KENDRIYA VIDYALAYA A.G.C.R. COLONY

COMPUTER SCIENCE (PYTHON) PROJECT

SESSION: 2021-2022

TOPIC: CRIME RATE PREDICTION

Submitted to:

Mr.Himanshu sehgal

Pgt C.S.

Made by:

Name: Garima bhushan

Board roll. no.:

CONTENT:

CERTIFICATE

This is to certify that **GARIMA BHUSHAN** of **CLASS XII** has satisfactorily completed the project on the topic "**CRIME RATE PREDICTION**" under the guidance of **MR. HIMANSHU SEHGAL** during the session **2021-2022.**

SIGN. OF TEACHER

SIGN. OF EXTERNAL EXAMINER

ACKNOWLEDGEMENT

I would like to express my greatest gratitude to the people who have helped and supported me throughout my project. I'm grateful to our school's computer science faculty.

I thanked **Mr. HIMANSHU SEHGAL SIR** for him continuous support for the project, from initial advice and encouragement to this day. Special thanks of mine goes to my colleagues who helped me in completing the project by giving necessary information about the formats and syntaxes which made this project easy and accurate.

INTRODUCTION

- Crime prediction and criminal identification are the major problems to the police department as there are tremendous amount of crime data that exist. There is a need of technology through which the case solving could be faster.
- ***The aim of this project*** is to make crime prediction using the features present in the dataset. The dataset is extracted from the official sites. With the help of machine learning algorithm, using python as core we can predict the type of crime which will occur in an area. The objective would be to test a model for prediction.
- Building the model will be done using better algorithm depending upon the accuracy. The supervised classification and other algorithm will be used for crime prediction. Visualization of dataset is done to analyse the crimes which may have occurred in the country. This work helps the law enforcement agencies to predict and detect crimes in India with improved accuracy and thus reduces the crime rate. This helps all others department to carried out other formalities.

CRIME ANALYSIS METHODOLOGY

The crime analysis methodologies are:-

- Data Collection
- Classification
- Pattern Recognition
- Prediction
- Visualization

#Crime analysis steps

- Data collection:

  The data collection is first methodology in crime analysis. Data's are collected from various different websites, news sites and blogs. The collected data is stored into database for further process. This is unstructured data and it is object oriented programming which is easy to use and flexible.

  Crime data is an unstructured data since no of field, content, and size of the document can differ from one document to another the better option is to have a schema less database. Also the absence of joins reduces the complexity.

  Other benefits of using an unstructured database are that:

  • Large volume of structured, semi-structured, and unstructured data.

  • Object-Oriented programming that is easy to use and flexible.

- Classification:

  In this step use **Naive Bayes Algorithm** which is supervised learning method. Naive Bayes classifier is a probabilistic classifier which when given an input gives a probability distribution of set of all classes rather than providing a single output.

  One of the main advantages of the Naïve bayes Classifier is simple, and coverage quicker than logistic regression.

  Compare to other algorithm like **SVM (Support Vector machine)** which takes lots of memory. Using naïve Bays algorithm is create a model by training crime data related to vandalism, murder, robbery, burglary, sex abuse, gang rape, etc.

  Naive Bayes is that works well for small amount of training **to calculate the classification parameter**.

- Pattern Identification:

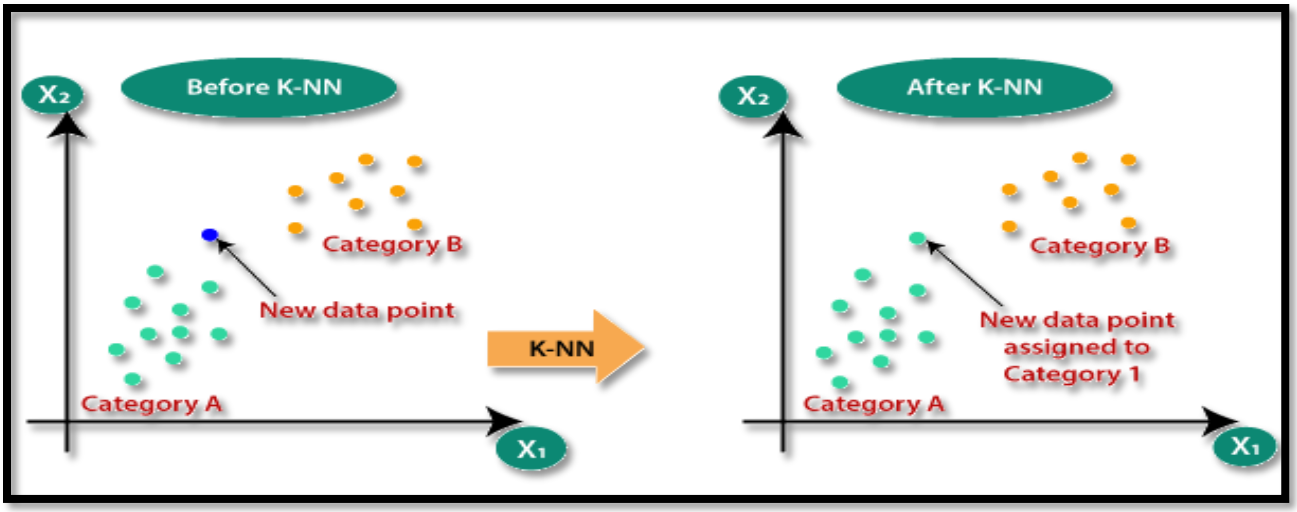
A third step is the pattern identification where we have identify trends and patterns in crime. For finding crime pattern that occurs frequently we are using apriori algorithm. Apriori can be used to determine association rule which highlight general trends in the database. By using pattern identification it will helps to the police officials in an effective manner and avoid the crime occurrences in particular place by providing security, CCTV, fixing alarms etc.

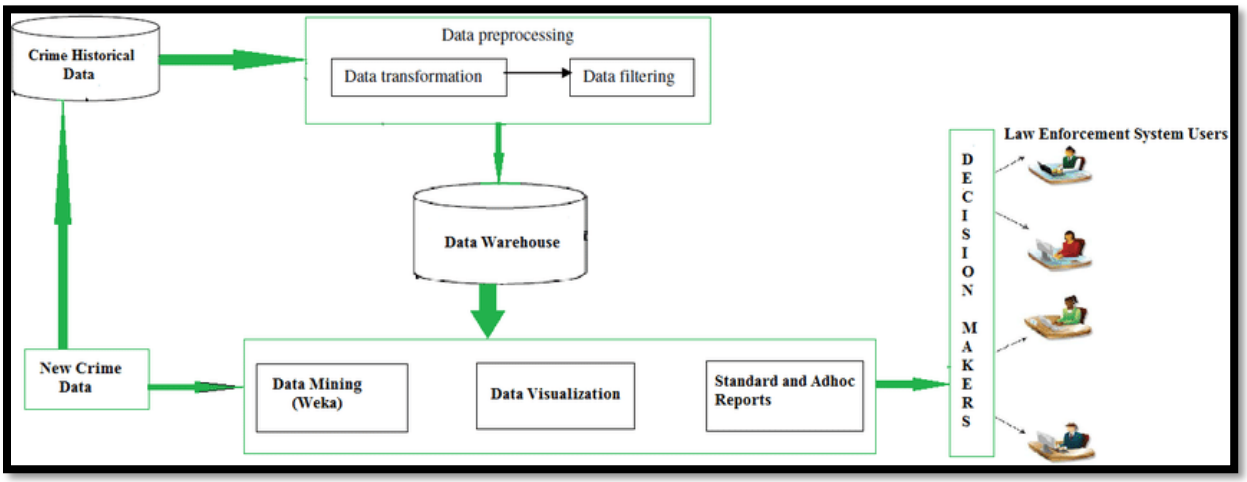
Crime prediction:

