KMeans

December 20, 2016

1 K-Means Clustering Example

Let's make some fake data that includes people clustered by income and age, randomly:

In [1]:
```
from numpy import random, array

#Create fake income/age clusters for N people in k clusters
def createClusteredData(N, k):
    random.seed(10)
    pointsPerCluster = float(N)/k
    X = []
    for i in range (k):
        incomeCentroid = random.uniform(20000.0, 200000.0)
        ageCentroid = random.uniform(20.0, 70.0)
        for j in range(int(pointsPerCluster)):
            X.append([random.normal(incomeCentroid, 10000.0), random.normal(ageCentroid,
    X = array(X)
    return X
```

We'll use k-means to rediscover these clusters in unsupervised learning:

In [2]:
```
%matplotlib inline

from sklearn.cluster import KMeans
import matplotlib.pyplot as plt
from sklearn.preprocessing import scale
from numpy import random, float

data = createClusteredData(100, 5)

model = KMeans(n_clusters=5)

# Note I'm scaling the data to normalize it! Important for good results.
model = model.fit(scale(data))

# We can look at the clusters each data point was assigned to
print(model.labels_)
```

```
        # And we'll visualize it:
        plt.figure(figsize=(8, 6))
        plt.scatter(data[:,0], data[:,1], c=model.labels_.astype(float))
        plt.show()
```

```
[0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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 3 3 3 3 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2]
```

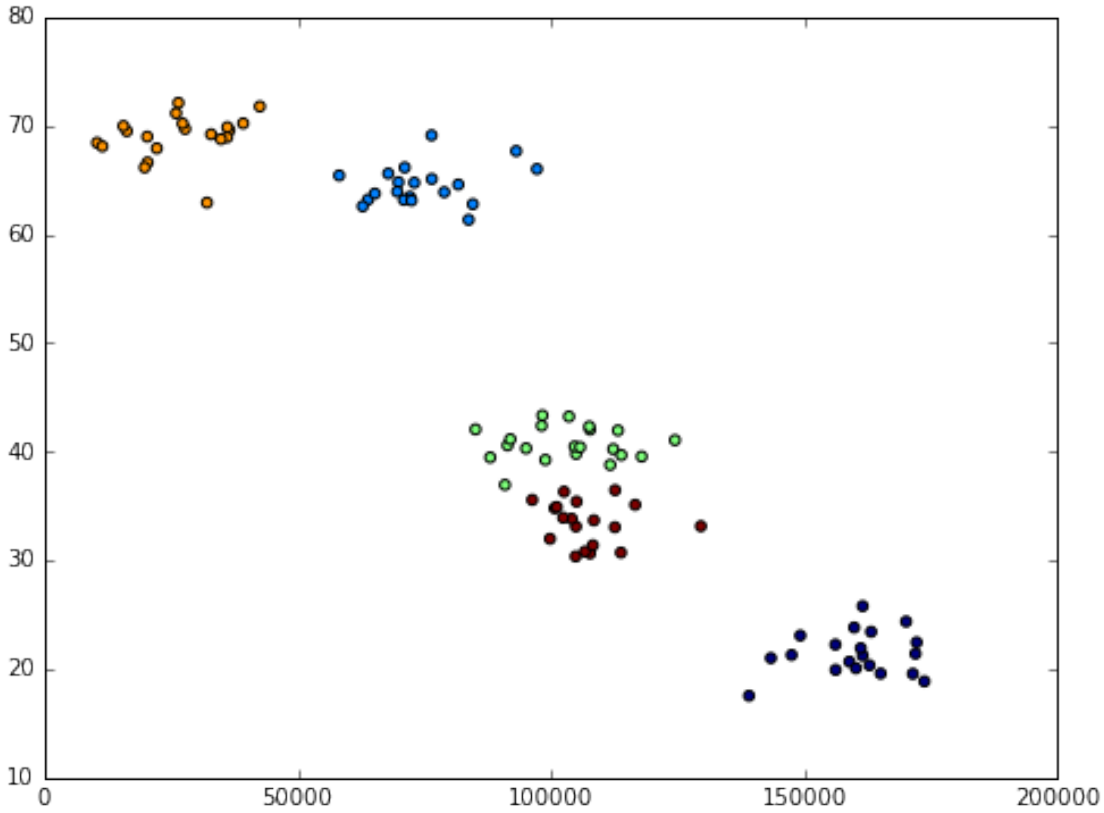

1.1 Activity

Things to play with: what happens if you don't scale the data? What happens if you choose different values of K? In the real world, you won't know the "right" value of K to start with - you'll need to converge on it yourself.

In [ ]: