To Predict the chances of winning of a candidate

Importing Important Libraries

```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import r2_score
import warnings
warnings.filterwarnings("ignore")
```

Importing Election dataset csv file

```
z = pd.read_csv(r"C:\Users\skj_h\OneDrive\Desktop\Election
dataset.csv")

z

              STATE     CONSTITUENCY                   NAME  WINNER
PARTY  \
0         Telangana         ADILABAD         SOYAM BAPU RAO       1
BJP
1         Telangana         ADILABAD           Godam Nagesh       0
TRS
2         Telangana         ADILABAD          RATHOD RAMESH       0
INC
3         Telangana         ADILABAD                   NOTA       0
NOTA
4     Uttar Pradesh             AGRA  Satyapal Singh Baghel       1
BJP
...             ...              ...                    ...     ...
...
2258    Maharashtra  YAVATMAL-WASHIM     Anil Jayram Rathod       0
IND
2259      Telangana        ZAHIRABAD              B.B.PATIL       1
TRS
2260      Telangana        ZAHIRABAD        MADAN MOHAN RAO       0
INC
2261      Telangana        ZAHIRABAD     BANALA LAXMA REDDY       0
BJP
2262      Telangana        ZAHIRABAD                   NOTA       0
NOTA

     SYMBOL GENDER CRIMINAL\nCASES   AGE CATEGORY      EDUCATION  \
0     Lotus   MALE                52  52.0        ST      12th Pass
1       Car   MALE                 0  54.0        ST  Post Graduate
2      Hand   MALE                 3  52.0        ST      12th Pass
3       NaN    NaN               NaN   NaN       NaN            NaN
4     Lotus   MALE                 5  58.0        SC      Doctorate
...     ...    ...               ...   ...       ...            ...
2258   SHIP   MALE                 0  43.0   GENERAL  Post Graduate
2259    Car   MALE                18  63.0   GENERAL       Graduate
2260   Hand   MALE                 0  49.0   GENERAL  Post Graduate
2261  Lotus   MALE                 3  47.0   GENERAL      12th Pass
2262    NaN    NaN               NaN   NaN       NaN            NaN

                                ASSETS                  LIABILITIES  \
0            Rs 30,99,414\n ~ 30 Lacs+      Rs 2,31,450\n ~ 2 Lacs+
1          Rs 1,84,77,888\n ~ 1 Crore+      Rs 8,47,000\n ~ 8 Lacs+
2          Rs 3,64,91,000\n ~ 3 Crore+  Rs 1,53,00,000\n ~ 1 Crore+
3                                  NaN                          NaN
4          Rs 7,42,74,036\n ~ 7 Crore+    Rs 86,06,522\n ~ 86 Lacs+
...                                ...                          ...
2258         Rs 48,90,000\n ~ 48 Lacs+    Rs 10,20,000\n ~ 10 Lacs+
2259  Rs 1,28,78,51,556\n ~ 128 Crore+  Rs 1,15,35,000\n ~ 1 Crore+
2260     Rs 90,36,63,001\n ~ 90 Crore+                     Rs 0\n ~
2261       Rs 5,85,77,327\n ~ 5 Crore+    Rs 52,50,000\n ~ 52 Lacs+
2262                               NaN                          NaN

      GENERAL\nVOTES  POSTAL\nVOTES  TOTAL\nVOTES  \
0             376892            482        377374
1             318665            149        318814
2             314057            181        314238
3              13030              6         13036
4             644459           2416        646875
...              ...            ...           ...
2258           14661             25         14686
2259          434066            178        434244
2260          427900            115        428015
2261          138731            216        138947
2262           11138              2         11140

      OVER TOTAL ELECTORS \nIN CONSTITUENCY  \
0                                 25.330684
1                                 21.399929
2                                 21.092771
3                                  0.875023
4                                 33.383823
...                                     ...
2258                               0.766419
2259                              28.975369
2260                              28.559732
2261                               9.271379
2262                               0.743328
```

```
      OVER TOTAL VOTES POLLED \nIN CONSTITUENCY  TOTAL ELECTORS
0                                     35.468248        1489790
1                                     29.964370        1489790
2                                     29.534285        1489790
3                                      1.225214        1489790
4                                     56.464615        1937690
...                                         ...            ...
2258                                   1.250060        1916185
2259                                  41.574183        1498666
2260                                  40.977823        1498666
2261                                  13.302678        1498666
2262                                   1.066535        1498666

[2263 rows x 19 columns]
```

```
z.shape
```

```
(2263, 19)
```

```
z.size
```

```
42997
```

```
z.ndim
```

```
2
```

```
z.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2263 entries, 0 to 2262
Data columns (total 19 columns):
 #   Column                                    Non-Null Count  Dtype
---  ------                                    --------------  -----
 0   STATE                                     2263 non-null   object
 1   CONSTITUENCY                              2263 non-null   object
 2   NAME                                      2263 non-null   object
 3   WINNER                                    2263 non-null   int64
 4   PARTY                                     2263 non-null   object
 5   SYMBOL                                    2018 non-null   object
 6   GENDER                                    2018 non-null   object
 7   CRIMINAL
CASES                            2018 non-null   object
 8   AGE                                       2018 non-null   float64
 9   CATEGORY                                  2018 non-null   object
 10  EDUCATION                                 2018 non-null   object
 11  ASSETS                                    2018 non-null   object
 12  LIABILITIES                               2018 non-null   object
 13  GENERAL
VOTES                             2263 non-null   int64
```

```
 14  POSTAL
VOTES                              2263 non-null   int64
 15  TOTAL
VOTES                               2263 non-null   int64
 16  OVER TOTAL ELECTORS
IN CONSTITUENCY      2263 non-null   float64
 17  OVER TOTAL VOTES POLLED
IN CONSTITUENCY  2263 non-null   float64
 18  TOTAL ELECTORS                            2263 non-null   int64
dtypes: float64(3), int64(5), object(11)
memory usage: 336.0+ KB
```

```
z.describe()
```

```
            WINNER          AGE  GENERAL\nVOTES  POSTAL\nVOTES  TOTAL\
nVOTES  \
count  2263.000000  2018.000000    2.263000e+03    2263.000000
2.263000e+03
mean      0.238179    52.273538    2.615991e+05     990.710561
2.625898e+05
std       0.426064    11.869373    2.549906e+05    1602.839174
2.559822e+05
min       0.000000    25.000000    1.339000e+03       0.000000
1.342000e+03
25%       0.000000    43.250000    2.103450e+04      57.000000
2.116250e+04
50%       0.000000    52.000000    1.539340e+05     316.000000
1.544890e+05
75%       0.000000    61.000000    4.858040e+05    1385.000000
4.872315e+05
max       1.000000    86.000000    1.066824e+06   19367.000000
1.068569e+06

       OVER TOTAL ELECTORS \nIN CONSTITUENCY  \
count                            2263.000000
mean                               15.811412
std                                14.962861
min                                 0.097941
25%                                 1.296518
50%                                10.510553
75%                                29.468185
max                                51.951012

       OVER TOTAL VOTES POLLED \nIN CONSTITUENCY  TOTAL ELECTORS
count                                2263.000000    2.263000e+03
mean                                   23.190525    1.658016e+06
std                                    21.564758    3.145187e+05
min                                     1.000039    5.518900e+04
25%                                     1.899502    1.530014e+06
50%                                    16.221721    1.679030e+06
```

```
75%                                       42.590233    1.816857e+06
max                                       74.411856    3.150313e+06
```

```
z.dtypes
```

```
STATE                                      object
CONSTITUENCY                               object
NAME                                       object
WINNER                                      int64
PARTY                                      object
SYMBOL                                     object
GENDER                                     object
CRIMINAL\nCASES                            object
AGE                                       float64
CATEGORY                                   object
EDUCATION                                  object
ASSETS                                     object
LIABILITIES                                object
GENERAL\nVOTES                              int64
POSTAL\nVOTES                               int64
TOTAL\nVOTES                                int64
OVER TOTAL ELECTORS \nIN CONSTITUENCY     float64
OVER TOTAL VOTES POLLED \nIN CONSTITUENCY float64
TOTAL ELECTORS                              int64
dtype: object
```

Counting number of null values, NAN values and removing it

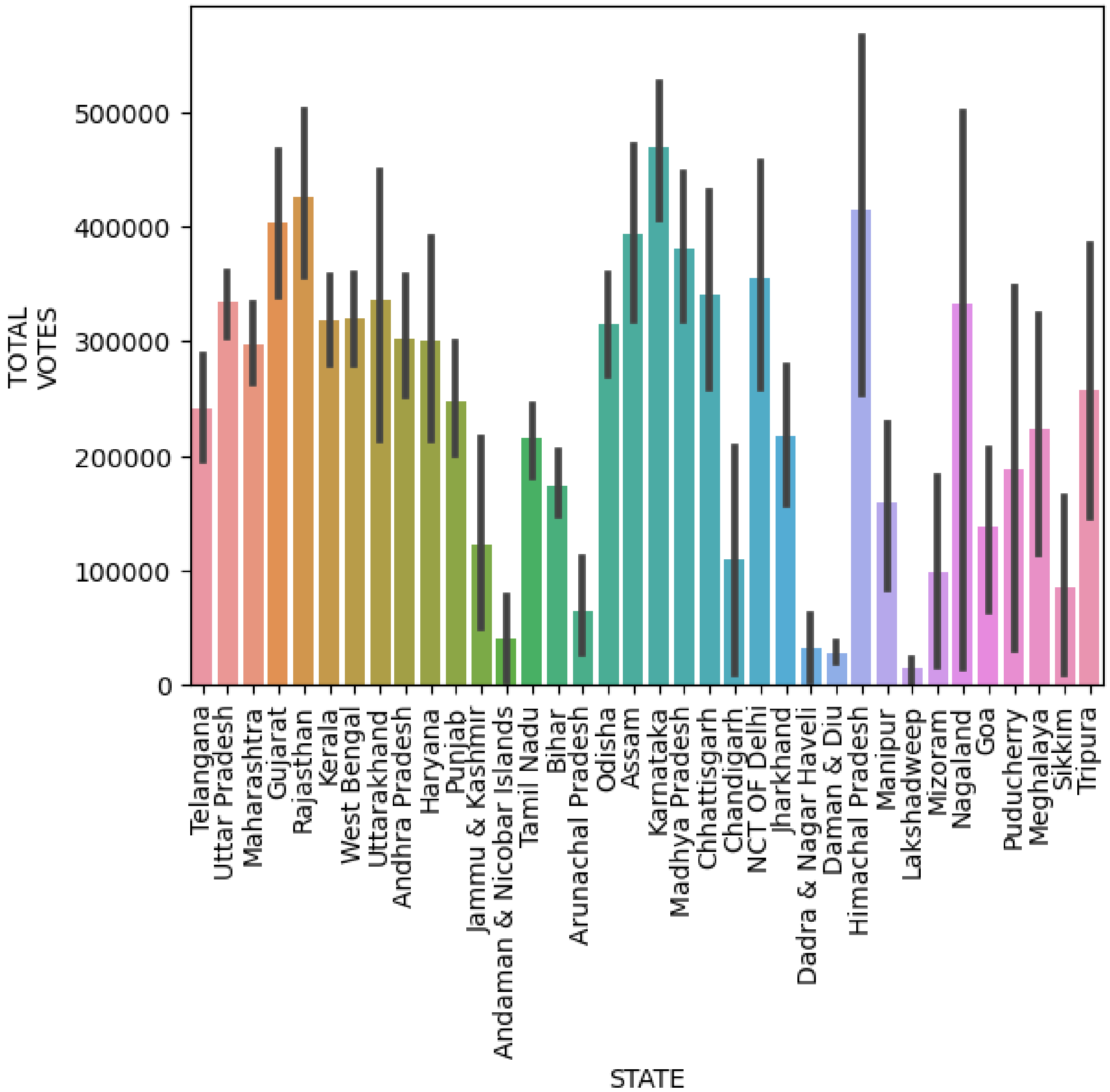
```
z.isnull().sum()
```

```
STATE                                        0
CONSTITUENCY                                 0
NAME                                         0
WINNER                                       0
PARTY                                        0
SYMBOL                                     245
GENDER                                     245
CRIMINAL\nCASES                            245
AGE                                        245
CATEGORY                                   245
EDUCATION                                  245
ASSETS                                     245
LIABILITIES                                245
GENERAL\nVOTES                               0
POSTAL\nVOTES                                0
TOTAL\nVOTES                                 0
OVER TOTAL ELECTORS \nIN CONSTITUENCY        0
OVER TOTAL VOTES POLLED \nIN CONSTITUENCY    0
TOTAL ELECTORS                               0
dtype: int64
```

```
z = z[z["SYMBOL"].notna()]

z.isnull().sum().sum()

0
```

Data visualization

```
sns.barplot(x = z["STATE"], y = z["TOTAL\nVOTES"], data = z)
plt.xticks(rotation = 90)

(array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13, 14,
15, 16,
        17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31,
32, 33,
        34, 35]),
 [Text(0, 0, 'Telangana'),
  Text(1, 0, 'Uttar Pradesh'),
  Text(2, 0, 'Maharashtra'),
  Text(3, 0, 'Gujarat'),
  Text(4, 0, 'Rajasthan'),
  Text(5, 0, 'Kerala'),
  Text(6, 0, 'West Bengal'),
  Text(7, 0, 'Uttarakhand'),
  Text(8, 0, 'Andhra Pradesh'),
  Text(9, 0, 'Haryana'),
  Text(10, 0, 'Punjab'),
  Text(11, 0, 'Jammu & Kashmir'),
  Text(12, 0, 'Andaman & Nicobar Islands'),
  Text(13, 0, 'Tamil Nadu'),
  Text(14, 0, 'Bihar'),
  Text(15, 0, 'Arunachal Pradesh'),
  Text(16, 0, 'Odisha'),
  Text(17, 0, 'Assam'),
  Text(18, 0, 'Karnataka'),
  Text(19, 0, 'Madhya Pradesh'),
  Text(20, 0, 'Chhattisgarh'),
  Text(21, 0, 'Chandigarh'),
  Text(22, 0, 'NCT OF Delhi'),
  Text(23, 0, 'Jharkhand'),
  Text(24, 0, 'Dadra & Nagar Haveli'),
  Text(25, 0, 'Daman & Diu'),
  Text(26, 0, 'Himachal Pradesh'),
  Text(27, 0, 'Manipur'),
  Text(28, 0, 'Lakshadweep'),
  Text(29, 0, 'Mizoram'),
  Text(30, 0, 'Nagaland'),
  Text(31, 0, 'Goa'),
  Text(32, 0, 'Puducherry'),
  Text(33, 0, 'Meghalaya'),
  Text(34, 0, 'Sikkim'),
  Text(35, 0, 'Tripura')])
```

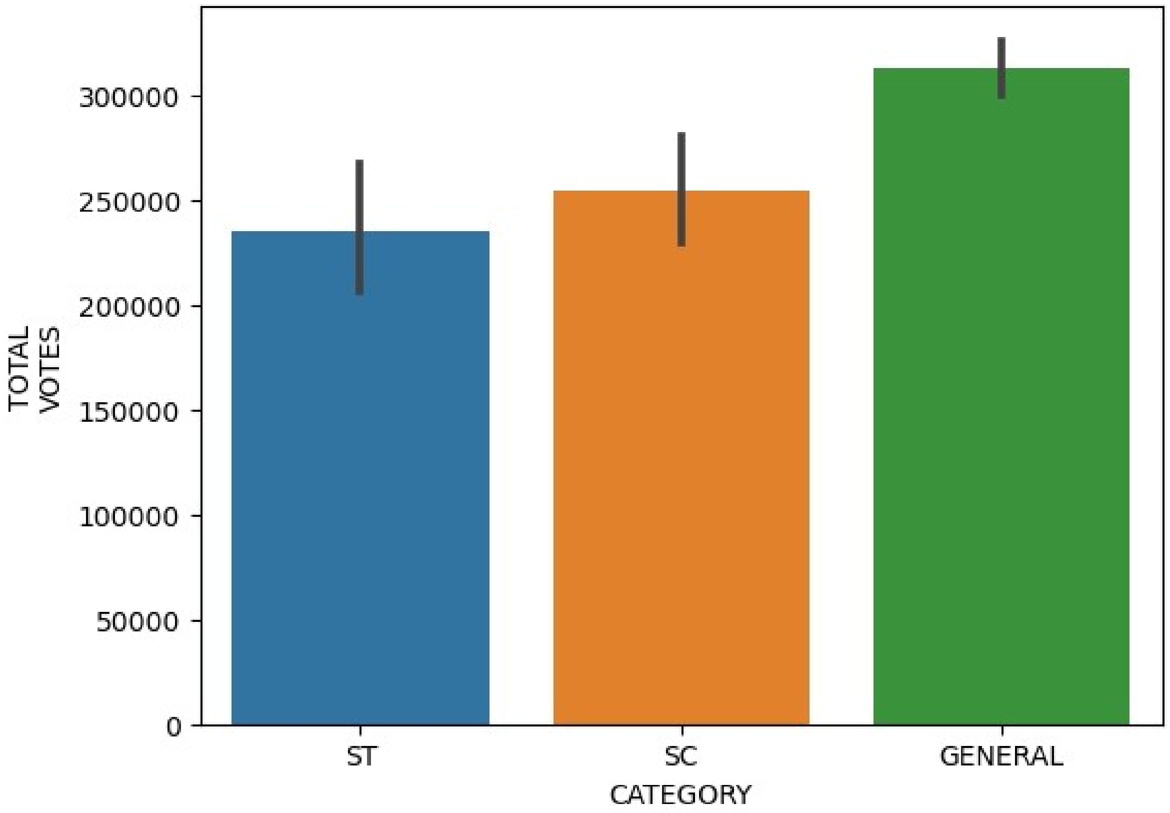


```
z["CATEGORY"].value_counts()

GENERAL    1392
SC          383
ST          243
Name: CATEGORY, dtype: int64

z.columns
```

```
Index(['STATE', 'CONSTITUENCY', 'NAME', 'WINNER', 'PARTY', 'SYMBOL',
'GENDER',
       'CRIMINAL\nCASES', 'AGE', 'CATEGORY', 'EDUCATION', 'ASSETS',
       'LIABILITIES', 'GENERAL\nVOTES', 'POSTAL\nVOTES', 'TOTAL\
nVOTES',
       'OVER TOTAL ELECTORS \nIN CONSTITUENCY',
       'OVER TOTAL VOTES POLLED \nIN CONSTITUENCY', 'TOTAL ELECTORS'],
      dtype='object')
```

