Iris-flower

November 17, 2022

A machine learning system to predict the iris flower type based on the K nearest neighbors algorithm.

The independent variables are

- sepallength
- sepalwidth
- petallength
- petalwidth

The dependent variable is

- The iris flower type

Dataset

- The dataset used for this experiment can be downloaded form this link

Tools

To work with this project, multiple libraries and frameworks need to be installed. The following is a list of them. - Pandas - NumPy - Matplotlib - Sciki-learn

Import the necessary packets.

```
[1]: import numpy as np
     import pandas as pd
     import matplotlib.pyplot as plt
```

The dataset is unlabeled; an assigned label is needed

```
[4]: headernames = ['sepal-length', 'sepal-width', 'petal-length', 'petal-width',␣
      ↪'Class']
     # read the iris.data as csv and assign the label
     df = pd.read_csv('iris.data', names = headernames)

     df.head(3)
```

```
[4]:    sepal-length  sepal-width  petal-length  petal-width        Class
     0           5.1          3.5           1.4          0.2  Iris-setosa
     1           4.9          3.0           1.4          0.2  Iris-setosa
     2           4.7          3.2           1.3          0.2  Iris-setosa
```

Data preprocessing Select the first four columns as independent (x) variables and the last column as dependent(y)

[5]:

```
x = df.iloc[:, :-1].values
y = df.iloc[:,4].values
```

Normalize the data

we only have numeric data so we don't used onehotencoder

[6]:

```
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
scaler.fit(x)
x = scaler.transform(x)
```

Split the data into train and test

[9]:

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(x, y, test_size = 0.40)
```

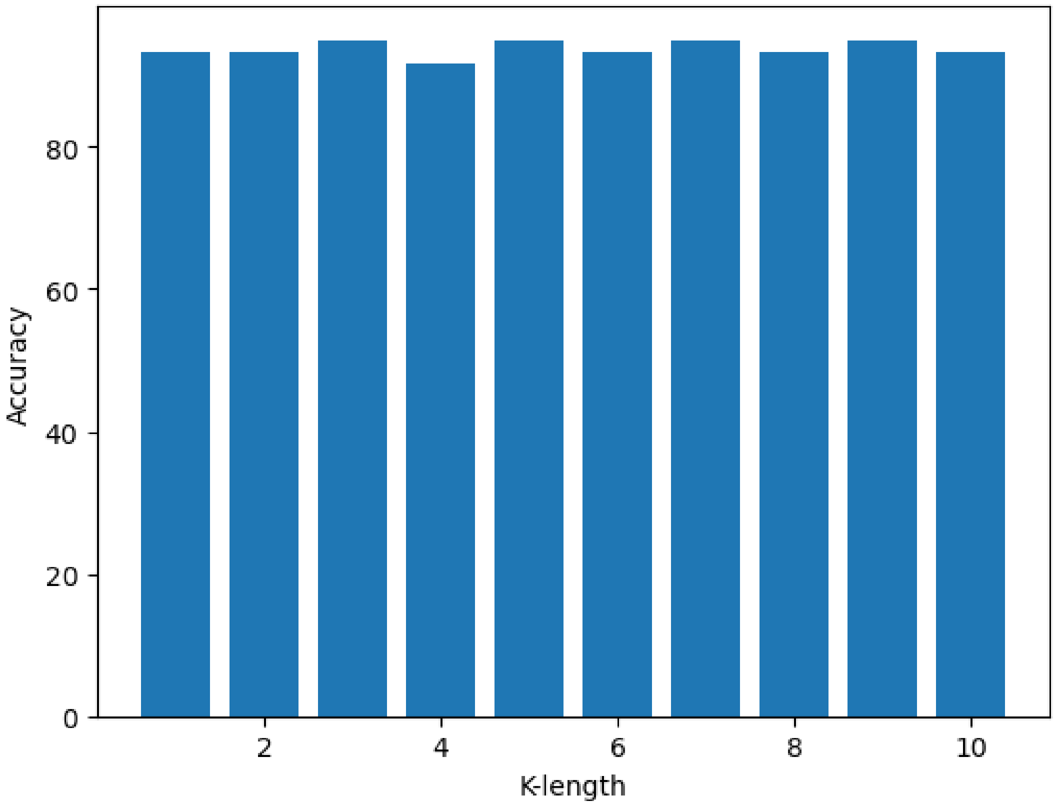
import the k-nn model

[14]:

```
from sklearn.neighbors import KNeighborsClassifier
k = 10
accuracy_result = []
for i in range(1,k+1):

    model = KNeighborsClassifier(n_neighbors = i).fit(X_train, y_train)
    yhat = model.predict(X_test)

    from sklearn import metrics
    # print("Train set Accuracy: ", metrics.accuracy_score(y_train, model.
 ↪predict(X_train))*100)
    ac = metrics.accuracy_score(y_test, yhat)
    # print("Test set Accuracy: ",ac )

    accuracy_result.append(ac)

plt.bar(np.arange(1,k+1), [i*100 for i in accuracy_result])
plt.xlabel('K-length')
plt.ylabel('Accuracy')
```

[14]:

```
Text(0, 0.5, 'Accuracy')
```



[16]:

```
print('The best accuracy achieved where k is equal to ', str(accuracy_result.
↪index(max(accuracy_result))), "The accuracy is␣
↪",str(accuracy_result[accuracy_result.index(max(accuracy_result))]*100)+"%")
```

```
The best accuracy achieved where k is equal to  2 The accuracy is  95.0%
```

Deploying

[17]:

```
import joblib
import os
if not os.path.exists('Model'):
        os.mkdir('Model')
if not os.path.exists('Scaler'):
        os.mkdir('Scaler')

joblib.dump(model, r'Model/model.pickle')
joblib.dump(scaler, r'Scaler/scaler.pickle')
```

[17]:

```
['Scaler/scaler.pickle']
```

To use the proposed model with real data create another file deploy.py and this lines

[19]:

```
import pandas as pd

# 1- define the new data
new_data = pd.DataFrame([{'sepal-length':5.3, 'sepal-width':3.7, 'petal-length':
 ↪1.6, 'petal-width':0.22}])
new_data = new_data[['sepal-length','sepal-width','petal-length','petal-width']]

# 2- import the Scalar and KNN models

import joblib

model = joblib.load(r'Model/model.pickle')
scaler = joblib.load(r'Scaler/scaler.pickle')

# 3- Normalize the data
new_data = scaler.transform(new_data)
predict_calass = model.predict(new_data)

print(predict_calass)
```

```
['Iris-setosa']
```