crime-data-analysis

February 8, 2024

0.0.1 Crime Data Analysis

[1]:
```
import seaborn as sns
import pandas as pd
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings('ignore') #To ignore the warning
```

[2]:
```
import pymysql as pms
connection=pms.
 ↪connect(host="localhost",user="root",password="Shanu@54",database="Project")
```

[4]:
```
q="select * from crime_data"
df=pd.read_sql(q,connection)
df
```

[4]:
```
          DR_NO   Date_Rptd    DATE_OCC    AREA_NAME  Crm_Cd  \
0     10304468  01-08-2020  01-08-2020    Southwest     624
1    190101086  01-02-2020  01-01-2020      Central     624
2    191501505  01-01-2020  01-01-2020  N Hollywood     745
3    191921269  01-01-2020  01-01-2020      Mission     740
4    200100502  01-02-2020  01-02-2020      Central     442
..         …         …         …           …     …
494  200106614  02-07-2020  02-07-2020      Central     624
495  200106615  02-07-2020  02-07-2020      Central     624
496  200106616  02-07-2020  02-07-2020      Central     624
497  200106617  02-07-2020  01-10-2020      Central     510
498  200106618  02-07-2020  02-03-2020      Central     745

                                          Crm_Cd_Desc  Vict_Age Vict_Sex  \
0                            BATTERY - SIMPLE ASSAULT        36        F
1                            BATTERY - SIMPLE ASSAULT        25        M
2            VANDALISM - MISDEAMEANOR ($399 OR UNDER)        76        F
3    VANDALISM - FELONY ($400 & OVER, ALL CHURCH VA…        31        X
4            SHOPLIFTING - PETTY THEFT ($950 & UNDER)        23        M
..                                                 …       …       …
494                          BATTERY - SIMPLE ASSAULT        33        M
495                          BATTERY - SIMPLE ASSAULT        25        M
```

```
496                           BATTERY - SIMPLE ASSAULT        35        M
497                                   VEHICLE - STOLEN         0        F
498           VANDALISM - MISDEAMEANOR ($399 OR UNDER)        72        M

                                     Premis_Desc Status            Location  \
0                          SINGLE FAMILY DWELLING     AO      1100 W 39TH PL
1                                       SIDEWALK     IC       700 S HILL ST
2    MULTI-UNIT DWELLING (APARTMENT, DUPLEX, ETC)     IC     5400 CORTEEN PL
3                              BEAUTY SUPPLY STORE     IC      14400 TITUS ST
4                                 DEPARTMENT STORE     IC   700 S FIGUEROA ST
..                                              …    …                …
494                                     SIDEWALK     IC   2400 ELLENDALE PL
495                                     SIDEWALK     IC            39TH PL
496                                   OTHER STORE     IC    2500 W VERNON AV
497                                   PARKING LOT     IC   700 EXPOSITION BL
498                       VEHICLE, PASSENGER/TRUCK     IC  2600 S FIGUEROA ST

       LAT     LON
0    34.01 -118.30
1    34.05 -118.25
2    34.17 -118.40
3    34.22 -118.45
4    34.05 -118.26
..     …     …
494  34.05 -118.26
495  34.05 -118.26
496  34.05 -118.25
497  34.05 -118.25
498  34.05 -118.24

[499 rows x 13 columns]
```

[38]:
```
df.info()    #Here we can see description of column.
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 499 entries, 0 to 498
Data columns (total 13 columns):
 #   Column       Non-Null Count  Dtype
---  ------       --------------  -----
 0   DR_NO        499 non-null    int64
 1   Date_Rptd    499 non-null    object
 2   DATE_OCC     499 non-null    object
 3   AREA_NAME    499 non-null    object
 4   Crm_Cd       499 non-null    int64
 5   Crm_Cd_Desc  499 non-null    object
 6   Vict_Age     499 non-null    int64
 7   Vict_Sex     499 non-null    object
```

```
 8   Premis_Desc  499 non-null    object
 9   Status       499 non-null    object
 10  Location     499 non-null    object
 11  LAT          499 non-null    float64
 12  LON          499 non-null    float64
dtypes: float64(2), int64(3), object(8)
memory usage: 50.8+ KB
```

[39]:
```
df.nunique() #Unique value in each column.
```

[39]:
```
DR_NO          499
Date_Rptd       68
DATE_OCC        61
AREA_NAME       19
Crm_Cd          42
Crm_Cd_Desc     42
Vict_Age        66
Vict_Sex         4
Premis_Desc     67
Status           4
Location       365
LAT             35
LON             29
dtype: int64
```

[40]:
```
df_subset = df[['Crm_Cd', 'Crm_Cd_Desc']]
distinct_values = df_subset.drop_duplicates(subset=['Crm_Cd']) #Distinct crime␣
 ↪code with their descriptions
distinct_values
```

[40]:

	Crm_Cd	Crm_Cd_Desc
0	624	BATTERY - SIMPLE ASSAULT
2	745	VANDALISM - MISDEAMEANOR ($399 OR UNDER)
3	740	VANDALISM - FELONY ($400 & OVER, ALL CHURCH VA…
4	442	SHOPLIFTING - PETTY THEFT ($950 & UNDER)
5	946	OTHER MISCELLANEOUS CRIME
6	341	THEFT-GRAND ($950.01 & OVER)EXCPT,GUNS,FOWL,LI…
7	330	BURGLARY FROM VEHICLE
8	930	CRIMINAL THREATS - NO WEAPON DISPLAYED
10	648	ARSON
12	354	THEFT OF IDENTITY
14	230	ASSAULT WITH DEADLY WEAPON, AGGRAVATED ASSAULT
17	761	BRANDISH WEAPON
19	350	THEFT, PERSON
22	310	BURGLARY
25	480	BIKE - STOLEN
27	623	BATTERY POLICE (SIMPLE)

```
29      440                 THEFT PLAIN - PETTY ($950 & UNDER)
38      510                                   VEHICLE - STOLEN
42      210                                           ROBBERY
46      900                          VIOLATION OF COURT ORDER
51      888                                       TRESPASSING
75      420   THEFT FROM MOTOR VEHICLE - PETTY ($950 & UNDER)
89      886                                DISTURBING THE PEACE
117     421               THEFT FROM MOTOR VEHICLE - ATTEMPT
122     647                THROWING OBJECT AT MOVING VEHICLE
129     940                                           EXTORTION
143     662                                BUNCO, GRAND THEFT
174     220                                 ATTEMPTED ROBBERY
176     625                                     OTHER ASSAULT
178     755                                       BOMB SCARE
212     649                  DOCUMENT FORGERY / STOLEN FELONY
214     901                    VIOLATION OF RESTRAINING ORDER
249     320                                 BURGLARY, ATTEMPTED
310     890                                    FAILURE TO YIELD
312     351                                     PURSE SNATCHING
317     956           LETTERS, LEWD  -  TELEPHONE CALLS, LEWD
329     820                                     ORAL COPULATION
341     812  CRM AGNST CHLD (13 OR UNDER) (14-15 & SUSP 10 …
399     920                          KIDNAPPING - GRAND ATTEMPT
424     850                                INDECENT EXPOSURE
431     666                                   BUNCO, ATTEMPT
466     343          SHOPLIFTING-GRAND THEFT ($950.01 & OVER)
```

[41]:
```
df['Date_Rptd'].value_counts()  #Crime count according to each reported date.
```

[41]:
```
Date_Rptd
01-11-2020    42
01-12-2020    34
02-02-2020    31
01-02-2020    30
01-08-2020    27
              ..
10-10-2020     1
08-06-2022     1
12-01-2021     1
02-03-2022     1
02-11-2020     1
Name: count, Length: 68, dtype: int64
```

[42]:
```
df['Vict_Sex'].value_counts() #Count of victims based on victim sex.
```

