Tarea12_kmeans

December 14, 2017

In [2]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
from sklearn.model_selection import train_test_split
from sklearn import preprocessing
from random import random,randint,seed,sample
from sklearn.preprocessing import StandardScaler
import random as rn
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import AdaBoostClassifier, RandomForestClassifier
from sklearn.cluster import KMeans
from sklearn import tree
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import classification_report,confusion_matrix
from sklearn.cluster import KMeans
```

In [3]:
```
ab=pd.read_csv('http://archive.ics.uci.edu/ml/machine-learning-databases/abalone/abalone
ab.head()
```

Out[3]:

	M	0.455	0.365	0.095	0.514	0.2245	0.101	0.15	15
0	M	0.350	0.265	0.090	0.2255	0.0995	0.0485	0.070	7
1	F	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.210	9
2	M	0.440	0.365	0.125	0.5160	0.2155	0.1140	0.155	10
3	I	0.330	0.255	0.080	0.2050	0.0895	0.0395	0.055	7
4	I	0.425	0.300	0.095	0.3515	0.1410	0.0775	0.120	8

Divido los datos

In [4]:
```
X=np.array(ab.iloc[:,1:9])
y=np.array(ab.iloc[:,0])
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.2,random_state=6)
```

Estandarizamos

In [5]:
```
scalerx = preprocessing.StandardScaler().fit(X_train)
X_train=scalerx.transform(X_train)
X_test=scalerx.transform(X_test)
```

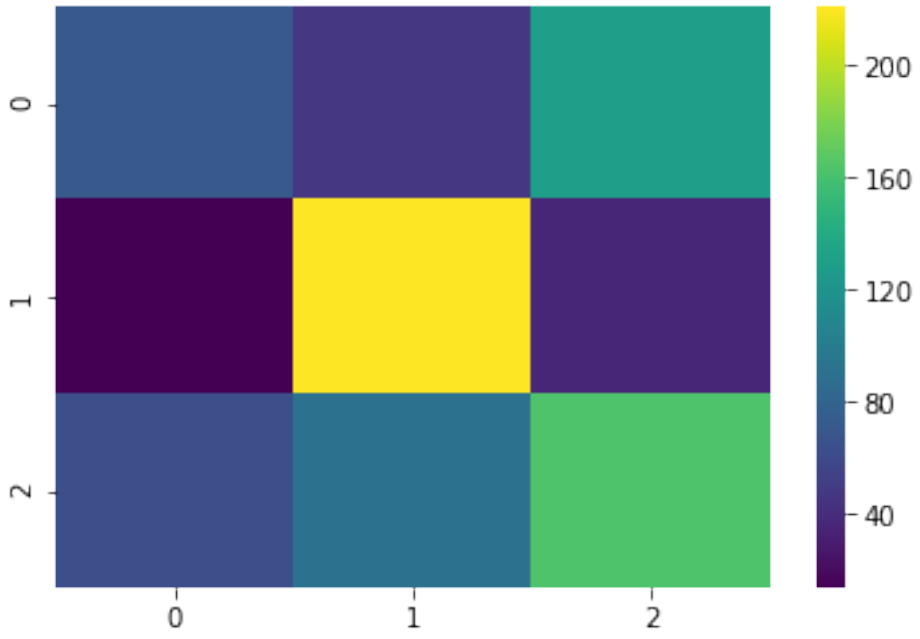
Hacemos un primer acercamiento con regresión logística y evaluamos el resultado.

```
In [6]: rl=LogisticRegression(C=0.01,penalty='l2')
        rl.fit(X_train,y_train)
        pred=rl.predict(X_test)
        print(classification_report(y_test,pred))
        print(confusion_matrix(y_test,pred))
```

```
             precision    recall  f1-score   support

          F       0.48      0.29      0.36       247
          I       0.62      0.82      0.70       271
          M       0.50      0.51      0.50       318

avg / total       0.53      0.54      0.53       836

[[ 71  47 129]
 [ 14 221  36]
 [ 64  91 163]]
```

```
In [8]: cm=confusion_matrix(y_test,pred)
        sns.heatmap(cm,cmap='viridis')
```

```
Out[8]: <matplotlib.axes._subplots.AxesSubplot at 0x7f4b24284710>
```



Ahora, aplicamos el algoritmo de k-medias para hacer un cúmulo.

```
In [9]: kmeans = KMeans(n_clusters=3, random_state=0).fit(X)
        kmeans.labels_
        clases=kmeans.predict(X)

        clas=np.unique(clases)
        e=np.column_stack((y,X,clases))

        X=e[:,1:10]
        y=e[:,0]
        X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.2,random_state=6)
```

Entrenamos.

