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Unified Perspectives on AI: Enhancing Retail, Healthcare, Military, Robotics, and Big Data through Advanced Data Science Algorithms

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Abstract

In recognition of its rapid progress, Artificial Intelligence (AI) is becoming a vital technology in a variety of sectors, including Retail, Healthcare, Military, Robotics, and Big Data through Advanced Data Science Algorithms natural language processing, services across many industries. Over the past ten years, it has made significant progress in these areas, opening up a wide range of potential opportunities and related difficulties. Artificial Intelligence (AI) technologies also affect industry activity and work productivity. While industries, Retail, Healthcare, Military, Robotics, and Big Data service providers are among the sectors that are favorably embracing artificial intelligence, there are opportunities and problems associated with its deployment. Artificial intelligence and related technologies are developing at a rapid pace, which will help service companies increase the value they offer to their clients and streamline their operational procedures. Planning and strategy are necessary for the effective implementation of artificial intelligence in order to transform the necessary technology. The present research endeavors to examine the current state of artificial intelligence-driven technological applications and their effects on several industries, including healthcare, Military, Robotics, and retail marketing. The findings show that artificial intelligence-enabled technologies are currently being used by the marketing, healthcare, and education sectors to carry out various tasks for a variety of services. The authors also discuss potential future benefits of AI technology as well as related risks in the many industries they have examined.

Keywords: *Retail AI, Healthcare AI, Military AI, Robotics, Big data, Artificial intelligence, Systematic Literature Review (SLR)*

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1. Introduction

In recent years, Artificial Intelligence (AI) has developed at an exponential rate. Artificially intelligent technologies are capable of carrying out a wide range of tasks by sorting through and interpreting enormous volumes of data from diverse sources (Bhadra *et al.*, 2023; Tzafestas, 2018). Healthcare, education, and marketing service providers worldwide, especially in developed economies, are aggressively implementing digital technologies like Artificial Intelligence (AI), Machine Learning (ML), big data analytics, smart sensors and robots, and the Internet of Things (IoT) in order to improve quality of life and operational efficiency (Dhanabalan and Sathish, 2018; Górriz *et al.*, 2020; Indrakumari *et al.*, 2020). Intelligent automation, natural language processing, machine learning, and other AI-based technologies present enormous opportunities for innovation in knowledge-intensive sectors (Rahul *et al.*, 2021). Machine intelligence is referred to as "Artificial Intelligence (AI)". It is presently used to study and mimic human behavior, having gained popularity in recent years. These devices can learn from their errors and carry out tasks that are comparable to those done by people. Our quality of life will be greatly impacted by AI as it develops, and AI-based models that have been trained on vast amounts of data are able to make wise decisions. The deployment of AI technology in many applications is the focus of the machine learning branch of AI. Continuous learning from fresh data is the aim of Machine Learning (ML), which aims to eliminate the need for explicit conversion when predicting or acting.

1.1. Background

These demonstrative instances have drawn significant resources to AI research and development, contributing to the remarkable advancements in AI and its applications in machine learning during the past 20 years (Sarker, 2022). The acquisition of fresh investments and interest in operational implant technologies has often been facilitated via supply chains. High-level data frameworks, such as those used in product distribution, online hosting, remote development, and intelligent sensors, are becoming important forces behind business progress. It is currently believed that supply networks and business cycles are inextricably intertwined, even across various businesses and geographical areas (Andreu-Perez *et al.*, 2018). AI applications in the business sector have increased work profitability by making it simple to comprehend and anticipate customer interests. This is made possible by advanced technology and robotization.

While the automotive sector and emerging companies spearheaded the introduction of AI, healthcare, and retail establishments, where AI may yield more profits, set prices that were often modest and restricted (Leone *et al.*, 2021). The application of AI has benefited some industries more than others, including the automobile, telecommunications, and healthcare sectors (Haase *et al.*, 2023). Similar to this, different sectors employ various AI applications. In less technologically advanced industries, there are evident adoption barriers that include both external (such as a lack of venture funding) and internal (such as cultural opposition, skill gaps, and financial concerns) obstacles. Most of the obstacles to digitization, particularly for medium-sized enterprises, are also present in the deployment of AI. It is anticipated that the use of these AI applications will benefit value chains, individual companies, as well as society and the economy in a number of ways. As a result, in this study, we look at the state of artificial intelligence-based technology applications and how they affect the marketing (retail), healthcare, and Military, Robotics sectors.

1.2. Motivation

Artificial Intelligence (AI) technology has advanced so quickly that it has completely changed several businesses and disciplines related to human interaction, employment, and living. Comprehending the present uses and constraints of artificial intelligence is crucial to its eventual takeover of a range of sectors, including big data, robotics, business, retail, healthcare/medical, and even the armed forces (Huang and Rust, 2021; Ramasamy *et al.*, 2022). Because of this, the goal of a holistic literature evaluation is to establish them, thereby pointing out potential areas of overlap and innovation opportunities by giving us a comprehensive grasp of how AI is influencing other domains. This review attempts to give researchers, practitioners, and policymakers an overview of trends around the adoption of AI as well as its advantages and disadvantages by synthesizing the corpus of available research.

1.3. Objectives

- To Identify and describe the various data science algorithms and artificial intelligence applications utilized in each sector.

- Evaluate each industry's potential gains and obstacles from deploying AI and data science.

