Advances in Engineering Innovation (2024) Volume 10 EWA Publishing
Published online: 31 August 2024 DOI: 10.54254/2977-3903/10/2024103

# The impact of artificial intelligence technology on various industries

***Jinxuan Wang***

Hefei No. 168 High School, No. 179, Shixin Road, Hefei Economic Development Zone, Hefei City, China

18855116680@ 163.com

**Abstract.** This paper provides an overview of AI and ChatGPT, covering their definitions, the evolution of AI, ethical concerns surrounding their interaction with humans, and their extensive applications in everyday life. The advantages and disadvantages of AI and ChatGPT are examined. Furthermore, the essay delves into the technical aspects by explaining the algorithm and presenting a graph illustrating the functioning of ChatGPT. A historical background of ChatGPT is also included. The paper specifically focuses on the impact of AI in four industries: education, finance, healthcare, and computing. It explores their applications within these sectors and makes predictions regarding the future implications of AI on human life and work. In medical industry, AI can help human a lot in new drug research, medical imaging, medical services innovation and patient health management. In education realm, the application of AI can help people on intelligence process support, intelligence teacher assistant intelligence education and management, and intelligence environment building. Also, the application of AI in finance realm has many benefits in bank, insurance, capital markets business and financial support industry. What is more, the application of it in computer industry helps human on network security, systematic reviews and data analysis.

**Keywords:** artificial intelligence, AI technology, ChatGPT

## 1. Introduction

Nowadays, with the rapid advancement of technology worldwide, countries like America and Japan have made significant strides in the field of Artificial Intelligence (AI). AI has proven to be highly beneficial, enabling people to accomplish various tasks more efficiently. One notable AI innovation is ChatGPT, a chatbot developed by OpenAI. ChatGPT gained attention upon its release as a prototype on November 30, 2022, owing to its ability to provide comprehensive responses and accurate answers to user prompts (Zarifhonarvar, 2023).

However, concerns have arisen regarding the impact of AI on employment, as it possesses the potential to replace human labor with cost-effective alternatives. It is essential to exercise caution concerning the unintended consequences of AI. The introduction of ChatGPT, in particular, has sparked widespread apprehension about incorporating AI into everyday human life. In a comprehensive analysis of the drawbacks of artificial intelligence.

However, there is a lack of research specifically discussing the impact of AI on various occupations and industries. Therefore, this essay aims to examine the effects of AI on different sectors, such as education, healthcare, finance, and computing industries.

## 2. Literature review

The literature review provides an overview of AI, including its definition and development. It discusses the disputes and research programs related to AI, as well as focuses on the details of ChatGPT, its definition, development, advantages, disadvantages, and algorithm.

 

## 2.1. Basic concepts

### *2.1.1. Artificial Intelligence*

#### *2.1.1.1. Definition*

Artificial intelligence refers to the intelligence exhibited by machines in perceiving, synthesizing, and inferring information, distinct from the intelligence displayed by humans or other animals. The term "intelligence" encompasses the capacity to learn, reason, generalize, and infer meaning [23].

#### *2.1.1.2. Development*

The development of AI traces back to ancient times, starting with the philosophers and mathematicians. The study of mathematical logic led to Alan Turing's theory of computation, which proposed that a machine could simulate mathematical deduction by manipulating symbols such as "0" and "1." This insight, known as the Church- Turing thesis, established that digital computers have the ability to simulate any form of reasoning process (Berlinski, 2000). Meanwhile, advancements in neurobiology, information theory, and cybernetics prompted researchers to explore the possibility of creating electronic brains [17]. The foundational work in AI is often attributed to McCullouch and Pitts, who formalized the design of Turing- complete "artificial neurons" in 1943 [19].

The concept of artificial intelligence was officially proposed by John McCarthy and other scientists at the Dartmouth Conference in 1956, marking a significant milestone in AI history, which was 61 years ago. Since then, AI has evolved into a multidisciplinary field that encompasses computer science, control science, life science, mathematics, philosophy, cognitive science, and other disciplines, revealing promising prospects for development [3]. During the 1960s and 1970s, researchers believed that the symbolic approach could lead to the achievement of artificial general intelligence, which became the primary objective of their endeavors (Newquist, 1994). Herbert Simon even predicted, "In the next twenty years, machines will be capable of doing everything humans can do" [20]. Marvin Minsky shared this view, asserting that "the problems we face will be solved" (Minsky, 1967).

In the late 1990s and early 21st century, AI experienced a resurgence. Focusing on more narrowly defined tasks allowed researchers to generate measurable results, develop new methodologies, and foster collaborations with other fields [19]. Between 2015 and 2019, AI research volume increased by 50% (UNESCO, 2021). Advancements in computer processing speeds and access to vast amounts of data propelled the progress of machine learning and deep learning, which are data-intensive methods that began to dominate accuracy benchmarks around 2012 [2]. The year 2015 marked a significant turning point for AI, as the number of AI-based software projects at Google surged from sporadic use in 2012 to over 2,700 projects. This growth was attributed to improved cloud computing infrastructure, enhanced research tools, and the availability of datasets, making neural networks more accessible and affordable [4].

