In [1]:
```
from sklearn.cluster import KMeans
import pandas as pd
from sklearn.preprocessing import MinMaxScaler
import seaborn as sns
import numpy as np
from matplotlib import pyplot as plt
%matplotlib inline
```

In [35]:
```
df=pd.read_excel(r'DataFinal17-20.xlsx',sheet_name='2020')
df2=df.iloc[:,2:16]
data=df.iloc[:,1:23]
data=data.drop(['Total','Crime Rate','Sex Ratio','Literacy','Density','Latitude','Longitud
df2=df2.drop(['Total'], axis=1)
df2.head()
from sklearn import preprocessing
df_standardized = preprocessing.scale( df2 )
df1 = pd.DataFrame( df_standardized )
```

In [36]:
```
data.head()
```

Out[36]:

	District	Homicide/Murder	Causing death by negligence	Hurt	Assault on woman	Kidnapping and abduction	Human trafficking	Rape	Offence against public tranquility	Offences against property
0	Ahmednagar	254	620	1826	543	369	0	92	905	3104
1	Akola	114	116	1345	245	76	0	28	111	946
2	Amravati	201	354	2133	461	190	0	97	144	2198
3	Aurangbad	139	386	1869	335	242	0	80	428	3821
4	Beed	206	308	1233	248	91	0	50	508	1002

In [37]:
```
#Elbow Method
from sklearn.cluster import KMeans

#create a list for the wcss parameter
wcss = []
#test with 14 clusters
for i in range(1, 15):
    kmeans = KMeans(n_clusters = i, init = 'k-means++', random_state = 0)
    kmeans.fit(df1)
    wcss.append(kmeans.inertia_)
```

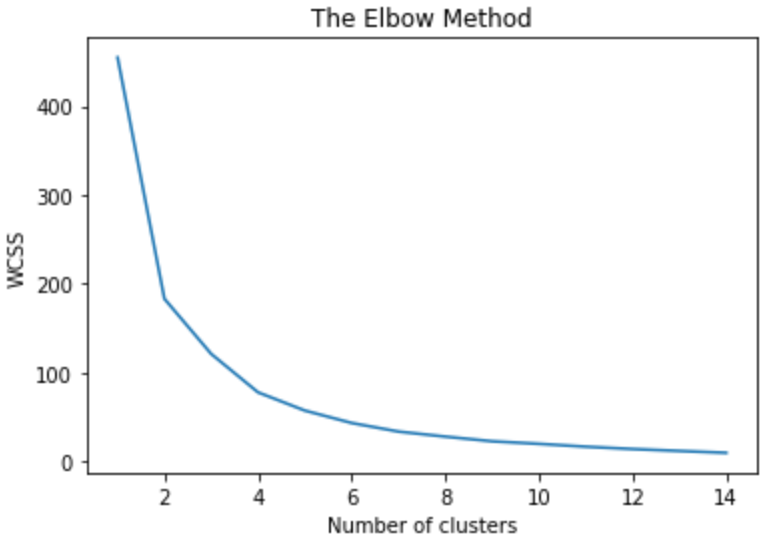
In [38]:
```
wcss
```

Out[38]:
```
[455.0,
 183.15163902707062,
 121.00520284639016,
 77.72527132804295,
 57.19196898334106,
 43.20454952915056,
 33.50410783186294,
 27.826870740722036,
```

```
22.576706877494622,
19.703831936011063,
16.477641547770464,
13.851069756261888,
11.696519258289692,
9.585075372115798]
```

In [39]:

```
plt.plot(range(1, 15), wcss)
plt.title('The Elbow Method')
plt.xlabel('Number of clusters')
plt.ylabel('WCSS')
plt.show()
```



In [40]:

```
import seaborn as sns
```

In [41]:

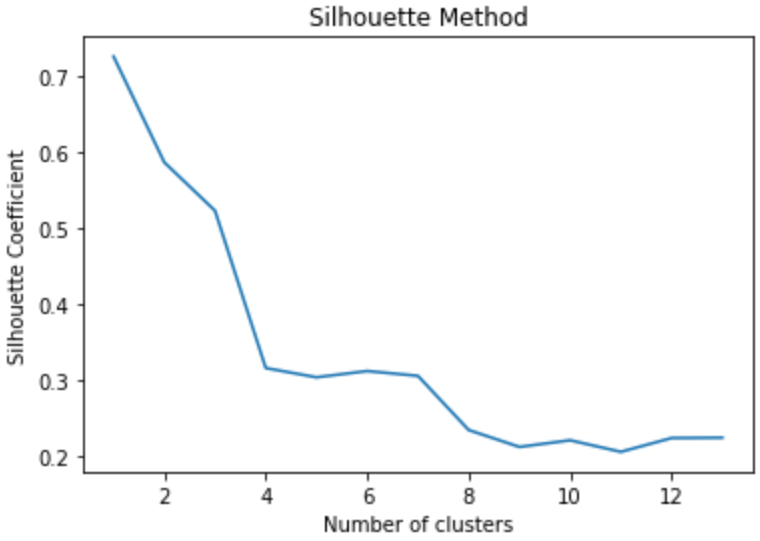
```
#Silhouette Method
from sklearn.metrics import silhouette_score

sil = []
kmax = 14

# dissimilarity would not be defined for a single cluster, thus, minimum number of clustei
for k in range(2, kmax+1):
  kmeans = KMeans(n_clusters = k).fit(df1)
  labels = kmeans.labels_
  sil.append(silhouette_score(df1, labels, metric = 'euclidean'))
```

In [42]:

```
plt.plot(range(1, 14), sil)
plt.title('Silhouette Method')
plt.xlabel('Number of clusters')
plt.ylabel('Silhouette Coefficient')
plt.show()
```



In [43]:
```
#K-Means Clustering using k=6
km=KMeans(n_clusters=6)
y_pred=km.fit_predict(df1)
```

In [44]:
```
y_pred
```

Out[44]:
```
array([2, 0, 4, 4, 4, 0, 4, 0, 0, 0, 0, 0, 4, 4, 4, 4, 1, 2, 4, 0, 2, 0,
       0, 0, 3, 0, 0, 4, 4, 0, 2, 5, 0, 0, 4])
```

In [45]:
```
df['cluster']=y_pred
df.head()
```

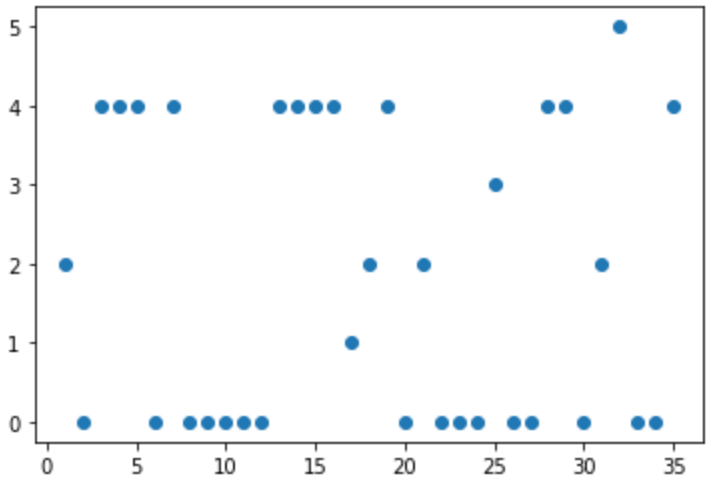
Out[45]:

	SrNo	District	Homicide/Murder	Causing death by negligence	Hurt	Assault on woman	Kidnapping and abduction	Human trafficking	Rape	Offence against public tranquility	...
0	1	Ahmednagar	254	620	1826	543	369	0	92	905	...
1	2	Akola	114	116	1345	245	76	0	28	111	...
2	3	Amravati	201	354	2133	461	190	0	97	144	...
3	4	Aurangbad	139	386	1869	335	242	0	80	428	...
4	5	Beed	206	308	1233	248	91	0	50	508	...

