The Role of Artificial Intelligence in future technology

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1 Introduction

Artificial Intelligence (AI) is one of the fastest-growing topics of the 2020s. With the release of numerous publicly available Large Language Models such as ChatGPT [1] and other tools for content generation such as videos and images, AI's relevancy cuts into everyone's lives at a staggering speed.

1.1 Motivation

Integrating AI technology into a broad spectrum of domains, including but not limited to healthcare, finance, education, and transportation, has enabled those branches to undergo a digital transformation and has helped them become more efficient. As AI only continues to evolve, its role in shaping our future becomes even more prominent. This essay explores and discusses the role of Artificial Intelligence in future technology, focusing on its probable contributions to automation, analysis, research, and possible ethical questions.

2 The role of AI in the future

2.1 AI in Healthcare and Medicine

In terms of healthcare, AI contributes to quite a large amount of fields related to it. Significant areas stretch across the diagnosis of patients, personalized treatment plans, or the help of discovery of new drugs [2]. Algorithms focusing on Deep Learning have already achieved a high level of accuracy in medical imaging tasks that, for example, detect tumor patterns and classify them [3]. Predictive analysis allows AI-driven systems to enhance clinical decision-making by empowering perdictive analytics. Training models on several types of vital information allows later analysis, for example, by using Electronic Health Records to further give predictive warnings and suggestions for patients [2].

In the future, even more devices using AI technology can be supported. Especially devices in the consumer market, e.g., „wearable health devices" such as the Apple Watch[1] or the Oura Ring[2] can use AI technology to help users get even more detailed information about their health and suggest changes in their respective lifestyles.

2.2 AI in Transportation and Urban Infrastructure

Another sector that is and will probably undergo one of the most drastic transforamtions driven by AI technologies is the sector of (personal) transportation and urban planning structure. One of these technologies is the autonomous vehicles (AVs) sector [4]. AVs are still under development, but recent achievements have made this technology more relevant than ever. Car manufacturers like Tesla[3] and many manufacturers in China are continuing to develop more advanced automated vehicle movement,

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[1]apple.com/watch

[2]ouraring.com

[3]tesla.com

allowing passengers to drive completely autonomously on public streets. To achieve this autonomous driving, object recognition, path planning, and behavioral prediction technology are needed [4].

Regarding smart cities, AI has the ability to support planning through real-time traffic flow optimizations, energy management, and infrastructure planning [5]. By dynamically adapting traffic signals, trained models can reduce congestion. Furthermore, the usage of AI in public transit systems can improve scheduling and potential resource allocation, improving traffic congestion even further.

2.3 Challenges and Ethical Considerations

Despite what AI promises for our future and the economy, it also introduces quite a large amount of significant ethical, legal, and societal questions. Lack of transparency, price concerns, and potential biases of algorithms, together with the not-so-profound understanding of how many of these models actually work, allow for valid reasons why AI deployment should be critically looked at [6]. In addition to that, the question of who is in control and accountable for actions arises. Content generation and so-called „Deepfakes" are just some of the many ways that help people spread misinformation across the world. Therefore, establishing and creating robust regulations for ethical standards in use with AI is key for a sustainable future with AI [6].

3 Conclusion

Artificial Intelligence is not just a trend but a foundational technology steadily transforming every significant aspect of modern life. AI's influence on future technologies is profound and far-reaching, from revolutionizing healthcare through predictive diagnostics and personalized treatment to reshaping urban environments and transportation systems with autonomous vehicles and smart infrastructure. However, with great potential comes significant responsibility. The ethical, legal, and societal challenges that AI introduces, ranging from bias and misinformation to data privacy and accountability, must be addressed through robust regulation and thoughtful design. A balanced approach that embraces innovation while safeguarding human values will be essential as we move forward. The future of AI is not only about what it can do but also about how we choose to shape it.

Bibliography

[1] "ChatGPT by OpenAI." [Online]. Available: https://chatgpt.com/

[2] Junaid Bajwa, Usman Munir, Aditya Nori, and Bryan Williams, "Artificial intelligence in healthcare – transforming the practice of medicine." [Online]. Available: https://doi.org/10.7861/fhj.2021-0095

[3] A. Aleid, K. Alhussaini, R. Alanazi, M. Altwaimi, O. Altwijri, and A. S. Saad, "Artificial Intelligence Approach for Early Detection of Brain Tumors Using MRI Images." [Online]. Available: https://doi.org/10.3390/app13063808

[4] D. Parekh *et al.*, "A Review on Autonomous Vehicles - Progress, Methods and Challenges." [Online]. Available: https://doi.org/10.3390/electronics11142162

[5] T. W. Sanchez, H. Shumway, T. Gordner, and T. Lim, "The Prospects of Artificial Intelligence in Urban Planning." [Online]. Available: https://doi.org/10.1080/12265934.2022.2102538

[6] Daria Korobenko, Anastasija Nikiforova, and Rajesh Sharma, "Towards a Privacy and Security-Aware Framework for Ethical AI – Guiding the Development and Assessment of AI Systems," *Association for Computing Machinery*. [Online]. Available: https://doi.org/10.1145/3657054.3657141