

Understanding Artificial Intelligence (AI): Technological, Social, and Ethical Implications

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Author Biography

Jiayou Tang is a senior at Orange Lutheran High School in California. He has a strong interest in the changes that artificial intelligence will bring to various aspects of life and holds unique opinions on the topic. In the future, he hopes to contribute to human progress in the field of artificial intelligence. Additionally, he is an ice hockey player and has represented his school in numerous competitions, achieving excellent results.

Abstract

With AI increasingly transforming how various entities perform certain operations, it is necessary to explore the technology in detail to gain additional insight into its nature and effects. The research focuses on AI's technical and social effects. In addition, it examines the impact of the technology on communication, and scrutinizes its ethical implications. This research draws data from secondary sources, particularly on works published in the past five years. Findings reveal that, technically, the technology enhances quality production and improves data processing and analysis. Socially, AI progresses healthcare, elevates education, and improves communication. With AI, the findings show, it is possible to incorporate personalization, augment language translation, advance sentiment analysis, upgrade chatbots and virtual assistants, boost content creation, and develop audience segmentation. Nevertheless, data from used sources shows the need to uphold ethical practices while interacting with the cutting-edge innovation. Specifically, users must consider the effects of bias, privacy violation, job loss, and the likelihood of creating autonomous weapons.

Keywords: Artificial intelligence, technology, innovation, communication, systems, data, analysis, ethical

Introduction

AI has become increasingly popular in the modern world. It is a science and engineering that enhances the development of smart systems, especially in computer science, which promotes technological advancements (Mahato, 2022). AI attempts to establish enhanced intelligence in different computer systems. The innovation imitates human intelligence but does not rely on biologically observable actions. It is a study dealing with the algorithmic and analytical components of problems utilizing computational frameworks (Mahato, 2022). The now well-known area of computer science can improve human life in multiple aspects (Mahato, 2022). The research question, in this instance, is to examine and comprehend AI's effects on technical, ethical, and social implications. Existing evidence shows that AI improves industrial operations, including production processes. With the technology, it is possible to achieve increased data analysis and enjoy the benefits of computer vision. Social-wise, the selected form of the Industry 4.0 applications improves healthcare access and delivery, creating a chance to improve people's quality of life and well-being. It also allows educators and students to experience improved encounters that elevate and transform teaching and learning. While exploring the social effects of AI, the report expounds on how technology influences communication, which is a societal component as it inherently entails interactions between people and is vital to forming and upholding relationships within a society. Despite associated merits, users must watch out and enact measures to counter ethical concerns such as bias and discrimination, privacy issues, job interference, and the production of destructive weapons that do not require human intervention. The report shows that best approach to addressing shortcomings is to rely on ethical theories that distinguish between moral and immoral conduct. AI improves production, bolsters data processing, augments real-time analysis, fosters healthcare, elevates education, and boosts education, but users must consider the ethical concerns associated with its use to avert far-reaching implications.

Technical impacts

Technically, AI has considerable effects, which make it increasingly applicable. An area that has experienced considerable advancements is human production, with particular emphasis on economic development. Li (2024) contends that the new generation of AI products, thanks to AI-enabled tools such as Wenyan Yixin and ChatGPT, extensively or rapidly integrates into human production at an unprecedented depth, breadth, and pace. AI applications that enhance production, which Li (2024) refers to as generative AI, possess unique qualities and functionalities contrasted with rule-based AI, placing a more significant dual effect on high-quality development. Hence, leveraging generative AI technology's iterative and self-updating abilities, global economic development is set to enter a novel model characterized by self-structuring information and AI content production. Furthermore, the development of generative AI tools such as ChatGPT will introduce new industrial paradigms, business logics, and application scenarios, hastening the establishment of the digital economy, changing production practices and value-addition techniques, and even possibly transforming the global industrial structure and business order (Li, 2024). In their study that abides by a four-step procedure – analyzing AI applications, examining case studies, gathering data, and reviewing AI-related literature, Domini et al. (2023) learned that AI has numerous technologies, such as self-learning algorithms, chatbots, and machine translation, that can bolster transformation, information, and automation effect. Several companies have already integrated AI into their operations to augment production. In the United Arab Emirates, the Abu Dhabi National Oil Company incorporates IBM's AI technology into its operations, focusing on petroleum and chemical products (Domini et al., 2023). The deployment hastens the formation of digital geological frameworks for reservoirs and digitalizes various operations, encompassing sampling and analyzing rock samples (Domini et al., 2023). Chances are high, based on the description, that corporations will increasingly integrate AI into their operations in the future to improve their production processes.

