ISSN : 3079-4765

Global Journal of Emerging AI and Computing

Volume 2, Number 10, 2026

https://doi.org/10.70445/gjeac.2.10.2026.22-40

Artificial Intelligence and Data Science: A Comprehensive Review of Applications, Emerging Trends, and Challenges across Multiple Domains

Mohammad Ali[1*], George Edison[2], Alexandra Harry[3]

[1]Independent Researcher Iraq

[2]Independent Researcher, France

[3]Independent Researcher USA

[1]m.ali.m2000m@gmail.com, [2]Geogeedison2nice@gmail.com, [3]Alaxendraharry37@gmail.com

open access

Corresponding Author

Mohammad Ali

m.ali.m2000@gmail.com

Article History:

Submitted: 26-09-2026

Accepted: 19-10-2026

Published: 24-10-2026

Keywords

Artificial Intelligence, Data Science, Machine Learning, Big Data Analytics, Deep Learning, Intelligent Optimization.

Global Journal of Emerging AI and Computing is licensed u der a Creative Commons Attribution-Noncommercial 4.0 International (CC BY-NC 4.0).

ABSTRACT

In the era of Artificial Intelligence (AI) and data science, they are revolutionizing various fields with their intelligent automation, predictive analytics, and data-driven decision-making capabilities. This review covers the basic concepts, new techniques and applications in healthcare, agriculture, manufacturing, finance, business management, education, and public administration. It delves into the realms of machine learning, deep learning, big data analytics, real-time processing, and intelligent optimization. In addition, the following technical constraints, data privacy, algorithmic bias, cybersecurity, governance and scalability issues are highlighted. Other current trends, like the use of generative AI, federated learning, and sustainable computing, are also taken into account. The review identifies future research areas to design reliable, ethical, efficient and responsible analytical systems driven by artificial intelligence.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

INTRODUCTION

Artificial Intelligence (AI) and data science have become revolutionary areas influencing data collection, processing, analysis and application in various sectors. With the emergence of smart technologies, connected devices and an explosion in the amount of data being generated, there is a growing need for intelligent systems that can extract meaningful information from complex data sets [1]. AI data science combines statistical methods, machine learning, deep learning, and computational techniques to uncover patterns, forecast future trends, automate analysis and aid in evidence-based decision making [2].

AI and data science have many applications, among others in healthcare, agriculture, manufacturing, finance, business management, education, smart cities, and public administration. Healthcare: Intelligent analytical systems help predict disease outbreaks, aid diagnosis, and facilitate clinical decisions [3]. Data-driven methods play a role in precision farming, resource management in agriculture, and crop management. Likewise, AI-powered tools are used in manufacturing for quality control, process optimization, and continuous improvement [4]. Predictive modelling and advanced analytics are used in the financial sector and by businesses to analyze trends, optimize business processes and to inform decision-making.

While these are groundbreaking advances, there are still challenges to consider when implementing AI and Data Science. Issues of data privacy, cybersecurity, algorithmic bias, model interpretability, computational complexity, and system scalability continue to be a matter of concern. Moreover, the governance, regulatory, and organizational preparation of AI systems are key to guaranteeing their reliability, transparency, and ethical use [5].

This review delves into the core principles, cutting-edge technologies, and multidisciplinary uses of AI and data science, focusing on predictive analytics, massive data processing, intelligent decision-making, and process optimization. It also covers the technical, ethical and operational challenges encountered in implementation. This review aims to identify common research challenges, point out emerging opportunities and set out avenues for future research, for the effective, responsible and sustainable embedding of AI and data science in the modern analytical and decision making systems.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

FOUNDATIONS OF AI IN DATA SCIENCE

Artificial Intelligence (AI) and data science offer the foundational principles, techniques, and algorithms for data analysis that enable the extraction of knowledge and actionable information from raw data. AI is about building systems that can do things that traditionally require human intelligence, such as learning, reasoning, pattern recognition, and decision making [6]. Data science is a blend of statistical analysis, mathematical modeling, programming, and subject matter expertise that harnesses structured and unstructured data to provide valuable insights [7]. These fields can be integrated to create intelligent analytical systems that can be used for prediction, automation, optimization, and evidence-based decision making in various fields.

One of the key functions of AI is to use machine learning to learn from past data and enhance the performance of the machine without having to be programmed for every situation. Supervised learning is used for classification and regression, whereas unsupervised learning is used to discover hidden structures, relationships, and clusters in data [8]. Reinforcement learning can be used to have a system learn to improve decision-making by interacting with an environment and receiving feedback from the environment. Deep learning builds on these same features with multi-layered neural networks capable of handling complex data like images, text, speech and time-series data. They are used in prediction of disease, forecasting financial trends, industrial automation and intelligent resource management [9].

Another key pillar of today's data science is big data analytics. To keep up with the growing amount, speed and diversity of digital information, scalable storage solutions, distributed computing architectures and efficient data-processing methods are necessary [10]. Data science frameworks organize the data collection, preprocessing, transformation, analysis, visualization, and model evaluation processes into a structured workflow [11]. For analytical results to be accurate, consistent and pertinent to real-world issues, effective data management and quality assurance (QA) are critical.

These core technologies are linked with real-world applications through predictive modelling and data-driven decision making. Predictive modeling involves using past observations to make estimates, prediction, risks and assess possible outcomes [12]. The purpose of decision support systems is to aggregate both analytical results and operational requirements to better plan and allocate resources. They are effective, however, when data quality is high, the proper model is used, validation

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

procedures are applied, and they are monitored on an ongoing basis [13].

