

***ARTIFICIAL INTELLIGENCE IN RESEARCH AND ITS
ADVANCEMENTS***

Mrs. Shweta Patel

Assistant Professor

Institute: Sardar Patel College of Commerce, Bakrol

Abstract

The rapid development of Artificial Intelligence (AI) has significantly transformed the research landscape across disciplines. AI-driven tools and techniques enable researchers to process vast data sets, automate analytical tasks, and generate insights with greater speed and precision than conventional methods. This paper explores the growing role of AI in research, examines recent technological advancements, and evaluates its benefits and limitations. The study also highlights ethical considerations and future directions, emphasizing AI as a supportive partner in advancing human knowledge rather than a replacement for human intellect. AI-powered technologies, such as machine learning, natural language processing, and predictive analytics, are reshaping commerce by enhancing customer experiences, optimizing supply chains, and improving marketing strategies. In management, AI facilitates data-driven decision-making, automates routine tasks, and aids in financial forecasting, workforce management, and strategic planning.

Keywords: Artificial Intelligence, Research Innovation, Machine Learning, Data Analytics, Research Advancement

Introduction

Research is fundamental to innovation, economic development, and societal progress. However, traditional research methodologies often struggle with increasing data volume, complexity, and time constraints. Artificial Intelligence (AI) has emerged as a powerful technological solution to these challenges by enabling machines to learn, reason, and make data-driven decisions.

In recent years, AI has been increasingly adopted in academic, scientific, medical, and business research. Through intelligent algorithms and computational models, AI supports researchers in discovering patterns, testing hypotheses, and improving research outcomes.

This paper aims to analyze the contribution of AI to research and examine how recent advancements have enhanced research efficiency and quality. In the field of Research, AI contributes to more informed and timely decision-making by providing real-time data analysis, trend forecasting, and performance monitoring. It enables organizations to streamline administrative functions.

Types of AI Used in Research

Artificial Intelligence in research refers to the application of intelligent systems that can simulate cognitive functions such as learning, problem-solving, and decision-making. Unlike traditional software, AI systems improve their performance over time by learning from data. There are different types of AI, depending on its level of intelligence, AI can be broadly categorized as Artificial Narrow Intelligence (ANI) or weak AI, Artificial General Intelligence (AGI) or strong AI and Artificial Super intelligence (ASI) (Elbaih, 2023).

AI tools are designed to solve limited task. Examples of weak AI include generative AI such ChatGPT, Gemini, Meta AI and Google Bard; Voice assistants such as Alexa, Google Assistant, Amazon's Alexa, Apple's Siri, image recognition software and recommendation systems. They are often programmed to perform a designated task with high efficiency (Chatterjee, 2020). However, this kind of AI is limited in scope and cannot re-use learned knowledge across different domains. Similarly, weak AI cannot function without human interaction (European Commission, 2020).

On the other hand, strong AI, also referred to as artificial general intelligence (AGI), possesses the capability to perform most, if not all, cognitive functions that human can do and can apply intelligence to various problems, not limited to a specified domain. This system possesses the ability to learn, understand, and apply knowledge across a wide range of task. This kind of AI is believed to understand human motivation and reasoning (Chatterjee, 2020). The goal of this kind of AI is simply to replicate human kind of intelligence capabilities. Although, true AGI is yet to be fully achieved, their development constitute fear that machine will some days replace human since they pose the capacity of exist independent of humans. Another proposed category of AI is the ASI which is perceived to have the ability to exceeds the cognitive ability in almost every aspect of life. It is believed that such AI will surpass even the brightest thinker with extreme level of problem solving abilities. However, Elbaih (2023) noted that such innovation exist only in the domain of science fiction

AI Tools for research activity**Identify research problem:**

Scholar AI, research Rabbit, ChatGPT are used to identify areas lacking sufficient research; that detect gap in existing studies and research area where researcher want for further study or research.

Review Literature

ChatGPT, Quillbot, Summarize Bot, Semantic Scholar, Research Rabbit, Prowess IQ are used to list available literature in a given area of research and summarise literature will help researcher for further study and save a time.

Develop Research Topic

ChatGPT, Google Scholar, Research Rabbit also help to brainstorm and suggest titles of research topic among that researcher can choose the relevant topic for further study will help to post graduate students for the project.

Develop research question

ChatGPT, Research Rabbit help researcher to, Brainstorm research ideas, formulate clear research question to collect the primary data from the respondent.

Data collection

Kobotoolbox, Textract, ChatGPT Automating that help to identify data collection process.

Writing

ChatGPT, Grammarly Generating contents, grammar check, punctuation, style check will help for academic writing.

Conclusion

Grammarly, ChatGPT, Bard, Generate Concise and accurate abstracts will help researcher to find conclusion from the collected primary and secondary data.

Referencing

Mendeley, EndNote Refwork CiteMate are Managing references, citation and generating citation in various formats.

Applications of AI in Research

The integration of AI into research has opened up a world of boundless possibilities to researchers, particularly post graduate students. AI help to save the time of the researcher in doing repetitive task. Starting with problem identification to conclusion including formatting the reference list. A typical academic research paper may have the following structure depending who the discipline, journal or institution where it is being carried out; In each of the stages highlighted in Figure 1, AI can assist the researcher. AI should be seen as a tool for researchers and not as an alternative in engaging in research exercise. In doing this, several AI tools may prove useful to the Researcher. The commonest among them is the virtual assistants such Amazon's Alexa, Apple's Siri, Google Assistant. For convenience, Virtual assistants can be categorized as follows; Voice assistants (e.g. Alexa, Google Assistant). Second, Chatbots (e.g. ChatGPT, Gemini, Meta AI and Google Bard). The starting point for research is identifying a gap or a problem that require investigation, this is accompanied by defining the scope usually expressed in the title and developing research questions to guide the study. With the right prompt, AI can be useful in achieving any of these goals. AI tools such as ChatGPT, Bard, and Gemini can be relied on to make suggestions of relevant title to a research paper by analysing the content of the work. Similarly, ChatGPT can help to identify possible gap in given area of research. More often, the responses from these Large Language Models (LLM) are remarkable. Similarly, AI tools can as well suggest literature in your area of research from which the literature review can be written. Also, some AI can perform task like summarising literature

Conclusion:

AI tool in research help to save the time of the researcher in reading tons of literature. AI can simply summarise the key point in the literature thereby saving time for other task. Artificial Intelligence has become an indispensable component of modern research. Its continuous advancements have improved research efficiency, accuracy, and innovation across disciplines. While challenges remain, the responsible and ethical use of AI can significantly contribute to the advancement of knowledge and societal development

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