


Chapter 8

Role of AI in Modern Academic Research

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ABSTRACT

AI is fast transforming the conduct of scholarly work across the methodological, analytical, collaborative, and innovative spectrum in contemporary academia and scholarship across fields of study. This chapter gives an account of the current use and future trends of AI in scholarship thereby laying the foundation for the subsequent sections of this book. It discusses how AI can help on hypothesis generation, data acquiring and curating, data analysis, experimentation, and cross-theme working with other disciplines. In addition, this chapter analyses ethical issues like transparency, bias, accountability, and participatory access that are crucial in the course of pursuing legitimate AI solutions. AI at the future perspective emphasizes new technologies like Enhanced NLP, XAI, AI-powered simulation, Robotics, and Predictive analysis. The findings of this chapter will be useful to scholars, policy makers, and educators who seek to implement the promises of AI in a socially beneficial way.

8.1 INTRODUCTION

Artificial Intelligence or AI is already touching everybody's life and no more restricted to being a geek's plaything; its reach spans different domains of human activity inclusive of academe and research. From hypothesis formation and prediction to data analysis and data interpretation, interdisciplinary communication, and controversy, the use of AI is completely transforming the system and structure of research in the academic institution. However, it is important to highlight that application of AI in research has the benefits that is mostly about promising but it discusses often such issues as transparency, fairness, and ethical as well as responsible utilisation of AI. As it has been intended this chapter has been meant to offer on one side, an account of the opportunities that AI offers to the academic research and, on the opposite side, point out the drawbacks related to the AI Technologies by giving an interdisciplinary overview on how and where AI is now and, possibly where it is going. The objective of the current chapter is to comparatively analyze the possibilities of AI-infrastructures to current paradigms in research, assess ethical implications of such infrastructures, and anticipate the promoting usage of

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AI technologies into several scholarly fields. It is both technological and contextual: aspects which are ethical or interdisciplinary, the socio-technical transformative parts and roles of the AI-supported research instruments. Thus, this book chapter's purpose is to talk about AI in connection with exhibiting what roles the different approaches to integrating artificial intelligence are playing in the present academic work. AI will not be part of a toolbox that refines the current methodology but a new way of getting at a problem, formulating hypotheses, testing, and interpreting data. Hence, this chapter seeks to define the AI as the IMC-relevant agent by assessing its existing uses, potential, risks and general concerns within various fields.

8.1.1 AI in Modern Academic Research

Artificial Intelligence (AI) has gradually moved from technology and theoretical approach of computer science to a basic platform on which contemporary academic investigation is underpinned.

This is the main and most general definition of artificial intelligence: AI is the fields and subfields involved with creating machines that can perform the same tasks Humans do, including things like learning, reasoning, solving problems and recognizing patterns.

AI application becomes increasingly increasing in research as evidence by the theme; challenges as well as solutions that revolves around it would benefit all fields of science, economy, and society (Venkatasubramanian, Bliss, Nissenbaum, & Moses, 2020).

8.1.2 Key Developments in the Integration of AI into Academic Research

The integration of AI in academic research can be traced through pivotal developments:

- **Data Availability:** Big data the excess of information has become both a blessing and a curse for traditional statistical methods. The primary sub-discipline of AI most relevant to these scenarios has been the capacity to extract information from large and diverse datasets (Lipkova et al., 2022).
- **Machine Learning Techniques:** Supervised, Unsupervised and reinforcement learning are now at the core of most of the AI research. These enables the researchers to forecast future occurrences, find a pattern in data, categorize information, or even model occurrences.
- **Computational Power:** AI's advancement is mainly attributed to the accelerated growth in computing power such as distributed computing and GPUs (Graphics Processing Units), so that the researchers can train AI models effectively.
- **Interdisciplinary Collaboration:** The contemporary academic scholarship is significantly interdisciplinary. AI helps to enhance collaboration through converting and sharing insights and methods across disciplinary frameworks for innovative research paradigms to be developed.

8.1.3 Objectives of the Chapter

Consequently, the fundamental intention of this book chapter is to offer a state-of-the-art review of AI applications to present-day academic research. This is not just an analytical probe but the new way of how the researchers think about a problem and countries in particular, how they formulate hypotheses, design experiments, and analyze outcomes. This chapter aims at outlining the role of AI as a broad

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