

```

import numpy as np
import matplotlib.pyplot as plt
from tensorflow import keras
from tensorflow.keras import layers

# Load the Fashion MNIST dataset
(fashion_train_images, fashion_train_labels), _ =
keras.datasets.fashion_mnist.load_data()

# Normalize the images
fashion_train_images = fashion_train_images.astype('float32') / 255.0

# Flatten the images for the autoencoder
fashion_train_images =
fashion_train_images.reshape((fashion_train_images.shape[0], -1))

# Define the autoencoder model
encoding_dim = 64 # Size of the encoded representations
input_img = layers.Input(shape=(28 * 28,)) # Images are 28x28 pixels
encoded = layers.Dense(encoding_dim, activation='relu')(input_img)
decoded = layers.Dense(28 * 28, activation='sigmoid')(encoded)

autoencoder = keras.models.Model(input_img, decoded)

# Compile the autoencoder
autoencoder.compile(optimizer='adam', loss='binary_crossentropy')

# Train the autoencoder
autoencoder.fit(fashion_train_images, fashion_train_images, epochs=10,
batch_size=256)

# Display original and reconstructed images
n = 10 # Number of images to display
plt.figure(figsize=(20, 4))
for i in range(n):
    # Original images
    ax = plt.subplot(2, n, i + 1)
    plt.imshow(fashion_train_images[i].reshape(28, 28), cmap='gray')
    plt.axis('off')

    # Reconstructed images
    reconstructed_img =
autoencoder.predict(fashion_train_images[i].reshape(1, -1))
    ax = plt.subplot(2, n, i + 1 + n)
    plt.imshow(reconstructed_img.reshape(28, 28), cmap='gray')
    plt.axis('off')

plt.show()

```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-
keras-datasets/train-labels-idx1-ubyte.gz
29515/29515 [=====] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-
keras-datasets/train-images-idx3-ubyte.gz
26421880/26421880 [=====] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-
keras-datasets/t10k-labels-idx1-ubyte.gz
5148/5148 [=====] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-
keras-datasets/t10k-images-idx3-ubyte.gz
4422102/4422102 [=====] - 0s 0us/step
Epoch 1/10
235/235 [=====] - 6s 22ms/step - loss: 0.3906
Epoch 2/10
235/235 [=====] - 6s 25ms/step - loss: 0.3141
Epoch 3/10
235/235 [=====] - 5s 21ms/step - loss: 0.2982
Epoch 4/10
235/235 [=====] - 7s 29ms/step - loss: 0.2883
Epoch 5/10
235/235 [=====] - 5s 19ms/step - loss: 0.2834
Epoch 6/10
235/235 [=====] - 3s 13ms/step - loss: 0.2806
Epoch 7/10
235/235 [=====] - 2s 10ms/step - loss: 0.2785
Epoch 8/10
235/235 [=====] - 3s 14ms/step - loss: 0.2771
Epoch 9/10
235/235 [=====] - 3s 12ms/step - loss: 0.2759
Epoch 10/10
235/235 [=====] - 2s 10ms/step - loss: 0.2751
1/1 [=====] - 0s 89ms/step
1/1 [=====] - 0s 20ms/step
1/1 [=====] - 0s 20ms/step
1/1 [=====] - 0s 22ms/step
1/1 [=====] - 0s 23ms/step
1/1 [=====] - 0s 23ms/step
1/1 [=====] - 0s 22ms/step
1/1 [=====] - 0s 26ms/step
1/1 [=====] - 0s 22ms/step
1/1 [=====] - 0s 26ms/step
```

