2/08

exp 4: Build a simple feed forward neural network to recognize handwritten character.

AIM: To design and implement a simple feed-forward neural network (FFNN) using python to recognize handwritten characters from the MNIST dataset.

OBJECTIVES:-

1) To load and preprocess the MNIST handwritten character dataset.
2) To build a feed-forward neural network with input, hidden and o/p layers.
3) To train the model using back propagation and gradient descent.
4) To evaluate the trained model on a test dataset and report accuracy.
5) To visualize some sample predictions for verification

Pseudocode:-

Start
Import necessary libraries (tensorflow/keras, numpy, matplotlib)

Step 1:- Load data.
Load MNIST dataset (training-images, training-labels, test-images, test_labels)

Step 2:- preprocess data
Normalize image pixel values to range [0,1]
One-hot Encode labels for output layer compatibi

Step 3:- Build model
Initialize a sequential feed-forward model.
Add flatten layer to convert 28x28 to 784 u
Add Dense hidden layer with ReLU activation
Add Dense Output layer with Softmax activat

Step 4 : Compile model
Choose optimizer = 'adam',
Loss function = 'categorial - crossentropy'
metrics = 'accuracy'

Step 5: Train model
fit the model on training data for defined epochs and batch size

Step 6 : Evaluate Model
Test accuracy = evaluate on test dataset.

Step 7: Display Results
Predict labels for sample on test images.
Plot images with predicted and actual labels.

Observations :
ANN:- on 8 epochs.

Accuracy : 95.63%.

Precision : 0.94

Recall : 0.93

f1 score : 0.93

ROC AUC (macro) : 0.985

Result :- Successfully implemented MNIST & Dataset trained on simple ANN.