[42]:
```
Vict_Sex
M    278
```

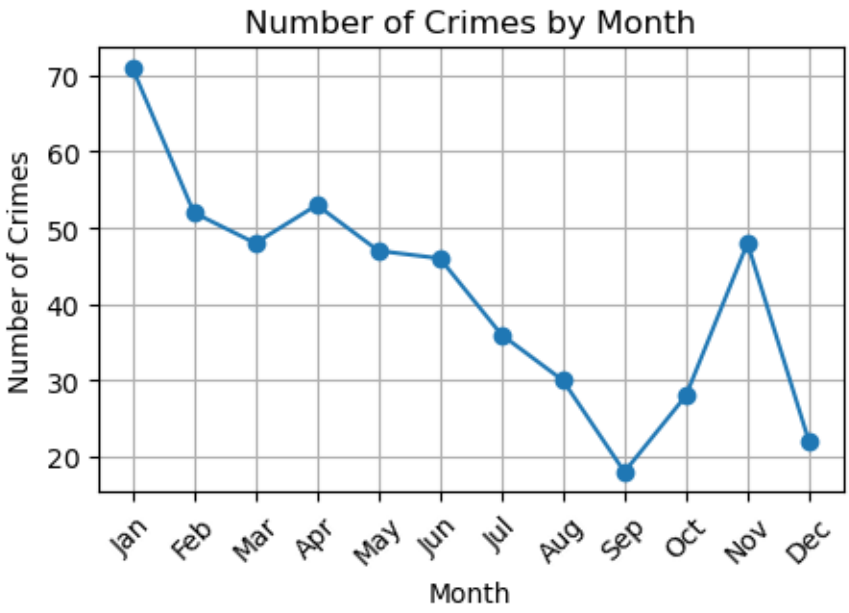
```
F    155
X     39
      27
Name: count, dtype: int64
```

[15]:
```
#Temporal Analysis:
#  Trends in Crime occurrence overt the time.

q1="""SELECT DATE_FORMAT(STR_TO_DATE(Date_occ, '%d-%m-%Y'), '%b') AS␣
 ↪month,count(dr_no) no_of_crimes
FROM crime_data group by month"""
df1=pd.read_sql(q1,connection)
pd.read_sql(q1,connection)
df2=df1.sort_values(by='month', key=lambda x: pd.to_datetime(x, format='%b').dt.
 ↪month)
df2
```

[15]:

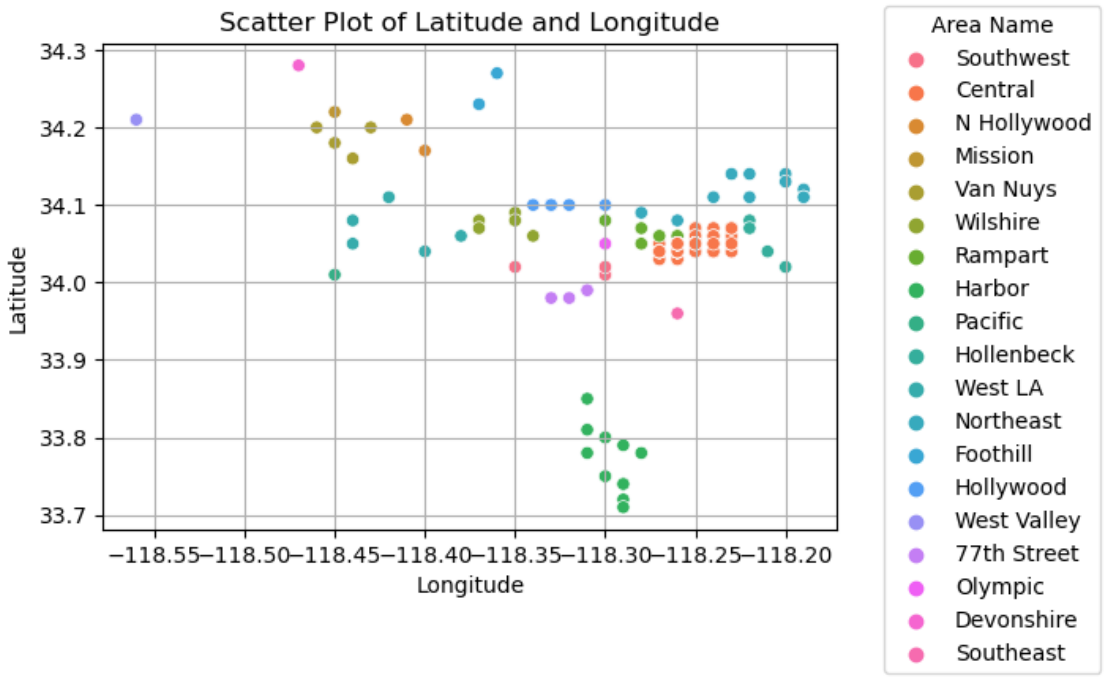
	month	no_of_crimes
1	Jan	71
2	Feb	52
7	Mar	48
3	Apr	53
4	May	47
8	Jun	46
5	Jul	36
0	Aug	30
6	Sep	18
11	Oct	28
9	Nov	48
10	Dec	22