- Ascertain the issues and topics that are prevalent in all sectors.

- Assess the state of data science and artificial intelligence research today and pinpoint areas that need more study.

- Offer advice to scholars and practitioners in each sector.

1.4. Scope

The focus of our work is on the latest advancements in the application of AI in five major fields: big data, robotics, healthcare, retail, and military applications. The first step in identifying patterns and common challenges encountered in research or application is to examine the intersections of AI and advanced data science algorithms, including machine learning, deep learning, Natural Language Processing (NLP), and computer vision. To achieve the targeting requirements, the professionals had to be knowledgeable about AI in terms of consulting, developing, using, or deploying artificial intelligence in the retail industry.

2. Methodology

2.1. Data Sources

This Systematic Literature Review (SLR) precisely follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria to methodically study the integration of AI-Powered Virtual Teaching Assistants in educational management. The objective is to guarantee a clear and well-organized evaluation procedure. The review, which was done using dependable sources like Google Scholar, IEEE Xplore, Scopus, and PubMed, covers all works published between 2018 and 2024. The abundance of AI-based material in these two ML groups led to their selection. Furthermore, the abundance of information accessible allows for the analysis of related ideas and usage trends of the term comprehensibility.

2.2. Search Strategy

A complete set of papers was included following an extensive selection process that adhered to the PRISMA principles for systematic examinations. PRISMA principles were adhered to, and a systematic and exhaustive search technique was employed. Predefined search phrases, such as AI in Retail, Unified Perspectives on AI, Robotics and AI, AI in Healthcare, Military Applications of AI, Advanced Data Science Algorithms were checked, such as IEEE Xplore, PubMed, Google Scholar, and Scopus.

2.3. Selection Criteria

In the process of information research, AI virtual teaching assistants. It also assists with Retail, Healthcare, Military, Robotics, and Big Data through Advanced Data Science. The first source of articles used was Google Scholar, followed by IEEE Xplore, Scopus, PubMed, and thousand seven hundred sixty and six fifty from Google Scholar. Following a comprehensive screening procedure that included identifying relevant papers and eliminating duplicates, one fifty articles were determined to be eligible for further assessment (Figure 1). The final selection of fifty (50) papers adhered to PRISMA principles, ensuring a comprehensive and uniform examination based on preset selection criteria.

2.4. Data Extraction

All works published between 2018 and 2024 are included in the review, which was conducted using credible sources such as Google Scholar, IEEE Xplore, Scopus, and PubMed. Their selection was prompted by the large number of AI in Retail, Unified Perspectives on AI, Robotics and AI, AI in Healthcare, Military Applications of AI, Advanced Data Science Algorithms. After the three thousand three hundred items are screened, twelve
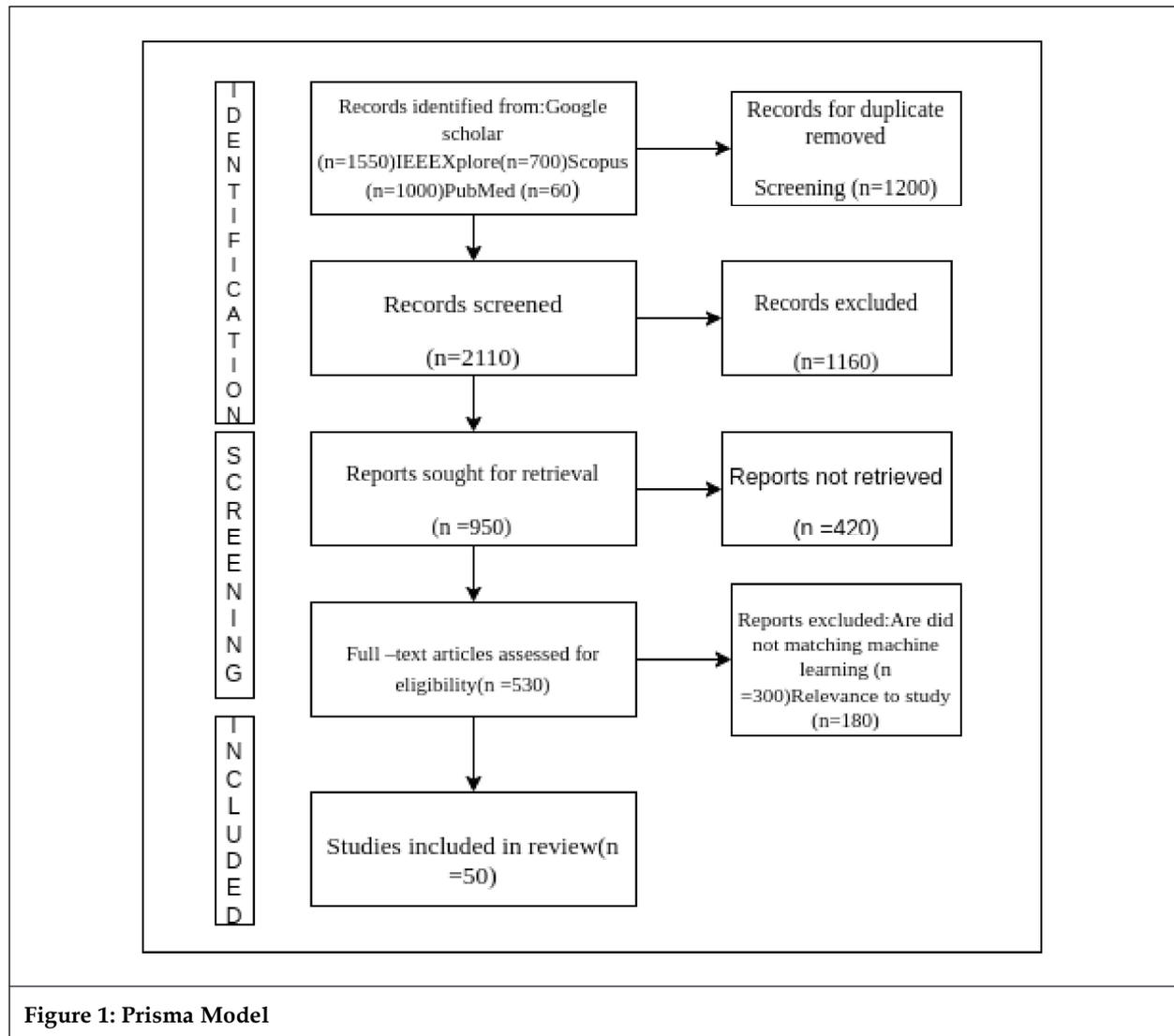
Figure 1: Prisma Model

