

Module 2: Perceptron

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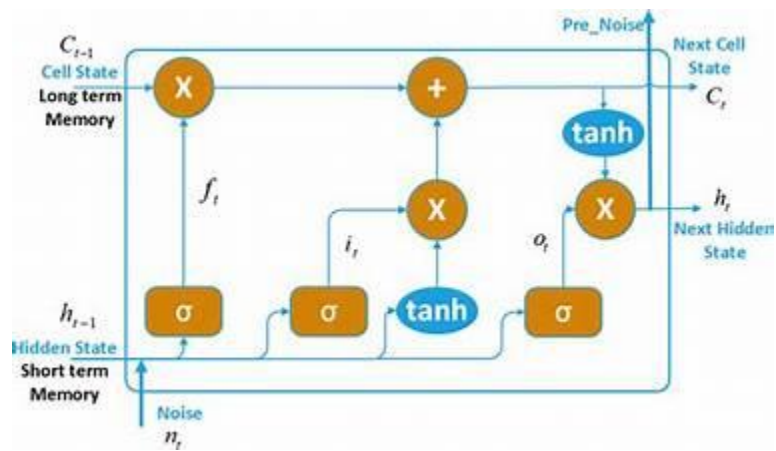
What is a perceptron?

A perceptron is the simplest form of a neural network and serves as the foundational building block for more complex artificial neural networks. It was introduced by Frank Rosenblatt in 1957. A perceptron takes multiple binary inputs, processes them using weights, and produces a single binary output. It can be seen as a linear binary classifier.

The basic components of a perceptron are:

- 1. Input Nodes:** Each input represents a feature, and these inputs are binary (on/off or 0/1).
- 2. Weights:** Each input is associated with a weight, which represents the strength of the connection between the input and the perceptron. Weights can be positive or negative.
- 3. Summation Function:** The perceptron calculates the weighted sum of its inputs ($\Sigma(\text{weight} * \text{input})$).
- 4. Activation Function:** The summation result is passed through an activation function. Traditionally, the step function was used, where the output is 1 if the weighted sum is above a certain threshold and 0 otherwise. Another common activation function used is the sigmoid function, which produces a continuous output between 0 and 1.
- 5. Output:** The output of the perceptron is the result of the activation function.

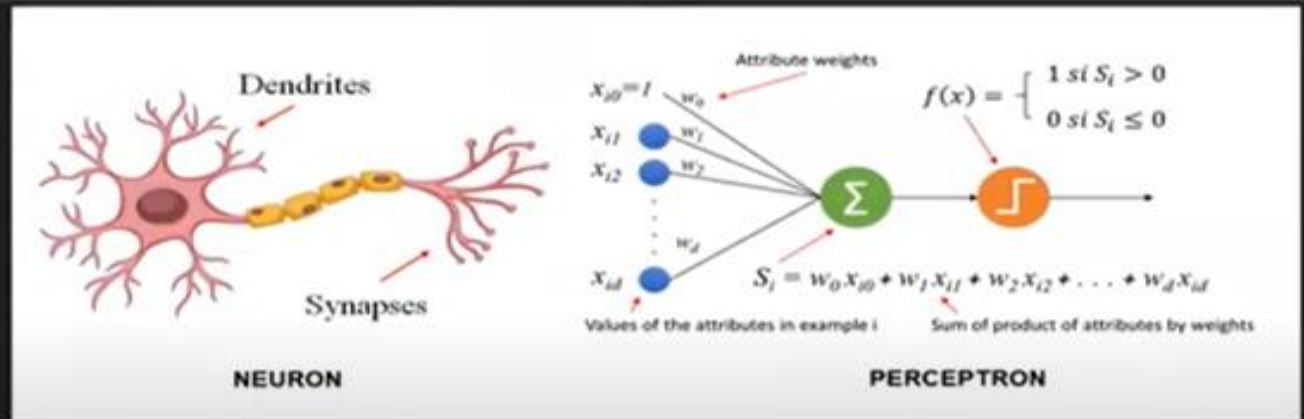
The perceptron is capable of learning simple linear decision boundaries. However, it has limitations when it comes to learning more complex patterns or non-linear decision boundaries.



Perceptron vs Neuron

Neuron Vs Perceptron

Tuesday, January 4, 2022 8:07 AM



Training in perceptron

Algorithm for perceptron tricks:

Class1	Class2	Class3	Class4	Class5
E	3234ffasfgf@3	asad@gmail.com	1213	Hffdh
Ddf	Sdfasf	asad@gmail.com	444	Kyukyu
Aa	Sfsdfsd4345	asad@gmail.com	335345	Yutyu
Aa	Dfadf3423423	asad@gmail.com	3434	Tyutyu
aff	Fggdfg434	asad@gmail.com	34434	ytyu