EXPT NO : 5 A python program to implement Multi Layer

**DATE: 20/09/2024 Perceptron With Backpropagation**

**AIM:**

To write a python program to implement Multilayer perceptron with backpropagation .

**PROCEDURE:**

Implementing Multilayer perceptron with backpropagation using the Keras dataset involve the following steps:

**Step 1: Import Necessary Libraries**

First, import the libraries that are essential for data manipulation, visualization, and model building.

# importing modules import tensorflow as tf import numpy as np from tensorflow.keras.models import Sequential from tensorflow.keras.layers import Flatten from tensorflow.keras.layers import Dense from tensorflow.keras.layers import Activation import matplotlib.pyplot as plt

**Step 2: Load the Keras Dataset**

The Keras dataset can be loaded.

(x\_train, y\_train), (x\_test, y\_test) = tf.keras.datasets.mnist.load\_data()

**OUTPUT :**



**Step 3: Data Preprocessing**

Ensure the data is clean and ready for modeling. Since the Iris dataset is clean, minimal preprocessing is needed.

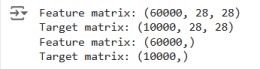
# Cast the records into float values x\_train = x\_train.astype('float32') x\_test = x\_test.astype('float32')

# normalize image pixel values by dividing

# by 255 gray\_scale = 255 x\_train /= gray\_scale x\_test /= gray\_scale

print("Feature matrix:", x\_train.shape) print("Target matrix:", x\_test.shape) print("Feature matrix:", y\_train.shape) print("Target matrix:", y\_test.shape)

**OUTPUT :**



**Step 4 : Train a Model**

**model = Sequential([**

**# reshape 28 row \* 28 column data to 28\*28 rows**

**Flatten(input\_shape=(28, 28)),**

**# dense layer 1**

**Dense(256, activation='sigmoid'),**

**# dense layer 2**

**Dense(128, activation='sigmoid'),**

# # output layer

**Dense(10, activation='sigmoid'),**

**])**

**OUTPUT:**



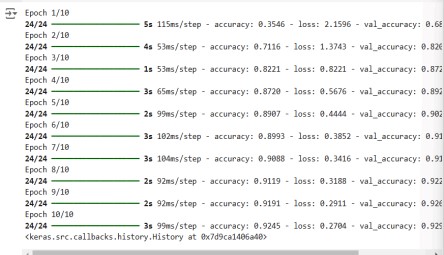
**Step 5 : Make Predictions**

Use the model to make predictions based on the independent variable. model.compile(optimizer='adam',

loss='sparse\_categorical\_crossentropy', metrics=['accuracy'])

model.fit(x\_train, y\_train, epochs=10, batch\_size=2000, validation\_split=0.2)

**OUTPUT:**



**Step 6 : Evaluate the Model** Evaluate the model performance. results = model.evaluate(x\_test, y\_test, verbose = 0) print('test loss, test acc:', results)

fig, ax = plt.subplots(10, 10)

k = 0

for i in range(10):

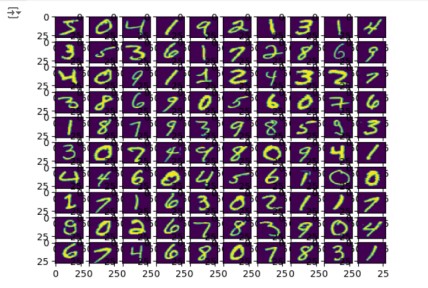
for j in range(10):

ax[i][j].imshow(x\_train[k].reshape(28, 28), aspect='auto')

k += 1

plt.show()

**OUTPUT :**



**RESULT:**

This step-by-step process will help us to implement MultiLayer Perceptron with

Backpropagation models using the Keras dataset and analyze their performance.