[16]:
```
#  Trends in Crime occurrence overt the time.
#    By line plot:

plt.figure(figsize=(5, 3))
plt.plot(df2['month'],df2['no_of_crimes'],marker='o')
plt.xlabel('Month')
plt.ylabel('Number of Crimes')
plt.title('Number of Crimes by Month')
plt.xticks(rotation=45)
plt.grid(True)
plt.show()
```



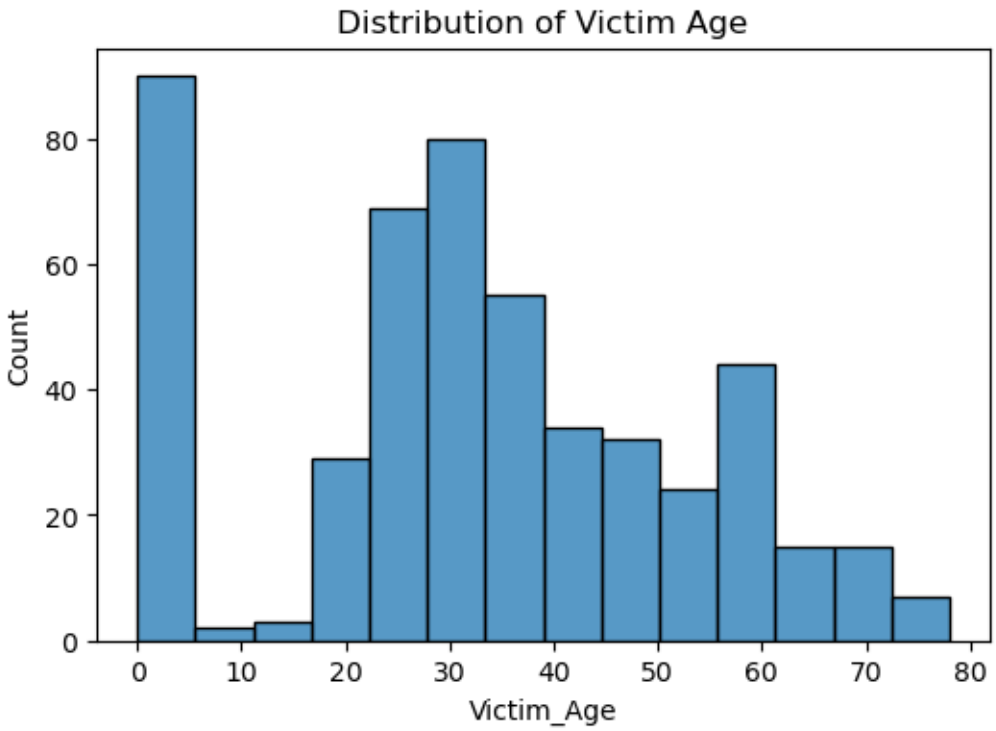
[17]:
```
#Observation:
  #The plot indicates the variation in the number of crimes reported over the␣
 ↪months of the year.
  #January and April have the highest number of reported crimes, with 71 and 53␣
 ↪cases, respectively.
  # least crime occured in (sept).

  #The number of reported crimes tends to fluctuate throughout the year.
  #There is a noticeable decrease in reported crimes during the middle months␣
 ↪of the year, particularly in July (Jul) and August (Aug), where the counts␣
 ↪are relatively lower compared to other months.
  #Towards the end of the year, in November (Nov) and December (Dec), the␣
 ↪number of reported crimes starts to decrease again.
```

