

The Future of AI and Data-Driven Technologies and Trends in real World

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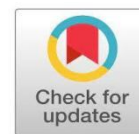
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Publication History

Manuscript Reference No: IJIRAE/RS/Vol.12/Issue12/DCAE10095

Research Article | Open Access | Double-Blind Peer-Reviewed | Article ID: IJIRAE/RS/Vol.12/Issue12/DCAE10095

Received: 20, November 2025, Revised: 29, November 2025, Accepted: 01, December 2025, Published Online: 12, December 2025. <https://www.ijirae.com/volumes/Vol12/iss-12/16.DCAE10095.pdf>

Article Citation: Sameera, Devina (2025), The Future of AI and Data-Driven Technologies and Trends in real World, IJIRAE: International Journal of Innovative Research in Advanced Engineering, Volume 12, Issue 12 of 2025 pages 782-785

Doi: <https://doi.org/10.26562/ijirae.2025.v1212.16>

BibTeX Key: Sameera@2025Future

IJIRAE papers should be cited as IJIRAE (International Journal of Innovative Research in Advanced Engineering, AM Publications, India 2025, ISSN 2349-2163, <https://doi.org/10.26562/ijirae.2025.v1212.16> The journal's official abbreviation is IJIRAE. **Orcid:** <https://orcid.org/0009-0004-9398-7488>

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Abstract: Artificial intelligence (AI) and data-driven technology have become the fundamental essentials of the new media age, determining our lifestyles and modifying our daily experience. With the global generation of data growing at an unprecedented rate, AI technologies are evolving rapidly becoming smarter, more flexible, and widely applied in key sectors like healthcare, education, finance, transportation, and public administration. This paper addresses the current modern innovations and advanced technologies in AI, inclusive of Intelligent Process Automation (IPA), Natural Language Processing (NLP), robotics, along with leading-edge technology such as quantum computing, generative AI, augmented reality and ethical AI. This research paper also investigates the data driven mechanics and the multifaceted nature of technology and its execution. This perspective aims to offer a solid view into how AI and data-centric systems will influence the future, presenting both opportunities and oppositions that lie ahead. The study wraps up with the outline of areas that future research could concentrate on.

Keywords - Artificial Intelligence (AI), Data Driven Technology, Intelligent Process Automation (IPA), Natural Language Processing (NLP), Ethical AI, Emerging Technologies, Robotics, Quantum computing, Augmented Reality, Generative AI.

INTRODUCTION

We live in a world where technology is not just shaping our world -it's reimagining it. Whether it's how we shop, talk to each other, get medical care, or run businesses, Artificial Intelligence (AI) and data driven technologies are now an everyday part of our lives, working behind the scenes to make things faster, smarter and more personalized. Artificial Intelligence - and data driven technologies are remaking societies in the fast developing digital era. The large amounts of data and the increases in computational power have made it possible to develop intelligent systems that mimic human cognitive functions. It's not just about complex calculations or faster computers, it's about the brilliant systems that learn from input given by user and predict what we might need before we ask for it. AI is revolutionizing industries and changing the way we do things by offering from personalised recommendations to predictive diagnostic. AI allows a machine to act on its intelligence and not be confined by pre-programmed work, which is quite fascinating. In numerous industries, AI has transitioned from being merely a tool to functioning as a partner, coexisting with human beings in their activities. This is only possible due to one thing: data. The more data that is available to machines, the better they will be at their learning, predicting, and decision-making tasks. With the explosion of devices, sensors, and digital interactions all throughout our lives, the amount of data being generated is simply mind-boggling, and it is growing by the second. Of course, with great power comes great responsibility. The conversation on AI of the future will, therefore, hinge around what can be done and what should be done. Questions about ethics, biases, job disruption, data privacy, and much more are becoming paramount today. Building smarter technologies must ensure an equal world where inclusion is given, and development drives the greater good. One thing is quite clear: AI and data sciences are here to stay; in fact, they are just getting started. The future will depend on how creatively, thoughtfully, and responsibly we treat them. And the future is already at our doorstep.