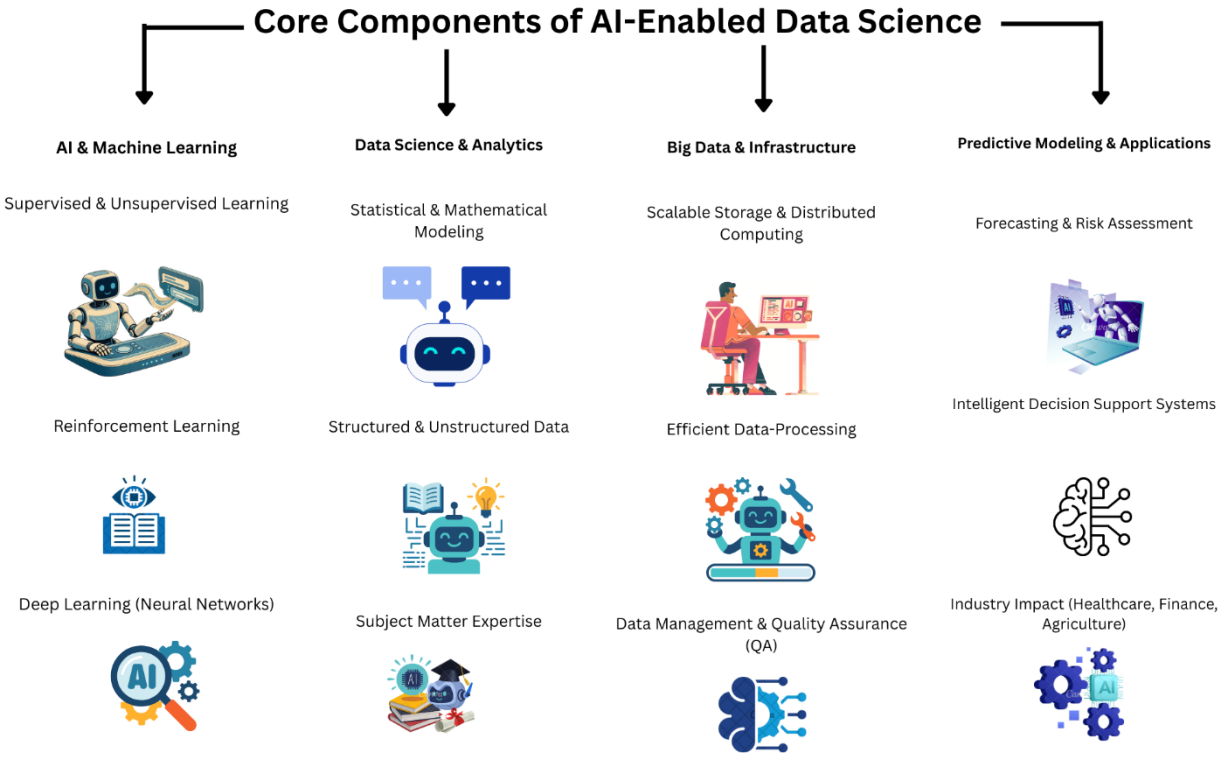


Figure 1. Core Components of AI-Enabled Data Science

AI and data science provide a technical framework for creating effective and scalable intelligent systems. To be successful, they must be accompanied by sophisticated algorithms, data infrastructure, and data governance, interpretability, security and domain expertise. These foundations are used to enable the emergence of innovative solutions in areas such as healthcare, agriculture, manufacturing, business analytics, education and public-sector management [14].

NEW AI SKILLS AND ANALYTICAL METHODS

Modern data science is enhanced by emerging techniques and approaches in artificial intelligence (AI), which enhance predictive accuracy, computational efficiency, and the handling of complex and volatile data. The advances combine machine learning, deep learning, distributed computing and real-time data processing to solve analytical problems in areas such as smart city infrastructures, agriculture, manufacturing, finance and healthcare [15]. Choosing the right analytical method is influenced by the type of data, available computing power, application needs and the desired reliability for decision-making.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

Recurrent neural networks (RNNs) are crucial deep learning approaches used for processing sequential data, such as financial time series, meteorological measurements, industrial sensor readings, and patient monitoring data. They can use the information from the previous time steps to learn from them and predict the future [16]. Learning long-term dependencies is challenging, but can be overcome by using advanced architectures like long short-term memory networks and gated recurrent units. However, the performance of their operation depends on data quality, model configuration, computational needs, and validated use [17].

Advanced predictive analytics and deep learning have also enhanced the ability to analyze complex data. Given a large amount of data, a neural network can automatically learn useful representations, which need not be processed very extensively by hand [18]. They can be used in fields like medical image analysis, anomaly detection, demand forecasting, and automated quality inspection. However, there are significant challenges related to computational complexity, lack of interpretability, and over-fitting [19].