```
In [10]: c_train=X_train[:,8]
         c_test=X_test[:,8]
         X_train=X_train[:,0:8]
         X_test=X_test[:,0:8]
         scalerx = preprocessing.StandardScaler().fit(X_train)
         X_train=scalerx.transform(X_train)
         X_test=scalerx.transform(X_test)
         X_train
```

```
/home/luxorville/virtualenvs/ML/local/lib/python2.7/site-packages/sklearn/utils/validation.py:47
  warnings.warn(msg, DataConversionWarning)
```

```
Out[10]: array([[ 0.3812389 ,  0.42198989,  0.39733321, ...,  0.07544934,
                  0.82381096,  1.24508119],
                [ 0.92147561,  0.92348295,  1.28893993, ...,  1.11733644,
                  0.80241088, -0.60248838],
                [ 1.00458895,  0.77303504,  1.92580187, ...,  0.72776126,
                  2.82115106,  1.86093771],
                ...,
                [-1.07324455, -1.1827879 , -1.13113545, ..., -1.02532704,
                 -1.15212907, -0.91041664],
                [ 0.46435224,  0.57243781,  0.65207799, ...,  0.25664709,
                  0.78814417,  0.3212964 ],
                [ 0.21501222,  0.12109406,  0.39733321, ..., -0.00608966,
                 -0.24619267, -0.29456012]])
```

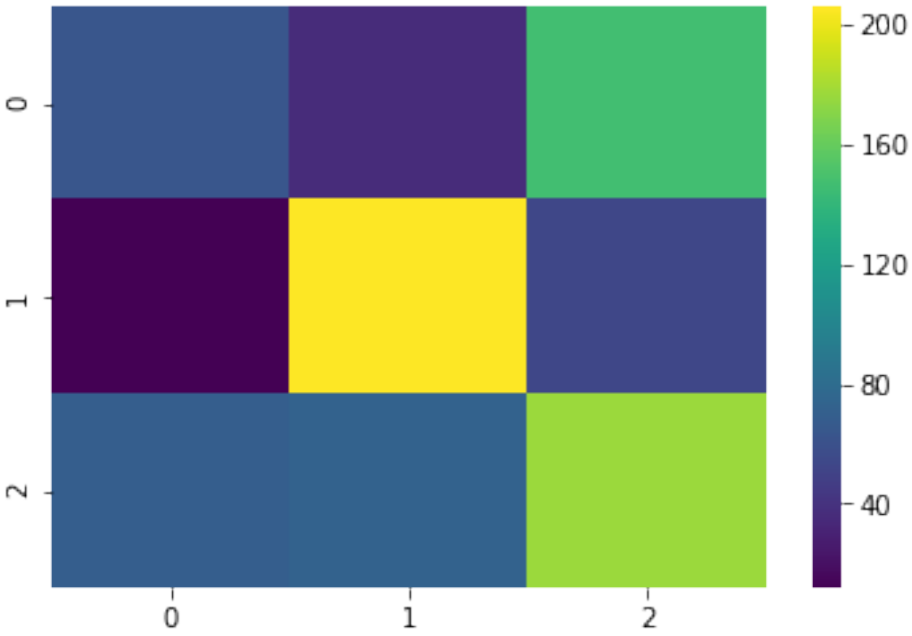
```
In [11]: X_train0,y_train0=X_train[np.where(c_train==0)],y_train[np.where(c_train==0)]
         X_train1,y_train1=X_train[np.where(c_train==1)],y_train[np.where(c_train==1)]
         X_train2,y_train2=X_train[np.where(c_train==2)],y_train[np.where(c_train==2)]

         X_test0,y_test0=X_test[np.where(c_test==0)],y_test[np.where(c_test==0)]
         X_test1,y_test1=X_test[np.where(c_test==1)],y_test[np.where(c_test==1)]
         X_test2,y_test2=X_test[np.where(c_test==2)],y_test[np.where(c_test==2)]

         rl=LogisticRegression(C=0.01,penalty='l2')
```

```
rl.fit(X_train0,y_train0)
pred0=rl.predict(X_test0)
rl.fit(X_train1,y_train1)
pred1=rl.predict(X_test1)
rl.fit(X_train2,y_train2)
pred2=rl.predict(X_test2)

yy=np.concatenate((y_test0, y_test1,y_test2), axis=0)
pp=np.concatenate((pred0, pred1,pred2), axis=0)

print(classification_report(yy,pp))
print(confusion_matrix(yy,pp))
```

```
             precision    recall  f1-score   support

          F       0.44      0.26      0.33       247
          I       0.66      0.76      0.70       271
          M       0.47      0.56      0.51       318

avg / total       0.52      0.53      0.52       836

[[ 64  36 147]
 [ 12 206  53]
 [ 69  72 177]]
```

In [12]:
```
cm=confusion_matrix(yy,pp)
sns.heatmap(cm,cmap='viridis')
```

Out[12]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x7f4b24284850>
```



Comparando esta matriz de confusión con la inicial, podemos notar que el recall de la categoria M mejora, así como la precisión de la categoría I.