0.1 History of AI

The breakthroughs of AI are predominant, and its importance in our everyday life is undeniable. The interest in the area grew immensely with all the Turing's theoretical research, the proposal of the first mathematical Artificial Neuron model in 1943 by Warren McCulloch and Walter Pitts [8] or the first successful Artificial Neural Network (ANN) by Belmont Farley and Westley Clark [2]. However, only in 1956, during the *Dartmouth Summer Research Project on Artificial Intelligence* [7], was the term "Artificial Intelligence" was firstly proposed by John McCarthy *et al.*, beginning what is now considered to be the birth of AI [15].

The succeeding two decades following the Dartmouth conference were filled with important developments. The 1959 General Problem Solver implemented by Allen Newel *et al.* [10] or Joseph Weizenbaum's ELIZA (1964), a natural language processing tool [14]. Unfortunately, part of the interest and development around AI met an unforeseen fade after the 1969 book *The Perceptron: A Probabilistic Model for Information Storage and Organization in the Brain* [9] that reported the incapability of ANN to solve linear inseparable problems. However, the authors failed to consider other solutions already proposed that solves the linear inseparability, such as the 1965 implementation, by Ivakhnenko and Lap, of what is considered to be the first deep learning network Ia [3].

In 1979, Kunihiko Fukushima introduced the first Convolutional Neural Network (CNN), and ten years later, Yann LeCun *et al.* applied to for the first time Backpropagation [5] to a CNN, creating what is now a pillar for most of the modern competition winning networks in computer vision [11]. The study on Neural Networks continued with special attention to CNNs due to their great performance in image related tasks when compared to others networks [6]. Some relevant examples: in 2003 the MNIST record was broken by Simard *et al.* [12] and, in 2011, a GPU implementation of a CNN [1] achieved superhuman vision performance [13]. To supplement even more the importance of CNNs and GPUs, only a year later, Alex Krizhevsky *et al.* proposed a Deep CNN trained by GPUs and became the first one of this type to win the ImageNet Large Scale Visual Recognition Challenge (ILSVRC) [4]. The year of 2012 was very important for Deep Learning, CNNs and Computer Vision, beginning what's considered to be the start of the new wave, we're currently in, of interest in Artificial Intelligence.