22p-9252-lab-task-07

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0.0.4 Date: 2021-10-07

0.0.5 Task 7

[53]:

```python
import pandas as pd

titanic_data = pd.read_csv("titanic.csv")
titanic_data.head()
```

[53]:

```
   PassengerId  Survived  Pclass  \
0            1         0       3
1            2         1       1
2            3         1       3
3            4         1       1
4            5         0       3

                                                Name     Sex   Age  SibSp  \
0                            Braund, Mr. Owen Harris    male  22.0      1
1  Cumings, Mrs. John Bradley (Florence Briggs Th…  female  38.0      1
2                             Heikkinen, Miss. Laina  female  26.0      0
3       Futrelle, Mrs. Jacques Heath (Lily May Peel)  female  35.0      1
4                           Allen, Mr. William Henry    male  35.0      0

   Parch            Ticket     Fare Cabin Embarked
0      0         A/5 21171   7.2500   NaN        S
1      0          PC 17599  71.2833   C85        C
2      0  STON/O2. 3101282   7.9250   NaN        S
3      0            113803  53.1000  C123        S
4      0            373450   8.0500   NaN        S
```

[54]:

```python
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.neighbors import KNeighborsClassifier
from sklearn.metrics import accuracy_score
from sklearn.preprocessing import LabelEncoder
import numpy as np

'''The features you plan to use are "Pclass" (Passenger
Class), "Gender," "Age," "SibSp" (Number of Siblings/Spouses Aboard), "Parch"␣
  ↪(Number of
Parents/Children Aboard), "Fare," and "Embarked" (Port of Embarkation). The␣
  ↪target variable you
want to predict is "Survived.'''

features = ['Pclass', 'Age', 'SibSp', 'Parch', 'Fare']
categorical_features = ['Sex', 'Embarked']
target = 'Survived'

'''Step : 1 -> Describe how you would convert categorical features like␣
  ↪"Gender" and "Embarked" into
numeric format.'''

le = LabelEncoder()
for cat in categorical_features:
    titanic_data[cat] = le.fit_transform(titanic_data[cat])

X = titanic_data[features + categorical_features]
y = titanic_data[target]

X = X.fillna(X.mean())
y = y.fillna(y.mean())


print("Features: ", X.head())
print("Target: ", y.head())
```

```
Features:      Pclass   Age  SibSp  Parch     Fare  Sex  Embarked
0       3  22.0      1      0   7.2500    1         2
1       1  38.0      1      0  71.2833    0         0
2       3  26.0      0      0   7.9250    0         2
3       1  35.0      1      0  53.1000    0         2
4       3  35.0      0      0   8.0500    1         2
Target:  0    0
1    1
2    1
3    1
4    0
Name: Survived, dtype: int64
```

[55]:

```python
'''Split the dataset into training and testing sets.
• Train the KNN model on the training set.
• Evaluate the model's accuracy on the testing set.
• Repeat steps 1-3 for different random states (e.g., 1, 10, 42) to observe how␣
 ↪the accuracy
varies.'''
random_states = [0,1,3,10,42,75]
accuracy_scores = []
for state in random_states:
    X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,␣
 ↪random_state=state)
    knn = KNeighborsClassifier(n_neighbors=5)
    knn.fit(X_train, y_train)
    y_pred = knn.predict(X_test)
    accuracy_scores.append(accuracy_score(y_test, y_pred))
    print("Accuracy score for random state ", state, " is ",␣
 ↪accuracy_score(y_test, y_pred))
```

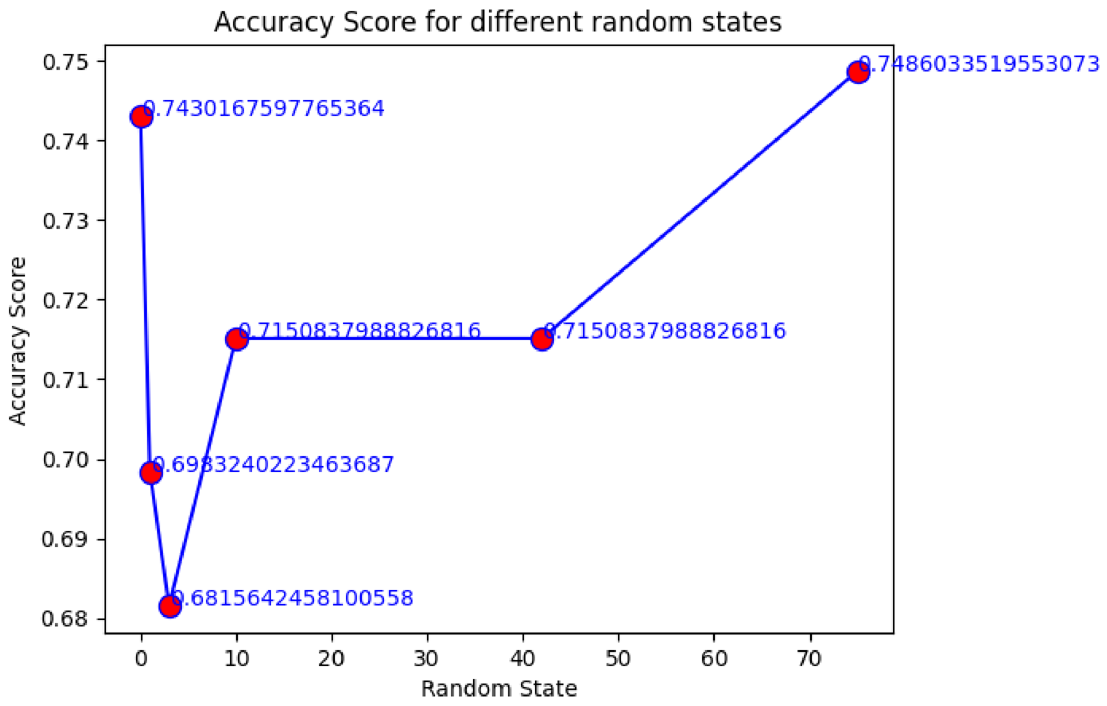
```
Accuracy score for random state  0  is  0.7430167597765364
Accuracy score for random state  1  is  0.6983240223463687
Accuracy score for random state  3  is  0.6815642458100558
Accuracy score for random state  10  is  0.7150837988826816
Accuracy score for random state  42  is  0.7150837988826816
Accuracy score for random state  75  is  0.7486033519553073
```

[59]:

```
plt.plot(random_states, accuracy_scores, marker='o', color='b',␣
 ↪markerfacecolor='r', markersize=10)
plt.xlabel('Random State')
plt.ylabel('Accuracy Score')
plt.title('Accuracy Score for different random states')

# Add text annotations for each data point
for i, txt in enumerate(accuracy_scores):
    plt.annotate(txt, (random_states[i], accuracy_scores[i]), color='b',␣
 ↪size=10)

plt.show()
```



[57]:

```
print("\nObservations:")
print("The observed range of accuracy scores is:", min(accuracy_scores), "to", max(accuracy_scores))
print("The observed mean of accuracy scores is:", np.mean(accuracy_scores))
print("This suggests a moderate level of stability in the model's performance across different random splits.")
```

```
Observations:
The observed range of accuracy scores is: 0.6815642458100558 to
0.7486033519553073
The observed mean of accuracy scores is: 0.7169459962756052
This suggests a moderate level of stability in the model's performance across
different random splits.
```

[ ]: