**Chapter 1**

**Introduction**

* 1. **Introduction**

Since the invention of the wheel, humans have always tried to reduce the load and burden of human effort. After the wheel was invented it opened up venues for transportation which included transporting humans, animals, food items, etc. throughout the world. This led to the discovery of gears leading to the invention of cars and automobiles. Just as the discovery of wheels started the industrial revolution, in the same way, the discovery of the “Difference Machine” by Charles Babbage [1] started the revolution in the field of using computers to automate and calculate large calculations in the field of science, mathematics, business and much more.

The concept of automation led to a curious start in the field of machine learning. “Making machines learn and do things on their own”, can be understood as a layman’s definition of machine learning. The sole focus of a machine learning system is to learn to automate the learning process [2]. Refining the algorithms and the observation that the machine learns to improve the future prediction over time.

Machine learning in itself is a concept modeled in parts, after the human brain. One of the earliest works done in this field was by Donald Hebb in 1949, in his book titled “The Organization of Behavior” [3]. After this one of the most influential works that kick-started the machine learning field was given by one of the most prominent personalities, Alan M. Turing. “Computing Machinery and Intelligence” is one of the key papers published by him in 1950, raised the question of “Can machines think?” [4].The paper argued that there isn’t any argument that can convince us that machines don’t have the ability to think like humans. The “Turing Test” designed by Alan Turing himself was the one that came up with the concept of identifying whether the answer given to a specific question is by a machine or a human being. Fig 1.1 illustrates the timeline of evolution of the field of machine learning and artificial intelligence.

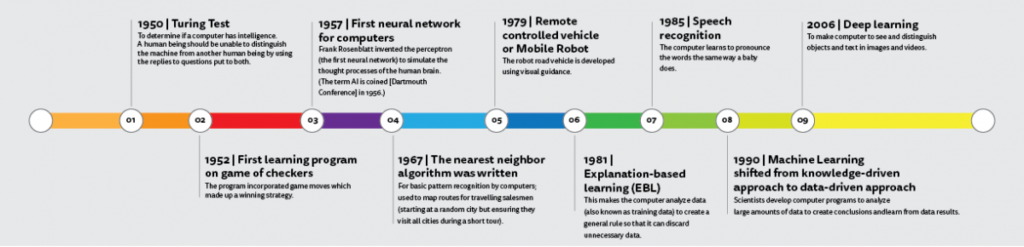


Fig 1.1 Evolution of the field of machine learning and artificial intelligence as we know it to date [5]

In the year 1952, Arthur Samuel from IBM developed a program to play checkers. In the year 1955, John McCarthy, a professor emeritus from Stanford coined the term “artificial intelligence” [6]. Keeping in conjecture to the history of the field of machine learning, in the year 1957, Frank Rosenblatt is credited with the work of the first-ever model of a computational unit modeled exactly like the brain and is best known by the name “Perceptron” [7]. The “Perceptron” can be thought of as the stepping stone for the creation of what we today know as an “Artificial Neural Network”. In the