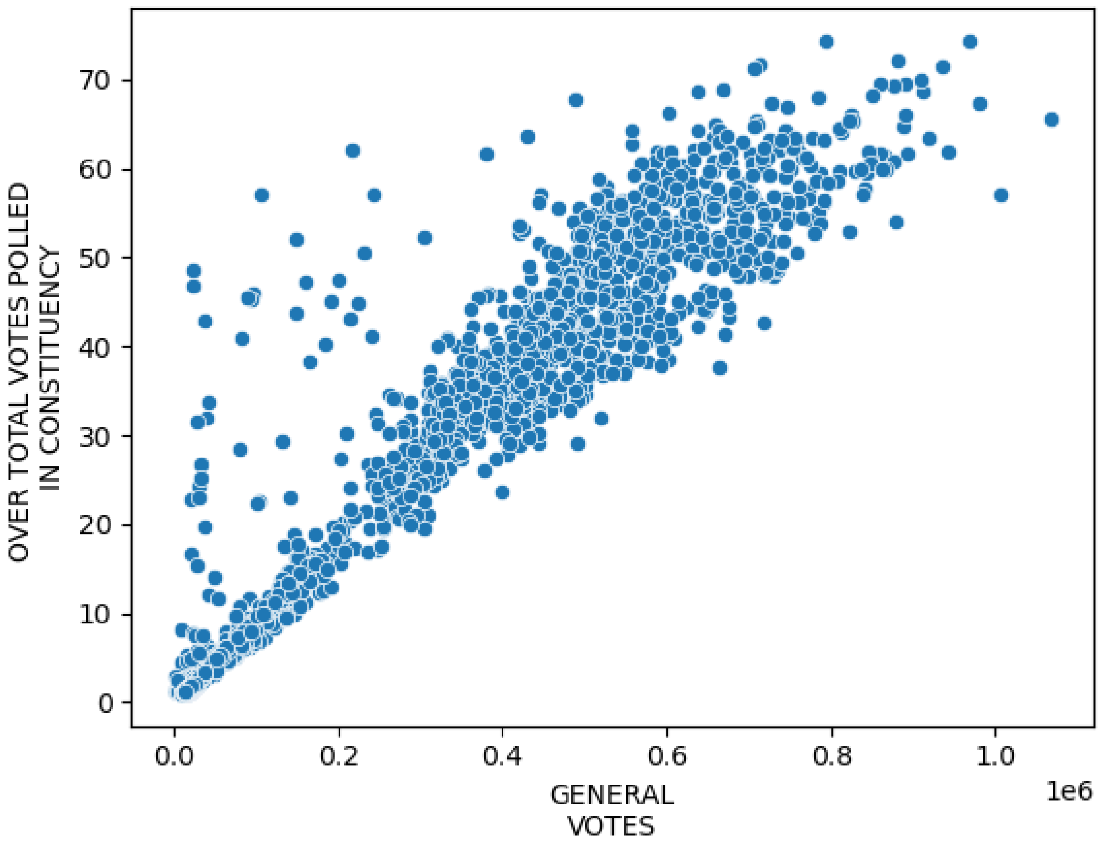
```
sns.barplot(x = z["CATEGORY"], y = z["TOTAL\nVOTES"], data = z)
```

```
<Axes: xlabel='CATEGORY', ylabel='TOTAL\nVOTES'>
```



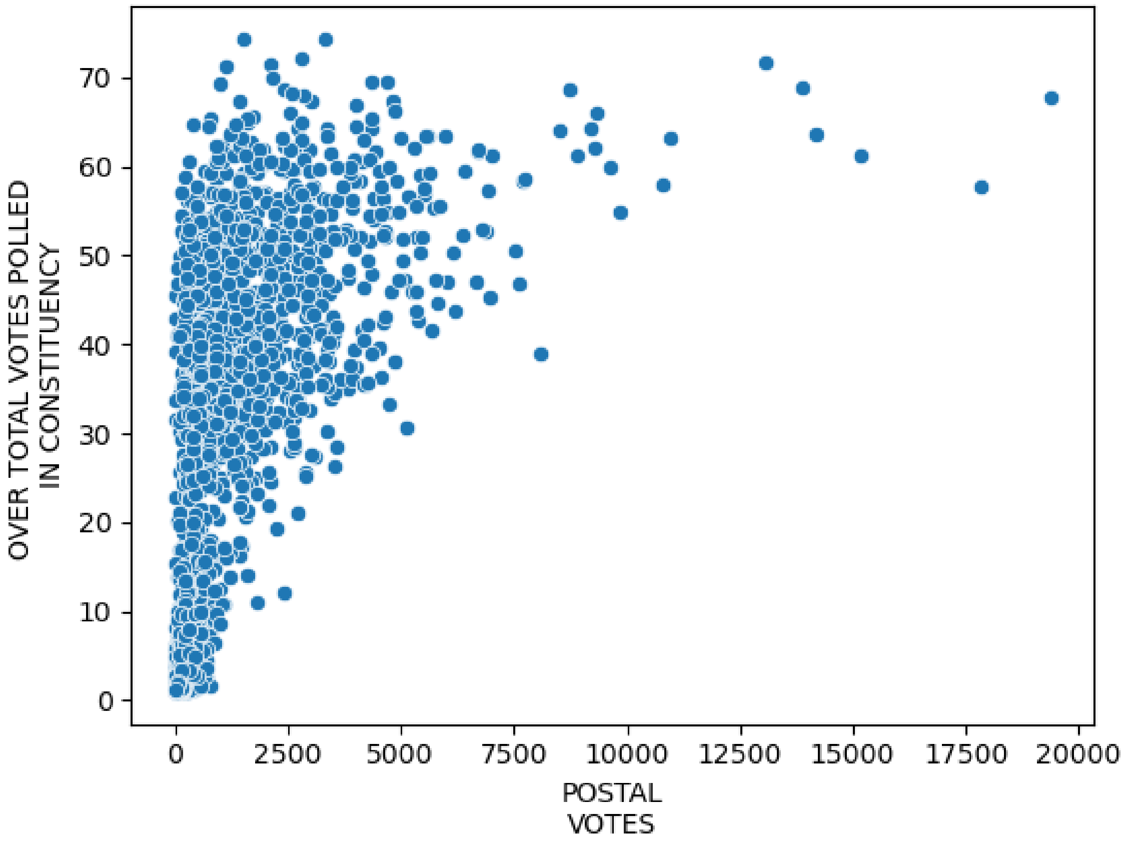
```
sns.scatterplot(x = z["GENERAL\nVOTES"], y= z["OVER TOTAL VOTES POLLED
\nIN CONSTITUENCY"], data = z)
```

```
<Axes: xlabel='GENERAL\nVOTES', ylabel='OVER TOTAL VOTES POLLED \nIN
CONSTITUENCY'>
```



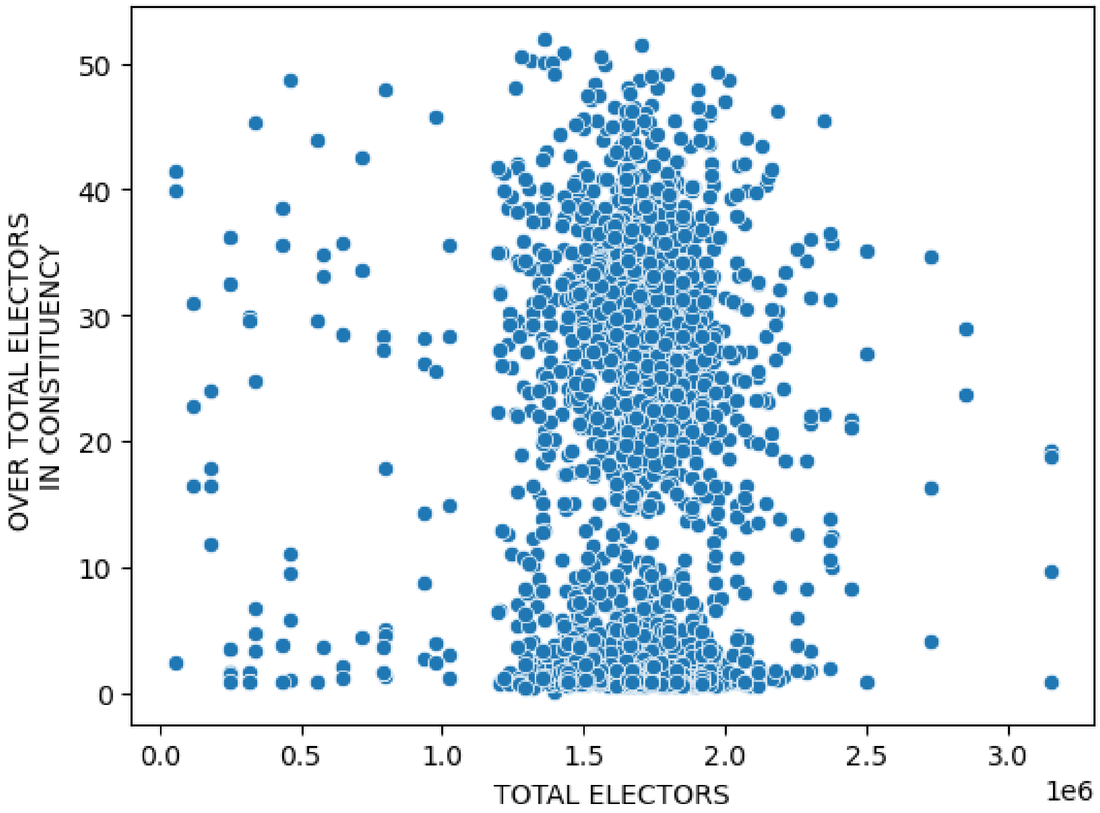
```
sns.scatterplot(x = z["POSTAL\nVOTES"], y= z["OVER TOTAL VOTES POLLED
\nIN CONSTITUENCY"], data = z)
```

```
<Axes: xlabel='POSTAL\nVOTES', ylabel='OVER TOTAL VOTES POLLED \nIN
CONSTITUENCY'>
```