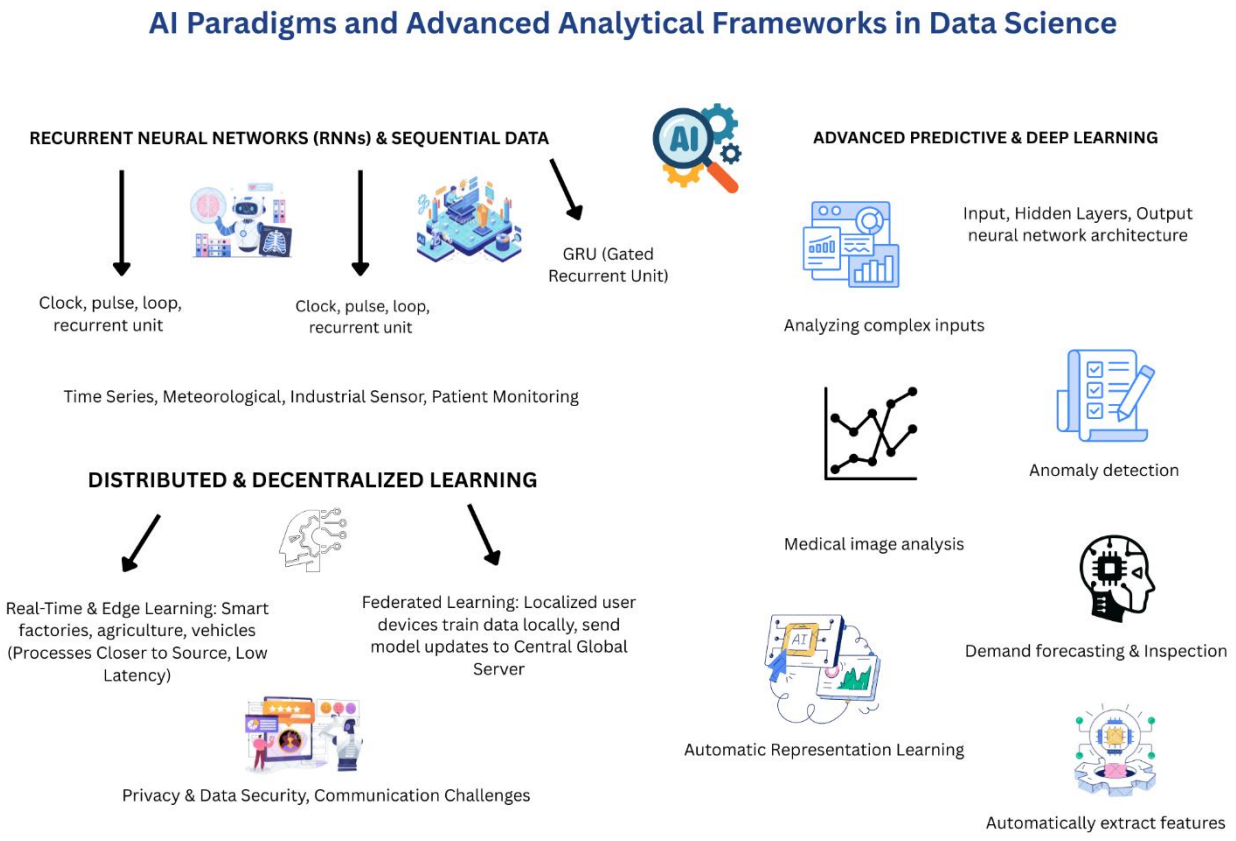


Figure 2. AI Paradigms and Advanced Analytical Frameworks in Data Science

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

There are other methods such as real-time learning, edge learning, and federated learning that can be used to efficiently deal with distributed data. Real-time analytics allows for quick reaction to the changing conditions, while edge computing processes information closer to its source, minimizing bandwidth and communication delays [20]. While federated learning offers benefits in terms of privacy and data sharing, there are still communication challenges and privacy concerns that must be addressed.

AI APPLICATIONS ACROSS MAJOR DOMAINS

By facilitating intelligent automation, predictive analysis, process optimization, and data-driven decision-making, Artificial Intelligence (AI) has emerged as a pivotal force in driving innovation across various fields. By leveraging machine learning, deep learning, big data analytics, and intelligent computational systems, organizations can provide solutions for complex problems, optimize their operations and make full use of their resources [20]. While the applications are different across industries, the pressing, common goal is to turn data into information and to enhance accuracy, productivity, and decision quality.

AI can be used in healthcare for predicting diseases, analyzing medical images, assisting with clinical decisions, and customizing treatments. The power of machine learning algorithms can be used to look through patient histories, clinical notes, and biological data to uncover patterns linked to health risks [21]. AI in agriculture, specifically precision farming, involves the integration of environmental data sensors, satellite data analysis, and predictive analytics to aid in crops monitoring, irrigation management, and optimizing the use of farming resources. Such applications can help to enhance productivity and farm sustainability [22].

AI is used in manufacturing for automated quality inspection, predictive maintenance, production planning, and defect detection. Combining intelligent analytical systems with Lean Six Sigma concepts can be used to detect process variations, minimize waste, and contribute to ongoing process improvement. Likewise, business intelligence and product management employ predictive model to gain insights into customer behavior, analyses market trends, optimize product development and make informed decisions [23]. AI tools are used in financial analytics for forecasting stock prices, assessing risks and analyzing and uncovering complex patterns in financial time-series data.

Another key area of application is smart cities, where real-time analytics and connected devices

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

facilitate traffic management, energy management, environmental monitoring, and urban planning. Predictive analytics can enhance supply chain management, staffing, sourcing, and other operational functions in public service supply chains [24]. AI-based early-warning systems can be implemented in educational institutions to detect students that might need extra academic assistance. Intelligent technologies have further advantages for human–computer interaction, such as the ability to customize interfaces, enhance accessibility, and assess usability [25].

While there are potential benefits to AI applications, there are also challenges that come with them, such as the availability of data, the reliability of AI models, the cost of implementation, cybersecurity, and ethical responsibility. For successful deployment, it needs to be validated in a domain-specific manner, governed appropriately, monitored by humans, and continuously monitored [26]. AI applications in various industries highlight the power of leveraging cutting-edge analytics and real-world experience to make better decisions, perform better, and innovate.