[18]:
```
#Spatial Analysis:  (Scatter plot)
  # Q. what are the Geographical hotspot for the reported crime?

plt.figure(figsize=(6, 4))
sns.scatterplot(data=df, x='LON', y='LAT', color='blue', hue='AREA_NAME')
plt.title('Scatter Plot of Latitude and Longitude')
plt.xlabel('Longitude')
plt.ylabel('Latitude')
plt.legend(title="Area Name", bbox_to_anchor=(1.05, 1.1), loc='upper left')
plt.grid(True)
plt.show()
```



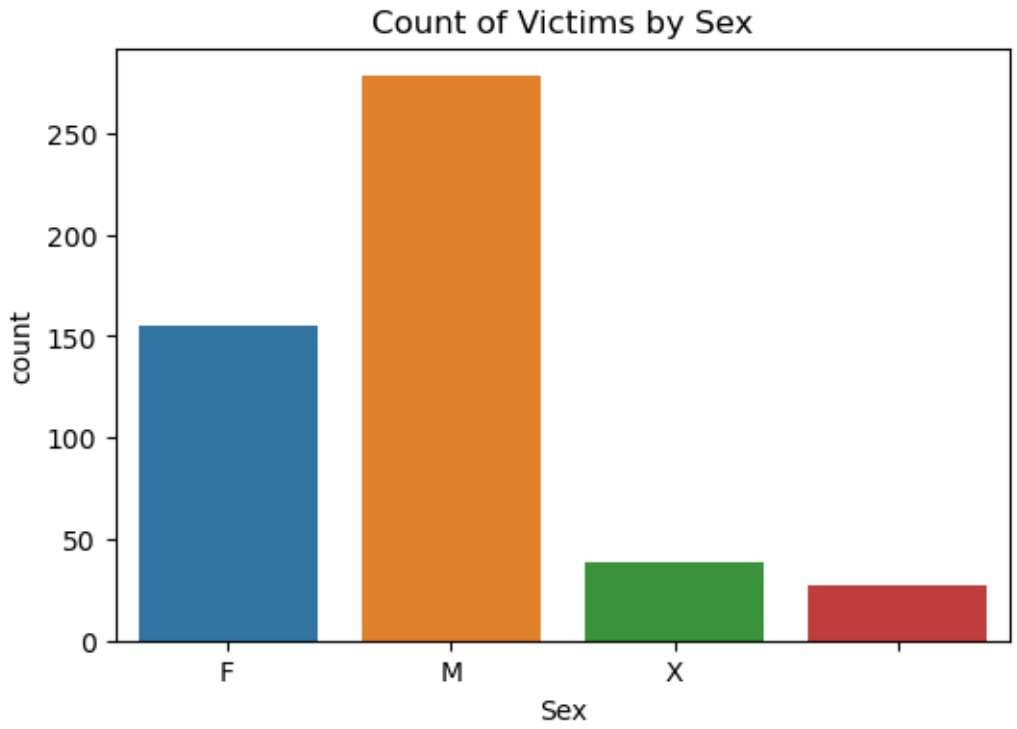
[19]:
```
#observation:
  #Areas with higher concentrations of red dots indicate potential hotspots for␣
 ↪reported crimes.
  #These hotspots can be areas with higher crime rates or locations where␣
 ↪crimes are more frequently reported.
```

[20]:
```
#Victim Demographics:
  #Distribution of victim age.

plt.figure(figsize=(6,4))
sns.histplot(data=df, x='Vict_Age')
plt.title('Distribution of Victim Age')
plt.xlabel('Victim_Age')
plt.show()
```



