

```
In [1]: import tensorflow as tf  
        from tensorflow import keras
```

```
In [2]: dataframe=tf.keras.datasets.mnist
```

```
In [3]: dataframe
```

```
Out[3]: <module 'keras.api._v2.keras.datasets.mnist' from '/usr/local/lib/python  
3.7/dist-packages/keras/api/_v2/keras/datasets/mnist/__init__.py'>
```

```
In [4]: (x_train,y_train),(x_test,y_test)=dataframe.load_data()
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-  
-datasets/mnist.npz  
11490434/11490434 [=====] - 0s 0us/step
```

```
In [5]: x_train.shape
```

```
Out[5]: (60000, 28, 28)
```

```
In [6]: x_test.shape
```

```
Out[6]: (10000, 28, 28)
```

```
In [7]: x_train,x_test=x_train/255,x_test/255
```

```
In [8]: model=tf.keras.models.Sequential(  
        [tf.keras.layers.Flatten(input_shape=(28,28)),  
         tf.keras.layers.Dense(128,activation='relu'),  
         tf.keras.layers.Dropout(0.2),  
         tf.keras.layers.Dense(10,activation='softmax')  
        ])
```

```
In [9]: model
```

```
Out[9]: <keras.engine.sequential.Sequential at 0x7f2b55e80b10>
```

```
In [10]: model.compile(optimizer='adam',  
                       loss='sparse_categorical_crossentropy',  
                       metrics=['accuracy'])
```

```
In [11]: model.fit(x_train,y_train,epochs=5)
```

```
Epoch 1/5  
1875/1875 [=====] - 6s 3ms/step - loss: 0.2959  
- accuracy: 0.9147  
Epoch 2/5  
1875/1875 [=====] - 5s 3ms/step - loss: 0.1424  
- accuracy: 0.9577  
Epoch 3/5  
1875/1875 [=====] - 5s 3ms/step - loss: 0.1074  
- accuracy: 0.9673  
Epoch 4/5  
1875/1875 [=====] - 5s 3ms/step - loss: 0.0884  
- accuracy: 0.9730  
Epoch 5/5  
1875/1875 [=====] - 5s 3ms/step - loss: 0.0757  
- accuracy: 0.9764
```

```
Out[11]: <keras.callbacks.History at 0x7f2b50a52110>
```

```
In [12]: model.evaluate(x_test,y_test)
```

```
313/313 [=====] - 1s 2ms/step - loss: 0.0755 -  
accuracy: 0.9769
```

```
Out[12]: [0.0754728764295578, 0.9768999814987183]
```