Artificial Intelligence and Social Computing, Vol. 122, 2024, 247–256
https://doi.org/10.54941/ahfe1004662

The Potential Issues and Crises of Artificial Intelligence Development

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ABSTRACT

The exponential development of artificial intelligence has brought limitless possibilities to human society. Concurrently, the potential problems and crises associated with its development follow closely behind the advantages. This paper categorizes the potential problems and crises of artificial intelligence development into three levels – "small, medium, and large," referring respectively to the negative impacts of artificial intelligence on humanity, the conflicts between artificial intelligence and humans, and the potential of artificial intelligence replacing and destroying humanity. Based on this classification, the human approach to the development of artificial intelligence should involve addressing minor issues, alleviating moderate problems, and being vigilant against major challenges. Additionally, in the realm of humanities, active intervention in technological development is necessary, including the establishment of a public discourse system, ultimately fostering a more refined human-machine civilization structure.

Keywords: Artificial intelligence, Problems and crises, Human-artificial intelligence relationship, Human-machine civilization structure

INTRODUCTION

Since the inception of human dominance over other species on Earth, empowered by "intelligence," humans have maintained a position of control in their relationships with other species. Currently, artificial intelligence (AI) technology is advancing at an unprecedented pace. In 2011, IBM's AI system Watson triumphed over two former champions in the US television quiz show "Jeopardy!", marking a significant breakthrough in natural language processing and knowledge retrieval for AI. In 2016, AlphaGo, developed by Google's DeepMind, defeated world champion Lee Sedol in a Go competition, showcasing machines' ability to surpass humans in complex and strategic games. In 2017, Ian Goodfellow and colleagues introduced and designed Generative Adversarial Networks (GAN), a milestone in AI for image generation and processing. In 2018, Google introduced the Bidirectional Encoder Representations from Transformers (BERT) for natural language processing, significantly advancing AI's capabilities in understanding context and handling natural language tasks. In 2020, OpenAI released GPT-3 (Generative

Pre-trained Transformer 3), currently one of the largest language models with 175 billion parameters. Additionally, McKinsey Global Institute's research indicates that by 2030, AI could contribute an additional $13 trillion to the global economy annually (Bughin *et al.*, 2018).

However, while technological miracles bring unprecedented possibilities to human society, they also impose significant impacts on individual lives, societal structures, and cultural systems. This paper aims to delve into the potential problems and crises in the development of artificial intelligence, categorizing them into three levels – "small, medium, and large." It progressively presents the negative impacts AI may bring, the conflicts in human-AI relationships, and issues such as machine intelligence surpassing human intelligence. This structured approach encourages a reconsideration of the relationship between humans and artificial intelligence, an awareness of the existence of the "singularity" in AI development, and a recognition of the potential crises that may arise from unbridled and unchecked AI development.

"SMALL ISSUES" IN THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE

Human Independence

The contemplation of human-machine symbiosis and integration can be traced back to the 1960s when two scientists from NASA, Manfred Clynes and Nathan Kline, proposed the concept of "Cyborg" (Cybernetic Organism). It broadly refers to the augmentation of human physical abilities beyond the limitations of the human body through mechanical extensions. The assistance and enhancement of mechanical devices to human physical capabilities encompass two aspects—physical functions and cognitive decision-making. In terms of physical functions, enhancement involves the transplantation of assistive mechanical devices into the human body, achieving the extension of senses or the replacement of organs, thereby enhancing the bidirectional connection and control between individuals and the external environment. As for cognitive decision-making, it refers to the assistance of big data and artificial intelligence, enabling individuals to make decisions beyond their own experiential and cognitive levels.

However, as artificial intelligence enhances both physical capabilities and cognitive decision-making, humans find their control over themselves and their independence continuously diminishing (Peng, 2020). Firstly, due to the maturity of network technology, people perceive the world through media. Means of connection between individuals, and between individuals and the external world, have become immensely diversified, with text, images, videos, and voice gradually replacing the necessity of face-to-face communication, rendering the concept of being "present" meaningless. Secondly, the ubiquity of search engines has lowered the cost of real-time information retrieval, leading individuals to externalize the tasks of knowledge retention and memory, potentially causing a decline in individual memory capacity and knowledge structure. Lastly, decision-making supported by data algorithms gradually fosters dependence on machine intelligence, causing a decline in independent

thinking and decision-making abilities of individuals. However, it is precisely the independent cognitive, judgment, and decision-making system and capabilities of humans that constitute the core of maintaining independence and proactiveness against machines (He, 2019).

