



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Coimbatore – 35.



DEPARTMENT OF BIOMEDICAL ENGINEERING

UNIT – 3

WEIGHT SPACE

What are weights?

Inside a neural network, the weight parameter changes input information within the hidden layers of the neural network. A network is made up of a sequence of nodes, also known as neurons. A collection of inputs, a weight, and a bias value are all contained within each node. When an input is fed into a node, it is multiplied by a weight value, and the result is either seen or sent to the next layer of the neural network. The weights of a network are frequently stored in the network's hidden layers.

How does it work?

To understand how weights function, it's helpful to picture a theoretical neural network. An input layer of a network receives input signals and sends them on to the next layer.

The neural network then has a succession of hidden layers that apply alterations to the data input. The weights are added to the nodes of the hidden layers' nodes. For example, before transmitting the data to the next layer, a single node may multiply the input data by a preset weight value, then add a bias. The output layer is also known as the final layer of the neural network.

Weights and Neural Network

Neural networks require two key considerations: [architecture](#) and weights. The neural network's [layers](#), wiring, and hyperparameters are stored in architecture, which is

similar to the natural human brain. Weights, on the other hand, are the strength of the various nodes during the model learning process (this can be compared to a human brain that has learned to multiply numbers or speak a foreign language).

Researchers in artificial intelligence seek to discover if architecture or weights are more important in neural network performance. Google researchers have recently proved that a neural network that has not learned weights through training may nonetheless obtain good performance in machine learning tasks, dealing a blow to the “nature” side.

Over the last few decades, the majority of machine learning research has focused on developing appropriate neural network architectures for specific tasks, such as convolutional neural networks for computer vision and pattern recognition, or recurrent neural networks with long short-term memory for processing time-series data like speech and language.

Bias

Inside the network, both bias and weights are learnable parameters. Before learning begins, both the weight and [bias](#) parameters will be randomized by a teachable neural network. Both parameters are modified as training progresses toward the desired values and the right output. The amount to which the two factors impact the input data differs. Simply said, bias is the distance between the predicted value and the desired value. The discrepancy between the function’s output and its intended output is made up of biases. A low bias value indicates that the network is making more assumptions about the output’s form, whereas a high bias value indicates that the network is making fewer assumptions about the output’s form.

Weights, on the other hand, are a measure of the connection’s strength. The degree of effect a change in the input has on the output is determined by its weight. A low weight value will have little effect on the input, whereas a higher weight value will have a greater impact on the output.

Reference:

<https://www.tasq.ai/glossary/weights/>