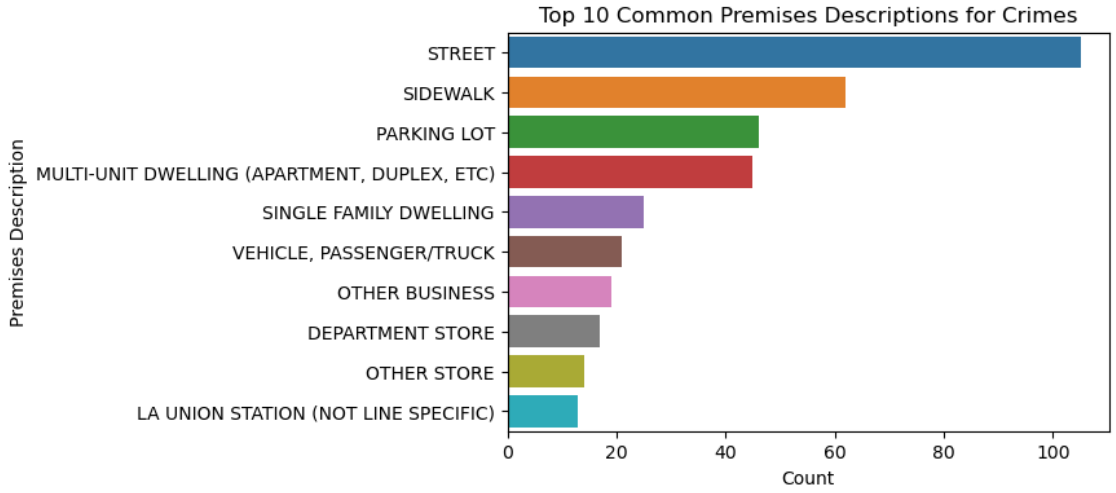
[21]:
```
#Observation:
  #The histogram shows the distribution of victim ages in reported crimes.
  #The majority of victims seem to be in their 20s to 40s, as evidenced by the␣
 ↪higher frequency of ages in that range.
  #There are some instances of victims with ages close to 0, which could␣
 ↪indicate missing or unknown age information.
```

[23]:
```
#Distribution of victim genders.(count plot)

plt.figure(figsize=(6,4))
sns.countplot(x=df['Vict_Sex'])
plt.title('Count of Victims by Sex')
plt.xlabel('Sex')
plt.show()
```



[24]:
```
#Obervation:
  #The countplot shows the distribution of victim sex in reported crimes.
  #The majority of victims are male (M) with 278 reported cases.
  #Female victims (F) come next with 155 reported cases.
  #There are fewer cases with an unknown or unspecified gender (X) with only 39␣
 ↪reported cases.
  #Additionally, there are 27 cases where the victim sex is not specified.
```

[25]:
```
#Common primises description where crimes occures:

plt.figure(figsize=(6,4))
sns.countplot(data=df, y='Premis_Desc', order=df['Premis_Desc'].value_counts().
 ↪index[:10])
plt.title('Top 10 Common Premises Descriptions for Crimes')
plt.xlabel('Count')
plt.ylabel('Premises Description')
plt.show()
```



