What is the difference between Learning and Deep Learning Machine?

Machine Learning forms a subset of Artificial Intelligence, where we use statistics and algorithms to train machines with data, thereby helping them improve with experience.

Deep Learning is a part of Machine Learning, which involves mimicking the human brain in terms of structures called neurons, thereby forming neural networks.

What is the difference between supervised and unsupervised machine learning?

Answer: Supervised learning requires training labeled data. For example, in order to do classification (a supervised learning task), you'll need to first label the data you'll use to train the model to classify data into your labeled groups. Unsupervised learning, in contrast, does not require labeling data explicitly**.**

What is reinforcement learning

Reinforcement learning (RL) is an area of machine learning concerned with how intelligent agents ought to take actions in an environment in order to maximize the notion of cumulative **reward**

What is a perceptron?

A perceptron is similar to the actual neuron in the human brain. It receives inputs from various entities and applies functions to these inputs, which transform them to be the output.

A perceptron is mainly used to perform binary classification where it sees an input, computes functions based on the weights of the input, and outputs the required transformation.

How is Deep Learning better than Machine Learning?

Machine Learning is powerful in a way that it is sufficient to solve most of the problems. However, **Deep Learning** gets an upper hand when it comes to working with data that has a large number of dimensions. With data that is large in size, a Deep Learning model can easily work with it as it is built to handle this.

What are some of the most used applications of Deep Learning?

Deep Learning is used in a variety of fields today. The most used ones are as follows:

- Sentiment Analysis
- Computer Vision
- Automatic Text Generation

- Object Detection
- Natural Language Processing
- Image Recognition.

What are the steps involved in training a perception in Deep Learning?

There are five main steps that determine the learning of a perceptron:

1. Initialize thresholds and weights
2. Provide inputs
3. Calculate outputs
4. Update weights in each step
5. Repeat steps 2 to 4

What are the supervised learning algorithms in Deep learning?

- Artificial neural network
- Convolution neural network
- Recurrent neural network

What are the unsupervised learning algorithms in Deep learning?

- Self Organizing Maps
- Deep belief networks (Boltzmann Machine)
- Auto Encoders

How many layers in the neural network?

- **Input Layer**
  The input layer contains input neurons which send information to the hidden layer.
- **Hidden Layer**
  The hidden layer is used to send data to the output layer.
- **Output Layer**
  The data is made available at the output layer.

What is the use of the loss function?

The loss function is used as a measure of accuracy to see if a neural network has learned accurately from the training data or not. This is done by comparing the training dataset to the testing dataset. The loss function is a primary measure of the performance of the neural

network. In Deep Learning, a good performing network will have a low loss function at all times when training.

What are autoencoders?

Autoencoders are artificial neural networks that learn without any supervision. Here, these networks have the ability to automatically learn by mapping the inputs to the corresponding outputs.

Autoencoders, as the name suggests, consist of two entities:

- Encoder: Used to fit the input into an internal computation state
- Decoder: Used to convert the computational state back into the output

. **Where are autoencoders used?**

Autoencoders have a wide variety of usage in the real world. The following are some of the popular ones:

- Adding color to black–white images
- Removing noise from images
- Dimensionality reduction
- Feature removal and variation

What are the types of autoencoders?

There are four main types of autoencoders:

- Deep autoencoders
- Convolutional autoencoders
- Sparse autoencoders
- Contractive autoencoders

What do you understand by a convolutional neural network?

A convolutional neural network, often called CNN, is a feedforward neural network. It uses convolution in at least one of its layers. The convolutional layer contains a set of filter (kernels). This filter is sliding across the entire input image, computing the dot product between the weights of the filter and the input image. As a result of training, the network automatically learns filters that can detect specific features.

What Are the Different Layers on CNN?

There are four layers in CNN:

1. Convolutional Layer - the layer that performs a convolutional operation, creating several smaller picture windows to go over the data.
2. ReLU Layer - it brings non-linearity to the network and converts all the negative pixels to zero. The output is a rectified feature map.
3. Pooling Layer - pooling is a down-sampling operation that reduces the dimensionality of the feature map.
4. Fully Connected Layer - this layer recognizes and classifies the objects in the image.

What are activation functions?

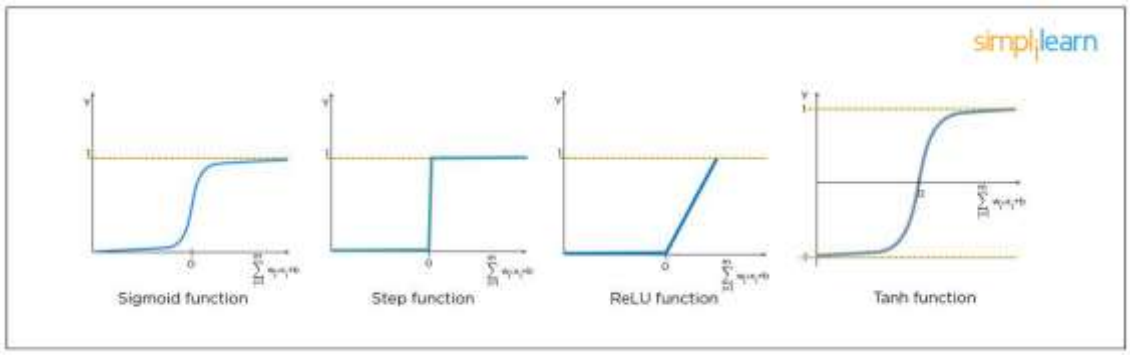
Activation functions are entities in Deep Learning that are used to translate inputs into a usable output parameter. It is a function that decides if a neuron needs activation or not by calculating the weighted sum on it with the bias.