5 rows × 23 columns

In [46]:
```
plt.scatter(df['SrNo'],df['cluster'])
#for col in df.columns:
 #   print(col)
```

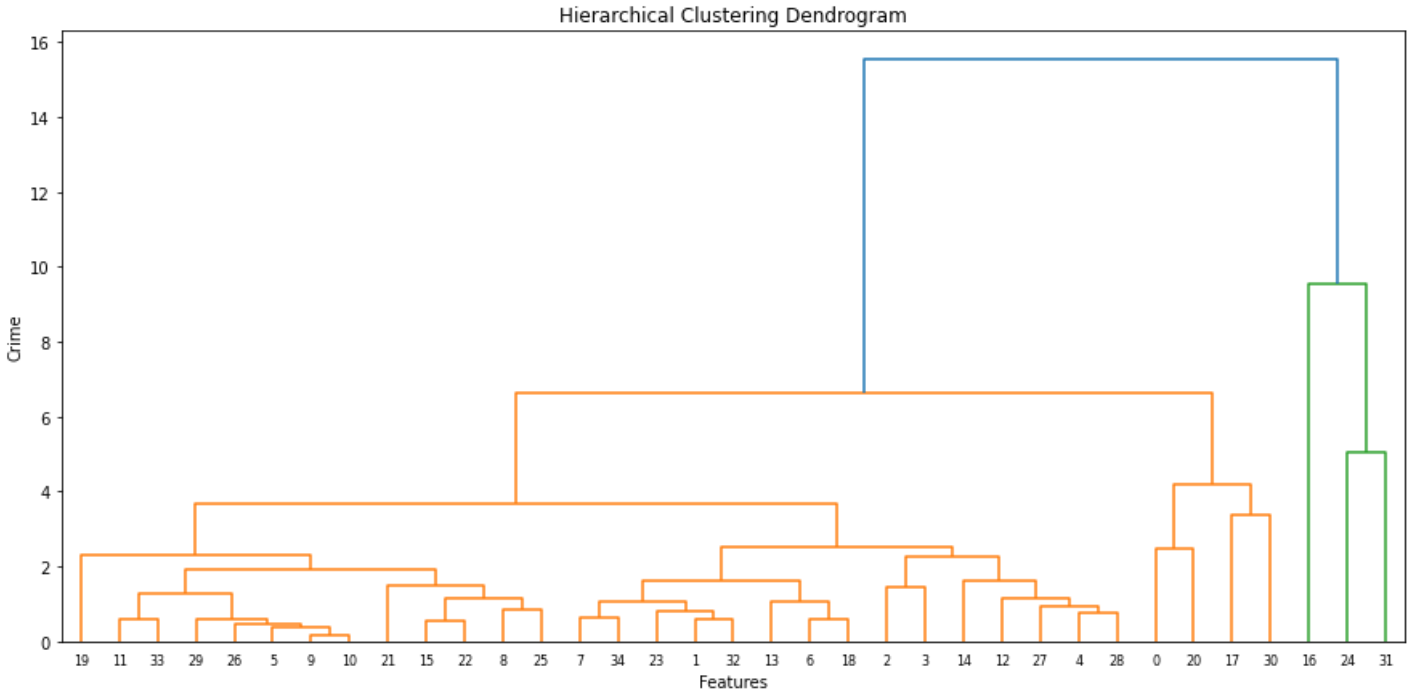
Out[46]:
```
<matplotlib.collections.PathCollection at 0x28185d83c10>
```



In [47]:
```
#Hierarchical Clustering
from scipy.cluster.hierarchy import linkage
import scipy.cluster.hierarchy as sch # for creating dendrogram
```

In [48]:
```
z = linkage(df1, method="complete",metric="euclidean")
```

In [49]:
```
plt.figure(figsize=(15,7))
plt.title('Hierarchical Clustering Dendrogram')
plt.xlabel('Features')
plt.ylabel('Crime')
sch.dendrogram(z,
    leaf_rotation=0.,  # rotates the x axis labels
    leaf_font_size=8.,  # font size for the x axis labels
)
plt.show()
```



In [50]:
```
#df = pd.read_excel (r'Path where the Excel file is stored\File name.xlsx', sheet_name='yo
```

In [51]:
```
X = df2[['Homicide/Murder','Causing death by negligence','Hurt','Assault on woman','Kidnap
clusters = KMeans(6)  # 6 clusters
```

```
clusters.fit( X )
clusters.cluster_centers_
clusters.labels_
df2['Crime_clusters'] = clusters.labels_
df2.head()
df2.sort_values(by=['Crime_clusters'],ascending = True)
X.head()
```

Out[51]:

	Homicide/Murder	Causing death by negligence	Hurt	Assault on woman	Kidnapping and abduction	Human trafficking	Rape	Offence against public tranquility	Offences against property	Offences relating to documents and property marks	I
0	254	620	1826	543	369	0	92	905	3104	220	
1	114	116	1345	245	76	0	28	111	946	86	
2	201	354	2133	461	190	0	97	144	2198	250	
3	139	386	1869	335	242	0	80	428	3821	265	
4	206	308	1233	248	91	0	50	508	1002	104	

In [52]:

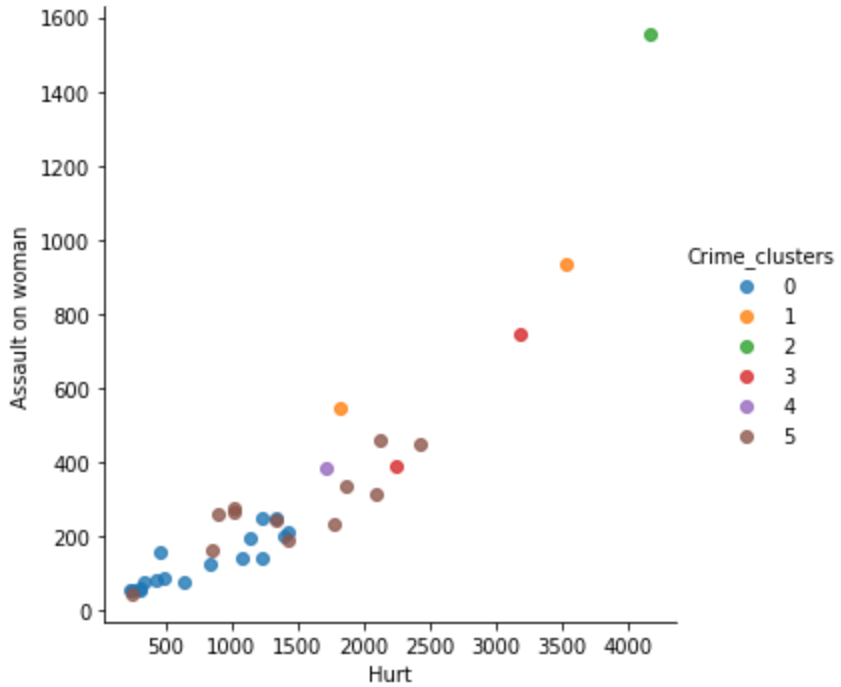
```
stats =df2.sort_values("Hurt", ascending=True)
stats
```

Out[52]:

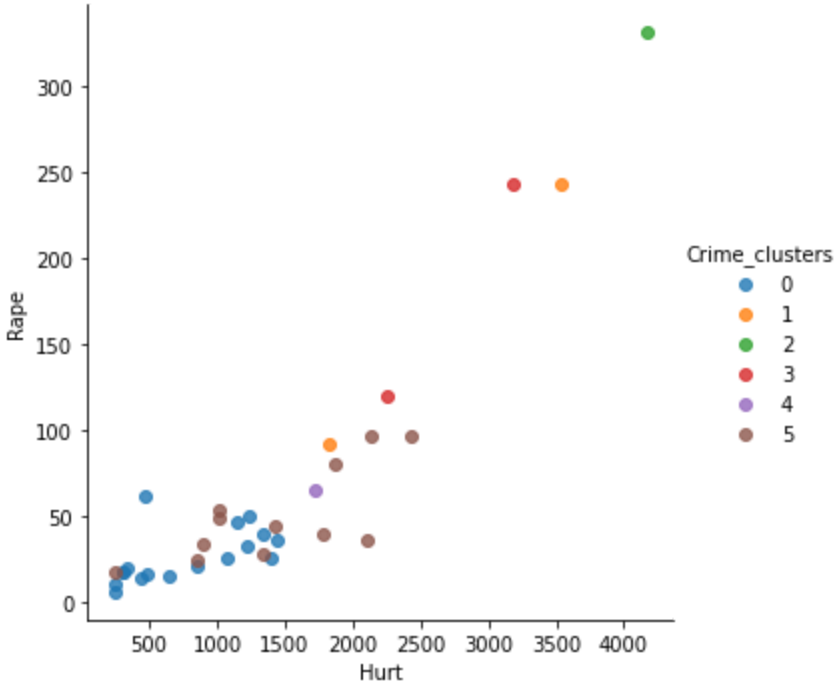
	Homicide/Murder	Causing death by negligence	Hurt	Assault on woman	Kidnapping and abduction	Human trafficking	Rape	Offence against public tranquility	Offences against property	Offences relating to documents and property marks
29	18	50	241	53	18	0	6	43	178	48
26	39	106	250	53	43	0	11	109	361	113
19	62	133	255	44	57	0	17	116	429	38
9	65	135	303	55	32	0	17	21	302	41
10	50	131	311	57	40	0	18	23	400	30
25	47	191	334	77	73	0	20	165	533	141
8	84	352	433	80	98	1	14	205	781	77
21	79	232	466	158	217	4	62	95	1859	500
5	41	141	486	88	71	0	16	43	676	60
11	75	119	649	73	27	0	15	140	436	35
22	92	253	847	123	87	0	21	247	685	80
33	114	110	855	163	66	0	24	142	449	39
12	192	439	901	259	187	0	34	440	2045	248
28	145	359	1017	275	192	2	49	481	1557	183
14	146	313	1020	263	150	15	54	388	1357	222
15	104	244	1077	138	111	3	26	303	964	94
7	105	234	1147	194	152	1	46	84	980	108