Employment and Wealth Disparity

Due to the development of artificial intelligence, businesses are transitioning from "manufacturing" to "creation," leading to the replacement of numerous non-technical jobs, causing unemployment and impacting human mental health. John Pugiano, a financial investment expert in the United States, believes that any routine and predictable job may potentially be replaced by artificial intelligence in the next 5 to 10 years (Pugliano, 2017). According to a research report from the University of Oxford, approximately 10 million non-technical jobs are projected to be replaced by robots, while only 15 types of related professions derived from artificial intelligence are anticipated, such as AI engineering technicians, big data engineering technicians, and industrial robot system operators. Additionally, artificial intelligence robots for various purposes are being designed and applied, leading to a non-linear, leap-forward growth trend in related industries, forming a high-value combination of artificial intelligence and industries (Zhou, 2019). Moreover, the low cost and high efficiency of artificial intelligence "smart manufacturing" create a series of advantages that attract investment institutions. This directs societal resources toward a minority that possesses technological skills, further widening the gap between the rich and the poor in society.

Information Privacy and Security

In the era of artificial intelligence and big data, user data exists in a state of high transparency and low privacy security (Li, An and Zhang, 2021). The quantity of data collection and applications is increasing in various mainstream fields such as business, science, education, and healthcare, where the application of artificial intelligence is often based on users' private data. However, concerns arise regarding whether users have the right to be informed and choose when it comes to the collection and analysis of such data. Furthermore, are there risks of information leakage in the subsequent stages of data application and decision-making? These concerns are not unfounded.

In 2018, data analytics firm Cambridge Analytica illegally collected private information of 50 million Facebook users through applications, including engagement on the platform, search content, and interpersonal relationships. In 2019, China's DeepNet Vision Technology Co., Ltd. experienced a massive leakage of facial database information, exposing highly sensitive personal privacy information of over 2.56 million users. In 2021, the "Didi Chuxing" app faced severe legal issues related to the unauthorized and non-compliant collection of personal information, resulting in the app being ordered to be taken down. In everyday life, ubiquitous surveillance, facial recognition technology, and smart home appliances meticulously collect and record users'

voices, images, movements, and other information, posing a threat to human information security.

Moreover, with the growing maturity of simulation and substitution technologies, the emergence of AI-synthesized anchors indicates that the cost of producing fake news will decrease. The difficulty in discerning the authenticity of information will significantly increase. In fields such as news and law, which rely on authenticity, can humanity withstand the impact of these technologies on existing social norms (Zhou, 2019)?

Data Analysis Monopoly

Information and data are crucial to productivity, the economic backbone, discourse power, and decision-making authority. Therefore, in the future, the segmentation, monopoly, and closure of data are inevitable. However, the centralized trend of data analysis not only harms the interests of users but also hinders the further development of artificial intelligence technology. For users, envision a scenario where a few internet data analysis giants control vast amounts of user information, selling these data as information resources to third parties, jeopardizing the privacy and security of user information. Meanwhile, artificial intelligence, based on user preferences, pushes advertisements, provides related services, and influences user thinking, threatening privacy, reinforcing biases, and impairing the right to freely choose (Zhou, 2019; Li, An and Zhang, 2021). However, the learning and training of artificial intelligence on private data are prerequisites for providing users with accurate personalized services. Therefore, user information security, transparency in data applications, ownership of information copyrights, and the standardization and legality of information trading procedures are crucial. Clear legal provisions and ethical standards are necessary to restrict and strictly regulate these aspects.

Regarding artificial intelligence technology, its decision-making is generally based on massive data. In other words, the adequacy and objectivity of data samples, as well as the effectiveness of the application environment, directly impact the results of artificial intelligence. However, internet computing intelligence giants, in their pursuit of data monopolization, utilize resources, capital, and politics to an extensive degree. This results in a lack of breadth and depth in data, hindering the normal advancement of artificial intelligence strategies (Zhou, 2019).

Bias and Discrimination

Deep learning, as the foundation of artificial intelligence technology, is a typical "black box operation." The purpose of the technology, program design, data inputs, and detection criteria are all subjective judgments and choices made by developers, making it challenging to avoid introducing the designer's subjective biases into the algorithmic technology system. In 2018, Ghanaian-American computer scientist Joy Buolamwini conducted the Gender Shades assessment of facial recognition technologies from Microsoft, IBM, and Face++, revealing an error rate of 0.8% for light-skinned males and 34.7% for dark-skinned females (Hardesty, 2018). The root cause of

this difficult-to-resolve issue lies in the absence of established scientific standards to assess whether the data input into artificial intelligence is biased. Furthermore, insufficient sample sizes in the data used for model training can also lead to biased results (Cheatham, Javanmardian and Samandari, 2019; Galaz *et al*., 2021). For example, in cases of insufficient data, an AI system developed for agricultural purposes may provide incorrect management advice to farmers struggling to maintain high and stable yields (Jiménez *et al*., 2019).