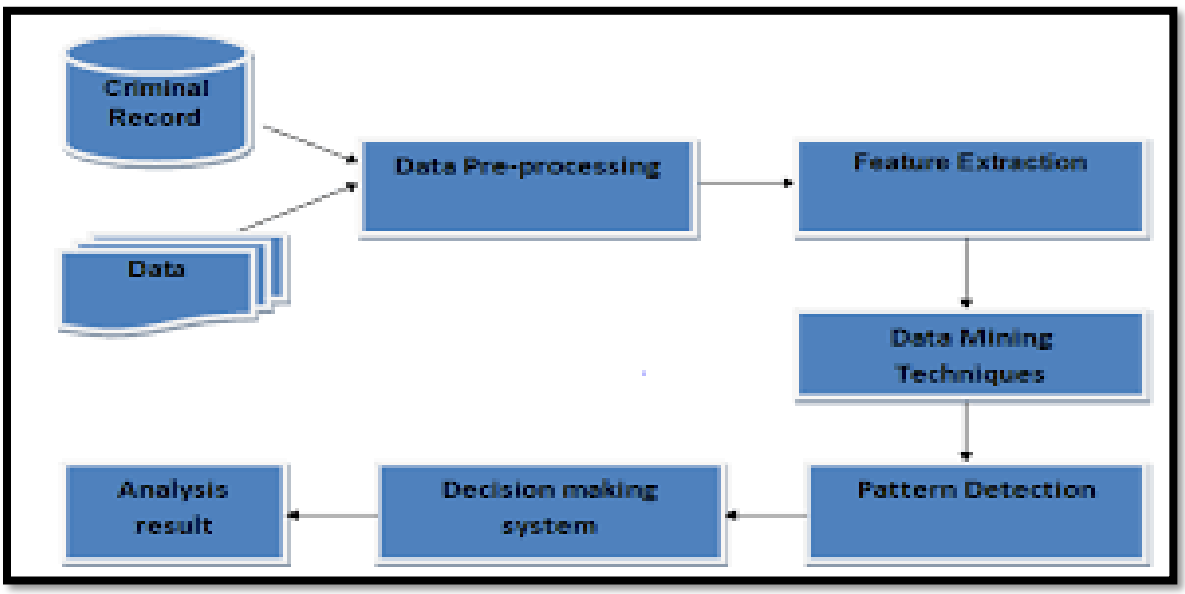
The second Approach is predicting the crime type that might occur in a specific location within particular time. To predict an expected crime type is provide four related features of the crime. The features are: occurrence month, the occurrence day of the week, the occurrences time and the crime location. Prediction is stating probability of an event in future period time. A Classification approach is used crime prediction in data mining classify areas into hotspots and cold spots and to predictive an area will be a hotspot for residential burglary. Variety of classification techniques are used for predicting the crime:-

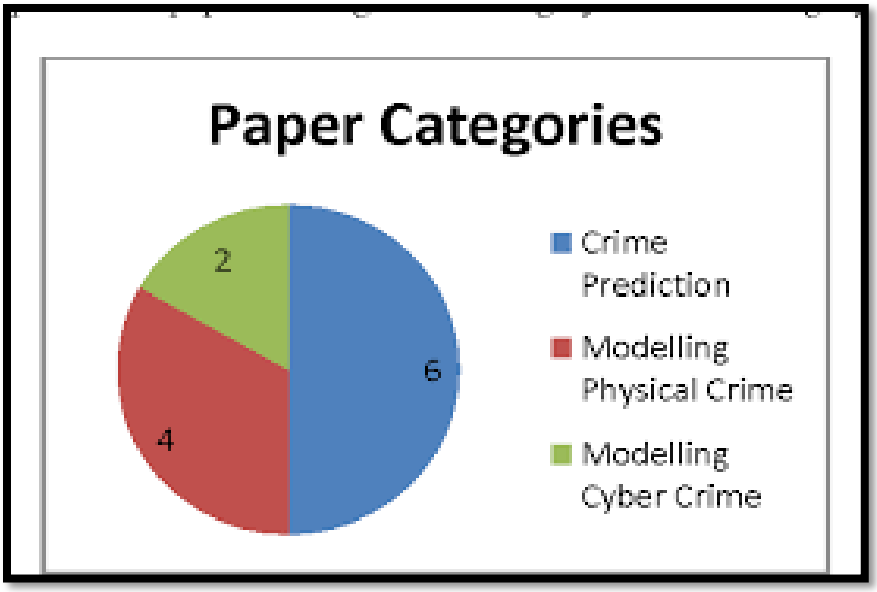
- K-Nearest Neighbor (k-NN)
- Decision trees (J48)
- Support Vector Machine (SVM)
- Neural Networks
- Naïve Bayes and ensemble learning

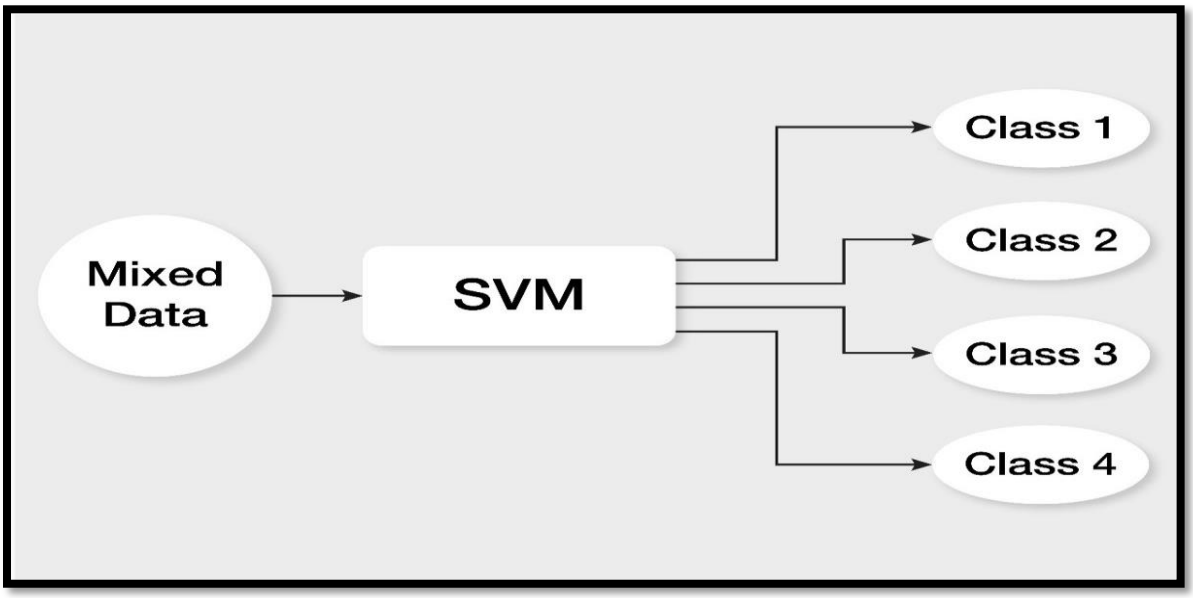
Linear Regression methods are also used for predicting the crime prediction.


