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import tensorflow as tf
from tensorflow.keras import layers, models
from tensorflow.keras.datasets import fashion_mnist
import matplotlib.pyplot as plt
import numpy as np

from tensorflow.keras.datasets import fashion_mnist

(x_train, y_train), (x_test, y_test) = fashion_mnist.load_data()

x_train = x_train / 255.0
x_test = x_test / 255.0

x_train = x_train.reshape((x_train.shape[0], 28 * 28))
x_test = x_test.reshape((x_test.shape[0], 28 * 28))

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

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

model.fit(x_train, y_train, epochs=5, batch_size=64,
          validation_split=0.1)

Epoch 1/5
844/844 ━━━━━━━━━━━ 4s 4ms/step - accuracy: 0.8851 - loss:
0.3117 - val_accuracy: 0.8778 - val_loss: 0.3409
Epoch 2/5
844/844 ━━━━━━━━━━━ 5s 6ms/step - accuracy: 0.8902 - loss:
0.2902 - val_accuracy: 0.8822 - val_loss: 0.3286
Epoch 3/5
844/844 ━━━━━━━━━━━ 4s 4ms/step - accuracy: 0.9017 - loss:
0.2691 - val_accuracy: 0.8867 - val_loss: 0.3206
Epoch 4/5
844/844 ━━━━━━━━━━━ 6s 5ms/step - accuracy: 0.8997 - loss:
0.2663 - val_accuracy: 0.8843 - val_loss: 0.3267
Epoch 5/5
844/844 ━━━━━━━━━━━ 4s 5ms/step - accuracy: 0.9072 - loss:
0.2493 - val_accuracy: 0.8798 - val_loss: 0.3309

<keras.src.callbacks.history.History at 0x79aacfbala90>

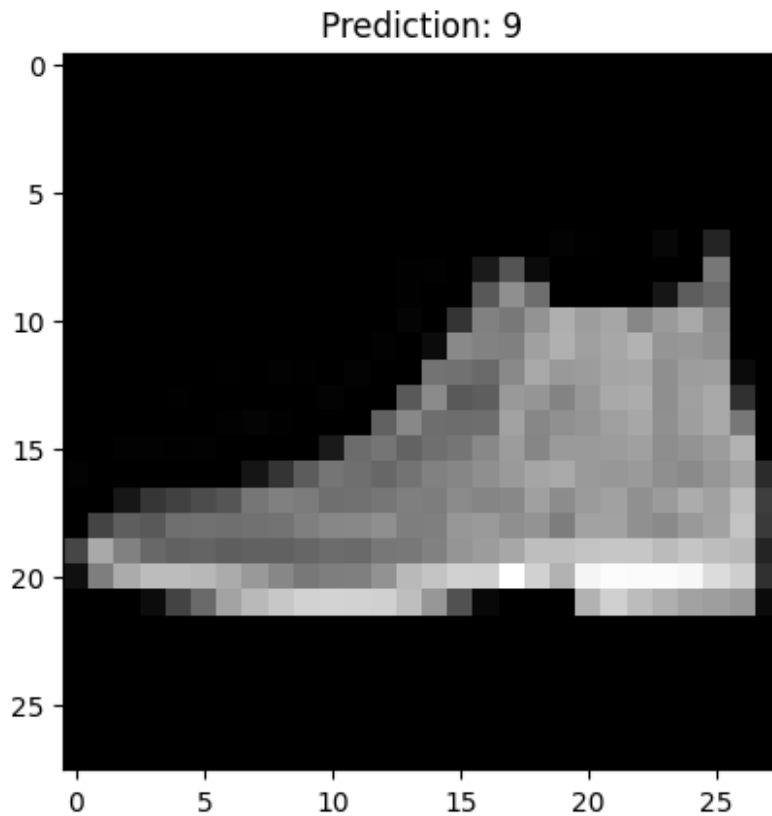
test_loss, test_acc = model.evaluate(x_test, y_test)
print(f"Test accuracy: {test_acc}")

```

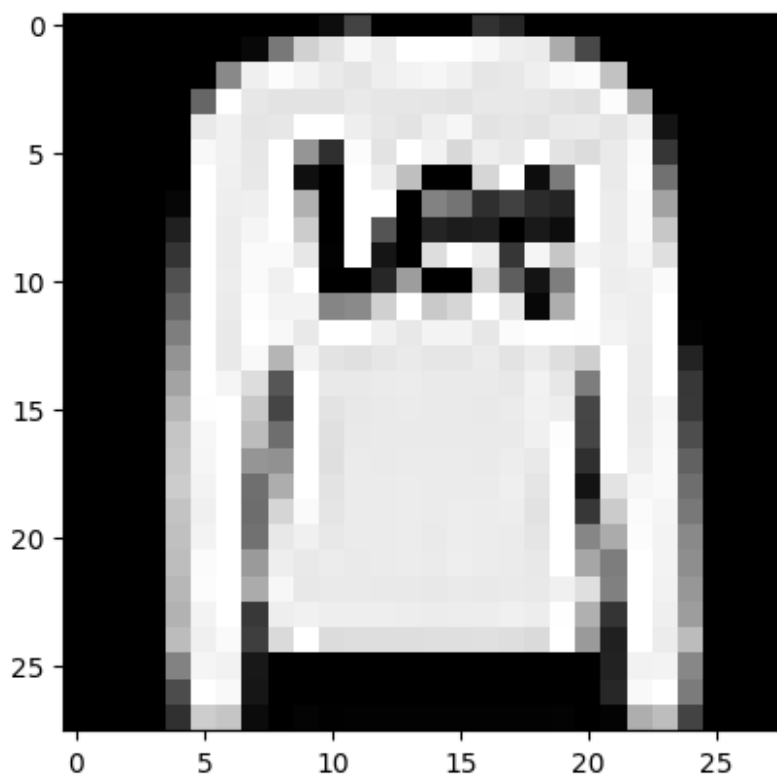
313/313 ————— 1s 2ms/step - accuracy: 0.8748 - loss:  
0.3491  
Test accuracy: 0.8761000037193298