Using an activation function makes the model output to be non-linear. There are many types of activation functions:

- ReLU
- Softmax
- Sigmoid
- Linear
- Tanh

What Is the Role of Activation Functions in a Neural Network?

At the most basic level, an activation function decides whether a neuron should be fired or not. It accepts the weighted sum of the inputs and bias as input to any activation function. Step function, Sigmoid, ReLU, Tanh, and Softmax are examples of activation functions.

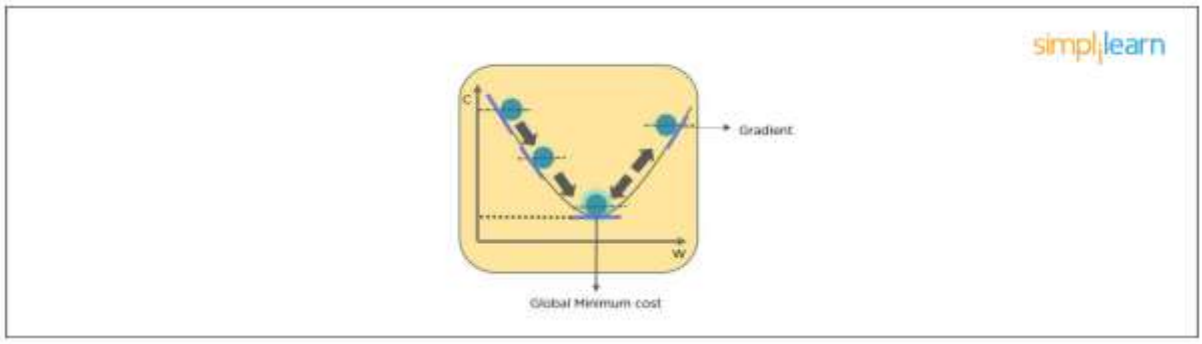


What Is the Cost Function?

Also referred to as “loss” or “error,” cost function is a measure to evaluate how good your model’s performance is. It’s used to compute the error of the output layer during backpropagation. We push that error backward through the neural network and use that during the different training functions.

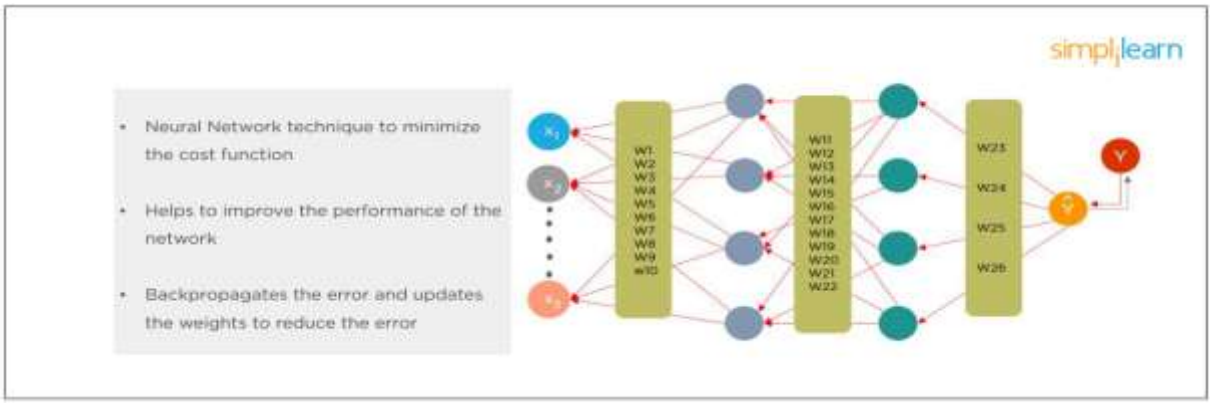
What Is Gradient Descent?

Gradient Descent is an optimal algorithm to minimize the cost function or to minimize an error. The aim is to find the local-global minima of a function. This determines the direction the model should take to reduce the error.



