```
import tensorflow as tf
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
from tensorflow.keras.datasets import mnist
from tensorflow.keras.utils import to_categorical
import matplotlib.pyplot as plt


(x_train, y_train), (x_test, y_test) = mnist.load_data()
x_train = x_train.reshape(-1, 28 * 28) / 255.0
x_test = x_test.reshape(-1, 28 * 28) / 255.0
y_train = to_categorical(y_train, 10)
y_test = to_categorical(y_test, 10)


model = Sequential([
    Dense(128, activation='relu', input_shape=(28 * 28,)),
    Dense(64, activation='relu'),
    Dense(10, activation='softmax')
])


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

# Train the model and store the training history
history = model.fit(x_train, y_train, epochs=10, validation_data=(x_test, y_test))


plt.figure(figsize=(12, 4))

plt.subplot(1, 2, 1)
plt.plot(history.history['loss'], label='Train Loss')
plt.plot(history.history['val_loss'], label='Validation Loss')
plt.xlabel('Epochs')
plt.ylabel('Loss')
plt.legend()

plt.subplot(1, 2, 2)
plt.plot(history.history['accuracy'], label='Train Accuracy')
plt.plot(history.history['val_accuracy'], label='Validation Accuracy')
plt.xlabel('Epochs')
plt.ylabel('Accuracy')
plt.legend()

plt.show()
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/mnist.npz
11490434/11490434 ━━━━━━━━━━━━━━━━━━━━ 0s 0us/step
/usr/local/lib/python3.10/dist-packages/keras/src/layers/core/dense.py:87: UserWarning: Do not pass an `input_shape`/`input_dim` argumer
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
Epoch 1/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 14s 5ms/step - accuracy: 0.8767 - loss: 0.4251 - val_accuracy: 0.9525 - val_loss: 0.1508
Epoch 2/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - accuracy: 0.9659 - loss: 0.1106 - val_accuracy: 0.9731 - val_loss: 0.0857
Epoch 3/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 13s 6ms/step - accuracy: 0.9773 - loss: 0.0706 - val_accuracy: 0.9736 - val_loss: 0.0808
Epoch 4/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 17s 4ms/step - accuracy: 0.9835 - loss: 0.0512 - val_accuracy: 0.9757 - val_loss: 0.0757
Epoch 5/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 9s 5ms/step - accuracy: 0.9866 - loss: 0.0442 - val_accuracy: 0.9772 - val_loss: 0.0785
Epoch 6/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 9s 4ms/step - accuracy: 0.9906 - loss: 0.0284 - val_accuracy: 0.9771 - val_loss: 0.0782
Epoch 7/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - accuracy: 0.9913 - loss: 0.0257 - val_accuracy: 0.9767 - val_loss: 0.0813
Epoch 8/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 9s 5ms/step - accuracy: 0.9930 - loss: 0.0234 - val_accuracy: 0.9763 - val_loss: 0.0918
Epoch 9/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 7s 4ms/step - accuracy: 0.9938 - loss: 0.0188 - val_accuracy: 0.9781 - val_loss: 0.0825
Epoch 10/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 9s 5ms/step - accuracy: 0.9941 - loss: 0.0178 - val_accuracy: 0.9786 - val_loss: 0.0905
```