DEEP LEARNING CONCEPTS SYNOPSIS

- Deep learning algorithms are similar to how the nervous system is structured where each neuron is connected to the other and passes information.
- It works in layers and a typical model has at least three layers. Each layer accepts information from the previous and passes it on to the next one.
- **Activation function :**
  Activation functions are functions that decide the output when the inputs are given to the node. These are generally non-linear transformations.
  - ❖ Some of the Activation Functions used in neural networks are the Tanh, Sigmoid, ReLu, and Softmax.
  - ❖ **Sigmoid Function Formula :** 1 / (1 + e^-x)
  - ❖ **Softmax Function Formula :** a / a.sum
    Where
    a=exp(x)
    x=feature set
  - ❖ **ReLu(Rectified Linear Unit)Softmax Function** :
    max(0, x)
  - ❖ **Tanh :** (e^x - e^(-x))/(e^x+e^(-x))
- Some of the popularly used Neural Network Architectures are:
  - ❖ Convolutional Neural Networks(CNN)
  - ❖ Recurrent Neural Networks(RNN)
  - ❖ Long Short Term Memory(LSTM)
  - ❖ Boltzmann MachineDeep Belief Networks

KERAS

Creating Model: A model is the core data structure of Keras and is how layers are organized in Keras. The simplest type of model is the Sequential model. I have used this in my practice code.

Adding Layers: A neural network consists of mainly three types of layers which are, input layers, hidden layers, and the output layer. The input layer is used to feed raw data to the network, and it is then communicated to the hidden layers for processing. The hidden layers will process the data by learning different aspects of the data. When processing data, the data may be broken down into smaller units so that it's easier for different components of the data to be processed like the way the human brain does it. The output layer is where you get your results.

There are different types of layers, and the most commonly used layers are Dense layers, Recurrent layers, Normalization layers, and Convolutional layers. Different layers perform different transformations on data, and some layers are better suited for certain tasks than others. For example, a convolutional layer is best suited for data that contain images while an Embedding layer is best suited for data that contains the text. The first layer will be the embedding layer, which converts each word into a word vector.

LSTM layers are preferred because they can learn the long-term dependencies of data and thus make accurate

predictions. The LSTM will transform the vector sequence into a single vector.
epoch represents the number of loops to go through your training set.
batch_size represents the size of your training sample used to train the network during its learning process.