Besides production, AI has several other positive technical impacts, explaining its rapid integration in various fields. The innovation allows enhanced data processing capabilities. The technology improves the exercise by automating repetitive functions such as data cleaning, enabling a faster assessment of voluminous datasets, identifying intricate trends and patterns that human capabilities might miss, and offering awareness through predictive modeling, eventually resulting in precise and efficient data analysis with little human intervention (Campeau & Dubois, 2019). Furthermore, AI permits real-time analysis. It facilitates the task by promoting rapid processing of big data, creating room for instantaneous insights and decision-making depending on the latest data, essential for applications such as predictive maintenance, fraud recognition, and customer experience personalization (Campeau & Dubois, 2019). AI facilitates these functions while identifying anomalies and patterns in data as they appear, eradicating delays in reaction time contrasted with conventional means. Furthermore, regarding real-time analysis, AI can identify future trends and results by learning from historical information, allowing timely and proactive decision-making. Additionally, it is possible to achieve continuous learning using AI, which elevates real-time analysis. AI tools can adjust and improve over time by repeatedly learning from newly generated data, enabling relevance and preciseness in real-time contexts (Campeau & Dubois, 2019). Moreover, improved computer vision abilities reaffirm the technical power of AI. The innovation can interpret visual data, encouraging the use of applications such as image analysis, object identification, and facial recognition (Matsuzaka & Yashiro, 2023). Therefore, the technical effects of AI are broad, and future researchers should explore these implications further to expand their knowledge and understanding of this subject.

Social impacts

The social implications of AI are immense and deserve further exploration to understand their effects on users. This analysis focuses on how the innovation transforms health, which is a social aspect considering that factors such as support networks,

community factors, healthcare access, and socioeconomic status substantially impact a person's health. The illustration means that social environment significantly determines one's quality of life and overall well-being. Udegbe et al. (2024), who performed a systematic review of the role of AI in healthcare, highlighting its uses and intricacies, found that the technology advances healthcare. Their analysis revealed that AI concepts, encompassing predictive analysis, natural language processing, and machine learning, are changing healthcare via patient monitoring, treatment personalization, and diagnostic assistance. The researchers who contend that the significance of AI in healthcare is evident argue that the technology can change disease diagnosis, tailor treatment to individual needs and desires, and revolutionize the management of operational components of healthcare delivery. Despite these potential gains, Udegbe et al. (2024) found that the innovation has certain ethical concerns and urge users to consider impediments such as security concerns, data privacy, legal gaps, and integration and interoperability intricacies. Other than the many effects on the health sector, AI has transformed educational practices, further depicting the technology's strengths. Li (2024 – The Influence) asserts that the rapid enhancement of AI has had a notable and far-reaching impact on the education sector. The extensive integration of AI and education, according to the author, has promoted the development of AI educational applications. Li (2024 – The Influence) further claims that modern-day AI is an application to improve the learning encounter and a vital enhancer of the changing conventional teaching structures and educational management techniques. The illustrations reaffirm AI's vital role in improving social aspects such as health and education.