hundred articles are eliminated for being duplicates. Consequently, just two thousand hundred ten articles underwent additional screening. Out of the ninety-fifty remaining items, eleven hundred and sixty are excluded, and a value of was not retrieved. For the final assessment, five hundred items in total were considered. The omitted did not correspond to study one eighty relevancy or Artificial Intelligence three hundred. The ultimate judgment is based on the fifty articles.

2.5. Synthesis Method

The choices about education are initiatives that are made using artificial intelligence-based methods such Natural Language Processing (NLP), Artificial Intelligence (AI) and machine learning. Online stores often employ them as training engines for algorithms in artificial intelligence-based systems. Researchers are reminded to keep using Retail, Healthcare, Military, Robotics, and Big Data through Advanced Data Science as AI develops, it Data Science Algorithms further transform education and play a significant role in determining how public learn in future generations.

3. Research Questions

3.1. What are the current applications of artificial intelligence (AI) and advanced data science algorithms in various industries (retail, healthcare, military, robotics, big data)?

Innovation and technology are valued more highly in businesses than productivity and efficiency. But businesses may keep a good balance between the two to boost the adoption of AI and Data Science programs. Applications of data science and artificial intelligence have produced standardized procedures that improve

the speed and effectiveness of commercial operations. Additionally, they have a strong hold on businesses' communication strategies, product development, market research, consumer loyalty, and processes for making decisions.

- Healthcare: Personalized medicine and predictive analytics for patient care.

- Finance: Risk management, automated trading, and fraud detection.

- Retail: Inventory control and analytics of consumer behavior.

- Transportation: Traffic control systems and self-driving cars

3.2. What are the benefits and challenges of implementing AI and data science in each industry?

- Artificial Intelligence (AI) may evaluate consumer data to make tailored recommendations and raise customer happiness.

- Adopting strict privacy policies is necessary for managing sensitive consumer data.

- AI uses massive dataset analysis to speed up the process of finding new medications.

- To prevent bias, AI judgments in healthcare must be open and equitable.

- AI can foresee equipment breakdowns before they happen, saving maintenance expenses and downtime.

- For smaller manufacturers, high initial expenses associated with AI integration may be a hurdle.

3.3. What are the implications of AI and data science for business, society, and individuals in each industry?

AI and data science improve decision-making, automate tedious jobs, and streamline operations. Predictive analytics has the potential to streamline supply chains, while artificial intelligence-powered customer support bots can enhance consumer interactions.

AI makes treatment programs more individualized, increases diagnostic accuracy, and forecasts illness outbreaks. Improved patient outcomes and more effective healthcare systems follow from this. With AI chatbots, data science improves consumer experience and aids in targeted marketing and inventory management.

4. Technologies and Methodologies

4.1. Overview of AI

Artificial Intelligence (AI) is a computer science technique that trains computers to understand and mimic human behavior and interactions. AI has produced a new intelligent computer that thinks, reacts, and works like that of humans based on the data that was made available. Artificial Intelligence can do intricate and specialized tasks like problem-solving, speech and image recognition, robotics, and natural language processing. Artificial Intelligence is a combination of many technologies that can do jobs that require intelligence from individuals. These technologies have human-like intelligence in their ability to learn, act, and perform when used in routine business processes. It saves us both energy and cash in business transactions by simulating human intelligence in technology.

The goal of Artificial Intelligence (AI) is to build intelligent machines that behave and think like people. It offers tremendous prospects to a variety of sectors (Bohara *et al.,* 2021; Bekbolatova *et al.,* 2024). The introduction of AI has either worried or fascinated every industry that has been discussed. Artificial Intelligence (AI) enables intelligent robots and devices to think and act like people. The "next step" in the industrial revolution is this technology. Most of the issues facing humanity now are seen to have answers in AI and ML.