#### *2.1.1.3. Dispute*

There are some problems with AI. The first thing is application risks caused by algorithmic security. Artificial intelligence technology with deep learning as the core has fragile and vulnerable flaws, making it difficult to trust the reliability of artificial intelligence systems [7]. For example, algorithms may have bugs, deep learning results may be unsatisfactory, and AI may give wrong answers. The black-box model leads to opaque algorithms, and deep learning has high complexity and uncertainty, which makes it easy to introduce uncertainty risks. The further integration of AI with traditional industries is hindered by the inability to intuitively understand the reasons behind the decision-making.

Data discrimination leads to intelligent decision-making bias. The results produced by AI algorithms are influenced by the training data, so if there is bias discrimination in the training data, the algorithm will also be affected by the discrimination data. It further solidifies the bias discrimination in the data, resulting in a bias in intelligent decision-making generated by artificial intelligence algorithms [13].

Complex system decision-making makes it difficult to define the subject of the responsible accident, and the automatic decision-making of the artificial intelligence system is affected by many factors, making it difficult to define the responsible entity, safety accidents are frequent for applications such as automatic driving and robots.

There are also some people worried that AI may hurt, or even kill people and replace humans. But the others believe they are very useful and can help humans. Also, there is a problem with whether AI will cause unemployment or not. All in all, the fact is AI has developed the world economy and helped humans do many things these years. In addition, AI also creates some jobs for humans.

*2.1.1.4. Research programme*

This research paper provides some information about computer vision, natural language processing, and machine learning. Computer vision involves the use of cameras and computers to identify, track, and measure targets and other visual data. It encompasses image processing techniques that transform images into a format suitable for human observation or for detection using instruments (Huang, 2011). Natural language processing revolves around human-machine communication using natural language. It deals with how to process and utilize natural language, while natural language understanding aims to enable computers to comprehend human language. Natural language generation involves transforming computer data into natural language, while natural language systems convert natural language into a format easier for computer programs to process. Machine learning aims to enable machines to acquire knowledge from user input and data, allowing them to automatically make judgments and produce corresponding results. This approach helps solve problems and reduce errors, ultimately improving problem-solving efficiency. Machine learning has been essential to the field of artificial intelligence from its inception. There are various methods of machine learning, categorized mainly into supervised learning and unsupervised learning. Supervised learning involves training machines using labeled samples, allowing them to extract common properties or train classifiers. When presented with new samples, the trained model can determine their class based on the extracted attributes or classifiers. [19]

*2.1.2. ChatGPT*

Nowadays, ChatGPT has emerged as a prominent and widely recognized form of AI, gaining substantial popularity worldwide. Understanding this type of AI is essential, as it has both advantages and limitations worth discussing.

*2.1.2.1. Definition*

ChatGPT is an artificial intelligence chatbot developed by OpenAI. It was released on November 30, 2022, and offers users the ability to shape and guide conversations according to their desired length, format, style, level of detail, and language. Each interaction with ChatGPT is considered as a context, with successive prompts and answers building upon the ongoing conversation. While ChatGPT covers a wide range of knowledge domains [16], it has been observed to occasionally provide confidently inaccurate information [22].

*2.1.2.2. Development*

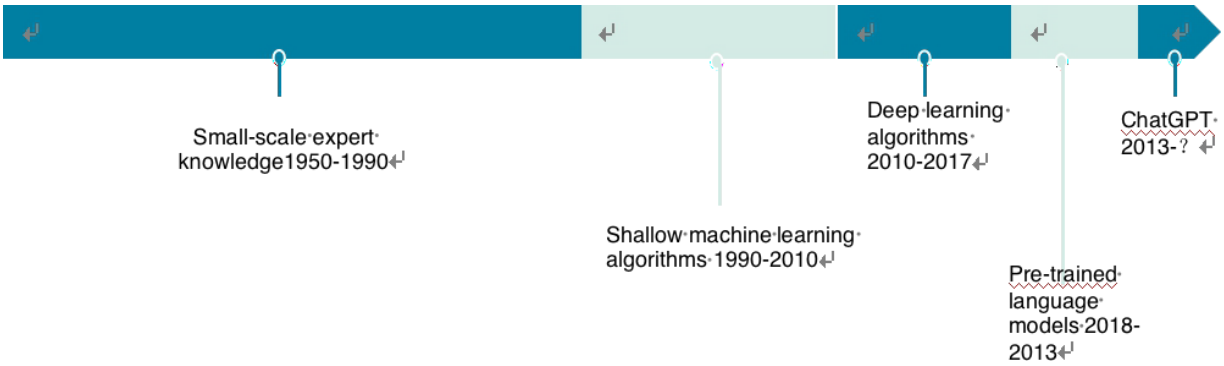


**Figure 1.** The development of the natural language processing research paradigm (Research reports,2023)

In 2018, GPT-1 was introduced and showcased decent generalization capabilities in NLP tasks unrelated to supervised learning. It demonstrated proficiency in tasks such as natural language reasoning, determining the relationship between two sentences (containment, contradiction, neutrality), Q&A, and common-sense reasoning. It could identify semantics, classify the relationship between sentence pairs, and determine the category of input text (HIT-NLP, 2023).