	Homicide/Murder	Causing death by negligence	Hurt	Assault on woman	Kidnapping and abduction	Human trafficking	Rape	Offence against public tranquility	Offences against property	Offences relating to documents and property marks
23	165	121	1227	139	65	0	33	119	924	94
4	206	308	1233	248	91	0	50	508	1002	104
27	207	269	1344	250	228	2	39	340	1678	197
1	114	116	1345	245	76	0	28	111	946	86
32	86	170	1394	197	113	0	25	44	741	88
34	140	310	1431	187	128	1	44	85	923	56
13	133	209	1436	208	100	0	36	411	1618	170
20	240	917	1720	384	473	1	65	637	2528	529
18	143	252	1778	232	127	1	40	307	1464	114
0	254	620	1826	543	369	0	92	905	3104	220
3	139	386	1869	335	242	0	80	428	3821	265
6	122	293	2099	313	110	0	36	320	1269	102
2	201	354	2133	461	190	0	97	144	2198	250
17	299	581	2252	386	442	13	120	199	4980	568
30	246	461	2437	449	276	8	96	786	3046	289
31	336	814	3187	746	1159	30	243	687	6209	1211
24	649	1102	3540	936	1113	28	243	1227	7935	999
16	521	349	4171	1553	1180	58	331	392	17530	3425

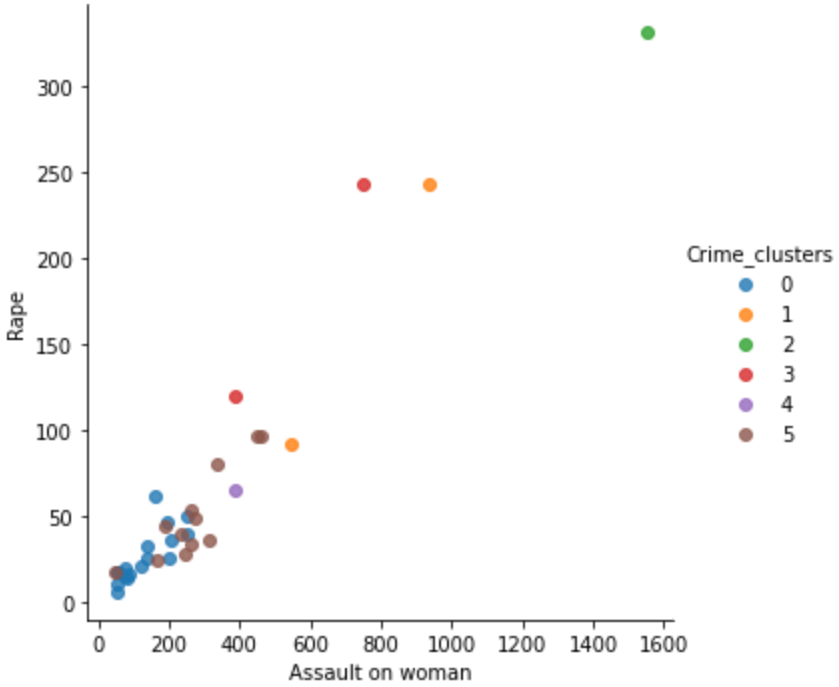
In [20]:
```
sns.lmplot(x='Hurt',y='Assault on woman',data=df2,hue = 'Crime_clusters',fit_reg=False);
```



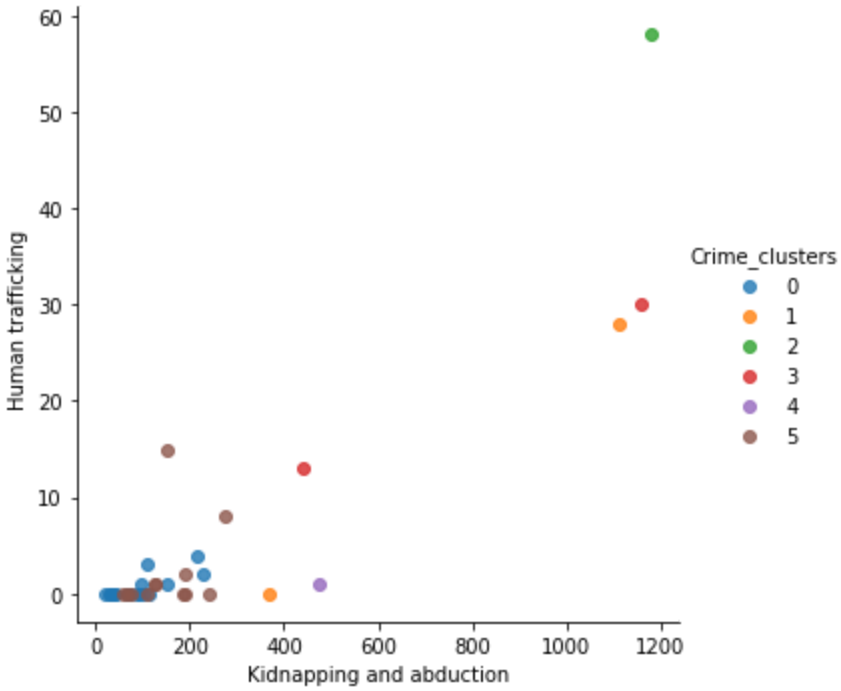
In [21]:
```
sns.lmplot(x='Hurt',y='Rape',data=df2,hue = 'Crime_clusters',fit_reg=False);
```



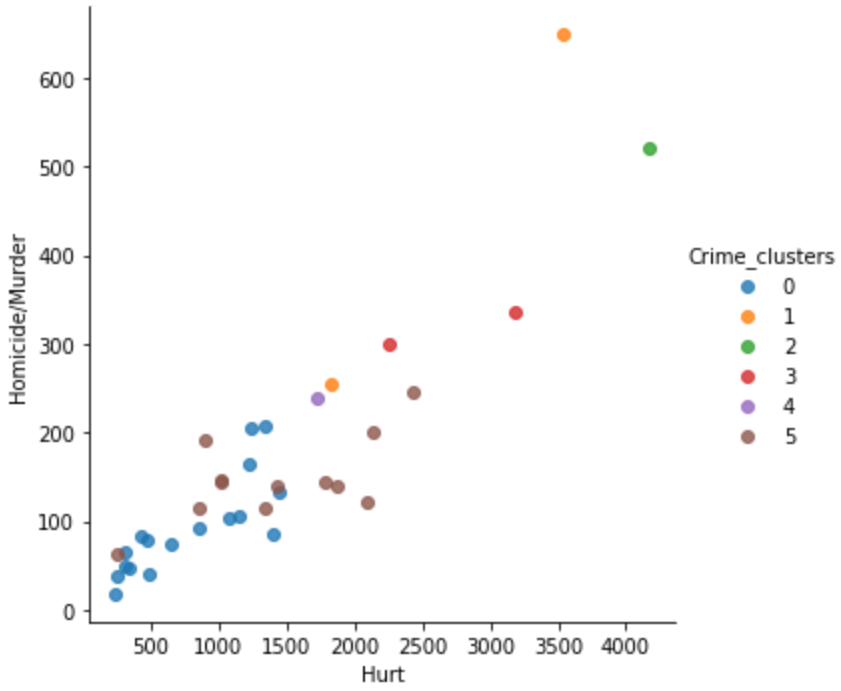
In [22]:
```
sns.lmplot(x='Assault on woman',y='Rape',data=df2,hue = 'Crime_clusters',fit_reg=False);
```