AI OPTIMIZATION AND INTELLIGENT DECISION-MAKING

AI is increasingly influencing operational processes, and decision-making in various sectors. By integrating machine learning, predictive analytics, and optimization algorithms, AI systems can analyze large datasets, identify inefficiencies, forecast potential outcomes, and recommend appropriate actions [27]. These capabilities help organizations shift from the traditional decision-making process to a more adaptive, evidence-based and efficient operational process. AI-powered optimization is especially useful in scenarios with intricate workflows, restricted resources, evolving requirements, and the need for prompt decision-making [28].

Automated process optimization includes leveraging intelligent algorithms to analyze operational processes, identify performance constraints, and uncover inefficiencies. AI can be used in manufacturing to identify problems, forecast equipment failures, lessen material waste, and boost product quality by analysing production data. These systems can be combined with continuous improvement processes to help standardize processes and reduce variations in operations [29]. AI can also be applied to streamline business operations, such as supply chain management, inventory management, production planning, and procurement processes, to enhance coordination and minimize unnecessary expenses.

Another significant use of AI optimization is to manage resources intelligently and plan staffing.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

Predictive models are able to forecast workloads, evaluate patterns of employee performance, and guide personnel allocation based on operational demand [30]. These approaches can enhance the use of staff, service provision and coordination of supply chains in public-sector organizations. But when it comes to implementation, it is important to consider employee privacy, fairness, workload balance, and the need for human oversight to ensure that decisions are not made inappropriately or in a biased manner [31].

Data-driven strategic decision making is the combination of historical data, real-time observations and predictions to feed the planning of organizations. AI systems can analyze different scenarios, calculate potential risks, pinpoint emerging trends, and help managers make informed decisions about appropriate strategies [32]. These features can be utilized in healthcare for resource management, in financial and commercial sectors for forecasting uncertainty and adapting to market shifts. Analytical results can only be used for operational efficiency and performance improvement if they are continually assessed. Organizations have to set up suitable performance indicators, test the recommendations from the models and track the changes of the system's behavior [33]. While AI can enhance the timeliness and uniformity of decisions, poor data quality, inappropriate algorithms, and lack of explain ability can diminish its value.

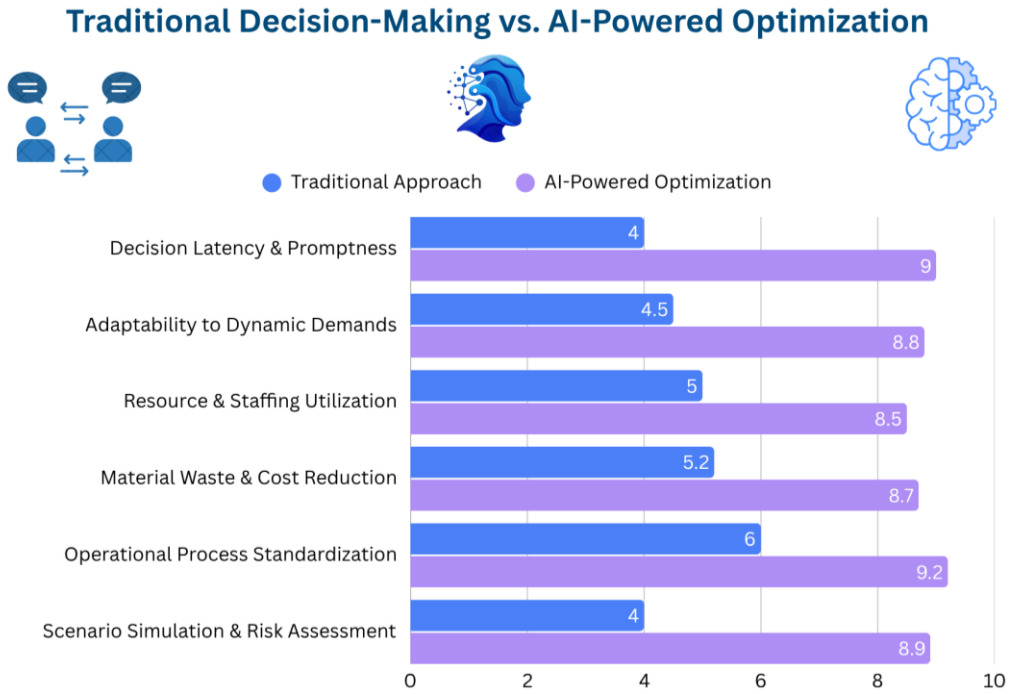


Figure 3. Traditional Decision-Making vs. AI-Powered Optimization

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

ETHICAL, LEGAL AND GOVERNANCE CHALLENGES

There is growing ethical, legal and governance concerns as Artificial Intelligence (AI) becomes omnipresent in healthcare, finance, manufacturing, education, agriculture and public administration. While AI-driven systems provide significant advantages in terms of automation, prediction, and decision-making, their use is not without concern and must be carefully considered with regard to privacy, security, fairness, transparency, and accountability [34]. These challenges require attention to guarantee intelligent technologies are reliable, respect individual rights, and trusted by the public.

AI systems often handle vast amounts of sensitive personal or financial information, medical data, and organizational information, making data privacy and information security paramount. Accessing data without permission, data breaches, sharing of data without permission, and even failing to provide adequate security measures can pose a significant risk to an individual or institution [35]. Securing these data is essential for effective data governance: storing the data securely, managing access to the data, encrypting the data, minimizing the amount of data, and ensuring the data meets privacy regulations [36]. There should be clear policies in place for collecting data, retaining it, and processing and sharing it.

