In this module, I assembled the information that my teammates gathered regarding Perceptrons and the history of deep learning into a timeline, in addition to adding knowledge that I had gathered myself. From this module, I was able to visualize the progression of AI from the first theories about artificial neural networks to modern deep learning models. This included learning that Frank Rosenblatt introduced the concept of the perceptron in 1957, backpropagation was a transformative technique for neural networks introduced in 1986 that allows them to update their own weights, and that transformers such as BERT were key in developing the modern deep learning models that are available today.

https://prezi.com/i/xjlxbrrxfrcv/

Deep Learning Timeline

Deep Learning, an advanced facet of AI, has transformed numerous sectors, driving innovation and solving complex problems. This evolution, marked by significant milestones, underscores deep learning's profound impact on technology and society. Here, we dissect pivotal moments in this journey, revealing the progressive enhancements, the challenges surmounted, and the profound influence each milestone has had on the technological landscape.
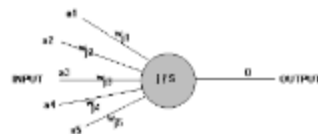

Image Source: https://home.csulb.edu/~cwallis/artificialn/History.htm

1943

Warren McCulloch and Walter Pitts Model the Neuron

- **Description**: McCulloch & Pitts published their paper, "A Logical Calculus of Ideas Immanent in Nervous Activity," in which they describe a simple binary function of neurons.
- **Significance**: Their model of the neuron could be used to create first-order logic sentences, opening the door for such neurons to be used as computational elements.

1957

Inception of the Perceptron by Frank Rosenblatt

- **Description**: Frank Rosenblatt introduces the perceptron, a simplified model of a biological neuron capable of binary classification. It forms the foundation for artificial neural networks.
- **Significance**: The perceptron marked the beginning of neural network research and laid the groundwork for future advancements in artificial intelligence.
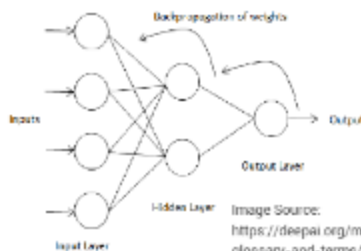
1969

Limitations and Criticisms of the Perceptron

- **Description**: Marvin Minsky and Seymour Papert publish "Perceptrons," highlighting the limitations of single-layer perceptrons, such as their inability to solve certain logical problems.
- **Significance**: This work led to a temporary decline in interest in neural networks, known as the "AI winter," as researchers grappled with the perceived limitations of perceptrons.

Image Source: https://deepai.org/machine-learning-glossary-and-terms/backpropagation

1986

Backpropagation Algorithm

- **Description**: The backpropagation algorithm is introduced by Geoffrey Hinton, David Rumelhart, and Ronald Williams. It enables training of multi-layered neural networks by efficiently adjusting weights.
- **Significance**: Backpropagation addressed the limitations identified by Minsky and Papert, paving the way for the development of deeper neural networks.

1980s-90s

Powerful Computers and Large Datasets

- **Description**: Advancements in computational power and availability of large datasets facilitate the development of deeper and more sophisticated neural networks.
- **Significance**: Increased training possibilities pave the way for significant improvements in performance and applicability of deep learning models.

1990s

Rise of Neural Network Applications

- **Description**: Neural networks find success in practical applications, including handwriting recognition and speech processing.
- **Significance**: The demonstrated practical utility of neural networks reignites interest in the field, leading to increased research and development.

Deep neural network

Image Source: https://www.ibm.com/topics/neural-networks

2000's