Before K-NN
X2
Category B
New data point
Category A
X1
K-NN
After K-NN
X2
Category B
New data point
assigned to
Category 1
Category A
X1


Crime Historical Data
Data preprocessing
Data transformation
Data filtering
Data Warehouse
New Crime Data
Data Mining (Weka)
Data Visualization
Standard and Adhoc Reports
DECISION MAKERS
Law Enforcement System Users


Criminal Record
Data
Data Pre-processing
Feature Extraction
Data Mining Techniques
Pattern Detection
Decision making system
Analysis result


Paper Categories
2
6
4
Crime Prediction
Modelling Physical Crime
Modelling Cyber Crime


Mixed Data
SVM
Class 1
Class 2
Class 3
Class 4


NAIVE BAYE'S ALGORITHM

- Visualization:

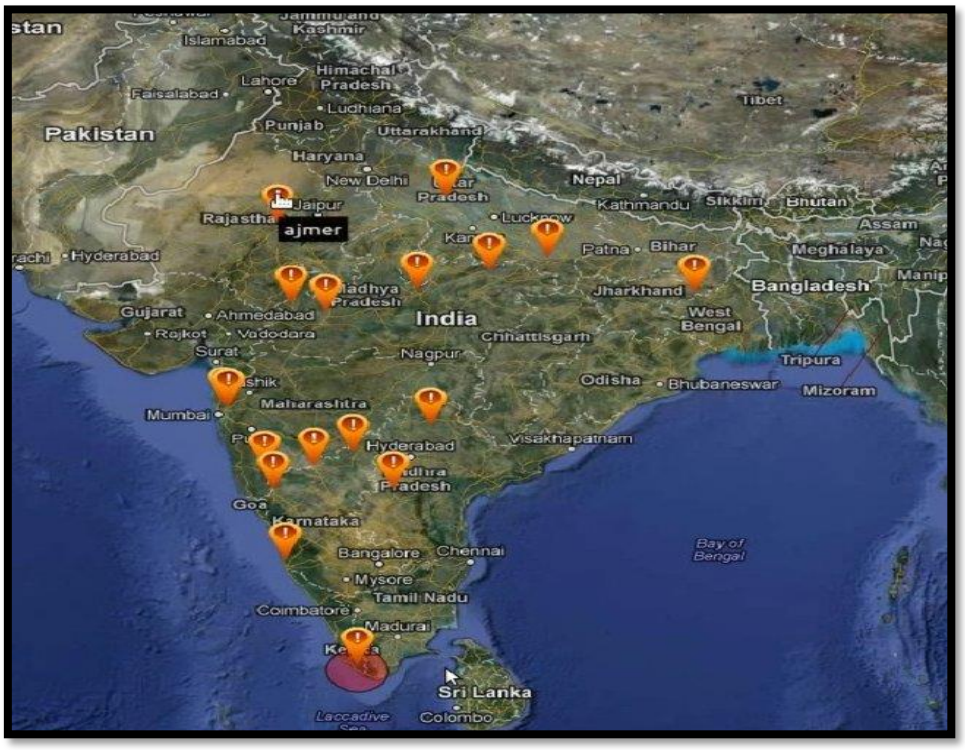
The crime prone area can be graphically reoresented using a heat amp which indicates level of activity,dark colour indicates low activity and brighter colour indicates the high activity.