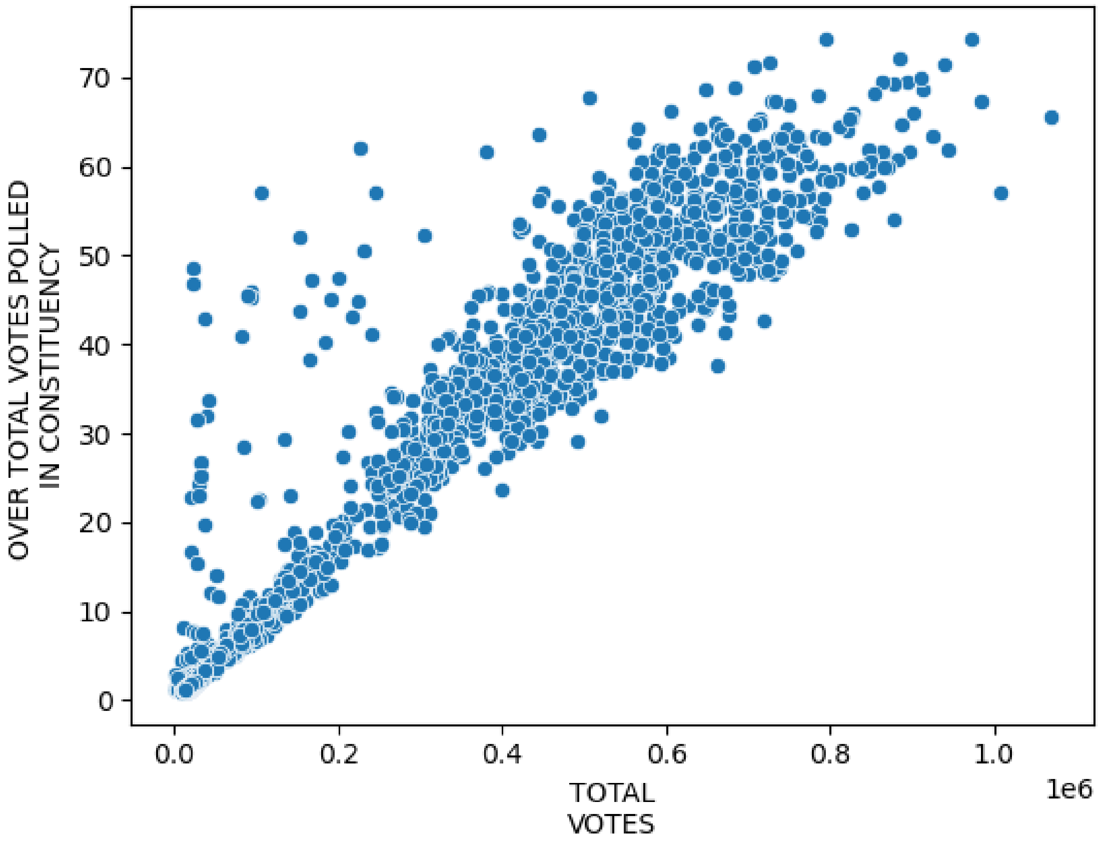
```
sns.scatterplot(x = z["TOTAL ELECTORS"], y= z["OVER TOTAL ELECTORS \
nIN CONSTITUENCY"], data = z)
```

```
<Axes: xlabel='TOTAL ELECTORS', ylabel='OVER TOTAL ELECTORS \nIN
CONSTITUENCY'>
```

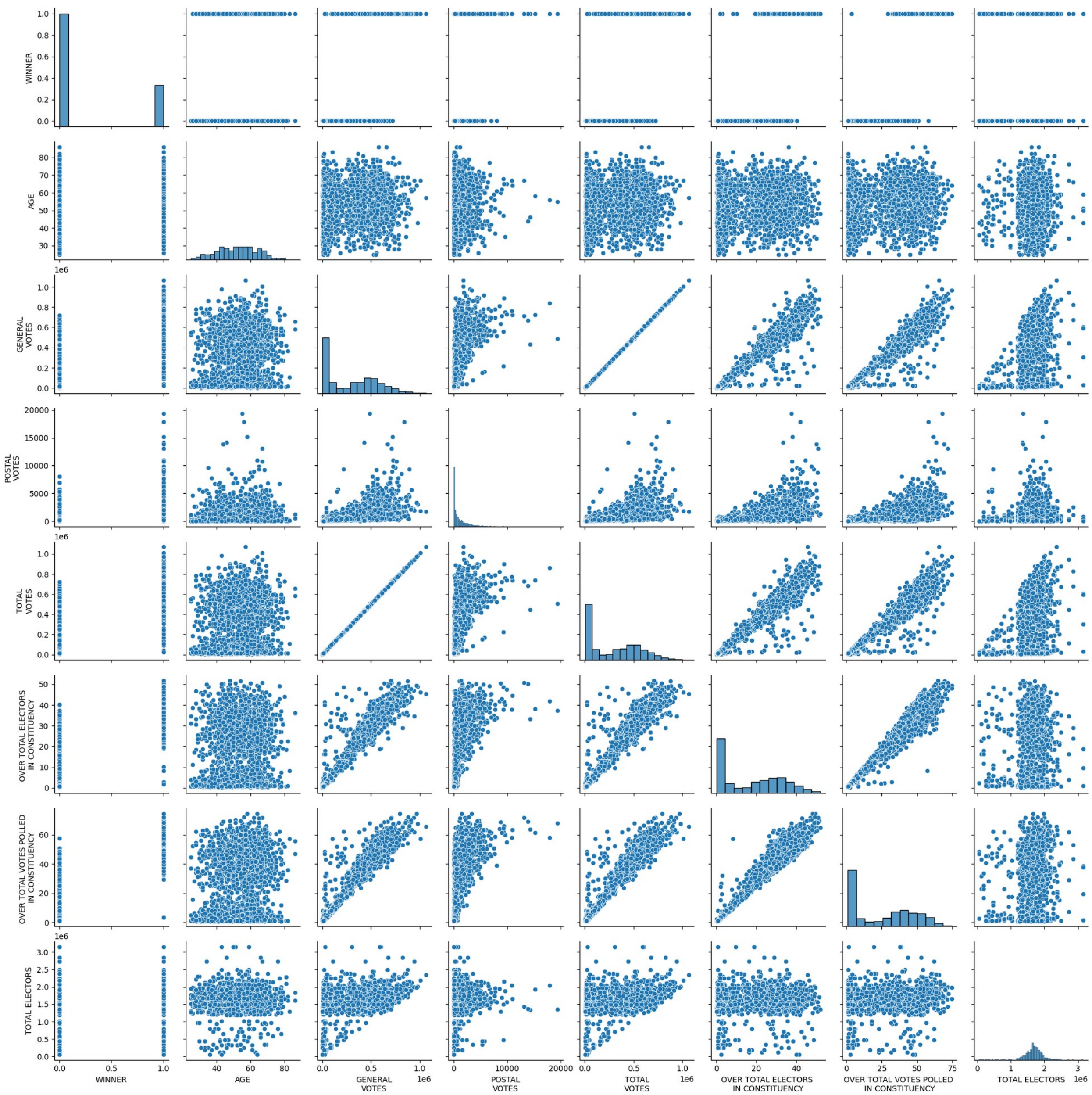


```
sns.scatterplot(x = z["TOTAL\nVOTES"], y= z["OVER TOTAL VOTES POLLED \
nIN CONSTITUENCY"], data = z)
```

```
<Axes: xlabel='TOTAL\nVOTES', ylabel='OVER TOTAL VOTES POLLED \nIN
CONSTITUENCY'>
```