Effects on communication

AI is revolutionizing communication, which is a major social component. Today, thanks to the application, people interacting with one another can take advantage of features such as chatbot engagements and personalized messaging. AI can comprehend and react to various forms of speech through natural language processing that uses virtual assistants and chatbots, permitting more human-like

conversations (Aslam, 2023). Furthermore, through the technology, it is possible to enjoy personalization, a practice increasingly revolutionizing communication. AI algorithms can analyze large volumes of data and modify communication messages, forming highly relevant and targeted engagements across various realms, encompassing customer services and marketing (Aslam, 2023). For firms employing the technology, it is possible to leverage AI-driven chatbots that can handle regular consumer inquiries, offering immediate assistance and elevating consumer experience (Aslam, 2023). Furthermore, through virtual assistants, it is possible to place reminders, set appointments, and conduct other functions depending on natural language directives. Moreover, with AI, it is possible to enjoy enhanced sentiment assessment, a practice that is increasingly gaining prominence. The technology can analyze large volumes of speech and text to find a message's emotional tone, permitting organizations to measure consumer sentiment and adjust their communication approaches accordingly (Aslam, 2023). Companies performing sentiment analysis often gain unified analytics of consumer feedback and comments. Usually, operators use various channels to carry out sentiment assessment, which entails identifying and understanding valuable buyer insights, such as social media, corporate websites, and physical interactions. Additionally, the technology improves content creation (Somosi, 2022), which has remained part of communication for centuries. It is possible to create presentations and text depending on issued information using the concept, thereby streamlining processes that lead to content creation. For instance, the application elevates content development by automating repetitive functions such as forming initial manuscripts, keyword searches, and approving style and grammar consistency (Somosi, 2022). The description gives an impression of AI that revolutionizes communication and presents a chance to attain engagement levels that were not possible before the Industry 4.0 component emerged.

On the same note, the impact of AI on audience segmentation, which is integral in communication, is evident and will continue to grow. By analyzing data, Bhagat et al. (2024) argue, entities using AI can identify various consumer populations

and align communication plans accordingly. Through scrutinizing a range of datasets, encompassing social media engagements, purchase trends, and browsing history, Bhagat et al. (2024) explain, AI algorithms can develop in-depth consumer personas that reflect individuals' behaviors, desires, and preferences, thus enabling relevant authorities such as the marketing teams to transmit precise and helpful information to other organizational unit. Hence, AI is a powerful tool that improves communication, calling on various entities to understand how it works and integrate it into their systems to witness its immense effects on communication.

Ethical impacts

Whereas AI has immense positive effects in various ways, the cutting-edge technology has significant ethical considerations that users must understand and enact mechanisms to avert unethical outcomes. A notable concern relates to bias and discrimination. Chen (2023) explains that AI algorithms can inherit and augment biases available in the data a system gets training on, leading to discriminatory results in vital areas such as criminal justice, employee recruitment, and financial lending. Bias typically happens when AI offers outcomes or makes choices that reinstate stereotypes and either favor or omit particular populations or segments (Chen, 2023). If an AI system works with biased data, the algorithms shall systematize and propagate these biases. Furthermore, AI could lead to privacy and surveillance-related problems. Such systems usually need access to large volumes of data, generating apprehensions about privacy infringements and possible misuse of classified information (Vadisetty, 2023). The possibility of mishandling or exploiting sensitive content when using AI prompts various jurisdictions to develop rules and regulations defining sensitive personal data handling. In Europe, for example, the General Data Protection Regulation (GDPR) sets directives for the gathering and processing of personal data from persons who reside in and outside the European Union (Lukic et al., 2023). The Health Insurance Portability and Accountability Act (HIPAA) defends patient confidentiality and health data in the health segment in the United States. HIPAA compels insurers, healthcare practitioners, and other entities to

deploy measures to counter unpermitted reach to patient data (Edemekong et al., 2024). Consequently, users should be cognizant of the bias and potential mishandling of sensitive information likely to occur when utilizing AI for different purposes and instill suitable plans to prevent any harm or breaches.