Advantages of using heat map are

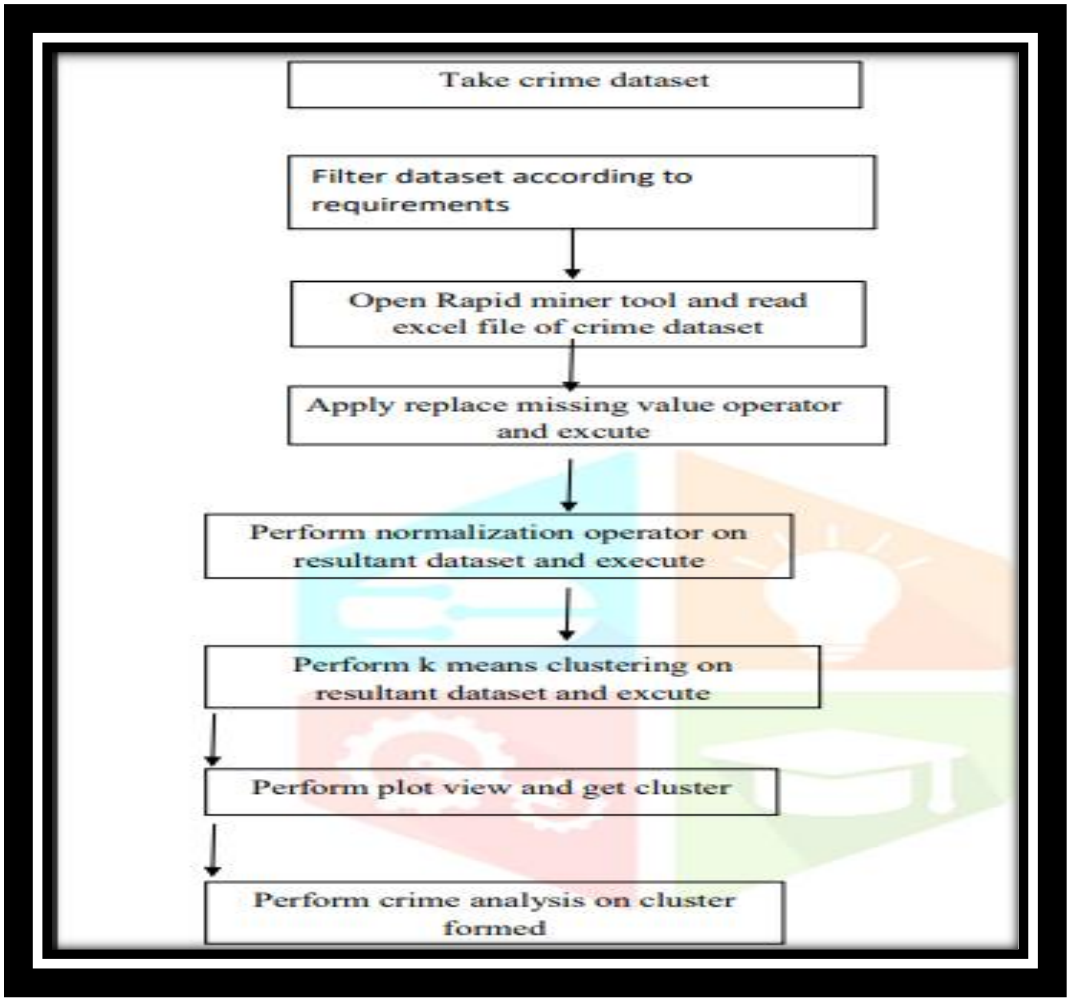
•Numerical and category based color images

- Gradient color range
- Analyze only the data we want
- Out of range data is automatically discarded.

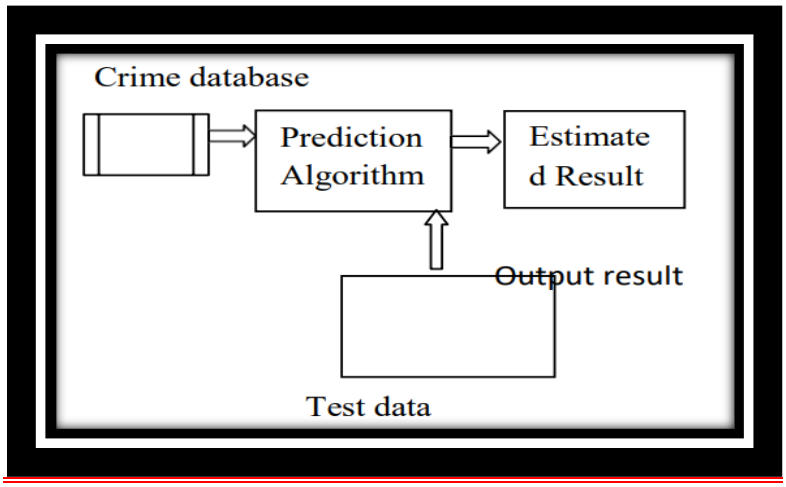
Map showing crime prone area



FLOW CHART OF CRIME ANALYSIS AND PREDICTION:



Flow chart of crime analysis:



SQL TABLE STRUCTURE FOR CRIME RATE PREDICTION

THERE IS 1 TO EXECUTE THIS SOFTWARE WORKING

- ***Table in database***

```
mysql> show tables;
+--------------------------------+
| Tables_in_crime_rate_prediction |
+--------------------------------+
| criminal_details               |
+--------------------------------+
1 row in set (0.03 sec)
```

- ***Criminal details***

```
ysql> DESC CRIMINAL_DETAILS;
+-------------+------------+------+-----+---------+-------+
| Field       | Type       | Null | Key | Default | Extra |
+-------------+------------+------+-----+---------+-------+
| crime_id    | varchar(30) | NO   | PRI | NULL    |       |
| criminal_name | varchar(30) | YES |     | NULL    |       |
| gen         | varchar(10) | YES |     | NULL    |       |
| age         | int(10)    | YES |     | NULL    |       |
| locality    | varchar(30) | YES |     | NULL    |       |
| type_of_crime | varchar(20) | YES |     | NULL    |       |
+-------------+------------+------+-----+---------+-------+
rows in set (0.22 sec)

ysql>
```

SOURCE CODE FOR CRIME RATE PREDICTION

- ***Python and MySQL connectivity:-***
- ***Code to execute the developer defined function:-***

```
File  Edit  Format  Run  Options  Window  Help
import mysql.connector

db=mysql.connector.connect(host="localhost",user="root",password="",database="crime_rate_prediction")
cur=db.cursor()
```

- ***What you while using this code:-***

```
def submenu():
    print("|-----SUBMENU FOR OPERATIONS YOU CAN DO-----|")
    print("1.----ADDING NEW DETAILS----|")
    print("2.----SEARCHING RECORD OF criminal BY ID----|")
    print("3.----SEARCHING RECORD OF CRIMINAL BY NAME----|")
    print("4.----UPDATING THE RECORD----|")
    print("5.----DELETING THE RECORD----|")
    print("6.----QUIT----")
    Or=int(input("Enter which operation you want to do:"))

    if Or==1:
        addnewdetails()
    elif Or==2:
        searchcrimebyId()
    elif Or==3:
        searchbyname()
    elif Or==4:
        updatebycrime_id()
    elif Or==5:
        deletebycrime_id()
    else:
        Or==6
        print("|-----THANKS-----|")
submenu()
```

```
====== RESTART: C:\Users\family\OneDrive\Desktop\Crime rate prediction.py ======
|-----WELCOME TO CRIME RATE PREDICTION SYSTEM-----|
|-----SUBMENU FOR OPERATIONS YOU CAN DO-----|
1.----ADDING NEW DETAILS----|
2.----SEARCHING RECORD OF criminal BY ID----|
3.----SEARCHING RECORD OF CRIMINAL BY NAME----|
4.----UPDATING THE RECORD----|
5.----DELETING THE RECORD----|
6.----QUIT----
Enter which operation you want to do:
```

- ***Source code for adding new details:-***

```
def addnewdetails():
    print("|----ADDING NEW DETAILS----|")
    print("|----USE CAPITAL LETTERS ONLY----|")
    cur.execute("SELECT MAX(CRIME_ID) FROM Criminal_Details")
    x=cur.fetchone()
    CRIMEID=int(x[0])+1

    Crime_Name=input("Enter the name of the criminal:")
    Gen=input("Enter the gender of the criminal:")
    Age=input("Enter the age of the criminal:")
    Locality=input("Enter the locality of crime:")
    Type_of_crime=input("Enter the type of crime:")
    query="INSERT INTO Criminal_Details VALUES('%s','%s','%s',%s,'%s','%s')"%(CRIMEID,Crime_Name,Gen,Age,Locality,Type_of_crime)
    cur.execute(query)
    db.commit()
    print("|----RECORD ENTERED SUCCESSFULLY----|")
    submenu()
```