AI may also help in the forecast of future issues. AI has the power to develop new ecosystems, industries, and technology. In a word, Artificial Intelligence (AI) is the machine simulation of human intelligence. Learning, reasoning, and above all the capacity for self-correction are some examples of this. AI can understand, analyze, and decide. It uses user data that already exists to forecast the market and anticipate user behavior (Yazici *et al.,* 2023). Organizations all over the world utilize it, also referred to as data forecasting, to fine-tune their sales and marketing strategies to boost sales. These days, ML is used in most AI marketing applications,

which range from personalized product recommendations to helping identify the most effective promotion channels, estimating attrition rate or consumer lifetime value and creating better customers.

In addition to the application of AI, marketers can comprehend their target audience and provide them with the optimal experience by using deeper consumer insights to categorize and move customers to the next stage of their journey. By closely analyzing customer data and understanding their true desires, marketers may boost return on investment without investing in futile endeavors. They can also save time by avoiding irritating customers with mind-numbing advertising. Numerous techniques exist for AI to personalize marketing (Yu and Zhou, 2021; Zeadally *et al.*, 2020; Iyer, 2021). AI is already being used by many businesses to personalize emails, videos, social media postings, websites, and other things to better meet client demands. Automating tasks that formerly required human intelligence is one of AI's main objectives. Significant efficiency gains are made possible by this reduction in the number of labor resources needed by an organization to complete a project or the amount of time a person must spend on daily tasks.

4.2. Advanced Data Science Algorithms

The key component of artificial intelligence is machine learning. For industrial applications, machine learning entails data collection, analysis, and prediction. Without explicit programming, machine learning learns from the data automatically and adapts its behavior accordingly. To assess and calculate the advantages of corporate objectives, data analysis is needed. Equations, models, and system functions are created using it. To assess the evaluation of data within an organization, data analytics requires the use of statistics, artificial intelligence, data mining, deep learning, prediction mechanisms, and other technologies. Along with analysis of data collection, diagnosis, manufacturing, and visualization for various uses, re-uses, filtering, binning, etc., statistical evaluation leads to focusing on the behavioral function of companies (Rasool *et al.*, 2023; Gupta and Kamath, 2023). Together, Machine Learning (ML) and Deep Learning (DL) offer methods for assessing the reusability of data and are appropriate for advanced analytics prediction and estimation. For training, the application leverages data produced by many sources. It is a method of doing a scientific investigation into an algorithm that is appropriate for creating and building a computer program that is adequate for data access. Machine learning algorithms, or MLAs, have applications in a variety of fields and businesses.

Supervised, semi-supervised, and unsupervised learning are all used in advanced machine learning. Machine learning is used in decision-making, modeling design form, identification of results analytics, and prediction for any large data analytics-based application. In a typical system, the program receives data and output, but in a machine learning concept, the program provides the data and output (Lee *et al.*, 2019). It falls into the supervised, unsupervised, and reinforcing mental learning categories. The task of supervised learning involves mapping input to output through learning functions. Prepare data, select an algorithm, and fit a predictive and learning model in supervised learning. Using the known target to forecast values in supervised learning (Tagde *et al.*, 2021).

Machine learning is appropriate for big data-driven applications, such those in the healthcare industry, where machine learning technologies can be used to enable fraud detection, health prediction, risk assessment of patient health, diagnostics, and alerts for both individuals and patients. In addition to these uses, it is beneficial for asset management, stock exchange, cybersecurity, marketing, supply chains and sales, among other areas (Longfei *et al.*, 2020). It produces results in the form of classification and regression techniques.

A few methods that are used in supervised learning are logistic regression, Supply Vector Machine (SVM), decision tree, K-nearest neighbors' polynomial regression, linear algorithm, Naïve Bayes algorithm, and soon. These are a few common supervised learning algorithms that also have business applications (Batth *et al.*, 2018; Almulihi *et al.*, 2022). Supervised learning is an effective way to learn how to save costs associated with medical treatment, diagnosis, and medical image identification for patients, including radiologists and pathologists (Schaffter *et al.*, 2020). The purpose of reinforcement learning is to create a mathematical structure that addresses the issue. Applications for reinforcement learning include robots, web system configuration, bidding and advertising, games, traffic light control, resource management in computer clusters, and much more. Before using the reinforcement learning method, there are several things to be aware of, such as the problem's nature, the simulated environment, the Markov Decision Process (MDP), and the method.

5. AI Applications in Various Domains

5.1. Enhancing through AI

AI is used in advertising techniques for a variety of industries, including retail, healthcare, banking, government, and entertainment. Various outcomes are obtained for each use case, such as improved advertising effectiveness, enhanced customer experience, or better execution of campaigns. Marketers are employing AI in automated marketing to tackle a range of issues. Programmatic platforms bid on real-time ad space relevant to target audiences using Machine Learning (ML). AI could also help reduce errors made in marketing procedures (Yuvaraj and Sri Preethaa, 2019; Al'Aref *et al.*, 2019; Woldaregay *et al.*, 2019; Purushotham *et al.*, 2018). AI can perform specialized tasks more effectively than humans as long as it has guidance and supervision.

AI has a far higher chance of producing a higher return on investment because it can significantly reduce costs, increase efficiency, and speed up the marketing campaign process. Using Machine Learning (ML), this technology can analyze tactical data faster than humans and make snap judgments depending on marketing and consumer situations. It gives team members more time to work on important initiatives, which can then be leveraged to inform marketing using AI. Instead of waiting until the conclusion of a campaign to make AI judgments, marketers can use real-time analytics to make more informed media decisions.

