lab7_knn

November 15, 2022

[ ]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.metrics import confusion_matrix
from sklearn.neighbors import KNeighborsClassifier
from sklearn.model_selection import train_test_split
from sklearn import preprocessing
```

[ ]:
```
data=pd.read_table("/content/fruit_data_complete (1).txt")
```

[ ]:
```
data.head()
```

[ ]:

	fruit_label	fruit_name	fruit_subtype	mass	width	height	color_score
0	1	apple	granny_smith	192	8.4	7.3	0.55
1	1	apple	granny_smith	180	8.0	6.8	0.59
2	1	apple	granny_smith	176	7.4	7.2	0.60
3	2	mandarin	mandarin	86	6.2	4.7	0.80
4	2	mandarin	mandarin	84	6.0	4.6	0.79

[ ]:
```
lookup=dict(zip(data.fruit_label.unique(), data.fruit_name.unique()))
lookup
```

[ ]:
```
{1: 'apple', 2: 'mandarin', 3: 'orange', 4: 'lemon'}
```

[ ]:
```
X=data.iloc[:,3:6]
y=data.fruit_label
```

[ ]:
```
xtrain,xtest,ytrain,ytest=train_test_split(X,y,test_size=0.3)
```

[ ]:
```
knn=KNeighborsClassifier(n_neighbors=5)
knn.fit(xtrain,ytrain)
ypred=knn.predict(xtest)
```

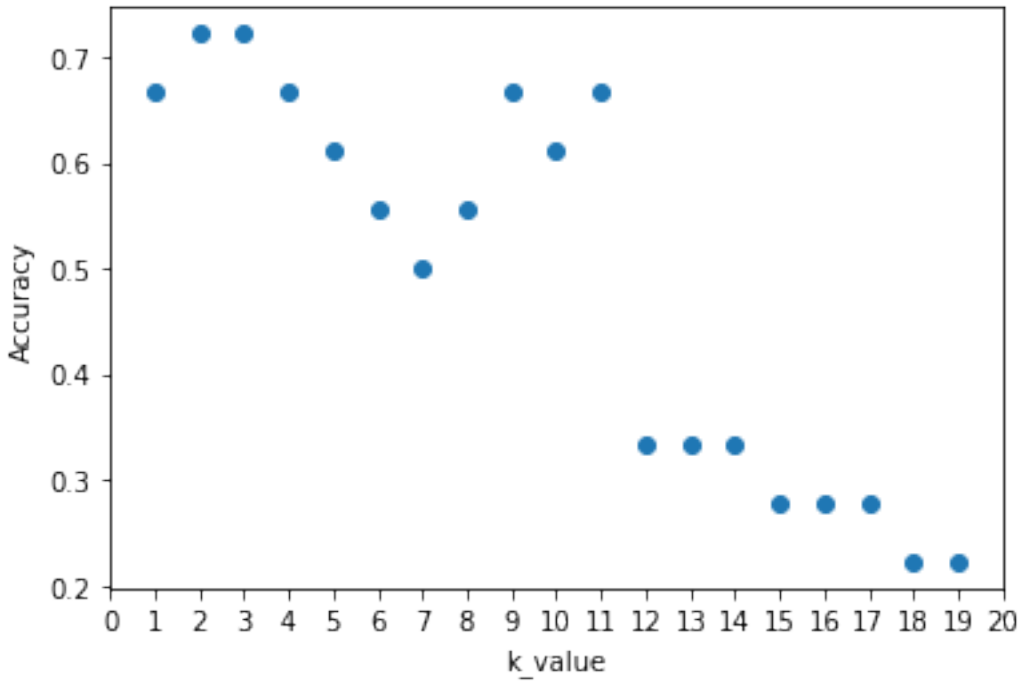
[ ]:
```
knn.score(xtest,ytest)
```

[ ]:
```
0.6111111111111112
```

[ ]:
```
conmat=confusion_matrix(ytest,ypred)
conmat
```

[ ]:
```
array([[3, 0, 1, 0],
       [0, 1, 0, 0],
       [0, 0, 3, 3],
       [2, 0, 1, 4]])
```

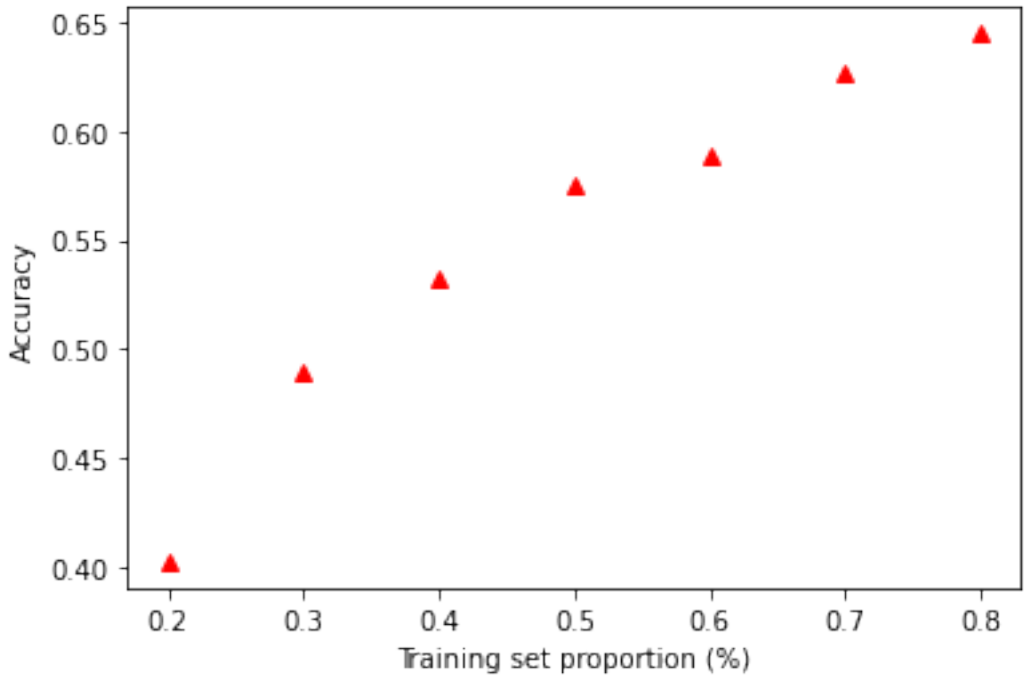
[ ]:
```
k_range = range(1,20)
scores = []
for k in k_range:
 knn = KNeighborsClassifier(n_neighbors = k)
 knn.fit(xtrain, ytrain)
 scores.append(knn.score(xtest, ytest))
plt.figure()
plt.xlabel('k_value')
plt.ylabel('Accuracy')
plt.scatter(k_range, scores)
plt.xticks(range(0,21));
```



[ ]:
```
t = [0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8]
knn = KNeighborsClassifier(n_neighbors = 3)
plt.figure()
for split in t:
```