It is necessary to consider several other ethical issues that will likely arise when utilizing the technology to perform different operations. Many employees and job seekers progressively worry about the prospects of losing jobs, with AI increasingly taking over many functions. Automation via AI could result in substantial job losses, especially in sectors with repetitive duties, creating uneasiness about economic inequality. A Gallup survey in 2024 revealed that about 25% of employees worry that their services can become obsolete because of the technology, up from 14.9% in 2021 (Husillos, 2024). In the same poll, 68.5% of HR executives asserted that innovation would substitute jobs in the next three years (Husillos, 2024). However, others contend that it complements human work and establishes new opportunities. Marr (2024) refers to experts who predict that the effects of automation and AI on the job market will be substantial. The author, who cites data from the World Economic Forum, which shows that the technology will displace nearly 85 million jobs, further mentions that the revolution will create 96.8 million new jobs. In addition to the loss of working opportunities, worries surround the development of autonomous weapons that cause ethical fears regarding the possibility of involuntary harm or loss of human intervention in warfare (Schwarz, 2021). An issue that complicates the matter further, as Schwarz (2021) puts it, is that debates whether the formation and utilization of lethal autonomous weapons systems equipped with the capacity to choose and attack targets without human control should not exist or function under strict control of international regulations, are ongoing, escalating, and not likely to cease in the near future. The identified ethical shortcomings that come with AI use deserve considerable intervention to prevent adverse eventualities likely to occur due to misuse.

Following ethical theories when employing AI offers a chance to counter the technology's

undesirable effects. According to Josephson and Michler (2024), ethical theories are an effort to provide a coherent, unambiguous explanation of one's or society's ethical responsibilities. In other words, they are intellectual attempts to categorize and describe human ethics. Most of these models frequently try to define or prescribe what thinkers consider right or incorrect behavior. The majority of current ethical decision-making frameworks are either deontological or consequentialist. Deontology is one theory that influences people's conduct and interpersonal interactions. The standard requires people to follow regulations and protocols while upholding fundamental moral values when addressing a problem (Josephson & Michler, 2024). The structure highlights the importance of adhering to broad ethical principles, like the duty to safeguard personal data. Furthermore, the rights principle of ethics is a major factor in handling moral conundrums and decision-making. The requirement emphasizes protecting societal rights. As long as most people or the ruling class supports them, rights are morally proper and appropriate, claims Josephson and Michler (2024). Since data privacy is a fundamental human right, implying that individuals have the right to safeguard and regulate their personal information from unpermitted utilization or reach, those handling such data must deploy adequate protective mechanisms when using AI. Additionally, companies that want to employ the technology to make moral decisions should follow utilitarian values, which maintain that a decent action makes the most people happy (Josephson & Michler, 2024). When deploying AI for various objectives, executives and those around them should invest significant time and resources in acquiring knowledge about and applying the abovementioned concepts.

Conclusion

AI is a transformative, cutting-edge technology that influences operations in key areas, but users should consider some of its possible shortcomings. In technical fields, the innovation facilitates quality production in firms, which is evident in how companies increasingly leverage the application. Based on scholarly findings, the report shows that AI advances data processing and promotes real-time analysis. Further review of current literature

presents valuable insight into the social effects of the selected technology. The concept elevates healthcare practices, improving people's well-being. Thanks to AI, it is possible to improve diagnostic processes, provide personalized care, and advance patient monitoring. Furthermore, with AI, instructors, and learners experience elevated practices, including better teaching strategies and educational management. Another social aspect that continues to witness considerable improvements due to the emergence of AI is communication. The innovation makes it possible to experience elevated personalization, improve language translation, enhance sentiment analysis, increase use of virtual assistants and chatbots, advance content creation, and boost audience segmentation. However, users must consider some of the ethical concerns associated with the technology. These include amplification of bias by AI algorithms, privacy challenges, possible job loss, and the prospects of developing autonomous weapons. The development of laws to regulate some of the ethical problems that come with AI use, as it appears with the GDPR and HIPAA, underscores the essence of considering and averting the ethical implications of integrating AI in different contexts. The overarching idea is that AI has numerous benefits, but users must also consider some of its potential shortcomings. Knowing the limitations associated with AI offers a chance to enact suitable interventions to curb adverse eventualities. Otherwise, not having robust measures to handle the ethical issues emanating from AI use could lead to unsatisfying implications that might be difficult to salvage.

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