**STEP 1 *- Import the required libraries,here we are importing pandas as used since we have to take the csv file and use it for coding that is for analysing the data, matplotlib

```
import pandas as pd
```

**STEP 2**- analysing the data

```
data = pd.read_csv("/content/US_births_1994-2003_CDC_NCHS.csv")
```

**STEP 3**-checking the data

```
data
```

| | year | month | date_of_month | day_of_week | births |
|---|---|---|---|---|---|
| **0** | 1994 | 1 | 1 | 6 | 8096 |
| **1** | 1994 | 1 | 2 | 7 | 7772 |
| **2** | 1994 | 1 | 3 | 1 | 10142 |
| **3** | 1994 | 1 | 4 | 2 | 11248 |
| **4** | 1994 | 1 | 5 | 3 | 11053 |
| **...** | ... | ... | ... | ... | ... |
| **3647** | 2003 | 12 | 27 | 6 | 8646 |
| **3648** | 2003 | 12 | 28 | 7 | 7645 |
| **3649** | 2003 | 12 | 29 | 1 | 12823 |
| **3650** | 2003 | 12 | 30 | 2 | 14438 |
| **3651** | 2003 | 12 | 31 | 3 | 12374 |

3652 rows × 5 columns

**STEP 4**-Here we are with the preprocessing step. For that we are importing standardscalar inorder to standarise the range of inputdataset

```
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
```

```
scaler.fit(data.drop('year',axis=1))
scaled_features = scaler.transform(data.drop('year',axis=1))
```

**STEP 5**-Since we are using knn as it is a supervised learning algorithm we need to train the code. Inorder to train we spliting the data and training

```
from sklearn.model_selection import train_test_split
```

```
x_train, x_test, y_train, y_test = train_test_split(scaled_features,data['year'],
                                                    test_size=0.30)
```

**STEP *6- Here we are importing the kneighborsclassifier for the classification of the data*

```
from sklearn.neighbors import KNeighborsClassifier
```

**STEP 7**-Here we are assigning the number of neighbors to be 3

```
knn = KNeighborsClassifier(n_neighbors=3)
```

```
knn.fit(x_train,y_train)

     KNeighborsClassifier(n_neighbors=3)
```

**STEP 8**-In this we are predicting the values using the x_test

```
pred = knn.predict(x_test)
pred

     array([1997, 1999, 1995, ..., 1998, 1996, 1994])
```

**STEP 9**-Importing the libraries to produce the confusion matrix, accuracy score and the classification report

```
from sklearn.metrics import classification_report,confusion_matrix,accuracy_score
```

**STEP 10**-Classification report produces a report which shows the precisions using the tested value and the predicted value

```
print(classification_report(y_test,pred))

                   precision    recall  f1-score   support

             1994       0.00      0.00      0.00       105
             1995       0.00      0.00      0.00       106
             1996       0.02      0.02      0.02       109
             1997       0.00      0.00      0.00       118
```

```
        1998       0.01      0.01      0.01       100
        1999       0.00      0.00      0.00       117
        2000       0.00      0.00      0.00       109
        2001       0.01      0.01      0.01       111
        2002       0.00      0.00      0.00       112
        2003       0.01      0.01      0.01       109

    accuracy                           0.00      1096
   macro avg       0.01      0.00      0.00      1096
weighted avg       0.00      0.00      0.00      1096
```

**STEP 11-**The confusion matrix shows the performance of the classification in the matrix format

```
print(confusion_matrix(y_test,pred))
```

```
[[ 0 35  2  0  3 36 27  2  0  0]
 [41  0 17  2  0  2 29 12  3  0]
 [ 1 18  2 47  9  0  1 11 17  3]
 [ 3  3 35  0 48  2  0  1 10 16]
 [ 9  1  5 36  1 39  0  0  2  7]
 [38  4  0  7 52  0 11  0  1  4]
 [14 30  1  2  1 10  0 43  6  2]
 [ 2 18  7  2  0  1 31  1 42  7]
 [ 0  1 22 13  4  1  5 32  0 34]
 [ 1  0  5 17  9  6  3 17 50  1]]
```

**STEP 12-**Accuracey score depicts the accuracy in the prediction of the classification

```
print(accuracy_score(pred,y_test))
```

```
0.004562043795620438
```

**STEP 13**-Importing numpy since we are going to work with arrays for finding the error rate.

```
import numpy as np
```

