

Chapter 11

Convergence of AI, ML, and DL for Enabling Smart Intelligence: Artificial Intelligence, Machine Learning, Deep Learning, Internet of Things

Revathi Rajendran

SRM Valliammai Engineering College, India

Arthi Kalidasan

SRM Valliammai Engineering College, India

Chidhambara Rajan B.

SRM Valliammai Engineering College, India

ABSTRACT

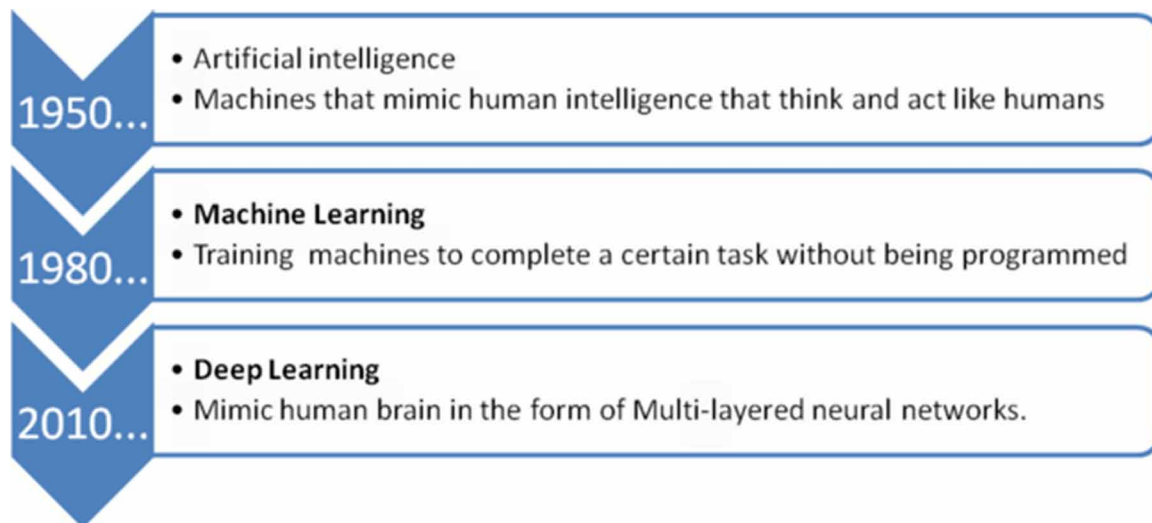
The evolution of digital era and improvements in technology have enabled the growth of a number of devices and web applications leading to the unprecedented generation of huge data on a day-to-day basis from many applications such as industrial automation, social networking sites, healthcare units, smart grids, etc. Artificial intelligence acts as a viable solution for the efficient collection and analyses of the heterogeneous data in large volumes with reduced human effort at low time. Machine learning and deep learning subspaces of artificial intelligence are used for the achievement of smart intelligence in machines to make them intelligent based on learning from experience automatically. Machine learning and deep learning have become two of the most trending, groundbreaking technologies that enable autonomous operations and provide decision making support for data processing systems. The chapter investigates the importance of machine learning and deep learning algorithms in instilling intelligence and providing an overview of machine learning, deep learning platforms.

INTRODUCTION

Rapid human growth has created an imperative need of smart technology for effective enhancement of every aspect of urban living in daily life. A lot of data is being generated by smart devices and sensors connected to the internet requiring skills for the analyses and management. Traditional techniques on large datasets can take a considerable amount of time creating an urge to develop an artificial intelligent system to perceive data from the environment and turn into action without any human intervention with optimal precision. In 1950s, Alan Turing, British polymath explored the mathematical possibility of artificial intelligence. Humans use all available information and reason for solving problems and making decisions. A question arises about why machines cannot do the same thing as humans? In seminal paper Computing Machinery and Intelligence, Turing discussed how to build intelligent machines and how to test their intelligence which leads to the evolution of AI and further Machine learning and deep learning as shown in Figure 1.

Artificial intelligence (AI), a mimic of human intelligence, attempts at simulation of human intelligence and produces a new intelligent machine that would have the ability to process information with human consciousness, behavior, and thinking integrated with appropriate algorithms. AI has been applied in many fields, such as Image Analysis, Natural Language Processing (NLP), Robotics, interactive computer games, multiuser virtual environments and Expert Systems. AI can be classified as Narrow AI and Strong AI. Narrow AI is an AI system that is intended for a particular task and a Strong AI with generalized human cognitive abilities, is capable of providing solution to any problem without human intervention even for an unfamiliar task.

Figure 1. Evolution of Smart Intelligence



Artificial intelligence brings welcome changes in automation of the tasks in all the processes and systems, by making them faster. AI technology enables machines to have cognitive functions for making devices smart and autonomous by learning and adaptation based on the data acquired. Instilling intelligence to make smart machines greatly reduces human efforts and time complexity. ML platforms

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