In [23]:
```
sns.lmplot(x='Kidnapping and abduction',y='Human trafficking ',data=df2,hue = 'Crime_clust
```

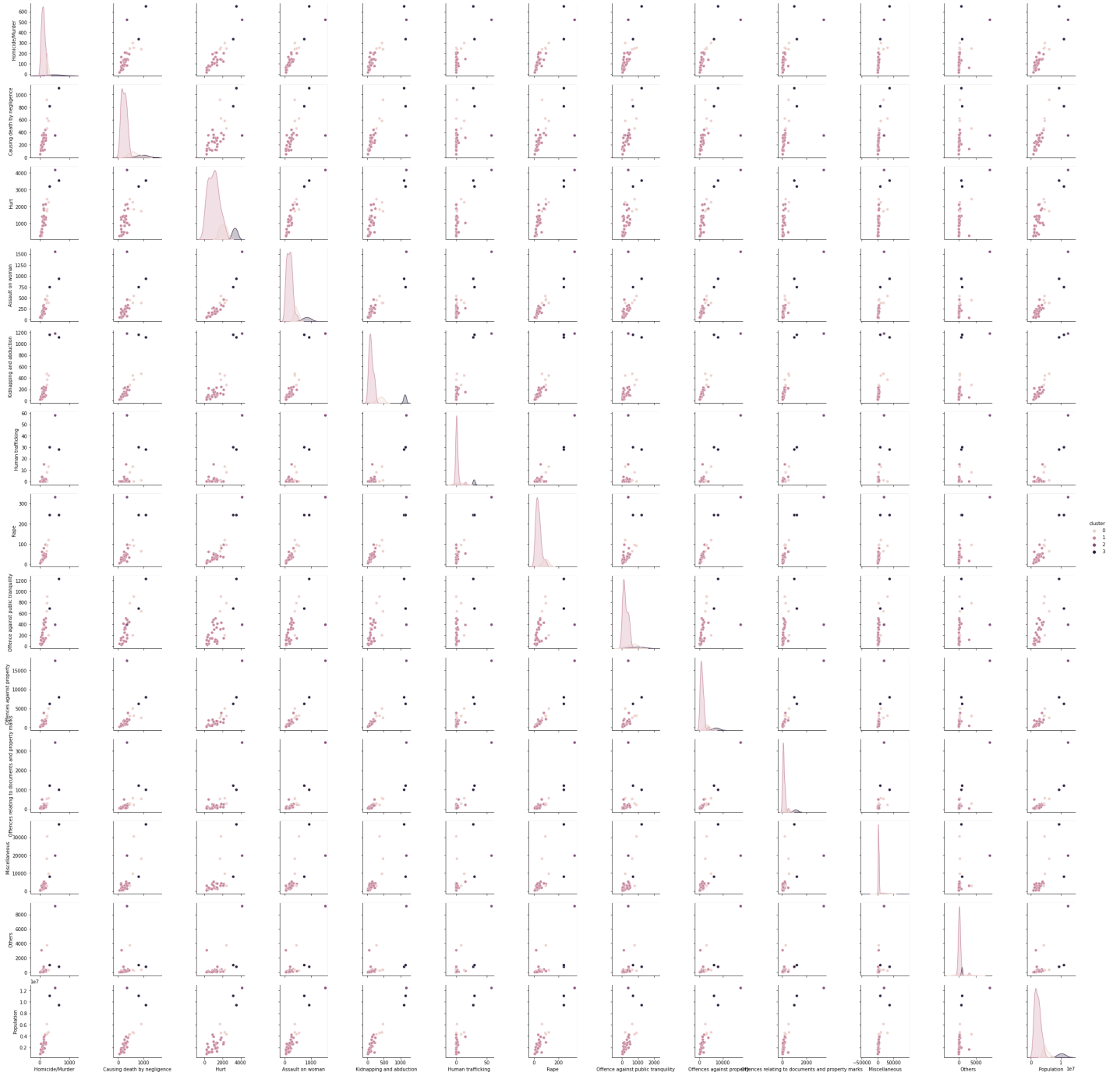


In [24]:
```
sns.lmplot(x='Hurt',y='Homicide/Murder',data=df2,hue = 'Crime_clusters',fit_reg=False);
```



In [53]:
```
sns.pairplot(data,hue='cluster')
```

Out[53]:
```
<seaborn.axisgrid.PairGrid at 0x28183e2bb80>
```

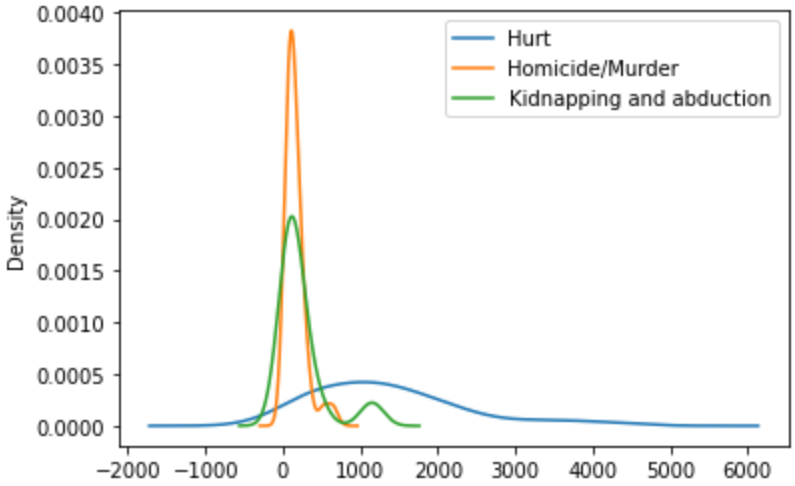


In [26]:

```
df3 = pd.DataFrame(data=df2, columns=['Hurt', 'Homicide/Murder', 'Kidnapping and abduction
df3.plot.kde()
#kernel density estimate (KDE) plot is a method for visualizing the distribution of obser
```

Out[26]:

```
<AxesSubplot:ylabel='Density'>
```



In [27]:

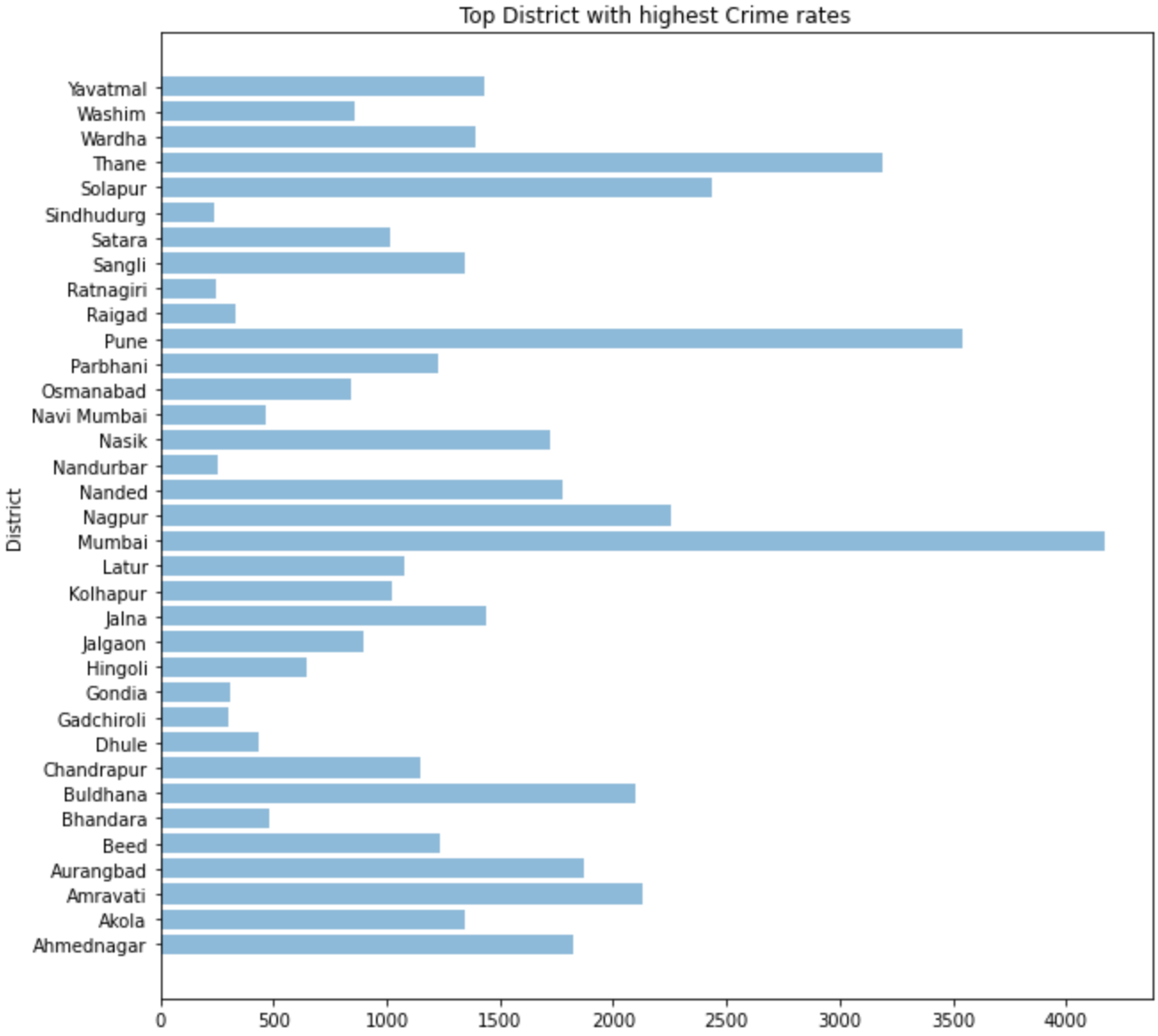
```
df2.head()
```

Out[27]:

	Homicide/Murder	Causing death by negligence	Hurt	Assault on woman	Kidnapping and abduction	Human trafficking	Rape	Offence against public tranquility	Offences against property	Offences relating to documents and property marks	I
0	254	620	1826	543	369	0	92	905	3104	220	
1	114	116	1345	245	76	0	28	111	946	86	
2	201	354	2133	461	190	0	97	144	2198	250	
3	139	386	1869	335	242	0	80	428	3821	265	
4	206	308	1233	248	91	0	50	508	1002	104	

In [29]:

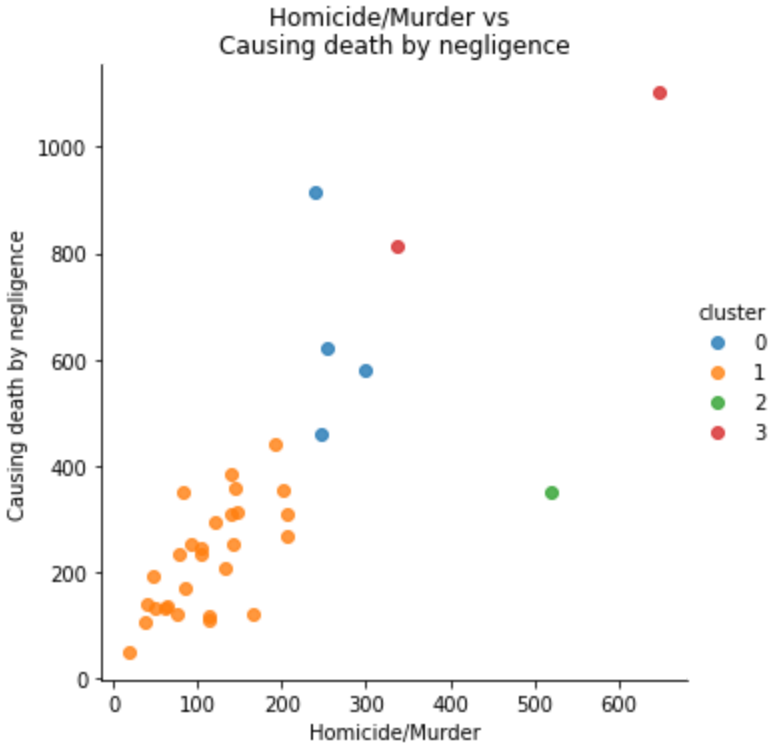
```
a1=data['Hurt']
b1=data['District']
f = plt.figure()
f.set_figwidth(10)
f.set_figheight(10)
plt.barh(b1, a1, align='center', alpha=0.5)
plt.ylabel('District')
plt.title('Top District with highest Crime rates')
plt.show()
```

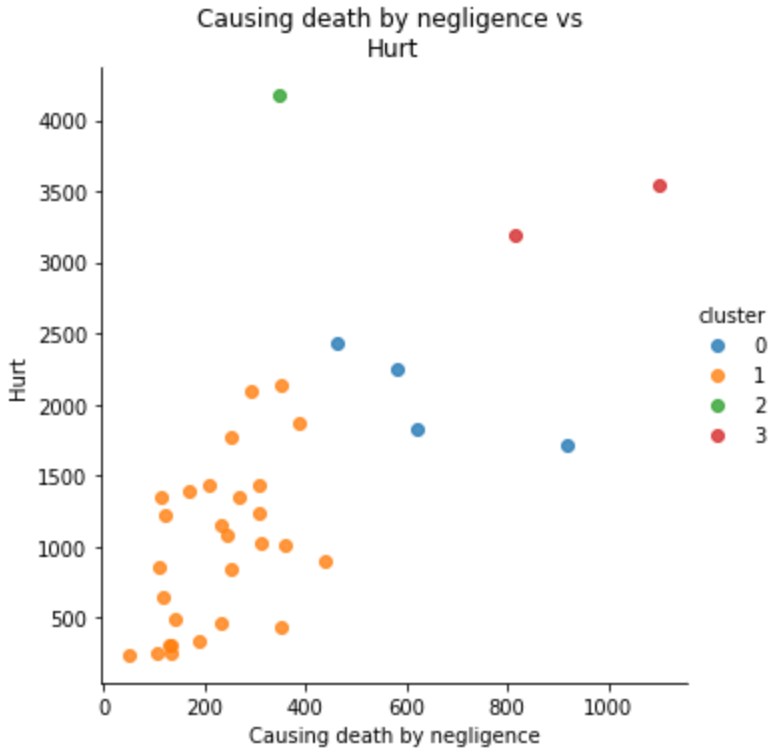


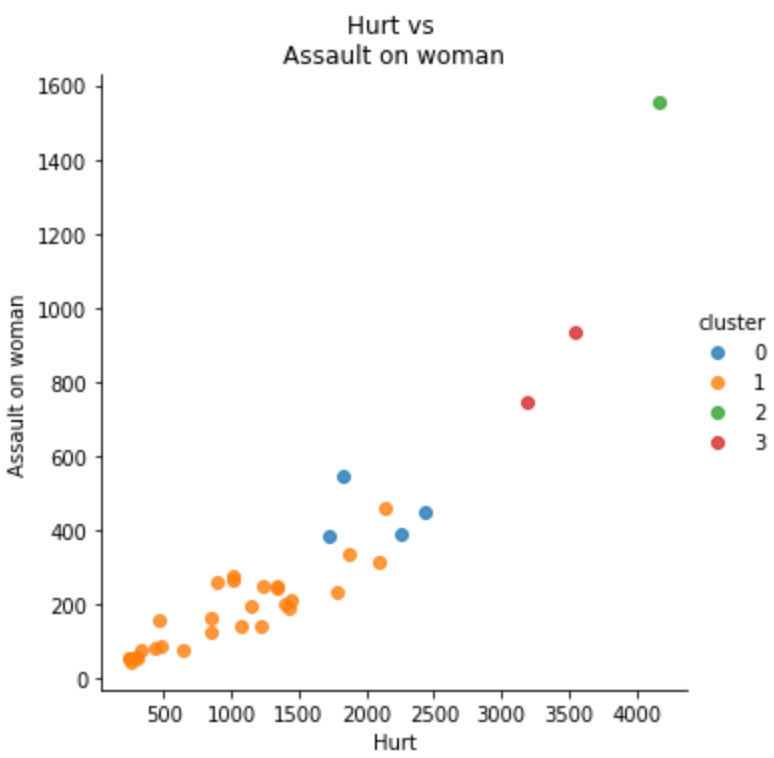
In [30]:

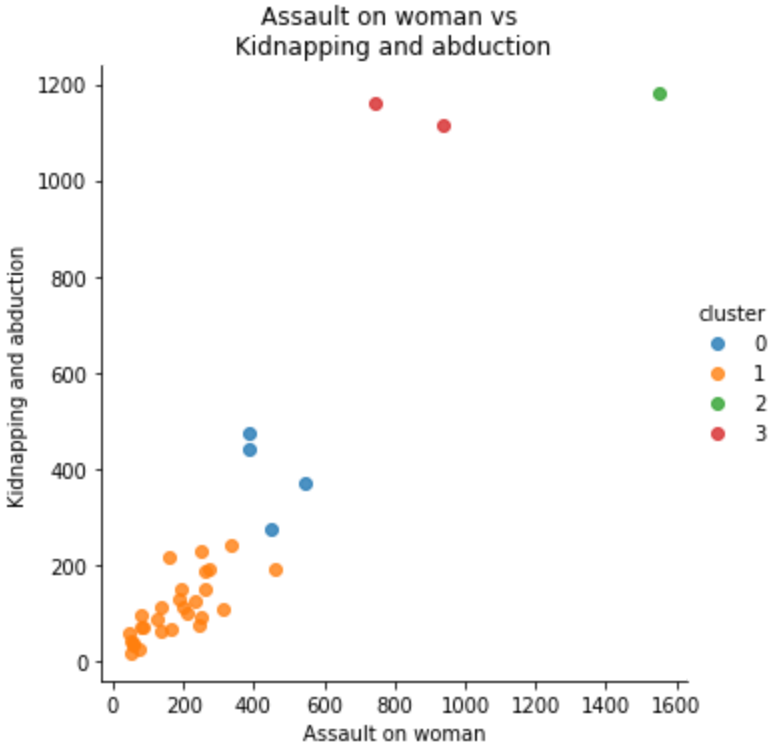
```
#Cluster plotting of crime vs crime/diff metrics
df=pd.read_excel(r'DataFinal17-20.xlsx',sheet_name='2020')
df2=df.iloc[:,2:23]
for i in range(len(df2.columns)-1):
    titles=df2.columns[i]+" vs \n"+df2.columns[i+1]
    plt.figure(i)
    sns.lmplot(x=df2.columns[i],y=df2.columns[i+1],data=df2,hue="cluster",legend=1,fit_reg
```

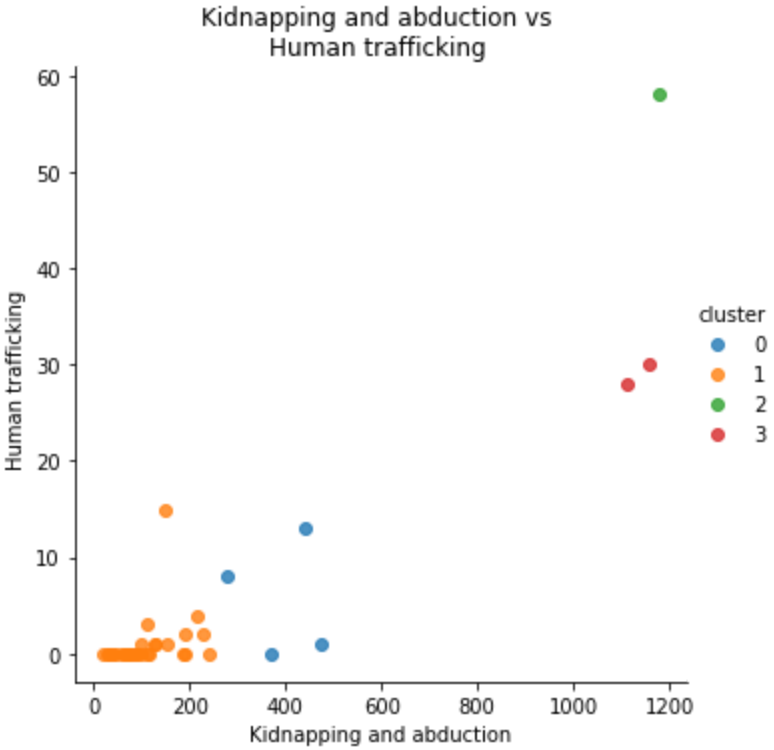
```
c:\users\welcome\appdata\local\programs\python\python39\lib\site-packages\seaborn\axisgri
d.py:447: RuntimeWarning: More than 20 figures have been opened. Figures created through t
he pyplot interface (`matplotlib.pyplot.figure`) are retained until explicitly closed and
may consume too much memory. (To control this warning, see the rcParam `figure.max_open_wa
rning`).
  fig = plt.figure(figsize=figsize)
<Figure size 432x288 with 0 Axes>
```

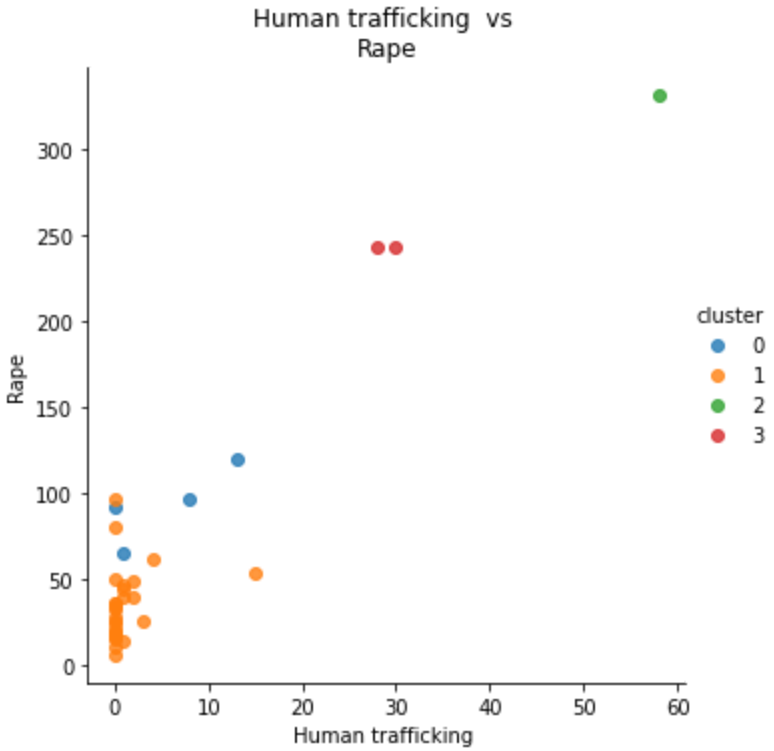

Homicide/Murder vs
Causing death by negligence
Causing death by negligence
Homicide/Murder
cluster
0
1
2
3

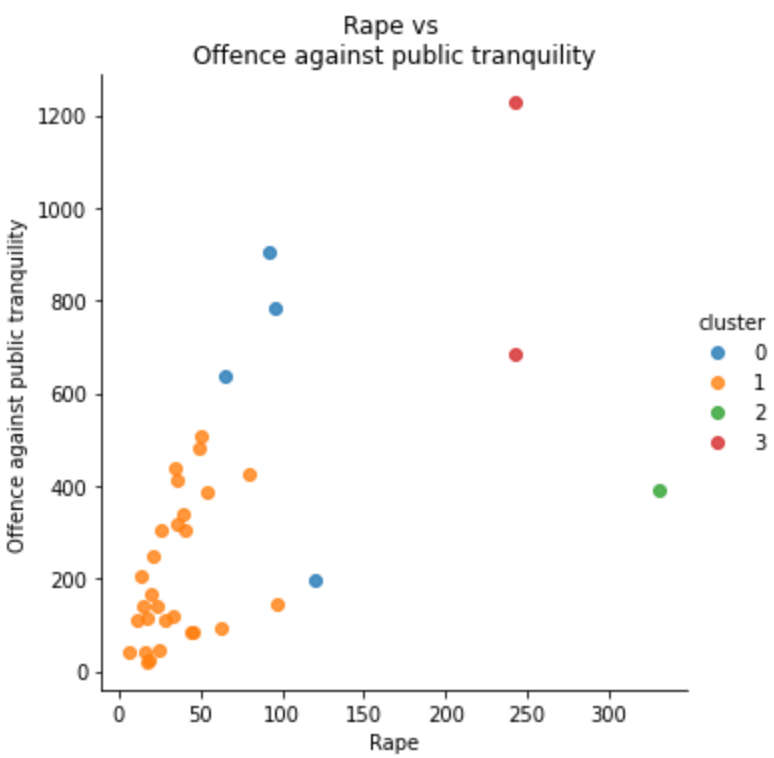

Causing death by negligence vs
Hurt
Hurt
Causing death by negligence
cluster
0
1
2
3

