed to analyze, improve, and optimize web content for better search engine rankings The first module of the proposed system is dedicated to automated keyword extraction. This component leverages the Natural Language Toolkit (NLTK) for linguistic preprocessing tasks such as tokenization, stop-word removal, and lemmatization, followed by the application of keyword extraction algorithms like RAKE (Rapid Automatic Keyword Extraction). By automating this initial and often time-consuming phase of SEO planning, the module enables users to swiftly identify contextually relevant keywords from any input text or webpage URL. These keywords form the cornerstone for subsequent optimization efforts, guiding the scoring and content generation phases. The second module in the system conducts a comprehensive SEO scoring of the input codes based on established SEO metrics. Techniques such as Term Frequency-Inverse Document Frequency (TF-IDF), keyword density analysis, and readability assessments using metrics like the Flesch-Kincaid score are employed to provide a quantifiable understanding of the content's SEO performance. This score acts as both a diagnostic tool and a benchmark, enabling users to identify weaknesses in their content before proceeding to the enhancement stage. The SEO scoring module is particularly valuable because it translates SEO principles into actionable numerical insights even for users with limited technical or marketing backgrounds. The third module represents the most transformative components of the system, AI-powered content generation. Utilizing OpenAI's language model via API integration, this module generates SEO-optimized articles that incorporate the extracted keywords and address the weaknesses identified in the scoring module. The AI-generated content maintains coherence. semantic relevance, and readability, making it suitable for immediate publication or further. The generated outputs are subsequently re-evaluated using the scoring metrics to quantify Improvements. This feedback loop ensures measurable enhancement in SEO quality and simplifies the role of artificial intelligence as a collaborative tool in the content creation process

CHATWITHAI: A VOICE-DRIVEN AI MENTOR AND INTERVIEW SIMULATOR USING FULL-STACK WEB TECHNOLOGIES

Gautam Bhatt, Utkarsh Negi, Divyansh Rohilla, Asish Ranjan
Computer Science & Engineering

In today's fast-evolving digital landscape, learners and job seekers demand more interactive, accessible, and personalised educational tools. ChatWithAI is a voice-enabled, AI-powered platform that bridges the gap between traditional learning and intelligent mentorship. This project integrates real-time speech recognition, natural language understanding, and smart feedback mechanisms to deliver a comprehensive solution for academic learning, technical interview preparation, and professional development. The platform allows users to engage in conversational learning through voice-guided lectures, interactive Q&A sessions, and customised mock interview simulations. Chat WithAI creates a responsive and immersive experience tailored to each user's skill level, tech stack, and learning goals by leveraging technologies such as Gemini AI for natural language processing and Assembly AI for speech-to-text transcription. The system also features intelligent note-taking, progress tracking, and secure payment integration via Razorpay to support monetized offerings. Built using a robust tech stack including Next.js, React.js, Tailwind CSS, Firebase, and Convex, ChatWithAI ensures scalability, high performance, and maintainability. The project demonstrates the potential of AI in redefining how education and career preparation are delivered, offering a unified, cost-effective, and scalable platform for both individuals and institutions. Through iterative development, agile methodology, and user feedback, ChatWithAI stands as a future-ready educational tool aligned with modern learning needs. What distinguishes ChatWithAI is its adaptive and learner-centric framework, which personalises each user's journey and evolves based on real-time performance insights. The system provides actionable feedback, session replays, domain-specific recommendations, and long-term learning analytics to create a highly customised mentorship experience. By staying updated with current trends and leveraging intelligent automation, ChatWithAI emerges as a powerful, next-generation tool for academic and career growth.

TECH FEST GLIMPSE

The Center of Business Incubation Innovation (CBII), iHUB Shivalik, and the Department of Computer Science and Engineering organized 'SHIVATECH-2024'on November 15, 2024. In ShivaTech-2024, approximately 250 students participated in various competitions, including students from other colleges.

In Shivatech-2024, computer science engineering department organized events, such as Project/Model Demonstration, LAN Gaming - Free Fire & VGMI, Code Hunt, Logo Making. The participants presented their projects in front of the judges, and at the end, the judges announced the winners.


Shivatec

HACKATHONS GLIMPSE

Shivalik College of Engineering, Dehradun had organized an institute-level internal hackathon on 15-16 November 2024 ground floor at Academic Block C building of the institute. Total 75 teams 380 students, (280 male and 100female) have participated in this event. To encourage female participation in innovative projects, most of the teams consist of at least one female student as a member. The participants of the institute have worked on 69 different problems put forward by various ministries of Government of India as well as problems from various PSUs. Out of them, 29 software problems and 40 problems of hardware categories were chosen by the participants to workup .To evaluate and shortlist the teams, 10 judges having industrial/academic experience in various fields were invited.

Shivalik

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