

# Report

## FullyConnectedLayer:

A traditional neural network layer, the FullyConnectedLayer is usually employed in the network's final layers. Every input neuron is linked to every output neuron by it, i.e., every input is linked to every output.

Input: A vector or matrix where each element represents a feature.

Output: A vector where each element represents a feature after applying the weights and biases of the FullyConnectedLayer.

OutputSize: Specifies the size of the output, i.e., the dimension of the output vector. This parameter determines the number of neurons in this layer. Setting the OutputSize can control the complexity and capacity of the model. For example, in classification tasks, OutputSize is often set to the number of classes.

## SoftmaxLayer:

In the last layer of multi-class classification problems, the SoftmaxLayer is an activation function layer that is commonly utilized. The input vector is transformed into a probability distribution with a sum of one for each output.

Input: A vector where each element represents a score for a class (unnormalized probabilities).

Output: A vector where each element represents the probability of the corresponding class (normalized probability values, ranging from 0 to 1, summing to 1).

## ClassificationLayer:

The ClassificationLayer is the network's last layer, where the classification results are assessed and the loss is calculated. It calculates the error between

the actual labels and the anticipated values using the cross-entropy loss function.

Input: The probability distribution vector from the SoftmaxLayer.

Output: The classification loss, used for backpropagation to adjust the network weights.