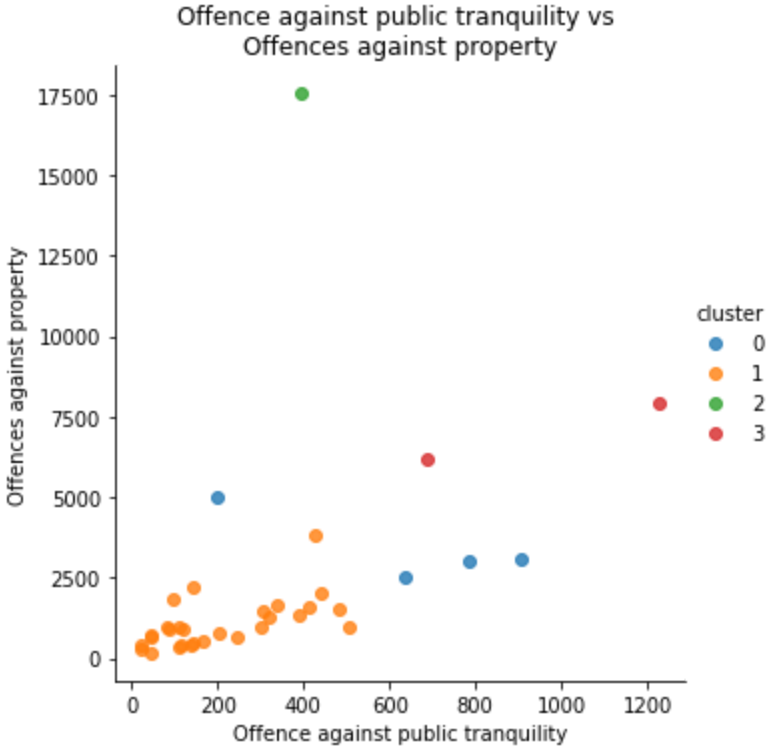

Hurt vs
Assault on woman
Assault on woman
Hurt
cluster
0
1
2
3

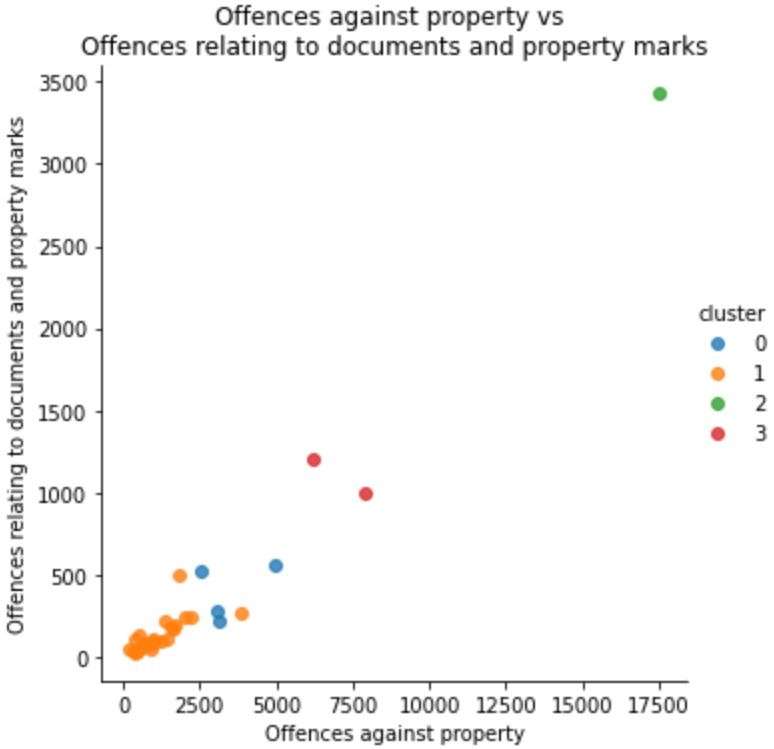

Assault on woman vs
Kidnapping and abduction
Kidnapping and abduction
Assault on woman
cluster
0
1
2
3

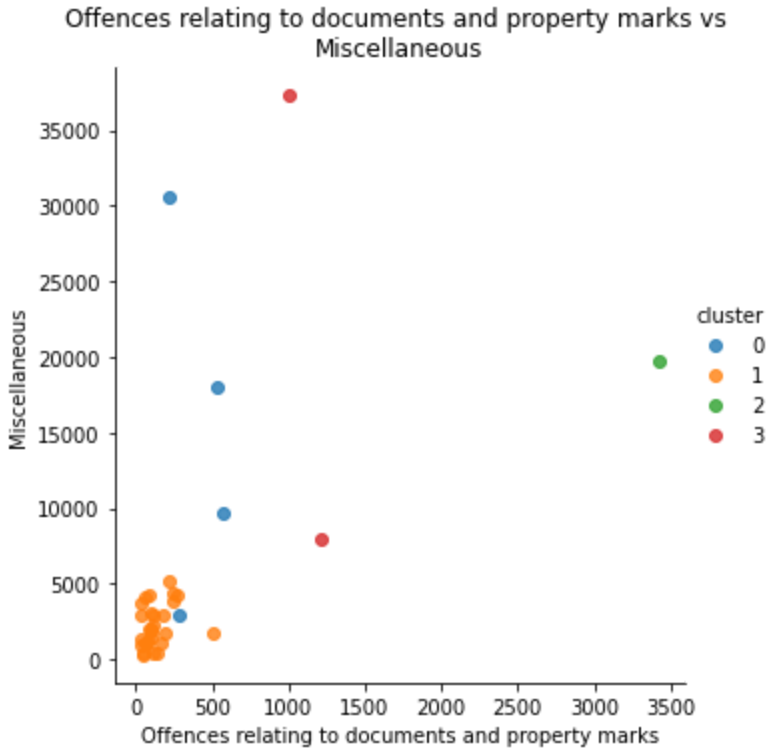

Kidnapping and abduction vs
Human trafficking
Human trafficking
Kidnapping and abduction
cluster
0
1
2
3
0
10
20
30
40
50
60
0
200
400
600
800
1000
1200

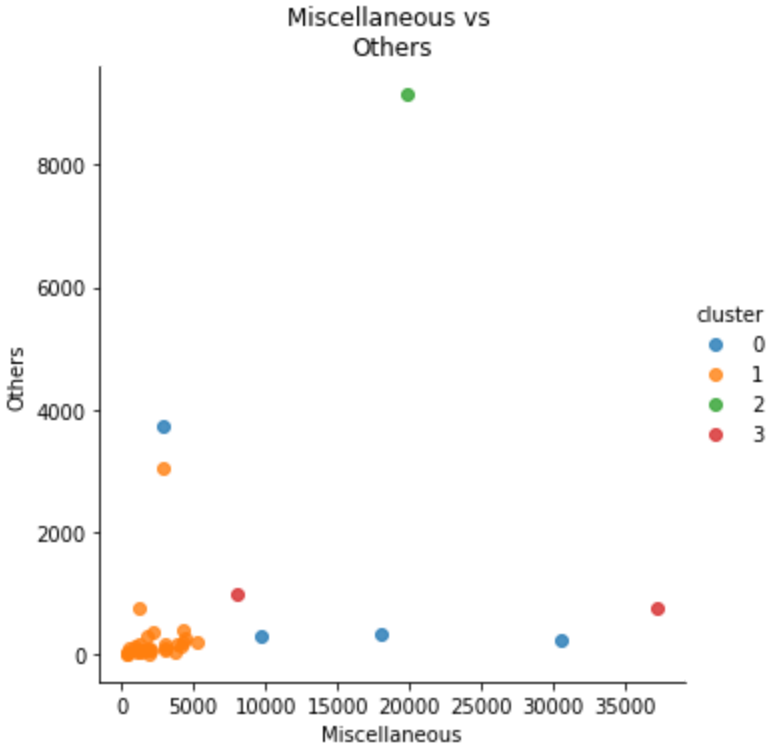

Human trafficking vs
Rape
Rape
Human trafficking
cluster
0
1
2
3
0
50
100
150
200
250
300
0
10
20
30
40
50
60