Another major challenge is that of algorithmic bias and fairness. Historical datasets may be incomplete, include social inequalities, or systematic biases, from which AI models learn patterns. This means that the outcomes of these models can be inequitable when it comes to recruiting, providing health services, education, assessing credit worthiness, and providing public services [37]. Systematic audit, representative training data, fairness checks and adequate human supervision can be used to detect and reduce discriminatory outcomes. But, depending on the application, fairness needs to be evaluated on a case-by-case basis, as different applications may have different criteria for evaluating fairness [38].

To create trustworthy intelligent systems, both explain ability and transparency are crucial. Predictions made by complex machine learning models might not give comprehensible explanations for the decisions made. Recommendations may be difficult to interpret, errors hard to find and inappropriate outcomes to challenge because of limited interpretability [39]. Clear communication and documentation, as well as explain ability techniques, can help to enhance accountability and informed decision making.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

AI governance and regulatory compliance create the organizational frameworks that enable responsible deployment. Good governance requires setting the roles, procedures for risk management, tracking the performance of the models and ensuring adherence to the applicable legal provisions [40]. Proper documentation of system development, testing, deployment and evaluation should also be kept. In high impact applications, such as those that involve health, employment, or financial security or access to essential services, human supervision is especially critical, since automated decisions could have serious consequences [41].

In today's world of generative AI and deep fake technologies, digital trust and information integrity are becoming of growing significance. Synthetic media can be used in legitimate creative ways, but can also be used for impersonation, fraud or disinformation [42]. These risks can be mitigated by detection mechanisms, verification of the content, media literacy, and the platform's policies and conduct. Ethical AI is a team effort that needs to be ongoing between developers, policymakers, organizations, and users. Effective governance, transparency and appropriate safeguards are vital for maximizing the benefits of AI and reducing possible harm [43].

TECHNICAL AND OPERATIONAL CHALLENGES

Using Artificial Intelligence (AI) and data science systems introduces several technical and operational challenges that can affect the accuracy, reliability, scalability, and usefulness of the systems. While advanced analytical techniques allow for automation and intelligent decision-making, they rely on data quality, computational infrastructure, model design, and organizational capabilities [44]. Sustainable AI solutions for healthcare, agriculture, manufacturing, finance, education and public administration require these challenges to be addressed.

Quality and availability of data is a crucial aspect of successful AI applications. The lack of records, different formats, wrong measurements, duplicated records and too few training examples can affect the performance of the model and generate unreliable predictions [45]. The data from various sources may also have compatibility problems, making it difficult to integrate and analyze. Thus, proper data preprocessing, validation, standardization and data management are required to enhance the reliability of the analysis [46].

Other challenges include scalability and computational complexity, especially for very large and rapidly expanding datasets. Some deep learning models and enhanced analytical algorithms can be

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

very large, demanding a significant amount of computing power, memory, storage and energy. Problems may arise in the implementation of these systems in companies with fewer technical resources [47]. These can be mitigated using distributed computing, cloud-based systems, model optimization, and efficient data-processing frameworks, with potential added costs and security risks.

Generalization of the model and predictive reliability also is a concern. A model that works well on the training data may fail to make accurate predictions for new data or real-world variations. Prediction quality can be impacted by overfitting, biased training samples, inappropriate feature selection, and changes in data distributions. Validating, testing, conducting periodic performance assessment and ongoing monitoring are necessary to ensure model reliability [48].

Real-time processing and system integration adds to the operational challenges. In applications like clinical monitoring, industrial automation, smart city management, and supply chain optimization, it is crucial to make quick evaluations and provide timely solutions. The effectiveness can be affected by slow transmission of data, integration problems with software systems and a limited network capacity. Implementing AI can also involve significant changes in the organization's infrastructure and a training program for the staff [49]. The long-term success of implementing AI depends on implementation costs and organizational readiness. Infrastructure, skilled staff, system maintenance, cyber security, and model updates expenses may pose an obstacle,

EMERGING TRENDS AND FUTURE RESEARCH DIRECTIONS

As the domain of Artificial Intelligence (AI) and data science evolves at a rapid pace, it promises to bring new opportunities in the field of innovation, automation, and intelligent decision making in several domains. New technologies are extending the functionality of analysis systems, making them more adaptable, more efficient in their computing power and more accessible as well as more capable of handling complex information [50]. Ongoing studies are needed to create trustworthy, clear, secure, and sustainable AI solutions that tackle real-world problems and facilitate responsible technological evolution.

Generative AI and autonomous analytical systems are significant advancements in contemporary data science. Generative models can output text, images, summaries, and synthetic datasets, and intelligent agents can aid a multistep analytical task and decision-making process [51]. These technologies can enhance research productivity, business intelligence, education support, and information

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

management. But future studies need to tackle issues of factual reliability, hallucination, intellectual property, security and the right degree of human oversight [52].

Distributed data organizations are becoming more critical as organizations look to use these data sets without exposing too much information. Distributed organizations of data becomes more important as organizations seek to leverage distributed data without exposing too much information. The main application of federated learning is to train a model across different devices or institutions without transferring the raw data. Other methods, such as differential privacy and secure computation, could further enhance information security [53]. They should be tested in the future for their effectiveness, computational cost, scalability, and applicability in the context of sensitive data in healthcare, financial, and public sectors.