```
  scores = []
  for i in range(1,100):
    xtrain, xtest, ytrain, ytest = train_test_split(X, y, train_size = split)
    knn.fit(xtrain, ytrain)
    scores.append(knn.score(xtest, ytest))
  plt.plot(split, np.mean(scores), 'r^')
plt.xlabel('Training set proportion (%)')
plt.ylabel('Accuracy')
```

[ ]: Text(0, 0.5, 'Accuracy')



[ ]:
```
traindata=pd.read_csv("/content/train_data (1).csv")
testdata=pd.read_csv("/content/test_data.csv")
```

[ ]:
```
traindata.head()
```

[ ]:

	loan_id	age	education	proof_submitted	loan_amount	asset_cost	\
0	1	27	1.0	Aadhar	504264	820920	
1	2	48	1.0	Aadhar	728556	831444	
2	3	30	2.0	VoterID	642936	826092	
3	4	28	1.0	Aadhar	746556	930924	
4	5	29	1.0	Aadhar	1139880	1902000	

	no_of_loans	no_of_curr_loans	last_delinq_none	loan_default
0	2	2	0	0

```
1            6                2                0            0
2            0                0                0            1
3            0                0                0            0
4            0                0                0            0
```

[ ]:
```
testdata.head()
```

[ ]:
```
   loan_id  age  education proof_submitted  loan_amount  asset_cost  \
0     7001   29        1.0          Aadhar       636936      768240
1     7002   28        1.0          Aadhar       548988      693060
2     7003   28        1.0          Aadhar       651756      936600
3     7004   45        2.0          Aadhar       614676      744840
4     7005   48        1.0          Aadhar       625236      839400

   no_of_loans  no_of_curr_loans  last_delinq_none
0            2                 2                 0
1            3                 3                 0
2            0                 0                 0
3            4                 3                 0
4            0                 0                 0
```

[ ]:
```
le = preprocessing.LabelEncoder()
xtrain=traindata.iloc[:,:-1]
xtrain=xtrain.drop("loan_id",axis=1)
xtrain.proof_submitted=le.fit_transform(xtrain.proof_submitted)
ytrain=traindata.loan_default
xtest=testdata
xtest.proof_submitted=le.fit_transform(xtest.proof_submitted)
xtest=xtest.drop("loan_id",axis=1)
```

[ ]:
```
      age  education  proof_submitted  loan_amount  asset_cost  no_of_loans  \
0      29        1.0                0       636936      768240            2
1      28        1.0                0       548988      693060            3
2      28        1.0                0       651756      936600            0
3      45        2.0                0       614676      744840            4
4      48        1.0                0       625236      839400            0
…   …        …                …           …           …           …
2995   30        2.0                0       353808      823656            0
2996   32        2.0                0       767364      919380            4
2997   43        1.0                0       639456      773088            2
2998   32        2.0                0       687108      907728            0
2999   42        2.0                0       648156      755160            5

      no_of_curr_loans  last_delinq_none
0                    2                 0
1                    3                 0
2                    0                 0
```

```
3                    3                    0
4                    0                    0
…                    …                    …
2995                 0                    0
2996                 2                    0
2997                 2                    0
2998                 0                    0
2999                 4                    0

[3000 rows x 8 columns]
```

[ ]:
```
xtrain['education'].fillna(0, inplace = True)
xtest['education'].fillna(0, inplace = True)
```

[ ]:
```
xtrain.education.unique()
```

[ ]:
```
array([1., 2., 0.])
```

[ ]:
```
knn=KNeighborsClassifier(n_neighbors=5)
knn.fit(xtrain,ytrain)
ypred=knn.predict(xtest)
ypred
```

[ ]:
```
array([0, 0, 0, …, 0, 1, 1])
```