GPT-2, released in 2019, did not bring substantial structural innovations or design changes to the original network. Instead, it featured larger network parameters and datasets. Its learning target involved unsupervised pre-training models for supervised tasks. GPT-2 displayed remarkable talent in language generation tasks, such as reading abstracts, engaging in conversations, continuing text, storytelling, and even generating fake news, phishing emails, or role-playing scenarios online. It achieved state-of-the-art performance on various language modeling tasks at that time (HIT- NLP, 2023).

GPT-3, a commercially and extensively applicable unsupervised model, raised the bar further. It demonstrated exceptional performance in many natural language processing tasks. GPT-3 surpassed the current state-of-the-art in French-English and German-English machine translations and generated articles that could hardly be distinguished from human-written ones.

Surprisingly, it achieved almost 100% accuracy on two-digit addition and subtraction tasks and even showed the capability to automatically generate code based on task descriptions (HIT-NLP, 2023).

*2.1.2.3. Advantages and disadvantages*

ChatGPT leverages a human trainer to enhance its performance. In supervised learning cases, the trainer assumes the roles of both the user and the AI, sequencing responses to guide the model's performance in ongoing conversations. These rankings are then used to create "reward models" fine-tuned through several iterations of Proximal Policy Optimization (PPO) strategies [22].

ChatGPT has gained popularity due to its comprehensive capabilities, accurate answers, fluent generation, and engaging interactions. It exhibits powerful overall performance, offering advantages over various products and paradigms from the following perspectives.

Firstly, compared to regular chatbots, ChatGPT delivers more accurate and fluent responses, performs detailed reasoning, and handles a broader range of tasks. This is attributed to three key aspects. Firstly, the strong foundation of ChatGPT's large-scale models, leveraging pre-training on billions of parameters and extensive knowledge.

Secondly, the thinking process and problem-solving abilities honed through code- based training, allowing for step-by-step reasoning. Lastly, the utilization of zero- shot capabilities through fine-tuning with diverse instructions, greatly enhancing its generalization and versatility [6].

Secondly, compared to other large-scale language models, ChatGPT benefits from its instruction fine-tuning process with a focus on multi-round dialogue data. This enables it to model dialogue history and engage in continuous interactions with users. Addressing the bias inherent in real-world language data, ChatGPT incorporates reinforcement learning based on human feedback during the fine-tuning stage, resulting in outputs that align more closely with human expectations and reducing security and bias concerns to some extent [6].

Thirdly, compared to fine-tuning smaller models, ChatGPT's extensive instruction- based generalization drives superior performance in zero-shot and few-shot scenarios, allowing it to handle unseen tasks. Additionally, its characteristics as a large-scale language model make it particularly suitable for creative tasks [6].

Despite its impressive capabilities, ChatGPT still has some limitations attributed to the nature of large-scale language models, data-related factors, and annotation strategies.

Firstly, the limitations inherent in large-scale language models include concerns regarding credibility, timeliness, high costs, and domain-specific performance. Each sampling of responses from the language model can yield slightly different results, and it can be sensitive to input variations, sometimes providing incorrect answers for specific instructions. These stability concerns are being addressed, but they have not reached optimal levels yet (HIT-NLP, 2023).

Secondly, limitations stemming from data-related factors include the risk of biased data generating harmful content. Additionally, the long-term extensive use of ChatGPT carries the potential of data leakage (HIT-NLP, 2023).

Lastly, annotation strategies present a limitation. During training, ChatGPT leverages reinforcement learning with human feedback to align its outputs with human expectations. However, this can introduce biases as the feedback is subject to the preferences and perspectives of the annotators. Furthermore, annotators tend to favor longer answers for comprehensive responses, which can sometimes lead to verbose outputs (HIT-NLP, 2023).

*2.1.2.4. Algorithm*

The algorithm of ChatGPT involves several steps to improve its performance. In step 1, developers collect demonstration data and train a supervised policy. This policy is initially prompted with a sampled prompt from the dataset, and the desired behavior is demonstrated by a labeler. This data is then used to enhance GPT-3.5. In step 2, models and prompts are sampled, and the outputs are ranked from best to worst by the labeler. The data collected in this step is used to train a reward model. Step 3 involves optimizing the reward model using the Proximal Policy Optimization (PPO) reinforcement learning algorithm. A new prompt is sampled from the dataset, and the PPO model is initialized from the supervised policy. The policy generates outputs, and the reward for each output is calculated by the reward model. The reward is then used to update the policy through PPO [14].