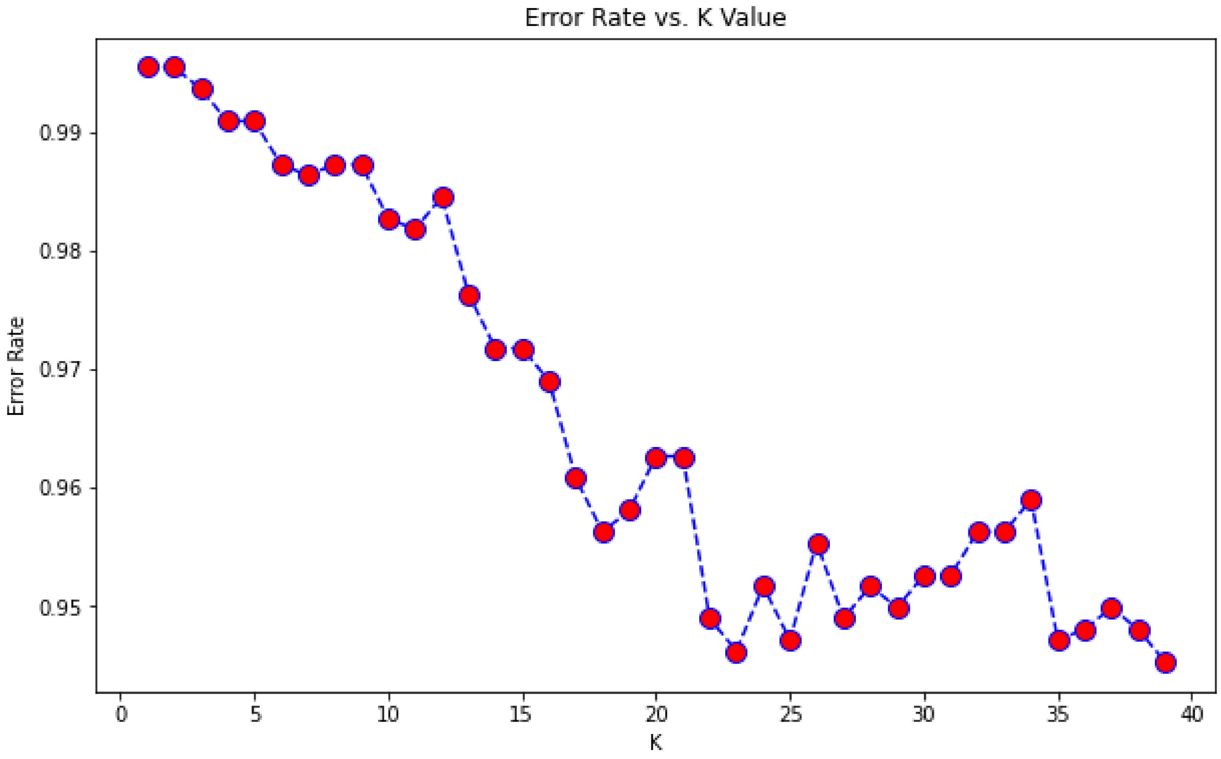
**STEP 14-**Here we are finding the error rate difference between the actual and predicted

```
error_rate = []

for i in range(1,40):

    knn = KNeighborsClassifier(n_neighbors=i)
    knn.fit(x_train,y_train)
    pred_i = knn.predict(x_test)
    error_rate.append(np.mean(pred_i != y_test))
```

**STEP 15-**Here we are importing the matplotlib as this library helps to visualisation of data.

```
import matplotlib.pyplot as plt


plt.figure(figsize=(10,6))
plt.plot(range(1,40),error_rate,color='blue', linestyle='dashed', marker='o',
         markerfacecolor='red', markersize=10)
plt.title('Error Rate vs. K Value')
plt.xlabel('K')
plt.ylabel('Error Rate')
```

```
Text(0, 0.5, 'Error Rate')
```



**STEP 16**-we are trying the same with the number of neighbors 1

```
knn1 = KNeighborsClassifier(n_neighbors=1)

knn1.fit(x_train,y_train)
pred1 = knn1.predict(x_test)

print('WITH K=1')
print('\n')
print(confusion_matrix(y_test,pred1))
```

```
WITH K=1


[[ 0 35  2  0  3 36 27  2  0  0]
 [41  0 17  2  0  2 29 12  3  0]
 [ 1 18  2 47  9  0  1 11 17  3]
 [ 3  3 35  0 48  2  0  1 10 16]
 [ 9  1  5 36  1 39  0  0  2  7]
 [38  4  0  7 52  0 11  0  1  4]
 [14 30  1  2  1 10  0 43  6  2]
 [ 2 18  7  2  0  1 31  1 42  7]
 [ 0  1 22 13  4  1  5 32  0 34]
 [ 1  0  5 17  9  6  3 17 50  1]]
```

```
print(classification_report(y_test,pred1))
```

```
              precision    recall  f1-score   support

        1994       0.00      0.00      0.00       105
        1995       0.00      0.00      0.00       106
        1996       0.02      0.02      0.02       109
        1997       0.00      0.00      0.00       118
        1998       0.01      0.01      0.01       100
        1999       0.00      0.00      0.00       117
        2000       0.00      0.00      0.00       109
        2001       0.01      0.01      0.01       111
        2002       0.00      0.00      0.00       112
        2003       0.01      0.01      0.01       109

    accuracy                           0.00      1096
   macro avg       0.01      0.00      0.00      1096
weighted avg       0.00      0.00      0.00      1096
```

```
print(accuracy_score(pred1,y_test))
```

```
0.004562043795620438
```

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