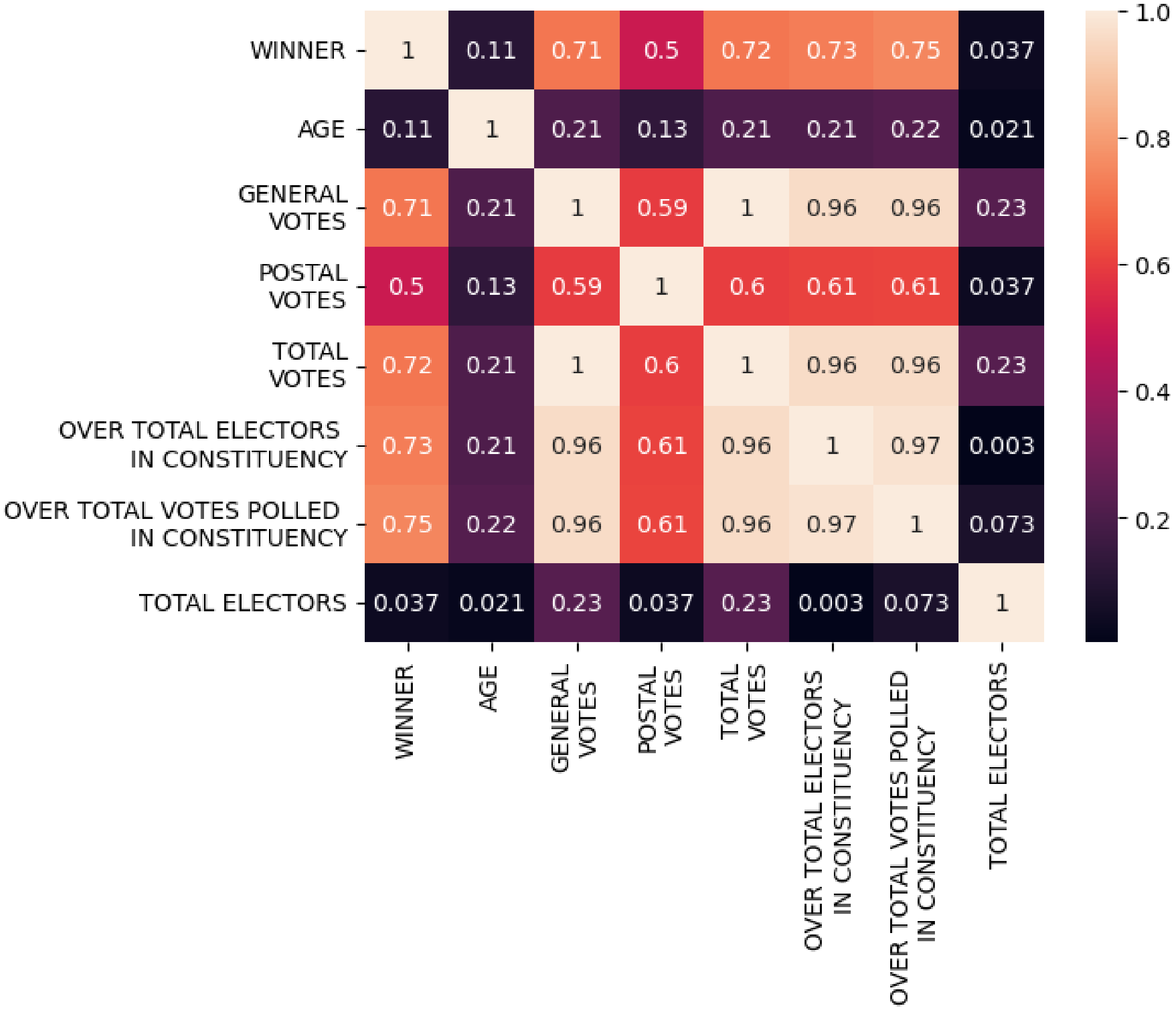
```
z.columns

Index(['STATE', 'CONSTITUENCY', 'NAME', 'WINNER', 'PARTY', 'SYMBOL',
'GENDER',
       'CRIMINAL\nCASES', 'AGE', 'CATEGORY', 'EDUCATION', 'ASSETS',
       'LIABILITIES', 'GENERAL\nVOTES', 'POSTAL\nVOTES', 'TOTAL\
nVOTES',
       'OVER TOTAL ELECTORS \nIN CONSTITUENCY',
       'OVER TOTAL VOTES POLLED \nIN CONSTITUENCY', 'TOTAL ELECTORS'],
      dtype='object')

sns.pairplot(z)

<seaborn.axisgrid.PairGrid at 0x229dbb1fed0>
```



