PROSPECTS OF ARTIFICIAL INTELLIGENCE

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Artificial intelligence (AI) is transforming at an unmatched pace and impacting nearly all domains of contemporary human life. The creation of large-scale neural architectures, particularly the Transformer model, has allowed machines to understand information in new ways. The model proposed by Vaswani et al. (2017, p. 2) introduced an attention mechanism that replaced recurrent and convolutional methods while achieving superior performance. This breakthrough opened new possibilities in natural language processing and computer vision, forming the foundation for modern generative AI.

The ability of large language models and multimodal systems to create, analyze, and integrate information across domains represents a defining characteristic of current AI evolution. AI now influences healthcare, finance, education, transportation, and creative industries – acting not merely as a tool for automation but as an instrument for augmentation (World Economic Forum, 2020, p. 5).

While explainable AI (XAI) has become an established field, interpretability remains a central concern. As Doran et al. (2017, p. 4) emphasized, this challenge is particularly critical in sensitive sectors such as healthcare, where autonomous decisions can lead to fatal outcomes. According to the survey *Towards Transparent AI* (2025), AI will require interpretive and supervisory measures to ensure trustworthy operation.

The democratization of AI research through open-science initiatives and cloud platforms allows smaller institutions and developing countries to participate actively in global innovation (OECD, 2023, p. 11). However, this accessibility must be supported by coherent frameworks for data governance, intellectual property protection, and ethical utilization.

Another emerging trend is the rise of "green AI," which focuses on minimizing

environmental impact while maintaining model performance (Schwartz et al., 2020, p. 8). This approach responds to the growing concern over the energy consumption required to train large-scale models.

Human–AI collaboration, or hybrid intelligence, aims to enhance rather than replace human abilities. The World Economic Forum (2020, p. 9) projects that by 2025, 40% of companies will need to redesign their workforce due to automation, emphasizing reskilling and educational reform. The Organization for Economic Co-operation and Development (OECD, 2023, p. 12) stresses the importance of developing creativity, critical thinking, and socio-emotional skills – areas in which humans retain substantial advantages.

Discussions about Artificial General Intelligence (AGI) suggest that such systems would require abstract reasoning, transfer learning, and adaptive abilities across domains (Bostrom, 2014, p. 56). However, as Bostrom warns, if these systems are misaligned, they may create existential risks. Therefore, AI safety and international cooperation are essential to ensure alignment with human welfare.

AI increasingly contributes to scientific research by processing massive datasets, simulating complex systems, and proposing new hypotheses (STOA, 2024, p. 15). Machine learning models are becoming "co-scientists," assisting researchers in biology, physics, and materials science.

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