

● AIM

Implementing Feed Forward neural networks with keras & TensorFlow.

● objective

To implement the feedforward network. To learn keras & TensorFlow.

● Software Requirements.

SR NO	NAME	version
1	Python, Jupyter Notebook	3.9 - 3.12
2	Window OS	10.11

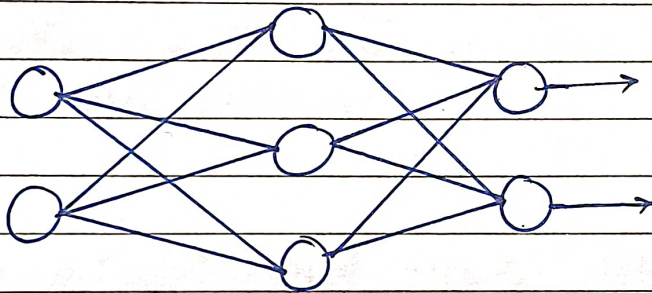
● Outcomes

- Build & train deep neural network model for use in various applications.

## ● Theory

### # Feed Forward Neural Network

- Feed Forward Neural network is a type of artificial neural network where connections between the nodes do not form cycles.
- The network consists of an input layer, one or more hidden layers & an output layer.
- Information flows in one direction - from input to output - hence the name "Feed Forward".



only forward Direction

### # Evaluation of Feed Forward neural network

#### 1] Accuracy -

The proportion of correctly classified instances out of the total instances

#### 2] Precision -

The ratio of true positive prediction to the total predicted positives.



### 3] Recall -

The ratio of true positive predictions to the actual positives

### 4] F1 score -

The harmonic mean of precision & recall, providing a balance between the two

### 5] Confusion Matrix -

A table used to describe the performance of a classification model, showing the true negative, true positive, False positive, False Negative

## # Training a Feed Forward Neural Network.

1] Forward Propagation - During forward propagation the input data passes through the network & the output is calculated.

### 2] Loss calculation -

The loss (error) is calculated using a loss function such as Mean squared error for regression tasks.

### 3] Back propagation.

In Back propagation the error is propagated back through the network to update the weights.

The weights are adjusted using gradient descent

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### Steps-

- 1] Import the necessary packages.
- 2] Load the training & testing data (MNIST)
- 3] Define the network architecture using keras
- 4] Train the model using SGD
- 5] Evaluate the network
- 6] Plot the training loss & accuracy.



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● conclusion →

Thus, we implemented Feed Forward Neural Network by keras & Tensorflow by following all the steps mentioned above.