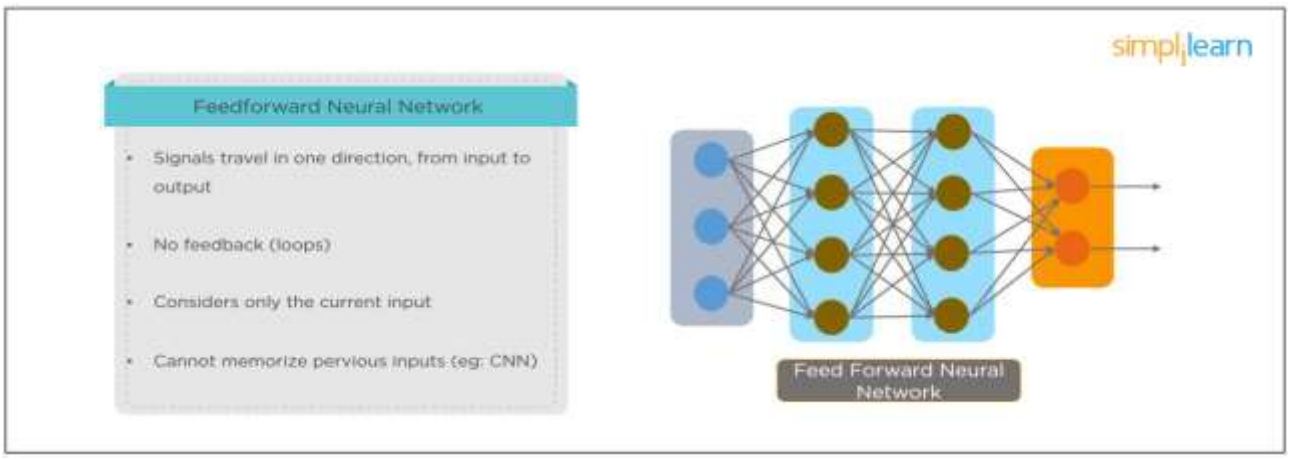
What Do You Understand by Backpropagation?

Backpropagation is a technique to improve the performance of the network. It backpropagates the error and updates the weights to reduce the error.



What Is the Difference Between a Feedforward Neural Network and Recurrent Neural Network?

A Feedforward Neural Network signals travel in one direction from input to output. There are no feedback loops; the network considers only the current input. It cannot memorize previous inputs (e.g., CNN).



A Recurrent Neural Network's signals travel in both directions, creating a looped network. It considers the current input with the previously received inputs for generating the output of a layer and can memorize past data due to its internal memory.

What is an RNN?

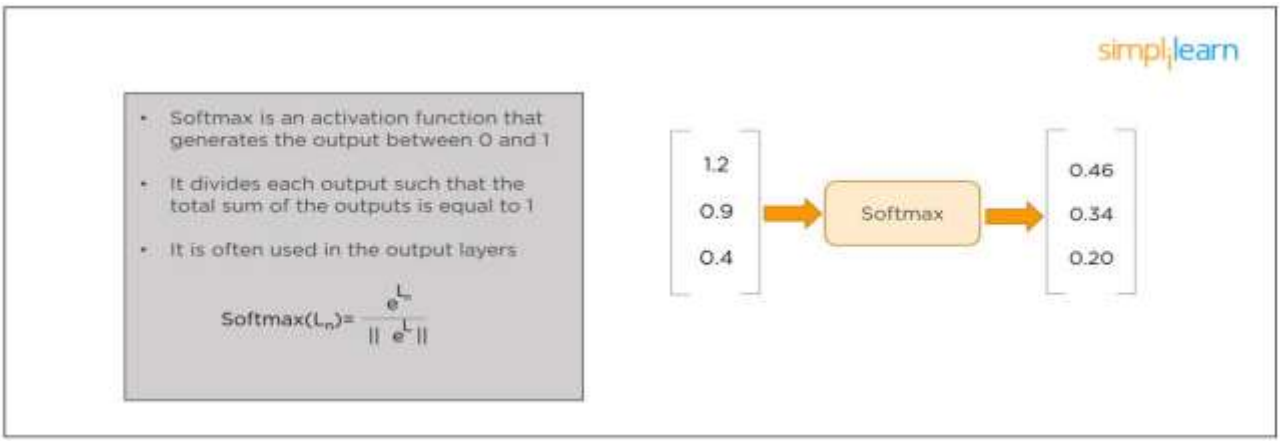
RNN stands for Recurrent Neural Networks. These are the artificial neural networks which are designed to recognize patterns in sequences of data such as handwriting, text, the spoken word, genomes, and numerical time series data. RNN use backpropagation algorithm for training because of their internal memory. RNN can remember important things about the input they received, which enables them to be very precise in predicting what's comi

What Are the Applications of a Recurrent Neural Network (RNN)?

The RNN can be used for sentiment analysis, text mining, and image captioning. Recurrent Neural Networks can also address time series problems such as predicting the prices of stocks in a month or quarter.

What Are the Softmax and ReLU Functions?

Softmax is an activation function that generates the output between zero and one. It divides each output, such that the total sum of the outputs is equal to one. Softmax is often used for output layers.



ReLU (or Rectified Linear Unit) is the most widely used activation function. It gives an output of X if X is positive and zeroes otherwise. ReLU is often used for hidden layers.