The initial phase in launching individualized marketing campaigns and generating significant customer interaction is to customize the services and content of a website or app using Srtificial Intelligence (AI). Machine Learning (ML) is a tool that AI chatbots use to continuously learn and advance. Users can experience something more realistic thanks to these, which are clever, versatile, and extensive. Because chatbots are great data collection tools that drastically reduce the need for human staff and other barriers, they are advantageous to businesses (Saleem *et al.*, 2019). To maintain competitiveness and quickly increase profitability, businesses utilize dynamic pricing modules to determine the best rates for their goods and services. Their ability to appropriately price their services, even for brief periods, is made possible by AI-controlled dynamic pricing modules. One of the most successful uses of AI in marketing is this one. AI is quite helpful in marketing when it comes to retargeting strategies. AI continuously tracks the purchasing patterns and behavior of prospects, applying machine learning and deep learning algorithms to identify trends.

5.2. Enhancing Retail through AI

The current managers benefit from forward-thinking intellectual advances that can both streamline their daily tasks and add a substantial dose of creativity and uniqueness to the managerial decision-making process (Massaro *et al.*, 2021; Chen and Gunawan, 2023). AI holds a unique position among these innovative techniques. Business procedures in the field of commerce are designed to improve the customer orientation of businesses by building a responsive system for tracking customer requirements and demands, developing personalized connections with purchasers, and offering multichannel, high-quality retail services to different consumer target audiences. These duties can only be managed and completed successfully in the current environment with the aid of digital and information technology.

AI is being used extensively in retail, particularly in business processes that call for innovative and non-traditional solutions, such as employee performance review procedures. Neural networks are currently capable of performing a large number of tasks that are performed by the departments of marketing, advertising, and public relations (Rathod and Kumar, 2021). These tasks include developing digital marketing solutions, improving marketing campaigns, producing engaging content, producing marketing creatives, developing contextual advertising, and more. It is interesting to note that very few businesses still do not use AI. This validates the current retail landscape's inclination toward innovative and progressive technologies.

AI systems are designed to improve retail business processes, gather and process enormous amounts of complex data, automate business tasks, manage remote processes, analyze purchasing behavior in-depth, visualize data, forecast consumer demand, ensure the security of retail services, and offer technical assistance to personnel managers to boost productivity and operational efficiency, guarantee the availability and safety of retail services, activate and stimulate consumer demand, raise average transaction amounts, boost sales volume and profitability, and help customers discover new experiences while shopping.

5.3. Enhancing Healthcare through AI

Drug manufacturers can expedite the drug discovery process thanks to Artificial Intelligence (AI) technologies. Conversely, it streamlines the process of target recognition via automation. Moreover, AI in Healthcare 2021 helps with drug repurpose by evaluating off-target chemicals. AI drug discovery, therefore, simplifies procedures and minimizes repetitious effort in the AI and healthcare industries.

The top biopharmaceutical companies have found several therapies that are currently accessible. To assist in the search for immuno-oncology medicines, Pfizer is using IBM Watson, a machine learning-based platform. A GNS Healthcare artificial intelligence system in Cambridge, Massachusetts, is being used by Roche subsidiary Genentech to help with its search for cancer treatments, while Sanofi has committed to using Exscientia's Artificial Intelligence (AI) platform to find drugs for metabolic diseases (Kang *et al.*, 2022).

There are similar internal initiatives or partnerships at all of the large biopharmaceutical companies. AI and machine learning will usher in a new era of drug development that is quicker, less expensive, and more efficient, if advocates of these tactics are right. While some people are dubious, many specialists think these tools will become increasingly important in the future. This change presents opportunities as well as challenges for scientists, especially when the methods are combined with automation.

There are medical robots that help patients in addition to human staff. Paralyzed patients can be helped with exoskeleton robots, for instance, to walk again and gain independence. The use of technology is also demonstrated via smart prostheses. In addition to having the option of being covered in prosthetic skin and being connected to the user's muscles, these bionic limbs are equipped with sensors that make them more accurate and responsive than real body parts (Mogarala *et al.*, 2024; Nasseri *et al.*, 2023). Physiotherapy and surgery can be aided by robots. To assist patients in recovering from conditions that result in lower limb disorders, such as damage to the spinal cord and strokes, Cyberdyne has developed the Hybrid Assistive Limb exoskeleton. The device uses sensors applied to the skin to effectively detect electrical energy in the patient's physique and communicate with movement at the joint.

