Chapter 1
Artificial Intelligence and Its Role in Information and Communication Technologies (ICT): Application Areas of Artificial Intelligence

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ABSTRACT

Artificial intelligence has become the most rapidly developing technology of our time. This chapter provides a detailed introduction of artificial intelligence, history of AI, and key components of AI. Recent advancements in machine learning, deep learning, natural language processing, and computer vision have made it possible to create AI systems that can perform tasks that were previously thought to be the exclusive domain of human intelligence, and it has become important to understand its role in ICT and the potential benefits and concerns associated with its use. The chapter is also providing a detailed overview of recent advancements in ICT and applications of AI, including machine learning, the development of deep neural networks, natural language processing, computer vision, reinforcement learning, and unsupervised learning.

INTRODUCTION

In this modern era of the world, it has been compulsory to use the computers in our daily lives just like other basic needs of the human beings. Therefore the term

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"Artificial Intelligence (AI)" is basically the creation of machines which can perform tasks that typically require human intelligence, such as Visual Perception, Speech Recognition, decision-making and Language Translation etc. The AI based systems are designed in such a way that they can learn from data provided to them, recognize patterns, and making decisions based on that data. These Artificial Systems provides the results as accurate as human can deliver.

These systems are planned and produces which undertake and analyze large amounts of data, produce information from that data and use this information to make predictions, recommendations, and decisions. The system can be designed by using machine learning algorithms, which enable them to learn and improve their performance over time.

Artificial Intelligence can be categorized into two groups: narrow or weak AI and general or strong AI. Narrow AI is designed to perform a specific task, such as playing chess or driving a car, while general AI is capable of performing any intellectual task that a human can do.

There are several techniques used to create AI, including *machine learning, natural language processing, computer vision,* and *robotics*. *Machine learning* is a technique that enables machines to learn from data, without being explicitly programmed, and improve their performance on a task over time. *Natural language processing* allows machines to understand, interpret, and generate human language. *Computer vision* enables machines to interpret and understand visual information from the world around them, while *robotics* combines machine learning, computer vision, and other techniques to create intelligent machines that can interact with the physical world.

AI is latent to transform many industries, from healthcare and finance to manufacturing and transportation. However, there are also concerns about the impact of AI on jobs, privacy, and security. As such, it is important to carefully consider the ethical and societal implications of AI as it continues to develop and become more integrated into our daily lives.

HISTORY OF AI

The concept of Artificial Intelligence was introduced in 1950s, when researchers began to investigate the possibility of making machines that could act, think, behave and learn like humans. Across the years as shown in Figure 1, this research area has experienced significant advances and setbacks, leading to the development of new trends, techniques and advance technologies that have enabled AI to become increasingly sophisticated and useful in a wide variety of applications areas. (Haenlein, 2019). These are some key milestones in the history of AI as shown in Figure 1.