PRACTICAL-2

Aim:

Implementing feedforward neural network with Keras and Tensorflow.

Objective:

a. Import the necessary packages.
b. Load the training and testing data (MNIST/CIFAR 10).
c. Define the network architecture using Keras.
d. Train the model using SGD.
e. Evaluate the network.
f. Plot the training loss and accuracy.

Theory:

- **FEED FORWARD NEURAL NETWORK:**

A feedforward neural network is a type of artificial neural network in which nodes connections do not form a loop. Often referred to as a multi-layered network of neurons, feedforward neural networks are so named because all information flows in a forward manner only.

The data enters the input nodes, travels through the hidden layers, and eventually exists the output nodes. The network is devoid of links that would allow the information exiting the output node to be sent back into the network.

- A feedforward Neural Networks layers:

The following are the components of a feedforward neural network:

- **LAYER OF INPUT:**

It contains the neurons that receive input. The data is subsequently passed on to the next tier. The input layers total number of neurons is equal to the number of variables in the

dataset.

- **HIDDEN LAYER:**

This is the intermediate layer, which is concelled between the input and output layers. This layer has a large number of neurons that perform alterations on the inputs. Then they communicate with the output layer.

- **OUTPUT LAYER:**

It is the last layer and is depending on the models construction. Additionally, the output layer is the expected feature, as you are aware of the desired outcome.

- **NEURON WEIGHTS:**

Weights are used to describe the strength of a connection between neurons. The range of a weights value is from 0 to 1.

- **MNIST Dataset:**

. The MNIST (Modified National Institute of Standard and Technology) dataset or database is a large database of handwritten numbers or digits that are used for training various image processing systems. The database also widely used for training and testing in the field of machine learning. The set of images in the MNIST database are a combination of two of NISTs database: Special Database 1 and Special Database 3. The MNIST dataset has 60000 training images and 10000 testing images.

. The MNIST dataset can be online and it is essentially a database of various handwritten digits. The MNIST dataset has a large amount of data and is commonly used to demonstrate the real power of deep neural networks. Our brain and eyes work together to recognize these shapes and determine what number is it, but the same task, is not simple for a computer to complete. There is only one way to do this, which is the use of deep neural network which allows us to train a computer to classify the handwritten digits effectively.

. The MNIST dataset is multilevel dataset consisting of 10 classes in which we can classify numbers from 0 to 9.

CONCLUSION:

We have successfully implemented the feed forward Neural network with the help of Keras and Tensorflow open source software libraries.