- ***What will you see on choosing 1st function:-***

```
====== RESTART: C:\Users\family\OneDrive\Desktop\Crime rate prediction.py ======
|-----WELCOME TO CRIME RATE PREDICTION SYSTEM-----|
|-----SUBMENU FOR OPERATIONS YOU CAN DO-----|
1.----ADDING NEW DETAILS----|
2.----SEARCHING RECORD OF criminal BY ID----|
3.----SEARCHING RECORD OF CRIMINAL BY NAME----|
4.----UPDATING THE RECORD----|
5.----DELETING THE RECORD----|
6.----QUIT----
Enter which operation you want to do:1
|----ADDING NEW DETAILS----|
|----USE CAPITAL LETTERS ONLY----|
Enter the name of the criminal:LAKSHAY
Enter the gender of the criminal:MALE
Enter the age of the criminal:26
Enter the locality of crime:KRISHNA NAGAR
Enter the type of crime:CHAIN SNATCHING
|----RECORD ENTERED SUCCESSFULLY----|
```

- ***My SQL changes:-***

```
mysql> select *from criminal_details;
+----------+---------------+------+------+---------------+-----------------+
| crime_id | criminal_name | gen  | age  | locality      | type_of_crime   |
+----------+---------------+------+------+---------------+-----------------+
| 11001    | ANSHU         | MALE |   35 | TRILOKPURI    | MURDER          |
| 11002    | AMAN          | MALE |   25 | KALYANPURI    | DRUGCRIME       |
| 11002    | GAURAV        | MALE |   30 | SEELAMPUR     | SNATCH THEFT    |
| 11002    | GAURAV        | MALE |   30 | SEELAMPUR     | SNATCH THEFT    |
| 11003    | salik         | male |   23 | jagatpuri     | murder          |
| 11004    | LAKSHAY       | MALE |   26 | KRISHNA NAGAR | CHAIN SNATCHING |
+----------+---------------+------+------+---------------+-----------------+
6 rows in set (0.00 sec)
```

- ***Source for searching record of criminal by crime id:-***

```
def searchcrimebyId():
    print("|----SEARCHING RECORD OF CRIMINAL BY CRIME_ID----|")
    CRIME_ID=input("Enter the crime_id of you want to search:")
    cur.execute("SELECT * FROM criminal_details")
    t=0
    for i in cur:
        if i[0]==CRIME_ID:
            print("Record found")
            print("CRIME_ID=",i[0])
            print("CRIMINAL_Name=",i[1])
            print("gen=",i[2])
            print("age=",i[3])
            print("locality=",i[4])
            print("type of crime=",i[5])
            print()
            print("THAT'S IT")
            t=1
            break

    if t==0:
        print("Record not found")
    submenu()
```

- ***What will you see on choosing 2nd function:-***

```
|-----SUBMENU FOR OPERATIONS YOU CAN DO-----|
1.----ADDING NEW DETAILS----|
2.----SEARCHING RECORD OF criminal BY ID----|
3.----SEARCHING RECORD OF CRIMINAL BY NAME----|
4.----UPDATING THE RECORD----|
5.----DELETING THE RECORD----|
6.----QUIT----
Enter which operation you want to do:2
|----SEARCHING RECORD OF CRIMINAL BY CRIME_ID----|
Enter the crime_id of you want to search:11001
Record found
CRIME_ID= 11001
CRIMINAL_Name= ANSHU
gen= MALE
age= 35
locality= TRILOKPURI
type of crime= MURDER

THAT'S IT
```

- ***Source for search by name:-***

```
def searchbyname():
    print("|----SEARCHING RECORD OF CRIMINAL BY NAME----|")
    n=input("Enter the name of the criminal:")
    cur.execute("SELECT * FROM criminal_Details")
    t=0
    for i in cur:
        if i[1]==n:
            print("Record found")
            print("CRIME_ID=",i[0])
            print("Criminal_Name=",i[1])
            print("Gender=",i[2])
            print("Age=",i[3])
            print("Locality=",i[4])
            print("type of crime=",i[5])
            print()
            print("THAT'S IT")
            t=1
    if t==0:
        print("Record not found")
    submenu()
```

- ***What will you see on choosing 3rd function:-***

```
Enter which operation you want to do:3
|----SEARCHING RECORD OF CRIMINAL BY NAME----|
Enter the name of the criminal:LAKSHAY
Record found
CRIME_ID= 11004
Criminal_Name= LAKSHAY
Gender= MALE
Age= 26
Locality= KRISHNA NAGAR
type of crime= CHAIN SNATCHING

THAT'S IT
```

-

- ***Source code for updating by crime id:-***

```
def updatebycrime_id():
    print("|----UPDATING THE RECORD----|")
    print("|----USE CAPITAL LETTERS ONLY----|")
    CRIME_ID=input("Enter the Id of the criminal:")
    cur.execute("SELECT * FROM Criminal_Details")
    t=0
    for i in cur:
        if i[0]==CRIME_ID:
            print("Record found")
            t=1

    if t==1:
        print("|----ENTER NEW DETAILS----|")
        Criminal_Name=input("Enter the name of the criminal:")
        Gen=input("Enter the gender of the criminal:")
        Age=input("Enter the age of the criminal:")
        Locality=input("Enter the locality of the crime:")
        Type_of_crime=input("Enter the type of crime of the criminal:")
        query1="UPDATE criminal_details SET criminal_name='%s',gen='%s',age=%s,locality='%s',type_of_crime='%s' where crime_id='%s'"%(Criminal_Name,Gen,Age,Locality,Ty
        cur.execute(query1)
        db.commit()
        print("|---RECORD UPDATED SUCCESSFULLY----|")
    else:
        print("Record not found")
    submenu()
```

- ***What will you see on choosing 4th function:-***

```
|-----SUBMENU FOR OPERATIONS YOU CAN DO-----|
1.----ADDING NEW DETAILS----|
2.----SEARCHING RECORD OF criminal BY ID----|
3.----SEARCHING RECORD OF CRIMINAL BY NAME----|
4.----UPDATING THE RECORD----|
5.----DELETING THE RECORD----|
6.----QUIT----
Enter which operation you want to do:4
|----UPDATING THE RECORD----|
|----USE CAPITAL LETTERS ONLY----|
Enter the Id of the criminal:11004
Record found
|----ENTER NEW DETAILS----|
Enter the name of the criminal:SUSHIL
Enter the gender of the criminal:MALE
Enter the age of the criminal:35
Enter the locality of the crime:LAXMI NAGAR
Enter the type of crime of the criminal:DRUG CRIME
|---RECORD UPDATED SUCCESSFULLY----|
```

- ***My SQL changes:-***

```
ysql> select *from criminal_details;
+----------+---------------+------+------+-------------+---------------+
| crime_id | criminal_name | gen  | age  | locality    | type_of_crime |
+----------+---------------+------+------+-------------+---------------+
| 11001    | ANSHU         | MALE |   35 | TRILOKPURI  | MURDER        |
| 11002    | AMAN          | MALE |   25 | KALYANPURI  | DRUGCRIME     |
| 11002    | GAURAV        | MALE |   30 | SEELAMPUR   | SNATCH THEFT  |
| 11002    | GAURAV        | MALE |   30 | SEELAMPUR   | SNATCH THEFT  |
| 11003    | salik         | male |   23 | jagatpuri   | murder        |
| 11004    | SUSHIL        | MALE |   35 | LAXMI NAGAR | DRUG CRIME    |
+----------+---------------+------+------+-------------+---------------+
rows in set (0.00 sec)
```

- ***Source code for deleting by crime id:-***

```
def deletebycrime_id():
    print("|----DELETING THE RECORD----|")
    print("|----USE CAPITAL LETTERS ONLY----|")
    CRIME_ID=input("Enter the Id of the criminal:")
    cur.execute("SELECT * FROM criminal_details")
    t=0

    for i in cur:
        print(i[0])
        if i[0]==CRIME_ID:
            print("Record found")
            t=1
            break
    cur.close()
    cur=db.cursor()

    if t==1:
        print("1")
        query1="DELETE FROM criminal_details where crime_id='%s'"%(CRIME_ID)
        cur.execute(query1)
        print("2")
        db.commit()
        print("|---RECORD DELETED SUCCESSFULLY----|")
    elif t==0:
        print("Record not found")
    submenu()
```

- ***What will you see on choosing 5th function:-***

```
|-----SUBMENU FOR OPERATIONS YOU CAN DO-----|
1.----ADDING NEW DETAILS----|
2.----SEARCHING RECORD OF criminal BY ID----|
3.----SEARCHING RECORD OF CRIMINAL BY NAME----|
4.----UPDATING THE RECORD----|
5.----DELETING THE RECORD----|
6.----QUIT----
Enter which operation you want to do:5
|----DELETING THE RECORD----|
|----USE CAPITAL LETTERS ONLY----|
Enter the Id of the criminal:11004
```

FUTURE SCOPE

As of now, the project relies on manual input from a human (a police officer) in order to enter details in the database. If we can make this a centralised system and connect it to all the police stations countrywide and make FIR reporting digital, then it would be quite easier to predict crimes in that particular location and recognise patterns in them. It would also encourage citizens to track their E-FIR online.

We can also avoid corruption as the government can keep a track on the number of cases registered and their solvability rate which can help them utilise their resources better.

CONCLUSION

In this system, we get to classify and cluster to improve the accuracy of location and pattern-based crimes. This software predicts frequently occurring crimes and its locations, especially for particular state, region and occasions.

Also, time is an essential factor in the occurrence of crimes, and we shall predict the time as well in this application.

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