Chapter 18
The Evolution of AI and Data Science

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ABSTRACT

The history of artificial intelligence (AI) and data science has their origins in the 1940s and 1950s respectively. However, it has been through many changes throughout its history. AI is a vast and fascinating subject. There are many more elements to discover and understand. This chapter aims to outline the history of AI and data science, from its origin to its current developments. It will also explore the ethical considerations within AI and data science, such as bias and fairness, transparency, data privacy, etc. In the end, the chapter sheds light on the ethical concerns regarding the implementation of AI and the security concerns that data science poses. The chapter also provides insights into the role of individuals, government, and society in mitigating these issues. This chapter aims to furnish the reader with the scientific foundation and essential understanding required for embarking on the journey to comprehend the realm of artificial intelligence and data science.

INTRODUCTION

Modern society is heading towards a remarkable technological explosion fuelled by Artificial Intelligence (AI). Many scientists believe that we will soon witness a sudden technological leap, leading to what is commonly referred to as technological singularity[1] and the emergence of superintelligence[2]. For instance, experts anticipate breakthroughs in areas like natural language processing and data science that could significantly surpass current capabilities. This rapid technological advancement signifies the growth that may surpass human control, a notion raising profound concerns among researchers and engineers. While superintelligence and singularity still may be the subjects of fiction, the capabilities of our current AI technologies are not to be underestimated. The ethical concerns they raise in today's context demand the utmost attention and corrective measures. This chapter aims to delve into the current ethical challenges of AI deployment, using concrete examples, and address the privacy and security risks associated with data science.

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Throughout history, human beings have gone through several technological advancements. The invention of the wheel, metal, electricity, and the computer and internet. These technological advancements brought prominent changes in our lifestyles. The most influential and latest of all technologies is AI. AI is the branch of Computer Science that deals with systems capable of solving problems and adapting to new environments by learning, understanding, and applying knowledge from past data. AI plays a crucial part in the modern society. Our lives depend on AI, from virtual assistants like Siri, Alexa, and Google Assistant to driverless cars and disease diagnosis. AI technology is a relatively newer technology in the field of computer science. The history of AI development has had several ups and downs and fallbacks. However, the true breakthrough came with the emergence of Machine Learning (ML). It enabled systems to learn from past data and make predictions without explicit programming. This shift began a new era where AI systems could understand and improve their performance over time. On the other hand, data science evolved alongside AI as a separate branch. The increasing volume and complexity of data generated by various sources propelled its growth. Data Science is an interdisciplinary field that collects, screens, and analyzes structured or unstructured data to extract essential information that helps solve various problems. During the initial stages, data science was based on statistics and data analysis, which evolved to include machine learning, big data, and advanced analytics. The beginning of AI and Data Science dates back to the mid-1900s when the concept of machine learning and data analysis began to take shape. Over the years, computing power and increased data availability have propelled AI and data science to new heights.

AI and data science represent two distinct branches within the realm of computer science, both emerging and evolving nearly during the same timeframe. These two fields have developed together, attaining prominence as pivotal technological advancements. The interconnection between Data Science and AI is evident in the present scenario, with AI benefiting from enhanced capabilities through data analysis. Conversely, these refined iterations of AI contribute to optimizing Data Science processes, thereby fostering a symbiotic relationship between the two domains.

BACKGROUND AND LITERATURE REVIEW

Before advancing further, it is essential to have a foundational understanding of AI and Data Science. This section guides readers through crucial moments and significant advancements, establishing the groundwork for a thorough understanding of these fields' intricate paths. This section will explore scholarly works, research papers, and other authoritative sources related to AI and Data Science. By reviewing these diverse data sources, readers can better understand the foundational concepts underlying AI and Data science. By acknowledging the varied origins, contextual intricacies, and essential discussions within AI and Data Science, this section seeks to cultivate a nuanced viewpoint, recognizing the unique contributions that have shaped today's technological innovation landscape.

Artificial Intelligence

The idea of Artificial Intelligence is as old as humanity itself. We have almost always dreamt of making something that can match our intelligence. So, marking the exact start of AI in the historical timeline takes time. However, AI was officially recognized as a research discipline in 1956 (Moor, 2006). Computer Scientist John McCarthy coined the term 'Artificial Intelligence' at the 1956 summer conference held