```
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
import tensorflow as tf

from sklearn.metrics import accuracy_score, precision_score, recall_score
from sklearn.model_selection import train_test_split
from tensorflow.keras import layers, losses
from tensorflow.keras.datasets import fashion_mnist
from tensorflow.keras.models import Model
```

```
(x_train, _), (x_test, _) = fashion_mnist.load_data()

x_train = x_train.astype('float32') / 255.
x_test = x_test.astype('float32') / 255.

print (x_train.shape)
print (x_test.shape)
```

```
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 ━━━━━━━━━━━━━━━━━━━━ 2s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/t10k-labels-idx1-ubyte.gz
5148/5148 ━━━━━━━━━━━━━━━━━━━━ 0s 1us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/t10k-images-idx3-ubyte.gz
4422102/4422102 ━━━━━━━━━━━━━━━━━━━━ 1s 0us/step
(60000, 28, 28)
(10000, 28, 28)
```

```
latent_dim = 64

class Autoencoder(Model):
  def __init__(self, latent_dim):
    super(Autoencoder, self).__init__()
    self.latent_dim = latent_dim
    self.encoder = tf.keras.Sequential([
      layers.Flatten(),
      layers.Dense(latent_dim, activation='relu'),
    ])
    self.decoder = tf.keras.Sequential([
      layers.Dense(784, activation='sigmoid'),
      layers.Reshape((28, 28))
    ])

  def call(self, x):
    encoded = self.encoder(x)
    decoded = self.decoder(encoded)
    return decoded

autoencoder = Autoencoder(latent_dim)
```

```
autoencoder.compile(optimizer='adam', loss=losses.MeanSquaredError())
```

```
autoencoder.fit(x_train, x_train,
                epochs=10,
                shuffle=True,
                validation_data=(x_test, x_test))
```

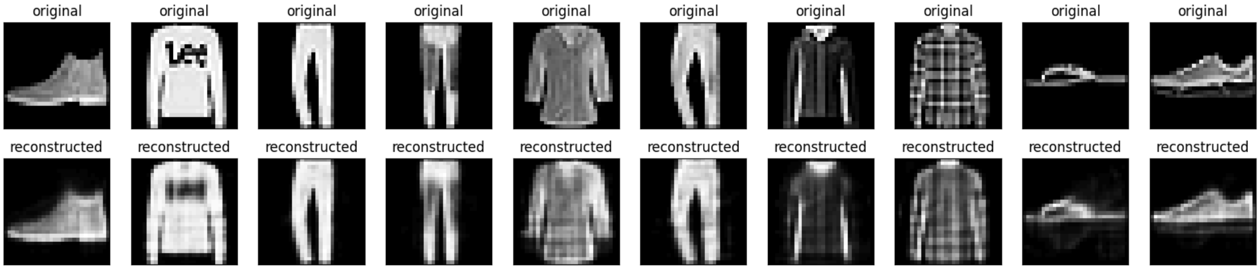
```
Epoch 1/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 10s 5ms/step - loss: 0.0402 - val_loss: 0.0132
Epoch 2/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - loss: 0.0123 - val_loss: 0.0106
Epoch 3/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - loss: 0.0103 - val_loss: 0.0098
Epoch 4/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - loss: 0.0096 - val_loss: 0.0095
Epoch 5/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - loss: 0.0093 - val_loss: 0.0093
Epoch 6/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - loss: 0.0092 - val_loss: 0.0091
Epoch 7/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 9s 5ms/step - loss: 0.0091 - val_loss: 0.0092
Epoch 8/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 7s 4ms/step - loss: 0.0089 - val_loss: 0.0090
Epoch 9/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - loss: 0.0089 - val_loss: 0.0090
Epoch 10/10
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 8s 4ms/step - loss: 0.0089 - val_loss: 0.0091
<keras.src.callbacks.history.History at 0x7ef31c9aeb70>
```

```
encoded_imgs = autoencoder.encoder(x_test).numpy()

decoded_imgs = autoencoder.decoder(encoded_imgs).numpy()
```

```
n = 10
plt.figure(figsize=(20, 4))
for i in range(n):
  # display original
  ax = plt.subplot(2, n, i + 1)
  plt.imshow(x_test[i])
  plt.title("original")
  plt.gray()
  ax.get_xaxis().set_visible(False)
  ax.get_yaxis().set_visible(False)

  # display reconstruction
  ax = plt.subplot(2, n, i + 1 + n)
  plt.imshow(decoded_imgs[i])
  plt.title("reconstructed")
  plt.gray()
  ax.get_xaxis().set_visible(False)
  ax.get_yaxis().set_visible(False)
plt.show()
```



Start coding or generate with AI.