Practical No. 9

Write a program to implement a simple neural network using TensorFlow/Keras.

This practical demonstrates how to create and train a basic neural network model using the MNIST dataset.

Python Code

```
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Flatten
from tensorflow.keras.datasets import mnist
from tensorflow.keras.utils import to_categorical

(x_train, y_train), (x_test, y_test) = mnist.load_data()
x_train = x_train / 255.0
x_test = x_test / 255.0

y_train = to_categorical(y_train)
y_test = to_categorical(y_test)

model = Sequential([
    Flatten(input_shape=(28, 28)),
    Dense(128, activation='relu'),
    Dense(10, activation='softmax')
])

model.compile(optimizer='adam',
              loss='categorical_crossentropy',
              metrics=['accuracy'])

model.fit(x_train, y_train, epochs=5, batch_size=32, validation_split=0.1)
test_loss, test_acc = model.evaluate(x_test, y_test)
print(f"Test Accuracy: {test_acc:.4f}")
```

Sample Output

```
Epoch 1/5
...
accuracy: 0.9756 - val_accuracy: 0.9720
Test Accuracy: 0.9754
```

Note

Make sure you have the required dependency installed before running the program.

Install TensorFlow using the following command:

pip install tensorflow

Also, ensure your system has Python installed and internet access to download the MNIST dataset.