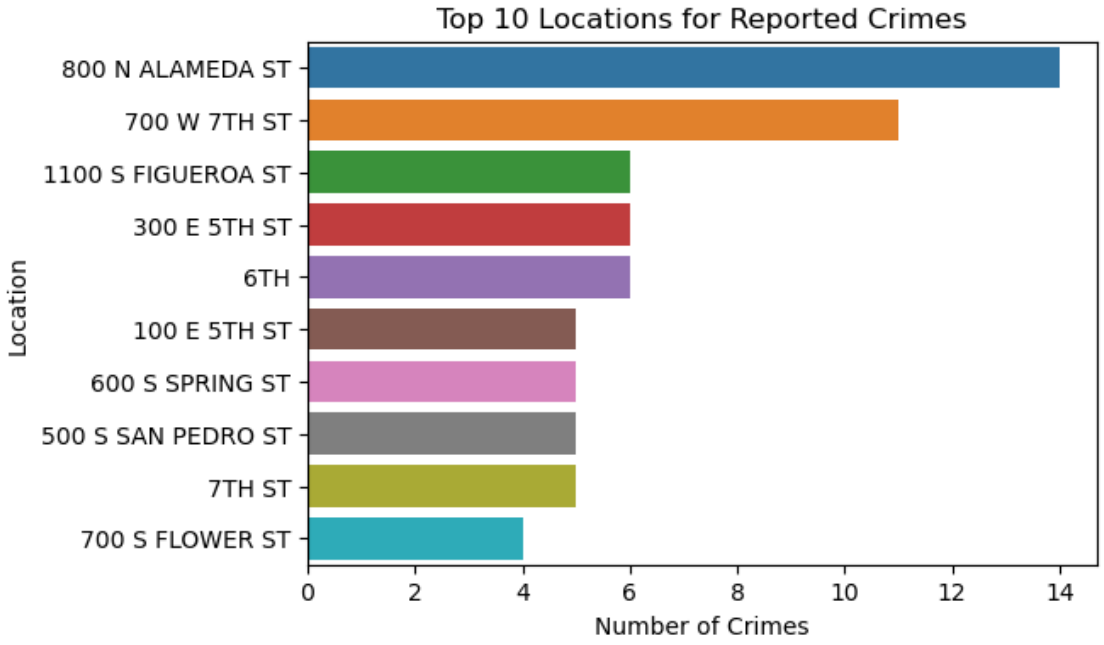
[26]:
```
#Observation:
  #The premises descriptions with the highest counts include: STREET, SIDEWALK,␣
 ↪PARKING LOT, and MULTI-UNIT DWELLING.
  #STREET and SIDEWALK appear to be the most common locations for reported␣
 ↪crimes, followed by PARKING LOT and MULTI-UNIT DWELLING.
```

[31]:
```
#Location Analysis:
  # Q. Where do most crimes occures based on location column?----(800 N ALAMEDA␣
 ↪ST: 14)
df['Location'].value_counts().head(10)
```

[31]:
```
Location
800 N ALAMEDA ST      14
700 W 7TH ST          11
1100 S FIGUEROA ST     6
300 E 5TH ST           6
6TH                    6
100 E 5TH ST           5
600 S SPRING ST        5
500 S SAN PEDRO ST     5
7TH ST                 5
700 S FLOWER ST        4
Name: count, dtype: int64
```

[32]:
```
# most crimes occures based on location by (Countplot)

plt.figure(figsize=(6,4))
sns.countplot(data=df, y='Location', order=df['Location'].value_counts().index[:
 ↪10])
plt.title('Top 10 Locations for Reported Crimes')
```

```
plt.xlabel('Number of Crimes')
plt.ylabel('Location')
plt.show()
```



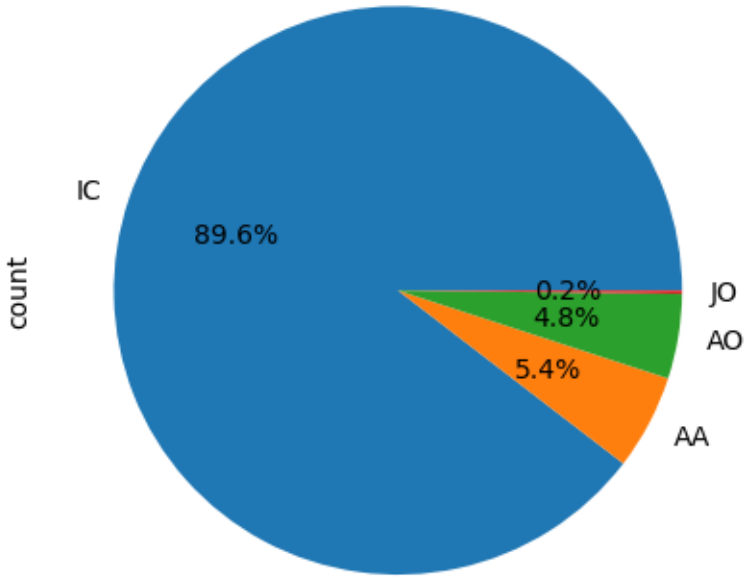
[33]:
```
#Observation:
  # Most of the crimes are reported on 800 Noth ALAMEDA St. that is 14 crimes␣
 ↪are reported.
```

