

```
In [5]: import tensorflow as tf  
from tensorflow import keras
```

```
In [6]: !pip install matplotlib  
import numpy as np  
import matplotlib.pyplot as plt
```

Requirement already satisfied: matplotlib in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (3.1.0)  
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (from matplotlib) (1.1.0)  
Requirement already satisfied: python-dateutil>=2.1 in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (from matplotlib) (2.8.0)  
Requirement already satisfied: cycler>=0.10 in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (from matplotlib) (0.10.0)  
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (from matplotlib) (2.4.0)  
Requirement already satisfied: numpy>=1.11 in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (from matplotlib) (1.16.4)  
Requirement already satisfied: setuptools in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (from kiwisolver>=1.0.1->matplotlib) (41.0.1)  
Requirement already satisfied: six>=1.5 in c:\users\ram1\anaconda3\envs\tensorflow\lib\site-packages (from python-dateutil>=2.1->matplotlib) (1.12.0)

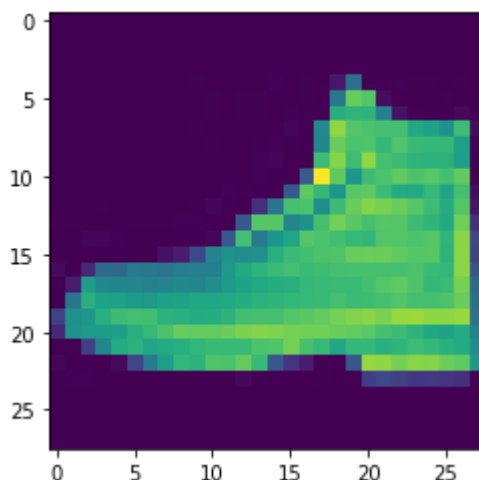
```
In [7]: fashion_mnist = keras.datasets.fashion_mnist
```

```
In [22]: fashion_data = fashion_mnist.load_data()
```

```
In [23]: (train_images,train_labels),(test_images,test_labels) = fashion_data
```

```
In [24]: plt.imshow(train_images[50000])
```

```
Out[24]: <matplotlib.image.AxesImage at 0x3f33898a58>
```



```
In [25]: train_images.shape
```

```
Out[25]: (60000, 28, 28)
```

```
In [12]: train_labels[1:10]
```

```
Out[12]: array([0, 0, 3, 0, 2, 7, 2, 5, 5], dtype=uint8)
```

```
In [13]: class_names = ['T-shirt/top', 'Trouser', 'Pullover', 'Dress', 'Coat',  
                        'Sandal', 'Shirt', 'Sneaker', 'Bag', 'Ankle boot']
```

```
In [14]: len(train_labels)
```

```
Out[14]: 60000
```

```
In [15]: test_images.shape
```

```
Out[15]: (10000, 28, 28)
```

```
In [16]: plt.figure(figsize=(10,10))
for i in range(25):
    plt.subplot(5,5,i+1)
    plt.xticks([])
    plt.yticks([])
    plt.grid(False)
    plt.imshow(train_images[i], cmap=plt.cm.binary)
    plt.xlabel(class_names[train_labels[i]])
plt.show()
```



```
In [32]: model = keras.Sequential([
    keras.layers.Flatten(input_shape=(28, 28)),
    keras.layers.Dense(128, activation='relu'),
    keras.layers.Dense(10, activation='softmax')
])
```

```
In [33]: model.compile(optimizer='adam',
    loss='sparse_categorical_crossentropy',
    metrics=['accuracy'])
```

```
In [34]: model.fit(train_images, train_labels, epochs=10)
```

```
Epoch 1/10
60000/60000 [=====] - 6s 108us/sample - loss: 12.9597
- acc: 0.1958
Epoch 2/10
60000/60000 [=====] - 6s 104us/sample - loss: 13.0396
- acc: 0.1910
Epoch 3/10
60000/60000 [=====] - 6s 100us/sample - loss: 12.9205
- acc: 0.1984
Epoch 4/10
60000/60000 [=====] - 6s 97us/sample - loss: 12.9205 -
acc: 0.1984
Epoch 5/10
60000/60000 [=====] - 6s 103us/sample - loss: 12.9205
- acc: 0.1984
Epoch 6/10
60000/60000 [=====] - 6s 103us/sample - loss: 12.9205
- acc: 0.1984
Epoch 7/10
60000/60000 [=====] - 6s 101us/sample - loss: 12.9205
- acc: 0.1984
Epoch 8/10
60000/60000 [=====] - 6s 106us/sample - loss: 12.9205
- acc: 0.1984
Epoch 9/10
60000/60000 [=====] - 6s 103us/sample - loss: 12.9205
- acc: 0.1984
Epoch 10/10
60000/60000 [=====] - 6s 103us/sample - loss: 12.9205
- acc: 0.1984
```

```
Out[34]: <tensorflow.python.keras.callbacks.History at 0x3f2e4807b8>
```

```
In [35]: test_loss, test_acc = model.evaluate(test_images, test_labels, verbose=2)
```

```
print('\nTest accuracy:', test_acc)
```

```
- 0s - loss: 12.9283 - acc: 0.1979
```

```
Test accuracy: 0.1979
```

```
In [ ]:
```