The term, artificial intelligence has been a popular buzzword over these recent years, AI developments like ChatGPT, have been mind-blowing for some. Many people believe that the concept of Artificial Intelligence is very new, however, that is not the case, AI development has been around for over 50 years.

The birth of the term, Artificial Intelligence, happened at the 1956 Dartmouth Research Conference, organized by John McCarthy, with notable individuals such as Marvin Minsky, and Herbert A. Simon. This was a conference for scientists and mathematicians to come up with ideas to improve the field of Computer Science. In his proposal, he stated that every aspect of learning or any other element of intelligence could be replicated by a machine (Dartmouth College,2023). The 1956 Dartmouth Conference was the catalyst for AI research.

A group of men sitting on the grass

Description automatically generated

Machine learning is a concept used to achieve artificial intelligence. In 1959, Arthur Samuel, an American Computer Scientist coined the term Machine Learning. Machine learning is defined as the science of getting computers to act like humans, and improving their learning over time, by feeding the computer data and information (Nguyen, 2019). The first ever machine learning algorithm was developed by Frank Rosenblatt, a Psychologist from Cornell University. He was motivated to figure out a way that a machine could mimic some processes of the brain. He developed an algorithm called the Perception; it was a single layer neural network that was used to classify two outcomes (Lefkowitz, 2019). Marvin Minsky published a paper called,” Perceptrons”, that criticized and mentioned the limitations of having a perceptron or neural network that only had one layer (Schmidhuber, 2013).

A diagram of a cell division

Description automatically generated

Two soviet researchers, Alexey Ivaknenko and Valatin Lapa, published a paper, titled, “Group Method Data Handling”, that established an early form of multi-layer perceptron, which is a perceptron that had more than one hidden layer, each layer had a nonlinear activation function (Schmidhuber,2013). To many this was considered the birth of deep learning.

The first time Backpropagation was introduced was in 1970 by Seppo Linnainmaa, it was a more effective way to minimize the cost function loss in a neural network instead of using gradient descent. In 1974, Paul Werbos was the first individual to efficiently apply the concept of backpropagation in his PhD thesis paper (Schmidhuber,2022). Backpropagation is a popular tool to train neural networks, this is done by using error feedback to adjust the parameters and weights of the neural network (Wythoff, 1992). This was a very significant moment in AI history because it was an effective way to increase the accuracy for prediction.

A diagram of a backpropagation

Description automatically generated

Between the years 1974 and 1980 were considered the AI winter. AI winter was a time where the research in AI was limited, and there was a lack of funding. Reports came out stating that the field of AI did not lead to impactful discoveries that were promised (Hendler,2008). Thankfully, “Learning by Backpropagating errors” by Rumelhart et al., ended the AI winter, by reviving the interest of AI research field. This paper demonstrated real world applications of the use neural networks and the backpropagation algorithm (Rumelhart et al., 1986).

The introduction to LTSM, a type of recurrent neural network, was introduced by Sepp Hochreiter and Jurgen Schmidhuber in 1997. This advancement improved natural language processing like speech recognition. It was designed to overcome the backflow errors of the recurrent neural networks in the past. According to Schmidhuber and Hochreiter, LTSM was considered an efficient gradient-based algorithm (Hochreiter & Schmidhuber,1997). Another notable event was the Optical Character Recognition, developed by Bottou et al. This introduced an algorithm called GTN, it was a variation of a convolutional neural network used for handwriting recognition. This algorithm was able to recognize bank statements like checks and achieve high accuracy (LeCun et al., 1998).

The Deep Learning paper of 2006 by Hinton et al., and ImageNet by Deng et al. of 2009, both played prominent roles in the evolution of Deep Learning and Artificial Intelligence The ImageNet was able to accurately detect and classify millions of images (Deng et al., 2007), the Deep Learning paper showcased an optimal way to reduce the dimensionality by training a multilayer neural network with a small central layer to reconstruct high-dimensional input vectors (Hinton et al., 2006).

Then, Alexnet of 2013 and Resnet of 2015, introduced the ability to train extremely deep convolutional neural networks the ability to train effectively and efficiently. These had a significant impact on the field of computer vision. Also, Alexnet introduced the effectiveness of the ReLu activation function (Anwar,2019).

A graph with a line

Description automatically generated

Lastly, in 2017, AlphaGo Zero an AI beat South Korean Go champion Lee Se-dol. The AI was trained in only 3 days and was able to beat the Go champion, and now it is considered the strongest Go player in history (Vincent, 2019).

The field of AI has come a long way since the Dartmouth Conference of 1956. It has been a prominent tool that we sometimes take for granted in today’s world. Machine learning inventions like Siri and Alexa are designed to make our day easier, and they do a pretty good job doing that. Also, without AI, extra-curricular activities such as video games would be less enjoyable.

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