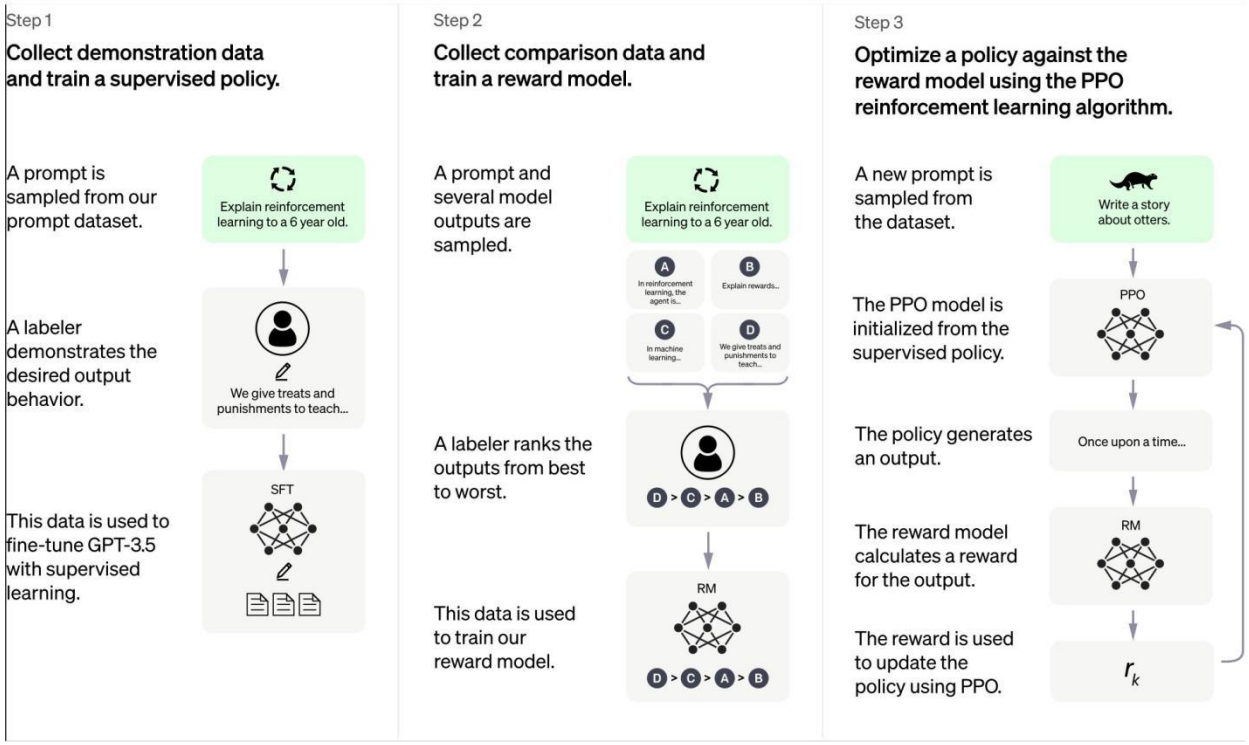


**Figure 2.** The algorithm of ChatGPT-3.[21]

In terms of the impact of AI and ChatGPT on different occupations, there is a significant potential that AI can revolutionize various industries, such as education, healthcare, finance, and computing. In education, AI can personalize learning experiences, provide intelligent tutoring, and automate administrative tasks. In healthcare, AI can assist in diagnosis, drug discovery, and remote patient monitoring. In finance, AI can improve fraud detection, risk assessment, and customer service. In computing, AI can optimize system performance, automate tasks, and enhance cybersecurity [7] [13].

While Douglas [6] discusses the advantages of AI in a professional manner, the paper does not delve into how AI can specifically benefit human life, study, and work. Similarly, Winston, P. H. [23] and Huang (2011) explain the workings of AI and emphasize its fast-paced development but lack explicit details on the applications and significance of AI in different occupations. On the other hand, Vincent & James [22] elaborate on the development and impact of ChatGPT, providing historical context and showcasing its application. However, the paper does not specifically address how ChatGPT can assist humans in various professions. Also, many references in the literature review lack in-depth analysis and comparison of these industries.

## 3. Discussion

In this part, the impact of AI will be analyzed in depth, and four industries will be selected for the case study. The four parts are the social pillar industry which are medical, education, finance, and computing.

### 3.1. Application of AI in the medical realm

Given the ever-increasing demand for medical care, leveraging AI to address these challenges has emerged as a promising solution. In this section, we will examine the profound impact of AI in the medical industry, specifically focusing on new drug research and medical imaging.

#### *3.1.1. New drug research*

A. One significant area where AI can play a pivotal role is in new drug research and development. Traditional methods involve laborious cross-screening of known drugs against multiple potential target molecules within the human body, followed by the manual identification of effective points of drug action. However, this approach is time-consuming and may overlook hidden relationships between target molecules and drug actions. Additionally, as the number of compounds

increases, so does the associated cost and risk. Hence, it becomes imperative to employ AI for automated drug and target screening, thereby improving screening efficiency.

B. Furthermore, AI can continuously gather real-time, up-to-date information from external sources to optimize and refine the screening process. Throughout the drug research and development lifecycle, AI can leverage image recognition and machine learning techniques to become well-versed in the discovery, preclinical research, clinical trials, and regulatory and marketing processes. For instance, in the initial stage of drug discovery, AI can efficiently identify potential targets, streamlining the compound synthesis process. In preclinical research, AI can facilitate virtual drug screening, reducing the number of screened drug molecules while predicting their activity. This, in turn, enables more targeted and informed decision-making, ultimately leading to the development of rational and effective therapeutic agents.

#### *3.1.2. Medical imaging*

The application of AI in medical imaging represents a particularly mature field within the healthcare industry. Given the scarcity of medical imaging experts and the increasing demand for optimized clinical application, AI technology offers diverse solutions.

A. Primarily, AI excels in focus recognition and information annotation tasks. Leveraging deep learning techniques, AI can accurately segment medical images, perform complex feature extraction, and enable quantitative comparative analysis. This capability assists doctors in disease identification and precise localization, thereby enhancing diagnostic efficiency.

B. Furthermore, AI can automate the delineation of target areas and facilitate adaptive radiotherapy during tumor treatment. By processing radiation images of tumors, AI significantly reduces the time required for computed tomography processing.

C. Lastly, in the context of tumor radiation therapy, AI leverages intelligent radiation therapy technology to continuously identify the disease's location and monitor its spatial changes. By enabling three-dimensional reconstruction of CT images and solving image registration challenges, AI improves computational efficiency, thereby augmenting overall treatment efficacy.

#### *3.1.3. Medical service innovation*

Another noteworthy area where AI finds application is medical service innovation. For instance, in the pre-diagnosis phase, AI can be employed in prevention, screening, and triage departments. Initially, AI analyzes patient-related data collected through terminal and wearable devices, providing valuable insights into the patient's physical condition. Subsequently, AI employs machine learning algorithms to analyze the patient's health data, issue disease warnings, and incorporate patient feedback to better understand the relationship between their physical fitness and disease progression. This proactive assessment of health status and disease characterization helps patients make informed decisions. Moreover, AI facilitates disease screening, including medical imaging and genetic screening, by leveraging vast datasets to establish correlations between test results and existing medical knowledge, thereby enhancing diagnostic accuracy and treatment effectiveness. Additionally, AI serves as a virtual medical assistant, utilizing technologies such as face recognition, voice recognition, and scene recognition to analyze patients' conditions and determine their diagnostic and treatment requirements. This integration of AI technologies improves pre-diagnosis efficiency and streamlines triage processes.

#### *3.1.4. Patient health management*

AI also plays a pivotal role in patient health management, particularly for chronic disease management. With the rising standards of living and the increasing prevalence of chronic conditions requiring long-term treatment, AI becomes instrumental in helping patients monitor their health and manage their conditions. Through technological advancements, AI can enable remote monitoring of patient health, ensuring timely intervention and support. This proves especially beneficial for patients with limited self-control, as AI facilitates targeted monitoring, contributing to enhanced patient health outcomes (Huang, Zhou, & Han, 2021).

### 3.2. Application of AI in the education realm

In recent years, China has witnessed a steady increase in disposable income per capita, resulting in improved living standards and a growing demand for education.

Expenditure on education, culture, and entertainment has also shown a consistent rise. However, the education industry continues to grapple with the issue of teacher distribution disparities, hindering access to quality education for many families. In this context, AI has the potential to address these challenges by offering personalized, diversified, and high-quality education services, paving the way for an advanced educational ecosystem that encompasses intelligent learning and interactive modalities. This further drives the widespread adoption of AI across the teaching process, educational management, resource development, and more.

*3.2.1. Intelligence learning process support*

AI finds application in the domain of intelligent learning process support. This adaptive learning system guides students independently, fostering active and convenient learning experiences. In teaching, the implementation of an intelligent teaching system manifests in several aspects. Firstly, it upholds an education-centric approach, employing different models and predefined knowledge bases for efficient knowledge transmission. Secondly, by utilizing voice recognition technology, the system captures diverse forms of data in real-time and integrates it with the knowledge base. Lastly, the system enhances machine learning capabilities, enabling it to understand students' learning habits, perceive emotions, and provide personalized learning recommendations, resulting in a more immersive educational experience.

*3.2.2. Intelligence teacher assistant*

Intelligent teacher assistants represent another application of AI in the education realm. These assistants seamlessly integrate AI technologies into the teaching system, addressing the disparity between the number of teachers and students while significantly enhancing teaching quality and precision. AI-powered education products are categorized into in-class teaching and post-class evaluation and analysis. In-class teaching products include intelligent educational robots, mainly employed in early childhood education and STEM disciplines, utilizing image recognition, speech recognition, and natural language processing technologies. Intelligent English teaching is another prominent form that encompasses language recognition and natural language processing techniques. Post-class evaluation and analysis products encompass intelligent correction, exercise recommendations, and intelligent reading recommendations. These products leverage image recognition, natural language processing, and data mining to automatically and intelligently correct students' work, generate learning reports, identify errors, and provide personalized feedback to teachers, parents, and students.

*3.2.3. Intelligent education and management*

Another significant application of AI in the education field is intelligent education and management. This encompasses learners, teachers, and the entire education system, with the aim of utilizing AI technology to enhance overall student quality, track teacher and student performance, and improve educational management. By employing various computing devices and AI algorithm models, education researchers can conduct comprehensive evaluations of learners from multiple angles, continuously track their progress, and provide dynamic diagnosis and evaluation of their problem-solving abilities, mental health monitoring, early warnings, and interventions, as well as physical health monitoring and improvement. Furthermore, AI facilitates exercise monitoring and health maintenance and enables functional classroom evaluations for teachers, empowering educators to take relevant measures in supporting the growth and development of learners and teachers. Additionally, AI can enhance the level of intelligent management and service in education. An intelligent decision-making system based on big data can integrate administrative and teaching decision-making management, enabling dynamic monitoring of educational quality. Educational platforms and software based on AI algorithm models can offer personalized services and research assistance tailored to the needs of individual learners and teachers, thereby improving the effectiveness and relevance of teaching and facilitating customized education that caters to individual characteristics.

Importantly, AI algorithms can optimize the allocation of regional educational resources, promoting educational equity.

*3.2.4. Intelligent environment building*

One more application of AI in the education sector is intelligent environment building, particularly in the construction of integrated smart campuses. By leveraging AI technologies such as computer vision, speech recognition, big data, and the Internet of Things, various dimensions of campus resources can be seamlessly integrated to establish an intelligent and open environment that serves multiple aspects of campus security, campus life, campus management, teacher instruction, and student learning. This integration enables the education system to operate more efficiently.

## 3.3. Application of AI in the finance realm

The development and advancement of AI technology have significantly impacted the finance industry, particularly in banking, insurance, and capital markets.

*3.3.1. Application of AI in banking*

The application of AI in banking extends across various business domains, including corporate and retail banking, encompassing product development, marketing and sales, risk control and review, as well as customer management and service. Within the four-core links of the banking value chain, AI has introduced innovative models such as customer profiling and prediction, as

well as voice and image recognition. It empowers banks with intelligent analysis and decision-making capabilities in product and solution design, customer demand management, robo-advisory, anti-fraud measures, asset portfolio management, risk early warning, and more. In areas such as credit scoring, data review, report generation, and customer service, AI has elevated levels of automation to new heights [10].

AI has introduced the concept of customer profiling, employing machine learning algorithms to extract extensive customer information and create personalized customer labels. This enables banks to identify the most potential customers and engage in conversations based on their unique characteristics, significantly increasing the likelihood of successful sales.

In terms of customer demand management, AI aids employees in making informed and intelligent decisions by enhancing social media analysis through cognitive computing. This enables banks to gain valuable insights into customer feedback on social media, provide personalized recommendations, improve customer experiences, and comprehensively anticipate and meet customer requirements.

AI serves as an "intelligent advisor" by providing portfolio recommendations based on market data and investor profiles, enabling online intelligent portfolio management for individuals. This not only meets the individual needs of customers but also saves labor costs for banks.

AI has advanced the standardized process of credit scoring by employing machine learning algorithms to analyze various customer data and make fast, flexible, and transparent credit decisions. This facilitates greater accessibility to loans for applicants and helps banks reduce defaults resulting from erroneous credit scores.

Using deep learning technology, AI enables in-depth mining of large-scale internal and external heterogeneous data. It quantitatively extracts risk characteristic indicators, employs complex network correlation analysis to identify real-time fraud business risk indicators from historical default data, and adopts multiple predictive analysis models, including anti-fraud and prepayment capability models, to enhance banks' ability to prevent and control fraud risks.

### *3.3.2. Application of AI in insurance*

AI has a wide range of potential applications throughout the insurance value chain, encompassing front-end sales, underwriting, claims, and back-end asset management. One innovative model facilitated by AI is intelligent recognition of customer satisfaction. It enables intelligent analysis and decision-making in areas such as insurance product design, cross-selling and up-selling, customer loss prediction, pre- approval recommendation, anti-fraud detection, claims prediction, portfolio management, and reinsurance advice. AI also enhances automation levels in user behavior assessment, financial status detection, underwriting automation, customer request handling, and remote claims investigation [10].

For example, predictive models powered by machine learning algorithms can enhance the success rate of cross-selling and up-selling by recommending tailored products based on internal and external customer data. Dynamic opportunity dashboards can assist insurance brokers in monitoring and capturing sales opportunities more effectively.

In terms of risk management, AI can identify complex structured and unstructured data sets and apply machine learning for standardized risk modeling, reducing the time required for risk modeling.

### *3.3.3. Application of AI in the capital markets*

AI also holds significant potential in the capital markets. Across the five-core links of the business value chain (securities origination, investment decision support, sales and trading, clearing/settlement, and custody reporting and data analysis), AI introduces innovative models such as multi-channel interface information communication. It assists in intelligent analysis and decision-making in personalized asset portfolio advice, stock trading decision support, research and analysis, risk modeling, intelligent investment advisory, and more. It promotes automation levels in areas such as intelligent document interpretation, automatic report generation, cross- asset class clearing, and mobile reporting [10].