```
predictions = model.predict(x_test[:5])  
for i in range(5):  
    plt.imshow(x_test[i].reshape(28, 28), cmap='gray')  
    plt.title(f"Prediction: {np.argmax(predictions[i])}")  
    plt.show()
```

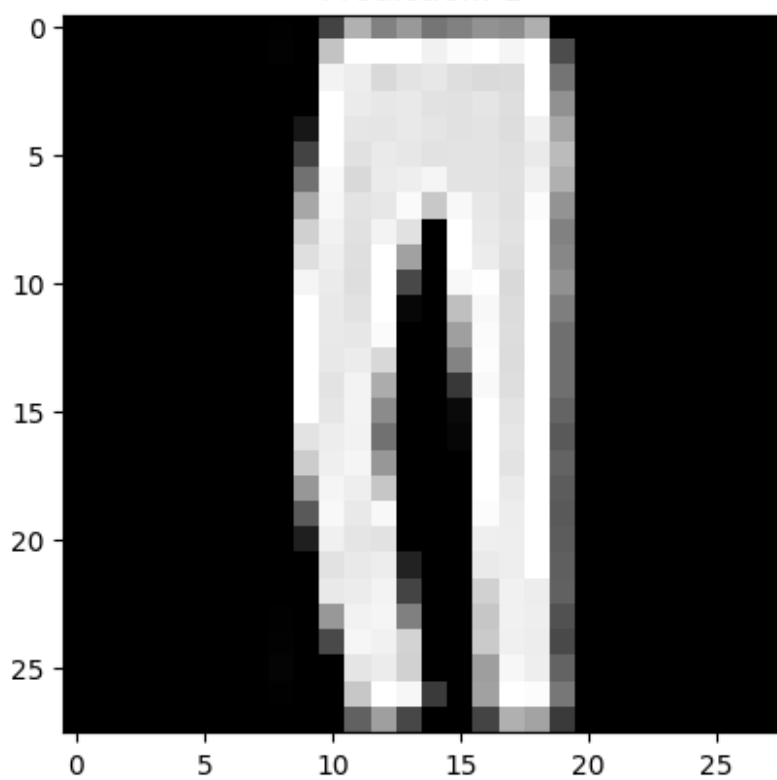
1/1 ————— 0s 165ms/step



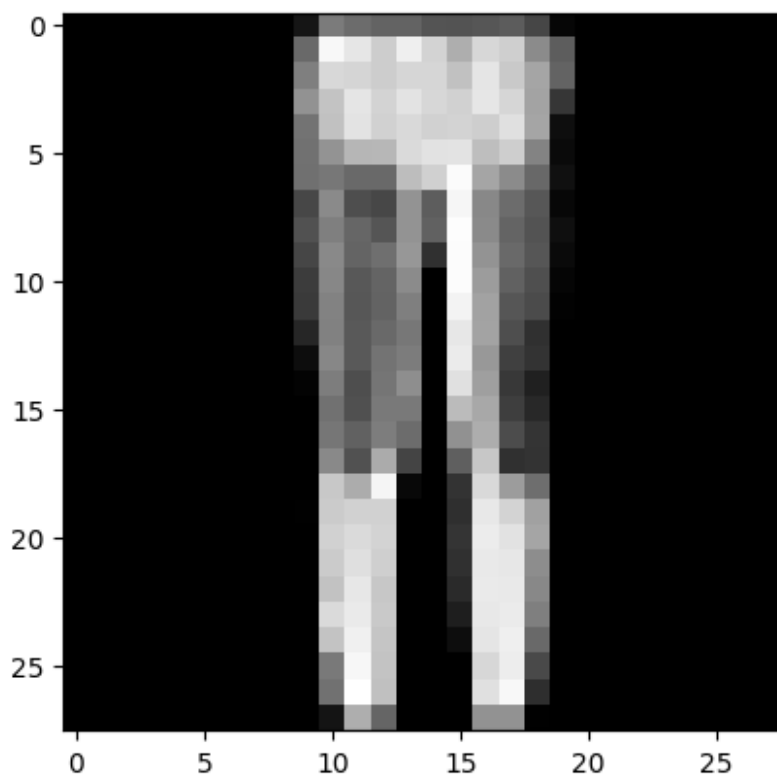
Prediction: 2



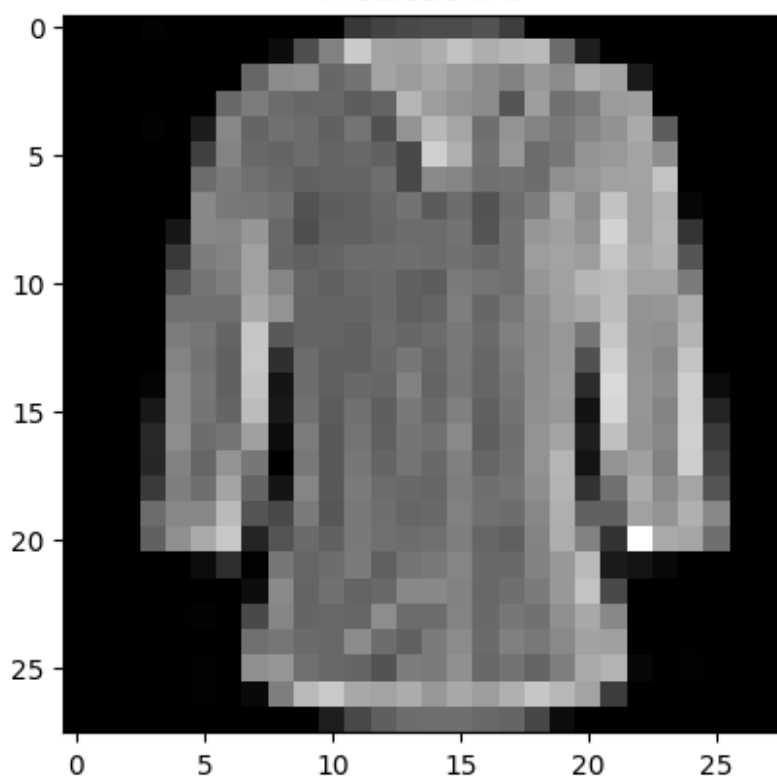
Prediction: 1



Prediction: 1



Prediction: 6