Artificial intelligence technology, based on capturing and analyzing user information, delivers targeted information to users, influencing their thoughts and judgments, thereby reinforcing biases. The resulting viewpoints and biases then become part of user information data, reintegrating into the training of artificial intelligence models, creating a self-reinforcing cycle of biased arguments (see Figure 1). This gradually leads individuals to lose their objective judgment. Ultimately, algorithmic bias and discrimination will result in the solidification of biases, gender and class divisions, and further marginalization and impoverishment of vulnerable groups. Therefore, ensuring the fairness, inclusiveness, and beneficial nature of artificial intelligence technology is a challenging task. Even minor deviations during the learning and training stages can deviate from the initial purpose of benefiting human survival and development, potentially causing harm.

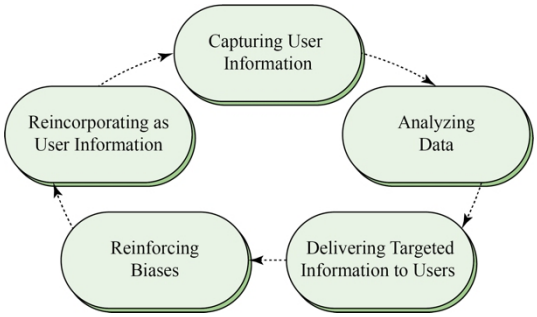

Figure 1: Achieving a self-reinforcing cycle of biased arguments (Lingxuan Li, 2023).

"MEDIUM ISSUES" IN THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE

The Relationship Between Humans and Artificial Intelligence

"Symbiosis" is a common expression in human-machine relationships. In daily life, people's physical states, behaviors, and even thoughts are translated into data and information records by mechanical or intelligent sensors, gradually blurring the boundaries between humans and information. The widespread use of devices related to the human body (including smartphones) has greatly promoted human "cyborgization." Humans are increasingly becoming what post-humanist scholar N. Katherine Hayles refers to as

material-information hybrids (Hayles, 1999). The development and application of technologies such as nanotechnology, biotechnology, information technology, and cognitive science have made the enhancement of humans by technology and the fusion of machines and humans irreversible facts and trends. However, can the enhancement of the human body by machines, even extending lifespan, truly bring well-being to humanity? How should people face the emergence of technologically enhanced, semi-mechanical, semi-human entities as new life forms? What are the limits to machine-enhanced human bodies? Moreover, if everything is "quantified" and "algorithmized" by machines, and even artistic creation becomes a form of data calculation, will humans be trapped in a single computational and tool-based rationality, leading to the atrophy of humanistic thinking and spirit (Peng, 2020), becoming slaves to data and information?

In the current human-machine dialogue, machines are not intermediaries in the communication process but are seemingly equal conversational partners on the other side. In reality, the essence of human-machine communication remains humans seeking information or attention from machine intelligence. With humans as the leading figures in dialogue and humans' needs as the purpose of communication, its essence is still human-centered, with machines serving as passive providers. While machines continue to anthropomorphize, humans are also gradually becoming objects of mechanization. Therefore, will the world of mechanical enhancement become more humanized or more mechanized? We cannot predict.

Due to intelligence, humans have detached themselves from the natural environment. Similarly, will silicon-based artificial intelligence also become independent of carbon-based human life? Currently, considerations about the status of artificial intelligence entities in fields such as ethics, philosophy, and law mainly fall into three categories: firstly, human subjectivity is inviolable, and machines will not gain subject rights. Secondly, artificial intelligence will gain subject status equal to humans. Thirdly, machines will gain subject rights with human dominance. In reality, these discussions are still based on the trajectory set by people for the development of machine intelligence, even if machines adhere to people's moral standards, standardize machine behavior and methods, and restrict machine permissions and abilities (He, 2019). Whether people can realize subjective intentions on machine intelligence through technology remains an unknown variable in the future.

Human Civilization and Machine Civilization

Under the collaborative efforts of artificial intelligence and humans, will artificial intelligence assist in the continued development of human civilization, work together to create a new harmonious human-machine civilization, or deviate from the track to establish a civilization exclusive to artificial intelligence? Technology introduces significant uncertainty into the development of humans, machines, and civilizations (Peng, 2020). As the gap between human intelligence and machine intelligence widens, people may gradually find it challenging to comprehend the purpose and behavior of machines.

Machines, on the other hand, can read all aspects of human civilization—poetry, music, painting, sculpture, philosophy, and more. They can even extract human memories. However, is machine civilization interested in understanding human civilization? Perhaps they consider it "too human," and they are more concerned with their own beautiful new world (He, 2018). Conversely, humans might be kept by machine intelligence, preserved as objects or animals. Will this shake people's beliefs, or will the "omniscient and omnipotent" machine intelligence become a new faith for humanity? Fortunately, "intelligence" does not constitute the entirety of humanity. What it means to be human also involves the rich world of meaning and spiritual products that humans have created in their relatively short history of civilization (He, 2018). In doing so, humans have gained a unique sense of meaning intrinsic to vibrant life.

