```
import tensorflow as tf
import keras
from keras.models import Sequential
from keras.datasets import mnist
import matplotlib.pyplot as plt
import numpy as np
import random
```

```
(x_train, y_train), (x_test, y_test) = mnist.load_data()
x_train = x_train / 255
x_test = x_test / 255
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
11490434/11490434 ━━━━━━━━━━━━━━━━━━━━ 1s 0us/step
```

```
model = Sequential()
model.add(keras.layers.Flatten(input_shape = (28, 28)))
model.add(keras.layers.Dense(128, activation = 'relu'))
model.add(keras.layers.Dense(10, activation = 'softmax'))
```

```
/usr/local/lib/python3.10/dist-packages/keras/src/layers/reshaping/flatten.py:37: UserWarning: Do not pass an `input_shape`/`input_dim`
  super().__init__(**kwargs)
```

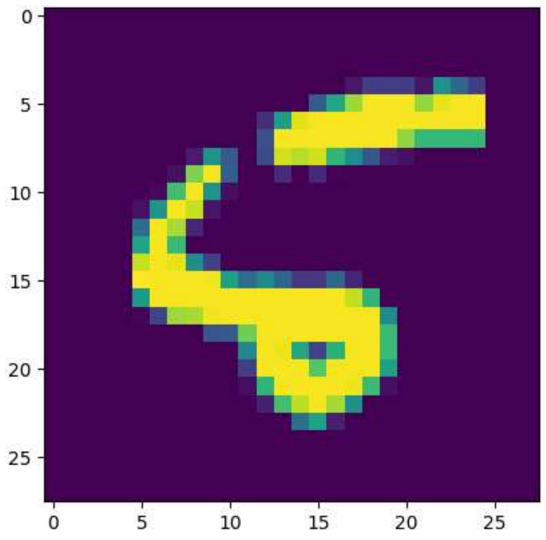
```
model.compile(optimizer = 'adam', loss = 'sparse_categorical_crossentropy', metrics = ["accuracy"])
model.fit(x_train, y_train, epochs = 10)
```

```
Epoch 1/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 17s 7ms/step - accuracy: 0.8785 - loss: 0.4303
Epoch 2/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 16s 4ms/step - accuracy: 0.9634 - loss: 0.1201
Epoch 3/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 6s 3ms/step - accuracy: 0.9757 - loss: 0.0819
Epoch 4/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - accuracy: 0.9834 - loss: 0.0568
Epoch 5/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 6s 3ms/step - accuracy: 0.9874 - loss: 0.0440
Epoch 6/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - accuracy: 0.9900 - loss: 0.0333
Epoch 7/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 10s 4ms/step - accuracy: 0.9914 - loss: 0.0275
Epoch 8/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 9s 3ms/step - accuracy: 0.9939 - loss: 0.0223
Epoch 9/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - accuracy: 0.9954 - loss: 0.0159
Epoch 10/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 9s 4ms/step - accuracy: 0.9954 - loss: 0.0146
<keras.src.callbacks.history.History at 0x7c288b28b400>
```

```
test_loss, test_acc = model.evaluate(x_test, y_test)
print("Loss = %.3f" % test_loss)
print("Accuracy = %.3f" % test_acc)
```

```
313/313 ━━━━━━━━━━━━━━━━━━━━ 1s 2ms/step - accuracy: 0.9775 - loss: 0.0827
Loss = 0.075
Accuracy = 0.980
```

```
n = random.randint(0, 9)
plt.imshow(x_test[n])
plt.show()
prediction = model.predict(x_test)
print("The handwritten number in the image is %d" % np.argmax(prediction[n]))
```



```
313/313 ━━━━━━━━━━━━━━━━━━━━ 2s 5ms/step
The handwritten number in the image is 5
```

Start coding or generate with AI.