Modelling

```
sns.heatmap(z.corr(), annot = True)
```

```
<Axes: >
```



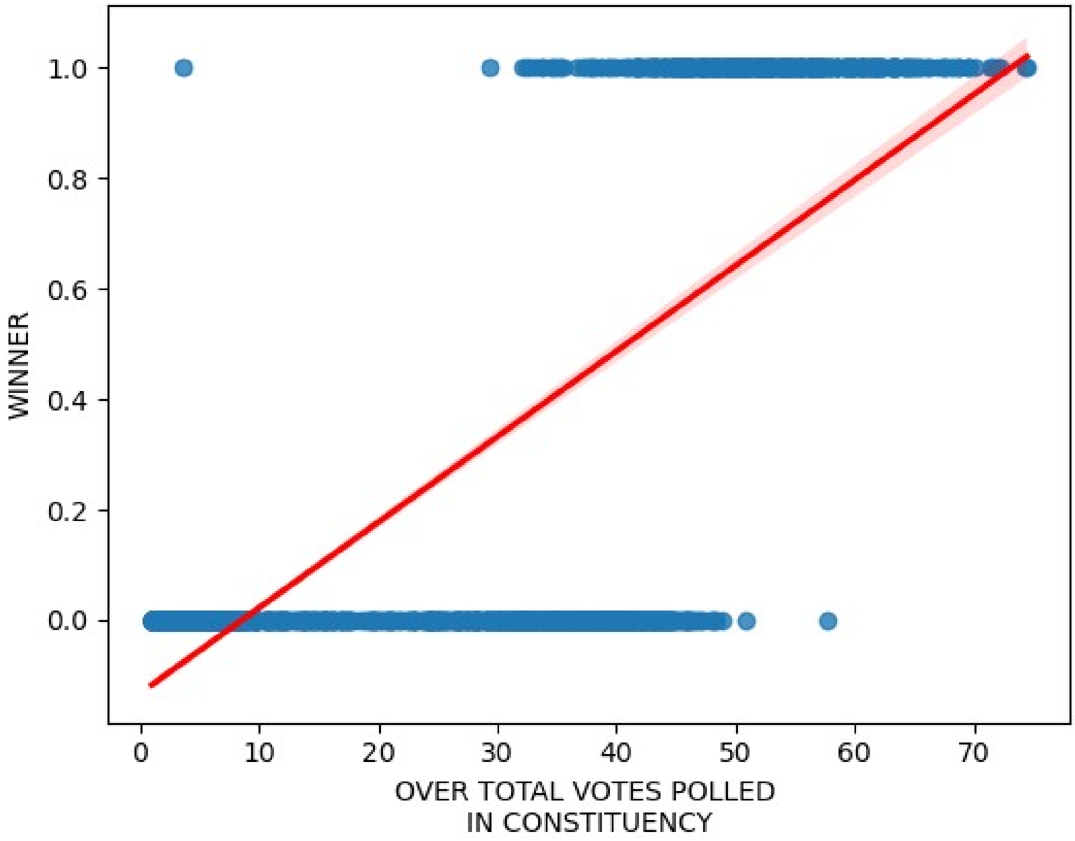
```
z.columns
```

```
Index(['STATE', 'CONSTITUENCY', 'NAME', 'WINNER', 'PARTY', 'SYMBOL',
'GENDER',
       'CRIMINAL\nCASES', 'AGE', 'CATEGORY', 'EDUCATION', 'ASSETS',
       'LIABILITIES', 'GENERAL\nVOTES', 'POSTAL\nVOTES', 'TOTAL\
nVOTES',
       'OVER TOTAL ELECTORS \nIN CONSTITUENCY',
       'OVER TOTAL VOTES POLLED \nIN CONSTITUENCY', 'TOTAL ELECTORS'],
      dtype='object')
```

Regression Analysis

```
sns.regplot(x = z["OVER TOTAL VOTES POLLED \nIN CONSTITUENCY"], y =
z["WINNER"], data = z, line_kws = {"color" : "red"})
```

```
<Axes: xlabel='OVER TOTAL VOTES POLLED \nIN CONSTITUENCY',
ylabel='WINNER'>
```



```
x = z[["OVER TOTAL VOTES POLLED \nIN CONSTITUENCY", "WINNER"]]

X = x
Y = x["WINNER"]

x_train, y_train, x_test, y_test = train_test_split(X,Y, train_size =
0.7, test_size = 0.3)

x_train = x.drop(["WINNER"], axis = 1)
y_train = x.drop(["OVER TOTAL VOTES POLLED \nIN CONSTITUENCY"], axis =
1)
```

Fitting training dataset in Logistic Regression model

```
n = LogisticRegression()
n.fit(x_train, y_train)

LogisticRegression()
```

Evaluting training dataset

```
y_predict_train = n.predict(x_train)
r2_train =  r2_score(y_true = y_train, y_pred = y_predict_train)
```

```
round((r2_train), 2)*100
```

```
71.0
```

```
x_test = x.drop(["WINNER"], axis = 1)
y_test = x.drop(["OVER TOTAL VOTES POLLED \nIN CONSTITUENCY"], axis =
1)
```

Fitting testing dataset into Logistic Regression model

```
n = LogisticRegression()
n.fit(x_test, y_test)
```

```
LogisticRegression()
```

Evaluting testing dataset

```
y_predict_test = n.predict(x_test)
r2_test = r2_score(y_true = y_test,y_pred = y_predict_test)
```

```
round((r2_test), 2)*100
```

```
71.0
```

The winner candidate is

```
z["NAME"][z["OVER TOTAL VOTES POLLED \nIN CONSTITUENCY"] ==
max(z["OVER TOTAL VOTES POLLED \nIN CONSTITUENCY"])]
```

```
2033    Darshana Vikram Jardosh
Name: NAME, dtype: object
```