Another major research focus is on human-centric and user-friendly AI systems. Intelligent technologies should be designed to be flexible with various users, user capabilities, levels of technical knowledge, and cultures. Studies of explain ability, usability, and accessibility, along with research on human–AI collaboration, can enhance a user's understanding and trust in the automated recommendations. Special care needs to be taken to ensure that AI systems are inclusive and do not perpetuate inequalities [54].

Additionally, the increasing complexity of models can require significant computational resources and energy to train and deploy, making sustainable AI more and more relevant. Further research should include lightweight models, efficient algorithms, and optimized hardware and environmentally friendly computing practices. Providing an energy usage assessment in addition to predictive performance can assist organizations in choosing more sustainable analytical solutions [55]. Cross domain AI integration represents additional possibilities, by integrating knowledge and analytical approaches from health care, agriculture, manufacturing, finance, education and smart city systems. Various data structures, operational needs, regulations and assessment criteria, however, pose problems for the transfer of models between domains [56].

CONCLUSION

Artificial Intelligence (AI) and data science have emerged as indispensable tools in the landscape of data to power intelligent decision-making, boost operational efficiency and turn data into meaningful insights in various domains. In the realm of data, Artificial Intelligence (AI) and data science have

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

become essential technologies, offering the capability to convert data into meaningful insights, enhance operational efficiency, and enable intelligent decision-making in diverse sectors. The advent of machine learning, deep learning, big data analytics, predictive modeling, and sophisticated computational technologies has provided organizations with a greater capacity to solve increasingly complex problems and to meet evolving needs. They are ubiquitous in various fields such as healthcare, agricultural, manufacturing, finance, business management, education, smart cities and public administration, which reflects the increasing role of these in the current technological and organizational development.

This review has shed light on the core concepts of AI and data science, new techniques being developed, and their use in a variety of industries. Predictive analytics helps to identify patterns and predict future outcomes, and intelligent optimization helps optimize resources, processes and workforce planning. Likewise, the opportunities for more responsive, scalable, and interconnected analytical systems lie in real-time analytics, edge computing, federated learning, and Internet of Things technologies. All of these advances can help to improve productivity, better utilization of resources and better informed strategic decisions.

While artificial intelligence and data science can be extremely valuable, they are limited in their effectiveness by a variety of technical, operational, ethical and legal issues. Bad data quality, computational complexity, poor scalability, model bias, and poor interpretability can impact the reliability of systems. In addition, the breach of privacy, cybersecurity risks and the misuse of generative AI technologies can negatively impact public trust and responsible innovation. These concerns can be addressed through strong data governance, reporting and analysis with transparency, proper regulatory compliance, continuous performance monitoring, and human oversight.

Moving forward, it is crucial to focus on creating reliable, interpretable, privacy-preserving, and energy-efficient AI systems. More focus should also be given to the enhancement of cross domain integration, further development of the ability to generalize models, making technologies more accessible and assessing their effectiveness in real-world applications. The interdisciplinary cooperation of researchers, technology developers, policy makers, and industry has the potential to help ensure that new solutions are viable and pose minimal risks.

AI and data science provide a powerful way to further enhance innovation, analytical skills, and

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

evidence-based decision-making in a wide range of sectors. But their long-term effectiveness relies not just on technological advancements but also on responsible implementation, organizational readiness and evaluation. Through innovation alongside ethical considerations, technical reliability and human insight, organizations can optimize the value of intelligent analytical systems and drive sustainable digital transformation.

REFERENCES

[1]. Erdenetsogt T, Jamal M. Machine Learning for Big Data Analytics: A Comprehensive Review. Global Trends in Science and Technology. 2026 Apr 25;2(2):199-218.

[2]. Shaikh MM. Artificial Intelligence and Workforce Performance Optimization in Government Supply Chains. Global Trends in Science and Technology. 2026 Jun 12;2(3):53-74.

[3]. Raza H, Erdenetsogt T, Singh A, Farooq M, Kabeer MM, Aslam MS. A Comprehensive Review on Data Science Frameworks for Big Data Analytics. PERFECT: Journal of Smart Algorithms. 2026 Jan 6;3(1):1-0.

[4]. Oad SK. From Algorithms to Insights: A Review of AI Applications in Data Science. American Journal of Artificial Intelligence and Computing. 2026 May 14;2(1):236-51.

[5]. Saini SS. Federated learning for privacy-preserving healthcare AI models. International Journal of Unified Research & Development (IJURD). 2025 Sep 13;1(1):1-5.

[6]. Raza H, Singh A, Erdenetsogt T, Kabeer MM, Aslam MS, Farooq M. Machine Learning Driven Decision Making in the Modern Data Era. PERFECT: Journal of Smart Algorithms. 2026 Jan 6;3(1):11-22.

[7]. Dey P, Hossain E, Hossain MI, Chowdhury MA, Alam MS, Hossain MS, Andersson K. Comparative analysis of recurrent neural networks in stock price prediction for different frequency domains. Algorithms. 2021 Aug 22;14(8):251.

[8]. Oad SK. Role of Artificial Intelligence in Modern Data Science: A Critical Review. Global Journal of Universal Studies. 2024 Jun 15;1(1).

[9]. Imtiaz N, Kundu TR, Roy A, Bhuiyan MI, Rahman K, Islam MK. Governance readiness beyond predictive performance: An empirical benchmark for higher-education early warning systems. Frontiers in Computer Science and Artificial Intelligence. 2025;4(5):49-65.

[10]. Jamshaid M, Muhammad AH, Akbar Z, Niaz S, Siddique MN, Akbar S. Artificial intelligence generated deepfakes as instruments of disinformation: Examining their influence on public

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

opinion, digital trust, and governance. Journal of Information Systems Engineering and Management. 2025;10.

[11]. Kabeer MM. Leveraging AI for process optimization: the future of quality assurance in lean six sigma. American Journal of Artificial Intelligence and Computing. 2025 May 7;1(1):87-103.

[12]. Oad VD. Artificial Intelligence in Data Analytics: A Comprehensive Review. Global Journal of Universal Studies. 2024 Jun 15;1(1).

[13]. Jamal A, Raza H, Erdenetsogt T, Singh A, Farooq M, Kabeer MM, Aslam MS. AI and Data Analytics for Precision Agriculture: Current Progress and Future Directions. JATAED: Journal of Appropriate Technology for Agriculture, Environment, and Development. 2025 Aug 15;2(2):36-46.

[14]. Rahman MM, Yeasmin MS, Kabir L, Abedin T, Uddin MH, Mahmud M, Rahman A, Nur-E-Alam M, Rokonuzzaman M. Balancing privacy and performance: Federated learning with differential privacy for real-time, resilient healthcare ai. Diyala Journal of Engineering Sciences. 2025 Sep 1:1-21.

[15]. Aslam MS. Artificial Intelligence in Product Management: Driving Innovation and Market Success. Global Journal of Universal Studies. 2024 Dec 12;1(2):88-112.

[16]. Singh A. Human-computer interaction: a review of usability, design, and accessibility trends. Global Research Repo. 2025 Sep 9;1(2):362-87.

[17]. Oad SK. AI-Powered Data Science: A Review of Current Developments and Emerging Opportunities. Global Trends in Science and Technology. 2026 May 13;2(2):263-82.

[18]. Alankamony A, Nels N. Systematic Review of Privacy Preservation in Federated Learning for Secured Healthcare Applications. Information. 2026 Jul 2;17(7):647.

[19]. Zeb S, Nizamullah FN, Abbasi N, Qayyum MU. Transforming Healthcare: Artificial Intelligence's Place in Contemporary Medicine. BULLET: Jurnal Multidisiplin Ilmu. 2024;3(4):592385.

[20]. Kabeer MM. Utilizing Machine Learning for Continuous Process Improvement in Lean Six Sigma. Global Trends in Science and Technology. 2025 May 7;1(2):49-63.

[21]. Shafik W, Tufail A, De Silva LC, Apong RA. Differential Privacy and Homomorphic Encryption in Healthcare Artificial Intelligence. InThe Convergence of Federated Learning

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

and Healthcare 5.0 and Beyond: A New Era of Intelligent Health Systems 2026 Feb 7 (pp. 179-202). Cham: Springer Nature Switzerland.

[22]. Oad VD. Artificial Intelligence for Big Data Analytics: A Review of Trends and Challenges. Global Trends in Science and Technology. 2026 Mar 20;2(2):83-102.

[23]. Akinsiku AM. Federated learning techniques for privacy-preserving AI in distributed networks: A review. Tech-Sphere Journal for Pure and Applied Sciences. 2025 Oct 31;2(1):69-83.

[24]. Abbasi N, Nizamullah FN, Zeb S. Ai in healthcare: Using cutting-edge technologies to revolutionize vaccine development and distribution. JURIHUM: Jurnal Inovasi dan Humaniora. 2023 Jun 14;1(1):17-29.

[25]. Jamal M. Deep Learning Applications in Medicine: Enhancing Diagnosis and Patient Outcomes. Global Journal of Universal Studies. 2024 Jun 15;1(1).

[26]. Batool M, Bashir A. Privacy and Security in Healthcare Federated Learning: Techniques, Frameworks. Federated Learning for the Future of Healthcare: Secure, Scalable, Smart. 2026 Jul 22:242.

[27]. Oad VD. AI in Business Data Analytics: A Review of Current Practices and Future Direction. Global Trends in Science and Technology. 2026 Apr 15;2(2):156-74.

[28]. Echendu U, Udeokechukwu C. Artificial Intelligence and Machine Learning in Healthcare: Developing Privacy-Preserving Frameworks. Available at SSRN 5125847. 2025 Feb 4.

[29]. Raza H, Erdenetsogt T, Kabeer MM, Aslam MS. IoT Generated Big Data Analytics: Trends and Scalability Issues. American Journal of Artificial Intelligence and Computing. 2025;1(2):306-27.

[30]. Nizamullah F, Fahad M, Abbasi N, Qayyum MU, Zeb S. Ethical and legal challenges in AI-driven healthcare: patient privacy, data security, legal framework, and compliance. Int. J. Innov. Res. Sci. Eng. Technol. 2024;13:15216-23.

[31]. Oad SK. Artificial Intelligence in Data Science: A Comprehensive Review. American Journal of Artificial Intelligence and Computing. 2026 Mar 17;2(1):1-25.

[32]. Mosaiyebzadeh F, Pouriyeh S, Parizi RM, Sheng QZ, Han M, Zhao L, Sannino G, Ranieri CM, Ueyama J, Batista DM. Privacy-enhancing technologies in federated learning for the internet of healthcare things: a survey. Electronics. 2023 Jun 16;12(12):2703.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

[33]. Singh A. Harnessing Artificial Intelligence in Product Management and Data Analytics: Trends, Applications, and Future Directions. Global Trends in Science and Technology. 2026 Jan 25;2(1):19-35.