[34]:
```
# Status Analysis:
  # Analysis the status of reported crime.
df['Status'].value_counts()
```

[34]:
```
Status
IC    447
AA     27
AO     24
JO      1
Name: count, dtype: int64
```

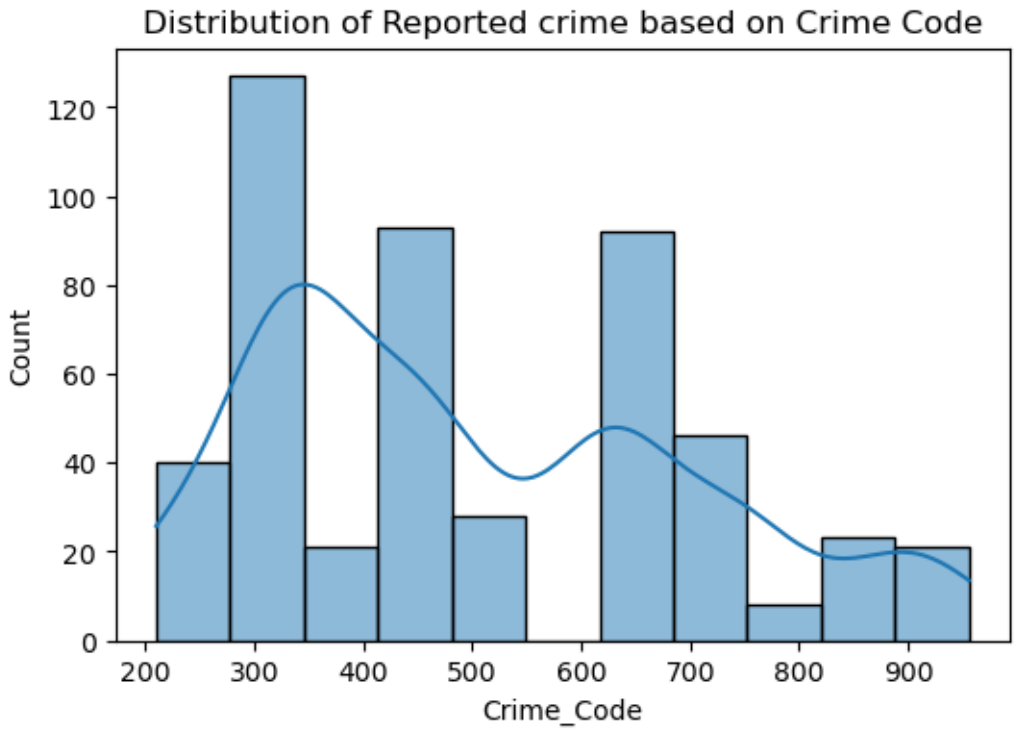
[35]:
```
# Analysis the status of reported crime by pie plot.

status = df['Status'].value_counts()
status.plot(kind='pie',autopct='%1.1f%%')
```

[35]:
```
<Axes: ylabel='count'>
```



[36]:
```
#Observation:
 ##The Investigation of most of the reported crimes has been closed ie.
 ↪(IC-Investigation Complete).
 ##IC (Investigation Complete),AA (Administrative Closure), AO (Administrative␣
 ↪Other), and JO (Juvenile Other).
```

[37]:
```
# Crime Code Analysis.
  # Distribution of reported crime based on crime code.
plt.figure(figsize=(6,4))
sns.histplot(data=df, x='Crm_Cd',edgecolor='black', kde=True)
plt.title('Distribution of Reported crime based on Crime Code')
plt.xlabel('Crime_Code')
plt.show()
```



From this analysis, we got to the insights into the spatial and temporal patterns of crime occurrences, understood the demographics of victims, identify common crime locations, and analyze the distribution of reported crimes based on crime codes. These insights can help law enforcement agencies, policymakers, and communities to better understand and address crime-related issues.

[ ]: