

Name - Chanakya Hosamani

USN - 1RV17CS035

Dataset - Fashion Mnist

```
import keras
import matplotlib.pyplot as plt
import numpy as np

print('''| Label | Description |
|:-----:|-----|
| 0 | T-shirt/top |
| 1 | Trouser |
| 2 | Pullover |
| 3 | Dress |
| 4 | Coat |
| 5 | Sandal |
| 6 | Shirt |
| 7 | Sneaker |
| 8 | Bag |
| 9 | Ankle boot |\n''')
'''This is a dataset of 60,000 28x28 grayscale images of 10 fashion categories,
along with a test set of 10,000 images''')
```

Label	Description
0	T-shirt/top
1	Trouser
2	Pullover
3	Dress
4	Coat
5	Sandal
6	Shirt
7	Sneaker
8	Bag
9	Ankle boot

This is a dataset of 60,000 28x28 grayscale images of 10 fashion categories, along with a test set of 10,000 images

(X\_train,y\_train),(X\_test,y\_test) = keras.datasets.fashion\_mnist.load\_data()

Downloading data from <https://storage.googleapis.com/tensorflow/tf-keras-dat32768/29515> [=====] - 0s 0us/step  
Downloading data from <https://storage.googleapis.com/tensorflow/tf-keras-dat26427392/26421880> [=====] - 0s 0us/step  
Downloading data from <https://storage.googleapis.com/tensorflow/tf-keras-dat>

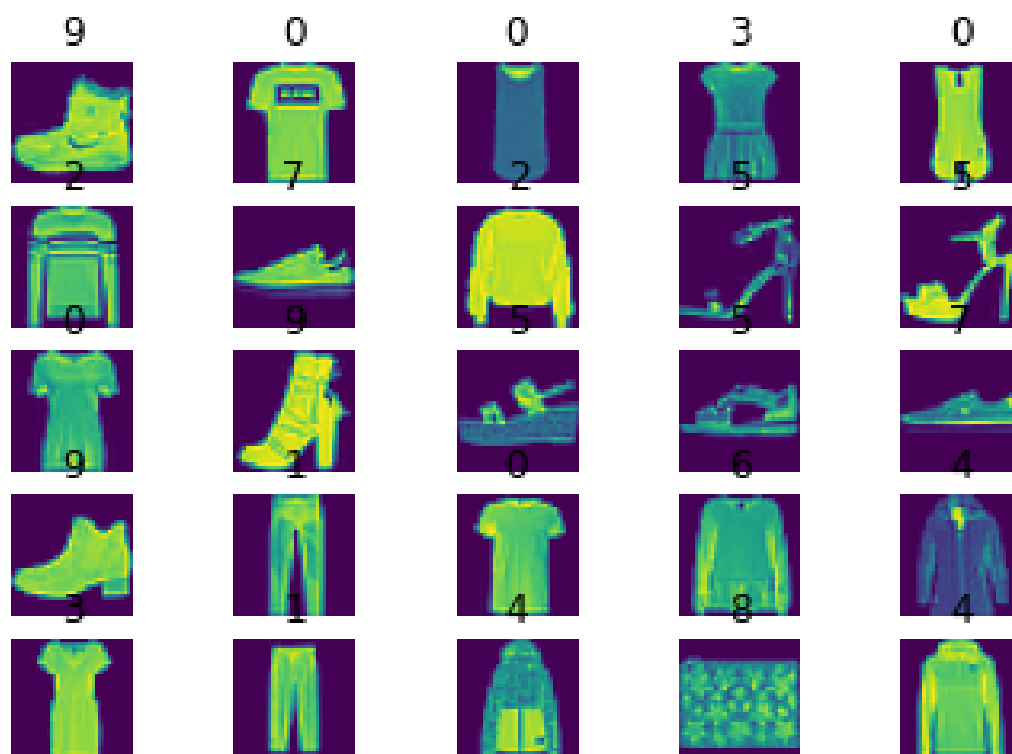
```
8192/5148 [=====] - 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-dat
4423680/4422102 [=====] - 0s 0us/step
```



```
print('Number of training samples : %d '%X_train.shape[0])
print('Number of test samples : %d '%X_test.shape[0])
```

```
Number of training samples : 60000
Number of test samples : 10000
```

```
number_of_images = 5 #per row
for i in range(number_of_images*number_of_images):
    plt.subplot(number_of_images, number_of_images, 1 + i).set_title(y_train[i])
    plt.axis('off')
    plt.imshow(X_train[i])
plt.show()
```



```
#Before flattening X_train shape is
X_train.shape
```

```
(60000, 28, 28)
```

```
#After flattening X_train shape is
flatten_X_train = X_train.reshape(X_train.shape[0],-1)
flatten_X_train.shape #same 60000 samples , but now is in 1d
```

```
(60000, 784)
```

```
pip install decision-tree-id3
```

```
Collecting decision-tree-id3
  Downloading https://files.pythonhosted.org/packages/53/60/9b51eb3b5096afa1
```

Collecting nose>=1.1.2

Downloading <https://files.pythonhosted.org/packages/15/d8/dd071918c040f50f>

|██| 163kB 5.3MB/s

Requirement already satisfied: scikit-learn>=0.17 in /usr/local/lib/python3.

Requirement already satisfied: numpy>=1.6.1 in /usr/local/lib/python3.6/dist

Requirement already satisfied: scipy>=0.17.0 in /usr/local/lib/python3.6/dis

Requirement already satisfied: joblib>=0.11 in /usr/local/lib/python3.6/dist

Building wheels for collected packages: decision-tree-id3

Building wheel for decision-tree-id3 (setup.py) ... done

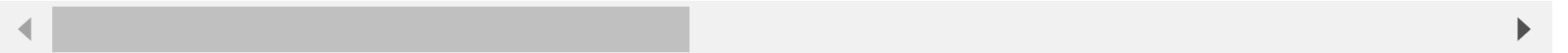
Created wheel for decision-tree-id3: filename=decision\_tree\_id3-0.1.2-cp36

Stored in directory: /root/.cache/pip/wheels/2d/d6/f2/96cb2cc307503a88b123

Successfully built decision-tree-id3

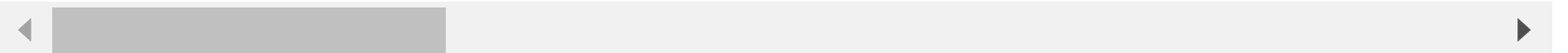
Installing collected packages: nose, decision-tree-id3

Successfully installed decision-tree-id3-0.1.2 nose-1.3.7



```
from id3 import Id3Estimator
from id3 import export_graphviz
```

/usr/local/lib/python3.6/dist-packages/sklearn/externals/six.py:31: FutureWarning: [\(https://pypi.org/project/six/\)](https://pypi.org/project/six/).", FutureWarning)



```
estimator = Id3Estimator(max_depth = 15)
estimator.fit(flatten_X_train, y_train)
```

```
Id3Estimator(gain_ratio=False, is_repeating=False, max_depth=15,
              min_entropy_decrease=0.0, min_samples_split=2, prune=False)
```

```
pred_is =estimator.predict(flatten_X_train)
print(np.sum(y_train == pred_is)/pred_is.shape[0])
```

```
0.9474166666666667
```

```
export_graphviz(estimator.tree_, 'tree.dot',list(range(0,int(28*28)))) )
!dot -Tpdf tree.dot -o tree.pdf
```