In the era of abundant market information, AI accelerates stock information analysis, previously requiring considerable human effort, by offering rapid, large-scale, and automated processing capabilities.

AI can also expedite risk management processes by identifying and analyzing vast amounts of internal and external data, enabling efficient risk modeling.

### *3.3.4. Application of Ai in the financial support industry*

The financial industry encompasses various background support functions, including compliance, IT, human resources, and finance. Many of these roles involve highly repetitive tasks, presenting opportunities for AI to automate such work. AI finds broad applications in back-office functions, including compliance risk detection, data analysis, and document processing. It introduces an innovative model of big data operation analysis, promoting intelligent analysis and decision-making in internal compliance detection, early warning of suspicious activities, and network risk detection. It enhances automation levels in resume/interview screening, candidate selection processes, accounting automation, legal research, and law enforcement assistance [10]. From the perspective of the breakdown of various functions in the back-office, AI will reduce and improve the number of jobs and work efficiency related to compliance, customer service, accounting, synthesis and administrative logistics.

In terms of accounting, the accounting automation system can be widely used in the basic functions of accounting, and in the administrative logistics, the automatic scheduling system can efficiently assist in the office, and even predict the data required for future disclosure. In the field of compliance, artificial intelligence has a place, such as internal compliance policies, suspicious activity warning functions, etc., which will have a greater impact on the banking and insurance industries with a large number of personal transactions. Even in human resources, AI can assist in resume interview screening, identifying and predicting candidates' personality and behavior, but due to the certain requirements for emotional interaction in this field, AI has unlimited potential in the foreseeable short term.

### 3.4. Application of AI in the computer industry

#### *3.4.1. Application of Ai in network security*

Computer networks and related technologies have become vital for the development of various industries. The security of the network environment directly influences the stable growth of these industries. AI has increasingly found popularity in network security management. By applying AI, various spam and viruses can be effectively identified, and security systems can be designed to be more flexible. AI, through machine learning and other advancements, enables quick identification of virus source files and composition structures, allowing for prioritized system detection before file downloads. This timely warning reduces the likelihood of users downloading virus-infected software. AI can establish computer network intrusion intelligence detection technology by utilizing fuzzy information identification, rule- based systems, and artificial neural networks. These technologies regularly monitor and eliminate various threats within the network environment. The virus database can also be continuously updated based on virus changes, thereby enhancing the security level of computer networks [24].

#### *3.4.2. Application of AI in data analysis*

AI has made significant contributions to data analysis, with two prominent examples being BP neural networks and support vector machines. The BP neural network, to a certain extent, emulates the functional characteristics of the human brain. By leveraging modern information technology, it simplifies, abstracts, and replicates biological systems, ultimately resulting in a multi-layer feedforward neural network based on the error backpropagation algorithm. Functionally and structurally, the BP neural network resembles the human brain, enabling it to surpass the limitations of traditional programs during specific operational processes. It can deduce patterns in conjunction with environmental changes and apply specialized operational knowledge accordingly.

Support vector machines are extensively employed in data analysis, formula recognition, and regression analysis, particularly for dealing with small sample sizes and non-linear adjustments. AI facilitates the appropriate selection of kernel functions and the identification of optimal objective functions, in collaboration with knowledge vector levels. Furthermore, the development of AI has significantly enhanced the algorithmic capabilities of support vector machines, progressively deepening their integration with computer networks [15].

#### *3.4.3. Application of AI in systematic reviews*

The advent of computer networks and associated technologies has introduced dynamic and instantaneous characteristics, thereby increasing the challenges in monitoring and managing traditional computer network information. Traditional technology-based computer network systems possess evaluation functions that enable quantitative assessment of network quality. However, evaluating computer network systems typically relies on user input, resulting in inherent subjectivity and significant deviations in the final evaluation outcomes. By leveraging AI in network system evaluation, it becomes possible to simulate the entire user operation process. Given the non-subjective nature of artificial intelligence, the evaluation results can be rendered more objective and equitable.

Intelligent solutions, as a crucial component of AI, employ three key technologies: structured knowledge solving, state diagram search, and logical reasoning. These techniques facilitate the selection of optimal items based on users' actual needs and aid in identifying the most valuable aspects within vast amounts of data.

Consequently, the detection efficiency of computers can be significantly enhanced (Li, 2021).

## 4. Conclusion

The main objective of this essay was to examine the applications and impact of AI in four different industries: healthcare, education, finance, and computing. AI has demonstrated significant potential in revolutionizing these sectors. In healthcare, AI has proved beneficial in various areas such as new drug research, medical imaging, medical service innovation, and patient health management, enabling hospitals and healthcare professionals to operate more efficiently. In the field of education, AI has the potential to enhance the learning process, support teachers as intelligent assistants, facilitate intelligent education

management, and create intelligent learning environments. Furthermore, AI's application in finance spans areas such as banking, insurance, capital markets, and financial support industries, streamlining processes, enhancing data analysis, and optimizing risk detection. In the computing industry, AI has contributed to network security, data analysis, and systematic reviews, bolstering network safety and improving computational workflows.

