Anatomy of an AI System

“Anatomy of an AI System” is a critical research project that examines the lifecycle of an AI system, specifically focusing on the Amazon Echo device. It was published by two authors Kate Crawford, a researcher in the field of social and political implications of AI, and the data visualization artist and researcher Vladan Joler in 2018. The project aims to raise awareness about human labor, planetary resources, and data involved in the development, usage, and disposal of AI technologies.

The project comprises a large infographic and an essay, both freely accessible in the web. The research was also published in a peer-reviewed article and the diagram and the text are also on display in various renowned museums, such as the MoMA in New York and the Victoria Albert Museum in London.

The project emphasizes the significant physical labor required to develop and sustain AI technologies. This labor encompasses various roles and individuals involved in the production of devices, such as miners, assemblers, and distributors, as well as in the development and maintenance of machine learning algorithms, e.g. developers and data labelers. The project draws attention to the social inequalities within the production processes, emphasizing disparities in wages and working conditions.

Additionally, the project examines the role of users of AI systems. Users not only consume the product but also contribute to training the algorithms by providing feedback and data to the Amazon Echo. Users effectively become part of the product, as their data is collected and utilized to create new products that Amazon will sell to future customers.

The project also addresses the environmental impact of AI systems, referring to the idea to consider media technologies within the context of geological processes that underlie their production and maintenance. The authors emphasize the short lifespan of devices constructed using rare materials, such as lithium, a resource with significant environmental implications. Furthermore, the transportation of these materials and the subsequent distribution of devices contribute to carbon emissions through shipping and logistics operations. The energy consumption required to power and cool the servers used for AI computations and data storage is another aspect highlighted by the project, as it adds to the carbon footprint and exacerbates climate change.

Further, the text discusses the implications of the machine learning algorithms behind, and data gathered by the Amazon Echo. It highlights, that despite a widening use of machine learning in many fields, the costs

associated with training and maintaining large machine learning models are very high. contributes to power imbalances, as only a few tech companies can afford the training and maintenance of large and powerful AI models. The project also questions the limits as to which mapping of reality by AI system is advantageous and questions the modeling of inner mental states by AI. It further stresses the potential for bias in training data, which can further exacerbate social inequalities around the world.

While the project focuses on the negative aspects and challenges associated with AI technologies, it does not provide an analysis of the potential positive aspects that AI can have across various domains. The project also doesn't discuss specific guidelines or measures which could help to improve a fairer, targeted, and sustainable use of AI systems, which have become part of our daily lives. Additionally, the project does not explore whether the processes it uncovers are unique to AI systems or if they are inherent to the production of many other products within our globalized society.

Besides these limitations, the project has received mainly positive reviews and sparked a public discussion on the social and ecological implications of AI systems. The project's multi-faceted approach, utilizing various media formats, such as the text and the visualization, the peer-reviewed journal, and the museum displays, allows it to reach and engage individuals from diverse disciplines and backgrounds. By using this diverse range of mediums, Crawford and Joler open up a common ground of discussion for a wide range of stakeholders, including policymakers, industries, and individual users for the reflection on this societal challenge. Kate Crawford further expanded the discussion on the ideas presented in this project by publishing more details on the societal implications of AI in her new book "Atlas of AI".

Overall, the Anatomy of an AI System started an ongoing conversation about the development and deployment of AI systems. By providing a comprehensive overview of the different components involved in AI systems, the project highlights the need for greater transparency and accountability in their development and deployment and demonstrates the importance of interdisciplinary collaboration in the field of AI research.

Handout by Pia Francesca Rissom as part of the Responsible Data Science course. May 2023.

Reference to project: Kate Crawford and Vladan Joler, "Anatomy of an AI System: The Amazon Echo As An Anatomical Map of Human Labor, Data and Planetary Resources," *AI Now Institute and Share Lab*, (September 7, 2018) https://anatomyof.ai