Today's healthcare consumers are more active in their own medical treatment than ever before, thanks to advancements like genome sequencing and the ability to create a personalized health status using information from our fitness and activity monitors. Our health or medical status is being more accurately predicted by compiling and connecting this massive amount of data. Individualized medical therapies could be made
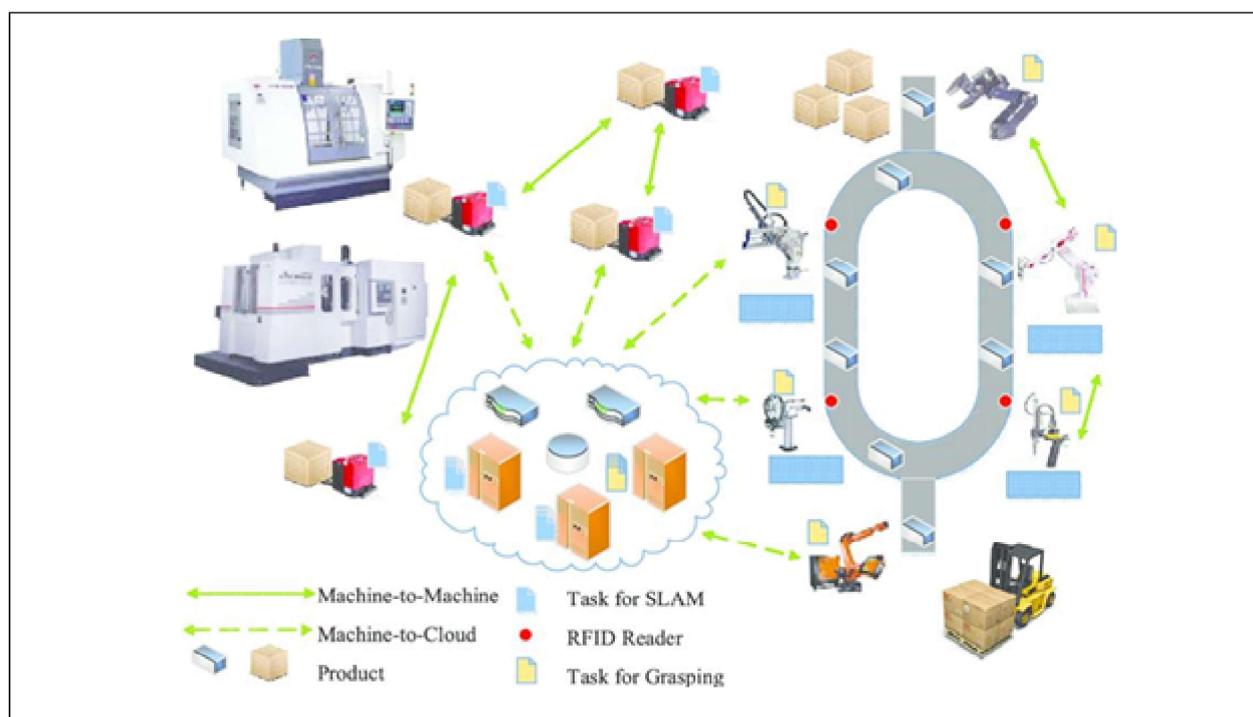

Figure 2: Cloud Robotics

possible by data-driven medicine, which also has the potential to increase the accuracy and speed of genetic illness identification.

A portion of the computing power of cloud robotic systems can be used locally to provide low-latency responses in the event of a network failure. The purpose of cloud robotics is to serve as a bridge between networked and preprogrammed robotics (Figure 2).

5.4. Enhancing Military through AI

A lot of the conception of Artificial Intelligence (AI) approximately seventy years ago, technology has gone through three phases of evolution. During the initial phase, the solutions commonly referred to as expert systems concentrated on rules-based techniques such as fuzzy, Boolean, and decision trees. Developers of artificial intelligence concentrated on creating and using statistical techniques in the second stage, which gave rise to the idea and practice of machine learning. They have been effective in developing remedies like internet search engines and email spam filters. The use of resembling learning techniques, such as neural networks, defined the idea and technique of deep learning during the third stage of expansion, which is currently underway. Deep learning has shown success in sensing and understanding (Vrontis *et al.*, 2023).

Primarily, Artificial Intelligence (AI) solutions will be clever, utilizing the integration of AI knowledge-focused analytical skills. Subsequently, the AI solutions will be integrated to leverage the network of both virtual and physical domains, encompassing sensors, companies, individuals, and autonomous agents. Additionally, the solutions will leverage the data integrity benefit of blockchain technology. They will be dispersed to make use of widely dispersed, decentralized big data networks, storage, and processing. Finally, to enable new disruptive impacts, they will digitally integrate the information, physical, and human domains.

Artificial Intelligence (AI) currently has a significant impact on nuclear arsenals, cyber and data warfare, nanomaterials and technological advances, aerospace, and aviation. It is anticipated that these effects will have an impact on global world order comparable to that which the development of nuclear weapons produced. It is anticipated that the AI systems would also trigger an AI arms race amongst adversaries.

5.5. Enhancing Robotics through AI

One of the most well-known subfields of human robotics is assistive robotics. Robots can offer the chance for rehabilitation and interaction for those with mental and physical disabilities. Many of them react quite well to mechanical gadgets yet are unable to react substantially to social cues. Robots offer a potential therapeutic role in which a mechanical instrument is used to enhance social exchanges. Additionally, robots are being investigated for other fields where children can benefit, such as children who have suffered trauma, for instance. The communal. The human-robot interaction dimension is not always required not just in supportive duties but in numerous other areas as well as areas in which the close connection occurs (Sun *et al.*, 2021; Siontis *et al.*, 2021).

The robot embodiment offers special opportunities that are not achievable with other forms of technology for people with physical impairments. For instance, scientists are developing the design of robots that deliver and support physical rehabilitation. To assist restore both flexibility and strength, the prescribed force and movement trajectories are provided. Additional research on identifying the motivated state and modifying the therapeutic approach to optimize the advantages is showcased. When a person needs a wheelchair, intelligent wheelchairs are the kind of robots that employ external sensors to enable course planning and avoidance of accidents.