While AI presents promising opportunities, challenges, such as ensuring AI safety, continue to persist. However, ongoing advancements and concerted efforts are likely to address these concerns in the future. Overall, AI has already generated positive impacts across a wide range of industries, including education, finance, computing, and healthcare. As the consensus surrounding AI's potential grows, increased resources and rapid advancements are expected to propel its development in the future.

## References


[1] Artificial Intelligence (AI). (2023). *Encyclopedia Britannica*. Retrieved September 18, 2023, from https://www.britannica.com/technology/artificial-intelligence

[2] McKinsey & Company. (2018). *Ask the AI experts: What's driving today's progress in AI?* Archived from the original on April 13, 2018. Retrieved April 13, 2018.

[3] Chen, Y. (2017). *What profession will AI replace?* Retrieved December 2017, from https://www.sohu.com/a/208381249_455313

[4] Clark, J. (2015b). *Why 2015 was a breakthrough year in artificial intelligence*. Bloomberg. Archived from the original on November 23, 2016. Retrieved November 23, 2016.

[5] Dwork, C., et al. (Year). *The algorithmic foundations of differential privacy*. Foundation and Trends in Theoretical Computer Science.

[6] Douglas, (2023, March 3). *The inside story of how ChatGPT was built from the people who made it*. Retrieved from https://www.technologyreview.com/2023/03/03/1069311/inside-story-oral-history-how-chatgpt-built-openai/

[7] European Commission. (2022). *White paper on artificial intelligence: European approach to excellence and trust*. Retrieved from https://ec.europa.eu/info/sites/info/files/commission-white-paper-artificial-intelligence-feb2020_en.pdf

[8] Glaese, A., McAleese, N., Trebacz, M., et al. (2022). Improving alignment of dialogue agents via targeted human judgment. *Journal*.

[9] Huang, G., et al. (2021). *Research on the application of artificial intelligence deep learning technology in the estimation of difficulty of medical examination questions*.

[10] He, D., Guo, X., Zhou, X., & Guo, Y. (2018). *The impact of AI on the financial job market*.

[11] Huang, T. (1996, November 19). Vandoni, C. (Ed.). *Computer Vision: Evolution and Promise*. Retrieved from https://cds.cern.ch/record/400313/files/p21.pdf

[12] Institute of Natural Language Processing, Harbin Institute of Technology. (2023). *ChatGPT research report*. Retrieved from https://www.docin.com/p-4509485601.html

[13] Jobin, A., et al. (2019). *The global landscape of AI ethics guidelines*. *Nature Machine Intelligence*.

[14] Beck, J., et al. (2023). *A survey of meta-reinforcement learning*. *arXiv preprint arXiv:2301.080828*.

[15] Liu, W. (2022). *Exploration of the application of artificial intelligence in computer network technology* (pp. 23-24).

[16] Lock, S. (2022, December 5). *What is the AI chatbot phenomenon ChatGPT and could it replace humans?* Retrieved from https://www.theguardian.com/technology/2022/dec/05/what-is-ai-chatbot-phenomenon-chatgpt-and-could-it-replace-humans

[17] McCorduck, P. (2004). *Machines Who Think* (2nd ed.). Natick, MA: A. K. Peters, Ltd. ISBN 1-56881-205-1

[18] Murphy, M. (2017). *Star Trek's tricorder medical scanner just got closer to becoming a reality*. Retrieved from https://qz.com/957285/star-treks-tricorder-handheld-medical-scanner-just-got-closer-to-becoming-a-reality/

[19] Russell, S. J., & Norvig, P. (2003). *Artificial Intelligence: A Modern Approach* (2nd ed.). Upper Saddle River, NJ: Prentice Hall. ISBN 0-13-790395-2

[20] Simon, H. A. (1965). *The Shape of Automation for Men and Management*. New York: Harper & Row. Archived from the original on July 26, 2020. Retrieved November 18, 2019.

[21] Stiennon, N., et al. (2020). *Learning to summarize with human feedback*. *Advances in Neural Information Processing Systems, 33*, 3008-3021.

[22] Vaswani, A., Ahazeer, N., Parmar, N., et al. (2027). *Attention is all you need*. Vincent, J. (2022, December 5). *AI-generated answers temporarily banned on coding Q&A site Stack Overflow*. Retrieved from https://www.theverge.com/2022/12/5/23493932/chatgpt-ai-generated-answers-temporarily-banned-stack-overflow-llms-dangers

[23] Winston, P. H. (1984). *Artificial Intelligence* (2nd ed.). United States. Retrieved from https://dl.acm.org/doi/abs/10.5555/119618

[24] Zhang, H. (2022). *Research on computer application software development technology based on artificial intelligence*.