knn-regression

April 5, 2024

0.1 Predicting Concrete Compressive Strength

[1]:

```
## importing necessary libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsRegressor
from sklearn.metrics import mean_squared_error, r2_score
```

[4]:

```
## Loading dataset
data = pd.read_csv(r'C:\Users\ntpc\Desktop\Slump.csv',sep= '\t')
data.head()
```

[4]:

```
   Cement   Slag  Fly ash  Water    SP  Coarse Aggr.  Fine Aggr.  SLUMP(cm)  \
0   273.0   82.0    105.0  210.0   9.0         904.0       680.0       23.0
1   163.0  149.0    191.0  180.0  12.0         843.0       746.0        0.0
2   162.0  148.0    191.0  179.0  16.0         840.0       743.0        1.0
3   162.0  148.0    190.0  179.0  19.0         838.0       741.0        3.0
4   154.0  112.0    144.0  220.0  10.0         923.0       658.0       20.0

   FLOW(cm)  Compressive Strength (28-day)(Mpa)
0      62.0                               34.99
1      20.0                               41.14
2      20.0                               41.81
3      21.5                               42.08
4      64.0                               26.82
```

[5]:

```
#checking for categorical variables
data.dtypes
```

[5]:

```
Cement                                  float64
Slag                                    float64
Fly ash                                 float64
Water                                   float64
SP                                      float64
Coarse Aggr.                            float64
Fine Aggr.                              float64
SLUMP(cm)                               float64
```

```
FLOW(cm)                                 float64
Compressive Strength (28-day)(Mpa)       float64
dtype: object
```

[6]:

```
#checking for missing values
data.isnull().sum()
```

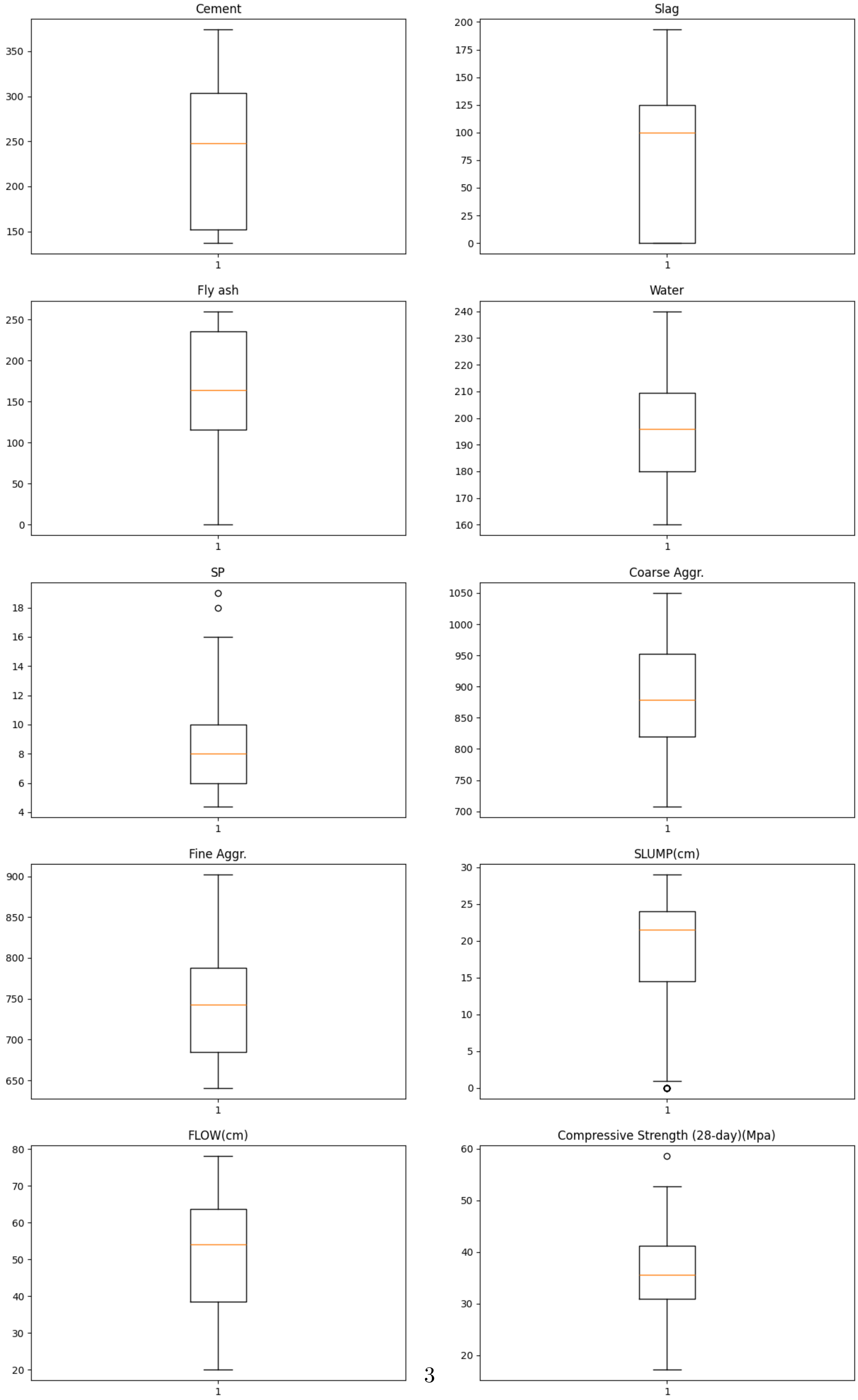
[6]:

```
Cement                                   0
Slag                                     0
Fly ash                                  0
Water                                    0
SP                                       0
Coarse Aggr.                             0
Fine Aggr.                               0
SLUMP(cm)                                0
FLOW(cm)                                 0
Compressive Strength (28-day)(Mpa)       0
dtype: int64
```

[8]:

```
import matplotlib.pyplot as plt
#checking for outliers
plt.figure(figsize = (15,25))
count = 1
for col in data:
    plt.subplot(5,2,count)
    plt.boxplot(data[col])
    plt.title(col)
    count +=1

plt.show()
```


Cement
350
300
250
200
150
1
Slag
200
175
150
125
100
75
50
25
0
1
Fly ash
250
200
150
100
50
0
1
Water
240
230
220
210
200
190
180
170
160
1
SP
18
16
14
12
10
8
6
4
1
Coarse Aggr.
1050
1000
950
900
850
800
750
700
1
Fine Aggr.
900
850
800
750
700
650
1
SLUMP(cm)
30
25
20
15
10
5
0
1
FLOW(cm)
80
70
60
50
40
30
20
1
Compressive Strength (28-day)(Mpa)
60
50
40
30
20
1

[9]:

```
# Splitting the data into features (X) and target variable (y)
X = data.drop(['Compressive Strength (28-day)(Mpa)'], axis=1)
y = data['Compressive Strength (28-day)(Mpa)']
```

[10]:

```
# Performing feature scaling
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
```

[11]:

```
# Splitting the scaled data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X_scaled, y, test_size=0.2,␣
 ↪random_state=42)
```

[13]:

```
knn_regressor = KNeighborsRegressor(n_neighbors=5)
knn_regressor.fit(X_train, y_train)
```

[13]:

```
KNeighborsRegressor()
```

[ ]:

```
# Making predictions on the testing data
y_pred = knn_regressor.predict(X_test)
```