Together with the human worker, the mobile robot precisely aligns itself with the workpiece. Food and medication delivery to patients can be done by mobile robots. Furthermore, the robot can take the patients' temperatures. This would reduce the likelihood of infection by limiting the direct contact between the patients, medical personnel, and other people (Siontis *et al.*, 2021). Additionally, the robot may assist people with wall and floor washing and sweeping. This lessens the likelihood of a viral infection.

To attain exceptionally effective human-robot collaboration for every application covered above, a safety mechanism needs to be identified and integrated into the robotic system. Adapted controllers should also

consider changes in the environment and the aim of human collaborators. Thus, this may result in robots that are kind to humans.

5.6. Enhancing Big Data through AI

In modern times, most businesses, regardless of industry, gather, store, and analyze data to extract value, since the increasing generation of available data is a recognized trend across businesses, nations, and market sectors. A more service-oriented economy has transformed every industry area, including manufacturing and agriculture, thanks to the widespread use of the Internet and digital services. Big data analytics are used in a wide range of industries, including e-commerce, politics, science and technology, health, and government services. Data-driven businesses from a range of sectors demonstrate the value of big data by producing predictions that are more accurate and help them make better decisions (Sarwar *et al.*, 2019; Zhang *et al.*, 2021).

Organizations can better understand their environment and identify emerging trends, develop fresh, creative products and services, react swiftly to changes, and maximize their marketing efforts when they learn to leverage big data and real-time information from multiple sources, such as sensors and connected devices.

Big data can be used to improve efficiency in the allocation and supervision of resources, reduce waste, enable new insights, and increase transparency across several business divisions, including production and sales (Mahirunnisa *et al.*, 2024).

As consequence, there are applications for Big Data Analytics (BDA) in every industry. There are applications in the fields of science and technology, smart health and well-being, politics, e-government, security, and safety (Tuli *et al.*, 2020; Shinde *et al.*, 2024; Penuelas and Sardans, 2023). Furthermore, businesses and industry sectors are using big data for a wide range of purposes. BDA helps businesses analyze customer behavior to create a 360-degree customer profile for the purpose of implementing targeted and optimized marketing campaigns that will influence customer acquisition and satisfaction. It can be used in e-commerce and marketing applications like online advertising and cross-selling. It provides a deeper comprehension of consumers' inclinations and behavior, enhancing customer support.

6. Performance Evaluation

6.1. Comparative Analysis

The most popular sectors for data science applications include Retail, Healthcare, Military, Robotics, and Big Data. It is utilized in the healthcare industry to locate medication, individualized care, and drug discovery,
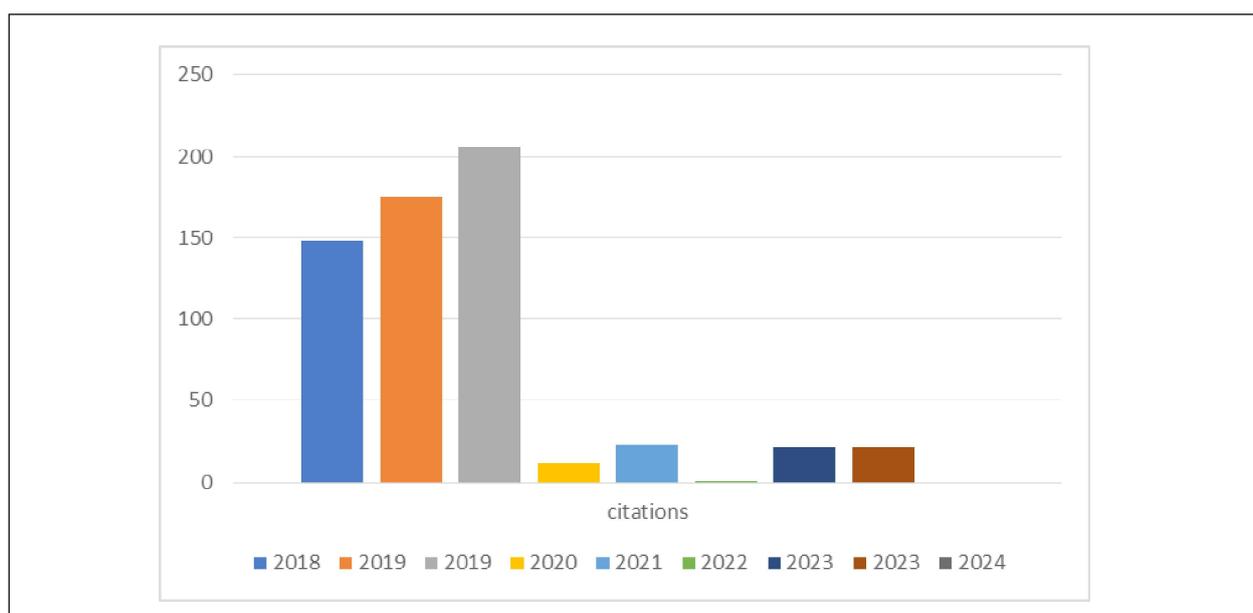

Figure 3: Number of Publications on AI in Retail, Healthcare, Military, Robotics, and Big Data through Advanced Data Science Algorithms

among other things. While product recommendations and customer service enhancements are more appropriate in the retail sector, fraud detection and accountholder focus are more appropriate in the banking sector. Machine learning is being used in the fields of medicine and healthcare for a variety of purposes, including the identification of diseases, individualized treatment plans, medication development, clinical research, radiography and radiotherapy, smart electronic health records, and the prediction of epidemic outbreaks. Artificial Intelligence (AI) is utilized in the healthcare industry for a variety of objectives, such as patient advocacy organizations, social interests, data applications, practices, and security. The reviewers concentrated on machine learning techniques for information extraction, picture analysis, data analysis, forecasts, etc. (Table 1 and Figure 3).

Table 1: Number of Publications on AI in Retail, Healthcare, Military, Robotics, and Big Data through Advanced Data Science Algorithms

Title	Authors	Source Title	Year	Citations
Transforming Indian industries through artificial intelligence and robotics in industry 4.0	Dhanabalan and Sathish	*International Journal of Mechanical Engineering and Technology*	2018	148
Diabetes prediction in healthcare systems using machine learning algorithms on Hadoop cluster	Yuvaraj and Sri Preethaa	*Cluster Computing*	2019	175
Predictive maintenance of machine tool systems using artificial intelligence techniques applied to machine condition data.	Lee, Wu, Yun, Kim, Jun, and Sutherland	*Procedia Cirp*	2019	206
The growing role of integrated and insightful big and real-time data analytics platforms.	Indrakumari, Poongodi, Suresh and Balamurugan	*In Advances in Computers*	2020	11
Augmented data and xgboost improvement for sales forecasting in the large-scale retail sector.	Massaro, Panarese, Giannone, and Galiano	*Applied Sciences*	2021	23
Data-driven Value-enhancing Strategies: How to Increase Firm Value Using Data Science.	Kang, Jang and Choi	*Applied Sciences*	2022	1
Cognitive IoT Meets Robotic Process Automation: The Unique Convergence Revolutionizing Digital Transformation in the Industry 4.0 Era	Bhadra, Chakraborty, and Saha	*In Confluence of Artificial Intelligence and Robotic Process Automation*	2023	21
Enhancing health and public health through machine learning: decision support for smarter choices	Rodrigues, Madeiro, and Marques	*Bioengineering,*	2023	21
Enhancing eye health through CNN-based glaucoma classification	Mahirunnisa, Chandrika and Phanindra	*Journal of Nonlinear Analysis and Optimization,*	2024	-

7. Discussion

7.1. Policy Implications and Future Research Directions

Big data and analytics have completely changed the retail sector by allowing businesses to acquire new

perspectives, streamline processes, and provide outstanding customer service. Retailers may boost consumer happiness, increase profitability, and maintain their competitiveness by utilizing big data and analytics in areas like supply chain management, marketing and sales, customer experience, and operational efficiency. To completely utilize the potential of big data and analytics in retailing, merchants must address obstacles, make investments in analytics capabilities, and adjust to changing technology. Big data usage as it has been addressed is only the tip of the iceberg (Quazi, 2022; Dogum *et al.*, 2022). The health sector continues to be a top supplier of data-driven solutions for a better life and specialized services to its clients thanks to the growth of data science and the emergence of numerous data-driven apps. With access to a wide range of healthcare sector data, including financial, clinical, administrative, and operational details, data scientists can obtain valuable insights into enhancing the productivity of drug and medical services.

8. Limitations

The pandemic brought attention to the lack of digital skills in the retail industry, which prompted some shops to make investments in retraining their present employees. For instance, the clothing company Levi's makes investments to train data scientists to reskill existing staff members. In a retail organization, the success of AI applications is dependent on skilled resources. This study makes clear that there is a skills and capabilities gap in the retail industry, and it would be beneficial to identify the talents needed to use AI in this setting. Subsequent studies may concentrate on comprehending the competencies needed by retail staff to collaborate with AI automation. This will help facilitate an investigation of the skills gap and offer training to close it.

9. Conclusion

The applications of AI and ML have advanced to previously unheard-of levels in the past 20 years. Automation and robots have improved thanks to Artificial Intelligence (AI), which has a big impact on many different areas of business, especially in Retail, Healthcare, Military, Robotics, and Big Data. Along with these social and industrial domains, Artificial Intelligence (AI) also affects smart urban planning, transportation, and maintenance, as well as rational design, Retail, Healthcare, Military, Robotics, and Big Data services. This study provided an analysis of the potential uses, risks, and prospects of artificial intelligence (Chowdhury *et al.*, 2021). Furthermore, covered in the paper are the applications of AI-enabled technology in the fields of healthcare, Military, Robotics, and retail (marketing), as well as the risks and opportunities associated with these applications.

Similar to medical care, marketing, education, criminal equality, housing, and banking, a facility's ingenuity, mechanical technology, and computing efficiency seem to be beyond the capacity to integrate such items as computer hardware, vehicles, and consumer electronics. These developments will keep providing a wide range of enticing and open environments for both customers and organizations, including longer lead times, higher quality, more customization, and increased efficiency. However, life presents challenges that must be faced. The division of labor by human instructors, the growth of robotic and human safety simultaneously, the creation of a framework to guarantee robotic systems, and the advancement of artificial insemination technologies to foster confidence are just a few of these challenges.

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