ROLE OF AI IN DIFFERENT FIELDS

Artificial Intelligence (AI) is a key player in revolutionizing almost all sectors in everyday life; it is no longer futuristic. AI is facilitating many industries like healthcare, finance, gaming, education, transport-as well as astronomy-to work smarter and faster.

Problem solving, task automating, and intelligent decision-making with life becoming more convenient, efficient, and connective are all reasons to believe AI improves life nowadays. Let us have a closer look at the applications of AI in the different areas:

1. AI in Travel and Transport:

The travel and transport sphere has really soaked up the benefits of AI. It may help you to book your air-ticket and rooms in hotels and now guides you across the best routes for travelling. A large number of companies have AI-enabled chatbots, which respond quickly to the queries while offering personalized advice for being so smooth and efficient in traveling.

2. AI in Social Media:

Social media platforms depend a lot on smart technology to manage how they work behind the scenes. Every second, thousands of terabytes of information concerning users go through sites like Facebook, Twitter, and Snapchat. The artificial intelligence analysis these data by filtering trends, hashtags, and other user behaviour to personalize content consumption and recommend what's most relevant to each user. In this way, they see most of the posts, advertisements, and updates that interest them.

3. AI in Data Security:

Today, more than ever, security of data is necessary because of a digital world. AI was used in detecting future threats and preventing cyber infringements and systems' safety. Technologies such as AI2 Platform and AEG bots assist in detecting bugs or suspicious activity before taking a real toll on the company.

4. AI in Financial:

The financial sector is highly reliant on AI, accuracy, and speed. Some tasks include fraud detection, automated trading, chatbot customer support, and analyzing possible investments. AI-enabled financial institutions can serve their customers faster and more effectively, thus reducing the chances of error.

5. AI in Gaming:

AI has brought exciting changes to the gaming world, and it now allows response systems to act in intelligent, sometimes unpredictable manners with greater difficulty and fun. From strategy games like chess to high-action, fast-paced games, AI is helping simulate the activity of real players, adding realism to users' experiences.

6. AI in Health Care:

AI is changing healthcare enormously. Whether it is through the early detection of diseases or through diagnosis that helps a physician's ability to make an accurate and speedy diagnosis, AI is saving lives now. Healthcare professionals are supported in analysing patient data, predicting possible health threats, and assuring timely treatment, even before reaching the hospital.

7. AI in Astronomy:

AI enables scientists to study the complete universe, track celestial bodies, and understand its origins. AI systems can analysis enormous volumes of astronomical data extremely fast and provide clarity.

CURRENT MODERN INNOVATIONS AND ADVANCED TECHNOLOGIES

(i) IPA-Intelligent Process Automation-IPA brings together a set of high technology constructed to streamline and automate digital task systems.

***Features of IPA:**

- Handles structured and unstructured data
- Real time monitoring and analytics
- Learns and improves over time
- Combines multiple technology

(ii) NLP-Natural Language Processing-It is all about making the devices understand, interpret and to also generate human language, allowing a successful interactions between humans and machines.

***Features of NLP:**

- Text and speech processing
- Sentiment analysis
- Named Entity Recognition (NER)
- Language understanding

(iii) Robotics -It is the study that concentrates on designing developing and controlling robots. These machines are programmed to execute task with higher efficiency and precision than humans.

***Features of Robotics:**

- Durability and consistency
- Real time response
- Autonomous functioning
- Precision and accuracy

(iv) Quantum Computing-Quantum computing depends on the core ideas of quantum mechanics like superposition and entanglement to carry out complex calculations much faster than traditional computers.

***Features of Quantum Computing:**

- Massive processing power
- Parallelism

- High efficiency in complex programs
- Superposition

(v) Generative AI -Generative AI which is commonly known as GenAI refers to the branch of AI that's developed to generate original content like text, images, audio, videos and even conversations which are based on the data it has studied from.

***Features of Generative AI:**

- Personalization
- Content creation
- Multi model capabilities
- Interactive Conversations

(vi) Augmented Reality- It is technologies that merge the digital world with the real one by Hannan Singh the uses perception of their surroundings.

