ROLL NUMBER: 210701114

Exp No: 2

BUILD A SIMPLE NEURAL NETWORKS

AIM:

To build a simple neural network using Keras/TensorFlow.

PROCEDURE:

1. Download and load the dataset.
2. Perform analysis and preprocessing of the dataset.
3. Build a simple neural network model using Keras/TensorFlow.
4. Compile and fit the model.
5. Perform prediction with the test dataset.
6. Calculate performance metrics.

PROGRAM:

```
pip install tensorflow
import keras as kr
pip install tensorflow_datasets
import tensorflow_datasets as tfds
import tensorflow as tf
from keras.datasets import mnist
(train_X, train_Y), (test_X, test_Y) = mnist.load_data()
import matplotlib.pyplot as plt
imageNum = 1500
plt.imshow(train_X[imageNum], cmap = 'magma')
firstNeuralNetwork = tf.keras.models.Sequential([
    tf.keras.layers.Flatten(input_shape = (28, 28)),
    tf.keras.layers.Dense(150, activation = 'relu'),
    tf.keras.layers.Dropout(0.2),
    tf.keras.layers.Dense(10)
])
firstNeuralNetwork.compile(optimizer = 'adam', loss = 'sparse_categorical_crossentropy',
metrics=['accuracy'])
firstNeuralNetwork.fit(x=train_X, y=train_Y, epochs = 25)
firstNeuralNetwork.evaluate(test_X, test_Y)
```

OUTPUT

```
Epoch 1/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 6s 2ms/step - accuracy: 0.1119 - loss: 3.7730
Epoch 2/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1112 - loss: 2.3227
Epoch 3/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.0723 - loss: 2.3471
Epoch 4/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1274 - loss: 2.3070
Epoch 5/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1362 - loss: 2.3026
Epoch 6/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1396 - loss: 2.3026
Epoch 7/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 1ms/step - accuracy: 0.1379 - loss: 2.3026
Epoch 8/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 1ms/step - accuracy: 0.1325 - loss: 2.3026
Epoch 9/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1370 - loss: 2.3026
Epoch 10/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1381 - loss: 2.3026
Epoch 11/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 1ms/step - accuracy: 0.1370 - loss: 2.3026
Epoch 12/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1333 - loss: 2.3026
Epoch 13/25
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 3s 2ms/step - accuracy: 0.1377 - loss: 2.3026
```

RESULT:

Hence, a Simple Neural Network has been implemented successfully.