"LARGE ISSUES" IN THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE

The Singularity in the Development of Artificial Intelligence

What is the singularity in the development of artificial intelligence? It refers to the moment when machine intelligence comprehensively surpasses human intelligence (He, 2018). It can also be understood as "Superintelligence," as described by Nick Bostrom, the director of the Future of Humanity Institute at the University of Oxford. This is a more general understanding, indicating the level of intelligence in which machine intelligence exceeds the cognitive boundaries of humans in all fields. From primitive societal civilization, agricultural civilization, industrial societal civilization to ecological civilization, and from the steam era, electrical era, information era to the intelligent era, the pace of development in both society and technology continues to increase, but it is far from reaching exponential growth rates. Moreover, the intellectual level of humans has not progressed with the changes in eras and the development of societal civilization. In contrast, the intelligence level of artificial intelligence relies entirely on algorithmic optimization and iterative improvements to achieve exponential and mutation-type growth. Therefore, the surpassing of human intelligence by machine intelligence at some point in the future seems inevitable.

Since humans can design artificial intelligence, artificial intelligence with intellectual capabilities far beyond human intelligence will inevitably be able to design even more remarkable machine intelligence (Zhou, 2019). This will inevitably trigger an "intelligence explosion." People's opinions on this matter are either extremely optimistic, believing that humanity will enter an unprecedented and splendid new era, or extremely pessimistic, thinking that the fate of humans becoming subordinate beings is inevitable. However, will a completely new life form that surpasses humans comprehensively in both capabilities and intelligence be willing to serve as humanity's servants, continuing to assist human life and development?

Looking at the "domination history" on Earth, except for dinosaurs dominating due to their size, physical capabilities, and attack power, humans have always relied on their intelligence advantage to confront and dominate

other organisms. Once the intelligence that humans pride themselves on and use to dominate is surpassed by artificial intelligence, is there still room and possibility for humans to change the situation?

Calm Before the Singularity

The development of artificial intelligence will go through three stages: narrow intelligence, general intelligence (AGI), and superintelligence (ASI). The capabilities will progress from weak intelligence to strong intelligence, ultimately achieving superintelligence. Analogous to human intelligence, it corresponds to artificial intelligence, humanoid intelligence, and superhuman intelligence (He, 2018). Before the singularity arrives, people may realize the vision envisioned by the Israeli historian Yuval Noah Harari in "Homo Deus: A Brief History of Tomorrow": machines as the most loyal servants of humanity, providing all material services to humans. People will no longer worry about basic needs and labor but will dedicate themselves entirely to the pursuit of eternal life and more intense and enduring experiences of happiness until superintelligence delivers a sudden and final fatal blow to humanity. The challenge lies in the fact that, before the singularity, humans remain comfortable, even considering such a scenario as highly unlikely.

CONCLUSION

Renowned physicist Stephen Hawking once predicted that the development of artificial intelligence would threaten, or even destroy, humanity. However, whether it's the long-standing confidence in our abilities, ambition in the face of the unknown, the pursuit of technological frontiers, or the pursuit of immense commercial interests, it seems that people are unlikely to halt their exploration of artificial intelligence technology. The future of artificial intelligence is destined to be filled with various unknowns, risks, and crises, and it's crucial not to lump all the problems it brings into one category. The classification of problems into "large, medium, and small" is valuable for people to understand the issues related to artificial intelligence, prioritize conflicts, and provide a sequence for addressing the artificial intelligence crisis.

At present, compared to the rapid development of artificial intelligence technology, the awareness and frameworks of laws, ethics, and morals that match it are significantly lagging behind. The responsibility to constrain the ethical aspects of artificial intelligence technology falls entirely on relevant technology companies and developers, which is far from sufficient. The fields of philosophy, literature, ethics, and design, among other humanities, should actively intervene in technological development. In the transition from the old to the new, fostering a brighter human nature and the warmth of morality permeating into the future civilization of man and machine, incubating better interactive mechanisms, and allowing voices from various fields to reach decision-makers and designers in technology development. Only by bringing the issues of human-machine civilization into the public eye, making them topics for public participation and discussion, can we construct an objective, scientific, and dynamic ethics for artificial intelligence. Only by confronting

the risks and challenges of machine intelligence can we accurately grasp the core values of humanity and have the chance to take control in the future civilization of man and machine.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to my advisor Professor Wei for his invaluable guidance and support throughout this research. I also want to thank Wenyuan Li for his encouragement and assistance. Special thanks to Communication University of China Advertising Institute for their generous funding.

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