***Features of Augmented Reality:**

- Enhanced visualization
- 3D registration
- Real time interaction
- Social and collaborative features

(vii) Ethical AI- Ethical AI is designing and utilising artificial intelligence in a way that is just open source and consistent with human values, it also guarantees that people and society gain advantages from it.

***Features of Ethical AI:**

- Safety
- Ethics
- Fairness
- Responsibility

Data Driven Mechanics

Data driven mechanics is a field of study that deals with scientific machine learning methods and approaches to utilise the growing volume of material data. It is an inventional approach that integrates experimental data directly into computational models.

Data driven mechanics has a huge range of real -world implementations across various sectors, a few instances are as follows:

1. Smart Wearables
2. Robotics
3. Autonomous Vehicles
4. Health Diagnostics
5. Virtual Reality (VR) and Gaming
6. Agricultural Machinery
7. Earthquake Engineering

CHALLENGES IN AI AND THEIR SOLUTIONS

1. Over dependence of AI

- **Issue:** It could possibly limit critical thinking and decision making abilities in humans.
- **Resolution:** Encourage collaboration between humans and AI, guaranteeing that critical decision are always guided by human oversight.

2. Security threads

- **Issue:** AI systems face numerous security threats which could harm the system severely.
- **Resolution:** Designing AI for threat identification, creating global AI safety standards and regulating risky AI applications.

3. Job displacement

- **Issue:** AI's capability to automate tasks can lead to job losses by replacing human jobs.
- **Resolution:** Allocate resources to education, encouraging collaboration between humans and AI, and develop new positions focused on AI oversight and innovation.

4. Bias and Discrimination

- **Issue:** AI can reflect and increase social biases.
- **Resolution:** Instruct AI on diverse datasets, conduct fairness audits, and apply ethical guidelines in designing models.

5. Privacy and surveillance

- **Issue:** There's a risk that AI might misuse the personal information that it gathers.
- **Resolution:** Implement robust data privacy regulations (such as GDPR) and encourage the development of ethical AI system with a focus on transparency.

AREAS THAT FUTURE RESEARCH COULD CONCENTRATE ON

- 1. Reducing Bias and Ethical AI:** Creating AI systems that are accountable, transparent, and equitable while reducing bias and respecting moral principles.

- 2. Explainable AI (XAI):** Developing models that can provide a human-comprehensible explanation of their choices in order to foster transparency and foster confidence.
- 3. Human-AI Cooperation:** Improving the way AI systems collaborate with people to aid in industry-wide decision-making and productivity.
- 4. Advancement in AI for Health and Life Sciences:** It is a vast opportunity where AI can revolutionize healthcare with improvement in diagnostics, development of drugs, individually tailored treatments, and technology innovations in medical robotics.
- 5. Toward AGI:** It could be in the exploration of ways to allow AI to be developed in order to think more broadly with more human-like reasoning capabilities, to make intelligence more general and adaptable.
- 6. AI Concerning Environmental Challenges:** AI is going to throw a significant portion of its efforts on addressing climate change by enhancing its capacity to optimize green energy use, predict climatic patterns, and boost environmental conservation and remediation.
- 7. How to Safeguard Privacy in AI Environments:** As AI continues to gobble data on a mammoth scale, research must incline toward privacy-preserving methods such as federated learning and differential privacy to keep user information secure throughout their training modes.

CONCLUSION

AI-tech plus data-centric learning is now no longer optional but integral. As these systems become more integrated into every aspect of life, it is imperative to guarantee that they are kept human-centered, ethical, and inclusive. Opportunities always come with issues that should be redressed through policy, interdisciplinary research, and public engagement. Thus, the future of artificial intelligence shall not be determined by just innovation; rather, it's determined by its intention.

REFERENCE

Artificial Intelligence

Authored by PuneetWadhwa, This book explores roles of Artificial Intelligence in various sectors and the book also examines the modern innovations and technologies such as Robotics and Natural Language Processing.

Future Innovation

Authored by Melanie Mitchell, This book offers an accessible introduction to AI, its current capabilities, and its future potential. It covers the impact of AI on society, ethics, and various fields.

Data-Driven Mechanics

Authored by Hilary Mason and DJ Patil, This book emphasizes the importance of data driven decisions and growing role of data science and AI in various sectors.