[34]. Kabeer MM. AI in manufacturing quality management: a review of techniques, tools, and industrial adoption. Global Journal of Universal Studies. 2024;1(2):46-64.

[35]. Telkar SS, Yogi MK. A comprehensive review of differential privacy with federated meta-learning for privacy-preserving medical IoT. ICCK Transactions on Wireless Networks. 2025 Jun 25;1(1):16-31.

[36]. Aslam MS, Jamal M. Machine Learning in Healthcare: Revolutionizing Clinical Decision-Making with Data Analytics. Global Trends in Science and Technology. 2026 Mar 18;2(2):23-42.

[37]. Oad VD. Exploring AI Techniques in Data Analytics: A Critical Review. American Journal of Artificial Intelligence and Computing. 2026 Apr 16;2(1):46-67.

[38]. Ayyappan G, Loganathan V, Padma E, Ilavarasan S, Subash A. Federated learning and edge AI for privacy-preserving diabetes prediction in healthcare. In2025 3rd International Conference on Self Sustainable Artificial Intelligence Systems (ICSSAS) 2025 Jun 11 (pp. 1116-1121). IEEE.

[39]. Zeb S, Nizamullah FN, Abbasi N, Fahad M. AI in healthcare: revolutionizing diagnosis and therapy. International Journal of Multidisciplinary Sciences and Arts. 2024 Aug 17;3(3):118-28.

[40]. Shaikh MM. Enhancing Workforce Efficiency in Public Sector Supply Chains through Predictive Analytics. American Journal of Artificial Intelligence and Computing. 2026 Jun 10;2(1):288-315.

[41]. Tanim SA, Mridha MF, Safran M, Alfarhood S, Che D. Secure federated learning for Parkinson's disease: Non-IID data partitioning and homomorphic encryption strategies. IEEE Access. 2024 Sep 5;12:127309-27.

[42]. Oad SK. Integration of AI in Data Science: A Systematic Review. Global Trends in Science and Technology. 2026 Mar 18;2(2):64-82.

[43]. Jamal M, Singh A. Federated and Edge Learning for Real-Time Data Analytics in Clinical Environments. Global Journal of Universal Studies. 2024 Jun 15;1(1).

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

[44]. Arrasyid R, Syifa NA. Systematic Review Of Privacy-Preserving Federated Learning: Methods, Architectures, Performance, And Challenges. INTEGRATED (Journal of Information Technology and Vocational Education). 2026 Apr 26;8(1).

[45]. Kabeer MM. AI in Lean Six Sigma: A Review of Industrial Implementations, Benefits, and Barriers. Global Journal of Universal Studies. 2024 Jan 10;1(2):134-58.

[46]. Raza A. Secure and privacy-preserving federated learning with explainable artificial intelligence for smart healthcare system. University of Kent (United Kingdom); 2023.

[47]. Abbasi N, Nizamullah FN, Zeb S, Fahad M, Qayyum MU. Machine learning models for predicting susceptibility to infectious diseases based on microbiome profiles. Journal of Knowledge Learning and Science Technology ISSN: 2959-6386 (online). 2024 Aug 25;3(4):35-47.

[48]. Thakur A. Securing Generative AI: Homomorphic Encryption, Differential Privacy, and Federated Learning in Key Industries. International Journal of High School Research. 2025 Oct 1;7(10):18.

[49]. Raza H, Erdenetsogt T, Farooq M, Kabeer MM, Aslam MS. Real-Time Data Analytics: Applications and Challenges in Smart Cities. Global Journal of Universal Studies. 2024 Jun 15;1(1).

[50]. Mathew A, Alex H. Federated Learning for Secure Genomic Research: Privacy-Preserving AI Solutions for Precision Medicine. Science and Technology: Developments and Applications. 2025 Apr 15;9:36-43.

[51]. Khan F. The role of artificial intelligence in privacy-preserving data processing. Journal of Big Data Privacy Management. 2025 May 21;3(01):79-89.

[52]. Alqazzaz A. Federated learning with homomorphic encryption: A privacy-preserving solution for smart cities. International Journal of Computational Intelligence Systems. 2025 Nov 17;18(1):304.

[53]. Babu KM, Nagendranath MV. Privacy preservation in distributed healthcare systems: A review of differential privacy, homomorphic encryption, and hybrid approaches. In2025 4th International Conference on Innovative Mechanisms for Industry Applications (ICIMIA) 2025 Sep 3 (pp. 976-983). IEEE.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

ISSN : 3079-4765
Global Journal of Emerging AI and Computing
Volume 2, Number 10, 2026
https://doi.org/10.70445/gjeac.2.10.2026.22-40

[54]. Sriharsha AV, Yarabolu SN. Federated Learning for Early Detection of Chronic Diseases: Privacy-Preserving Models in Population Health Management. AI Trust, Risk, and Security Management: Framework, Principles, and Practices. 2026 Jan 20:153-81.

[55]. Gomathi R, Saranya K, Mahaboob John YM, Mary GL. Stochastic Poisson-embedded privacy framework for federated learning with secure homomorphic encryption in medical AI. Scientific Reports. 2026 Mar 27.

[56]. Rudwan E, Ali HE, Ibrahim M, Mohamedelnour H, Almandalawi YS, Hassan MK, Mohamedain LM, Saeed L, Rudwan A. Artificial intelligence-driven approaches to disease surveillance and outbreak prediction. Open Access Library Journal. 2026 Feb 2;13(2):1-6.

This is an Creative Commons License This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.