```

predictions = model.predict(x_test)
predicted_labels = np.argmax(predictions, axis=1)

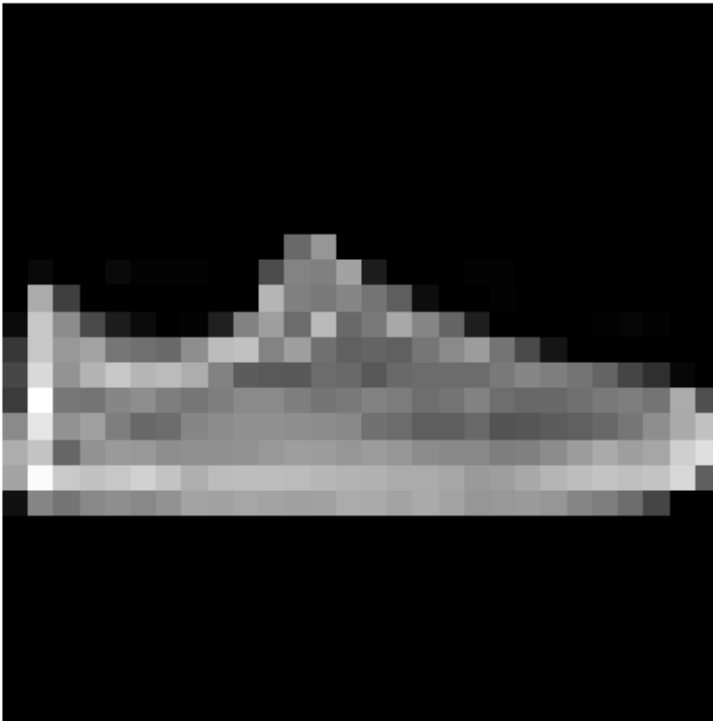
313/313 ————— 0s 1ms/step

incorrect_indices = np.where(predicted_labels != y_test)[0]
print(f"Number of incorrect predictions: {len(incorrect_indices)}")
Number of incorrect predictions: 1239

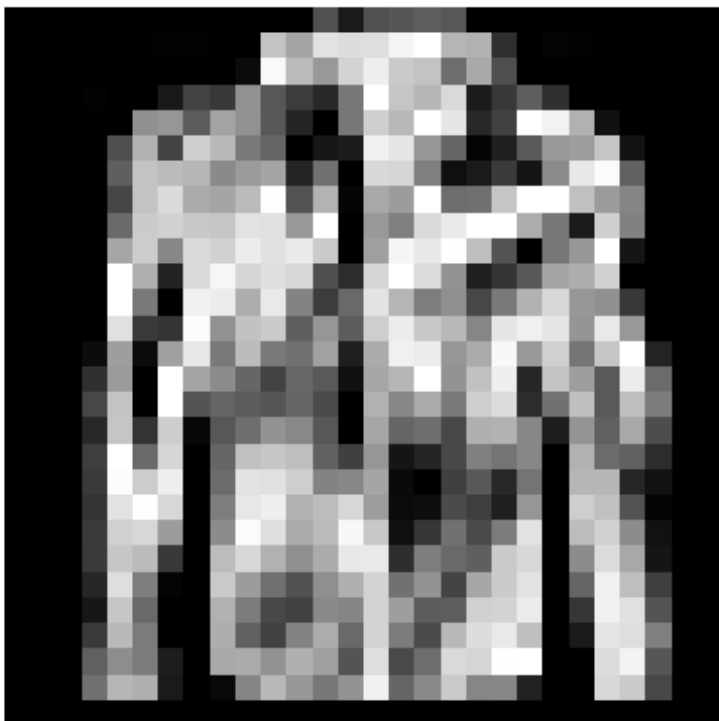
for i in range(5):
    index = incorrect_indices[i]
    plt.imshow(x_test[index].reshape(28, 28), cmap='gray')
    plt.title(f"True Label: {y_test[index]}, Predicted:
{predicted_labels[index]}")
    plt.axis('off')
    plt.show()

```

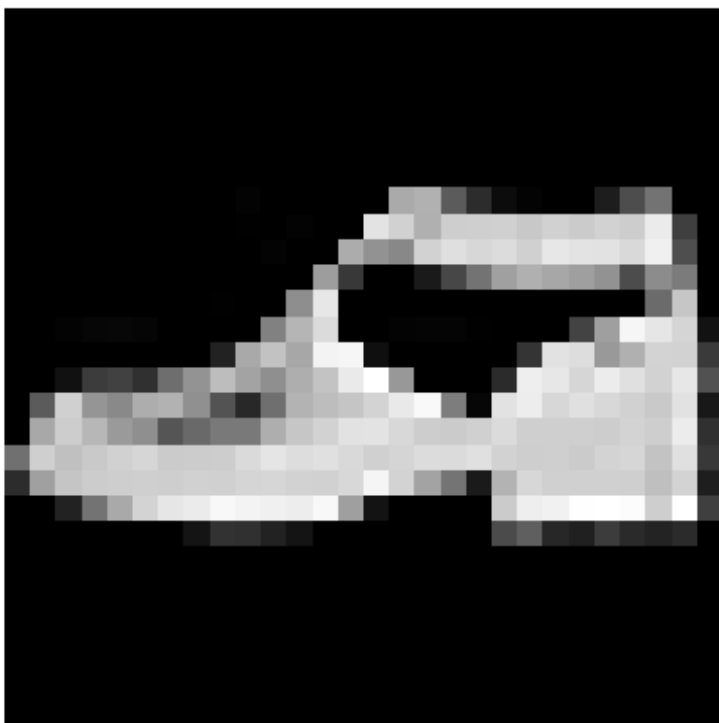
True Label: 7, Predicted: 5



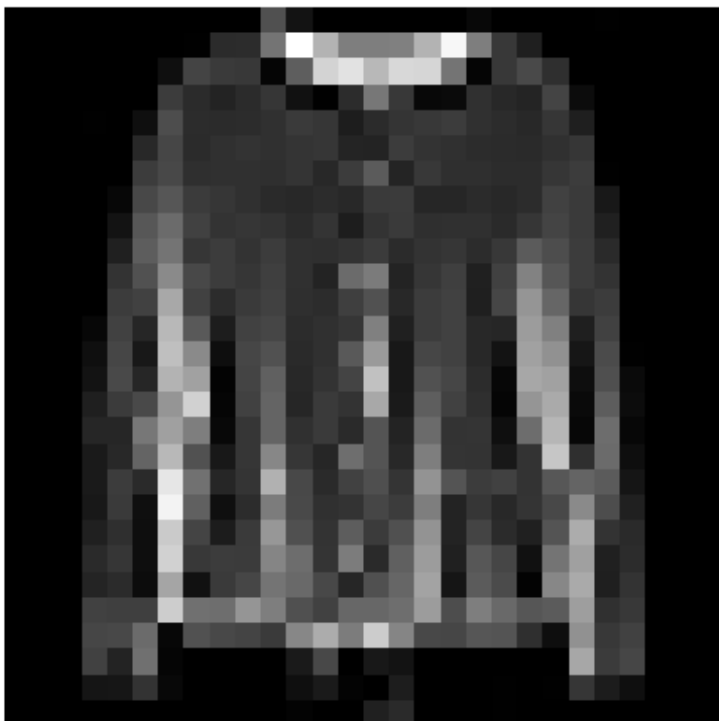
True Label: 4, Predicted: 2



True Label: 9, Predicted: 7



True Label: 4, Predicted: 2



True Label: 3, Predicted: 4

