Chapter 4
A Breakthrough With Machine Learning in Real-Time Environments

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ABSTRACT

Over the past few years, machine learning (ML) has seen potential growth globally and has contributed a huge role in technological advancements. With improved learning mechanisms, the ML algorithms have provided huge breakthroughs and enhancements in solutions for the real-time global challenges that persist. With large amounts of digital data evolving each day, ML algorithms have evolved as the right-to-go approach, to provide technological breaks though by overruling the traditional methods. The chapter aims to briefly review the overview of ML algorithms and highlight the different applications under various segments where ML has contributed to providing breakthrough solutions. The applications that are to be discussed from different segments are healthcare, businesses, government, security, agriculture, industry, and the educational sector. The objective of the chapter is to provide the readers with a better understanding of how ML applications are used in different segments and the advancements it brings to modern technology.

1. INTRODUCTION

Machine learning has brought a breakthrough in today's scientific world. It is one of the most in-demand technologies that technical experts are looking into. Its diverse capability of providing breakthrough solutions across multiple domains has created a huge demand for Machine Learning skills across the globe. The prominent usage of these Machine Learning algorithms in various segments includes classification methods such as detection of tumors, chatbots, recommendation systems, customer segmentations, elderly care monitoring, healthcare systems, and so on. The significance of ML is that it could work better with large amounts of data, and can provide better Decision Making on different application domains on

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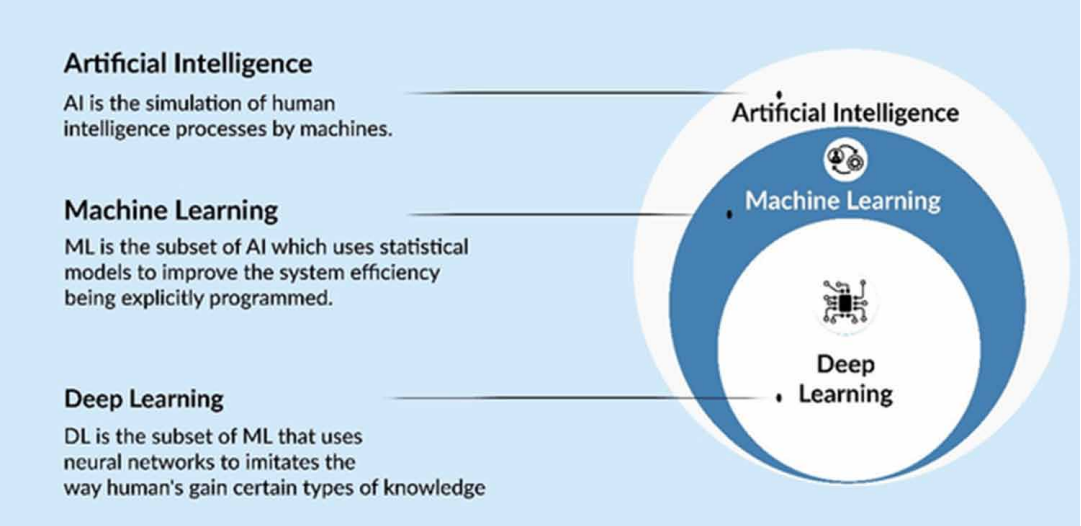
proper training. ML algorithms are of many types and can be applied to the data based on the necessity and application type. More about ML algorithms are briefed later in the sections below. Different ML algorithms fall under different categories of Machine Learning methods for different applications. For example, Machine Learning uses prediction for forecast sales which come under supervised learning, customer segmentation in unsupervised learning, and self-driven cars in reinforcement learning.

In general, Machine Learning can be termed to be a subset of artificial intelligence (AI) and deep learning (DL) is termed to be a subset of ML. The relationship between the three is illustrated in Figure 1.

The ground understanding in ML is to build a machine (i.e. system) that is self-intelligent to take actions (or decisions) that learns from the data using a defined algorithm. Since the machine learns from the data, to build the model, the input data plays a major role in determining the efficiency of the system. The system or machine or model is built by learning the input data. To add more clarity to the ML understanding let's figure out the answers to the questions below in a few lines.

Figure 1. Demystifying AI, ML and DL



Q1: How does learning happen in ML?
Q2: How much data should it learn?
Q3: Are all the models built, are learned using the same method?

The answers to the Q1 is,

A1: The learning is happening through ML algorithms while training the input data to develop the model. Also, the learning procedure is different based on the learning methods.

The answer to Q2 is,

A2: More the data it learns, the more the accuracy and better the system.