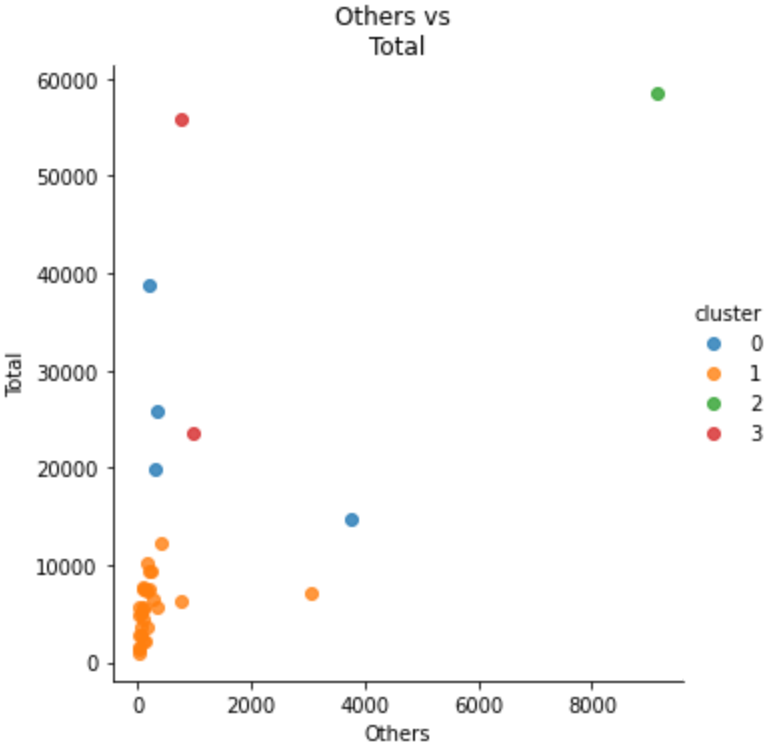

Rape vs
Offence against public tranquility
Offence against public tranquility
Rape
cluster
0
1
2
3

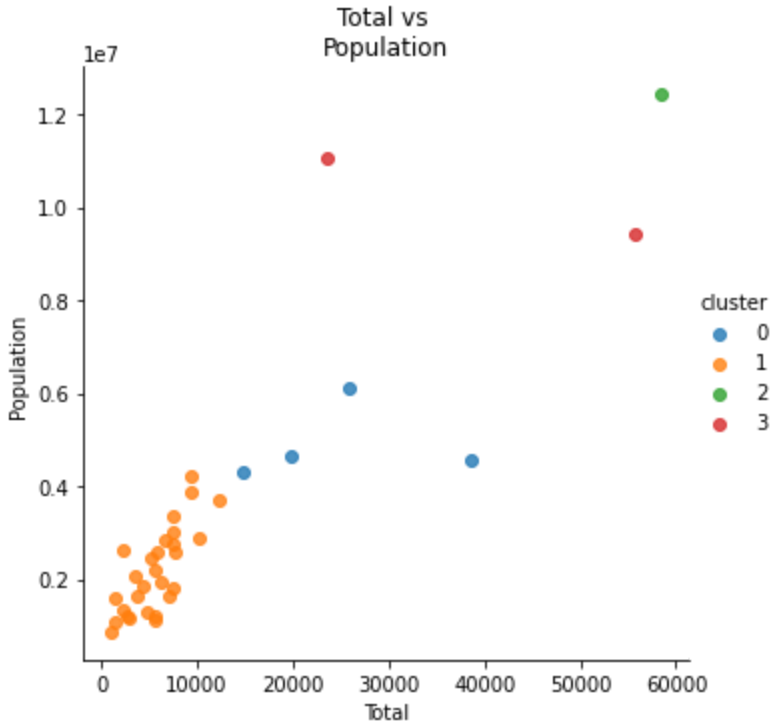

Offence against public tranquility vs
Offences against property
Offences against property
Offence against public tranquility
cluster
0
1
2
3

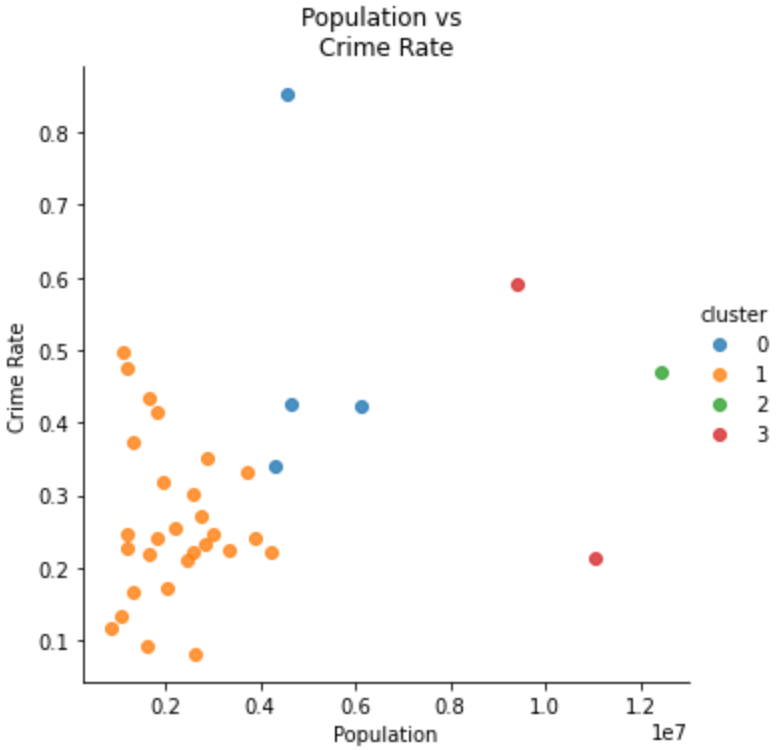

Offences against property vs
Offences relating to documents and property marks
Offences relating to documents and property marks
Offences against property
cluster
0
1
2
3

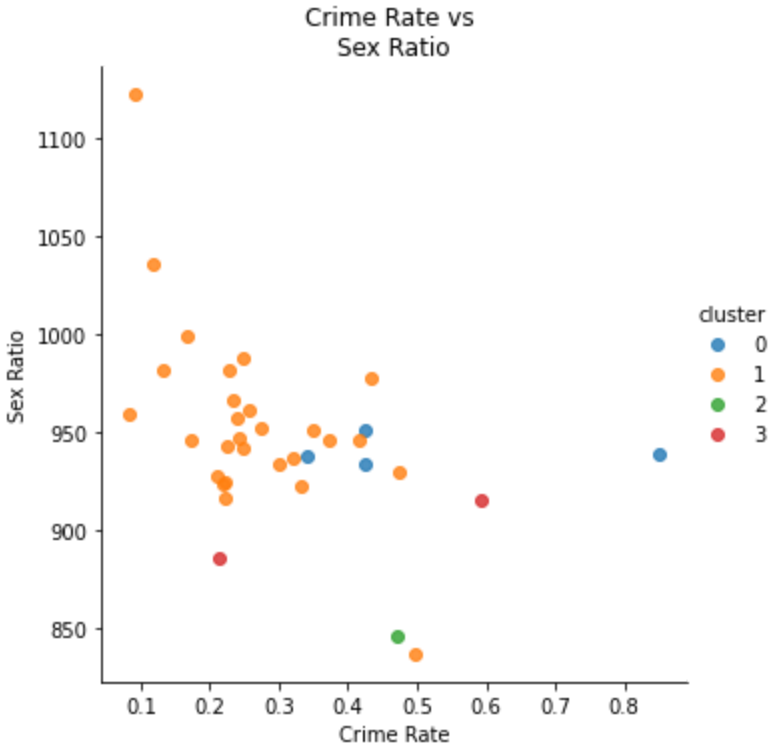

Offences relating to documents and property marks vs
Miscellaneous
Miscellaneous
Offences relating to documents and property marks
cluster
0
1
2
3

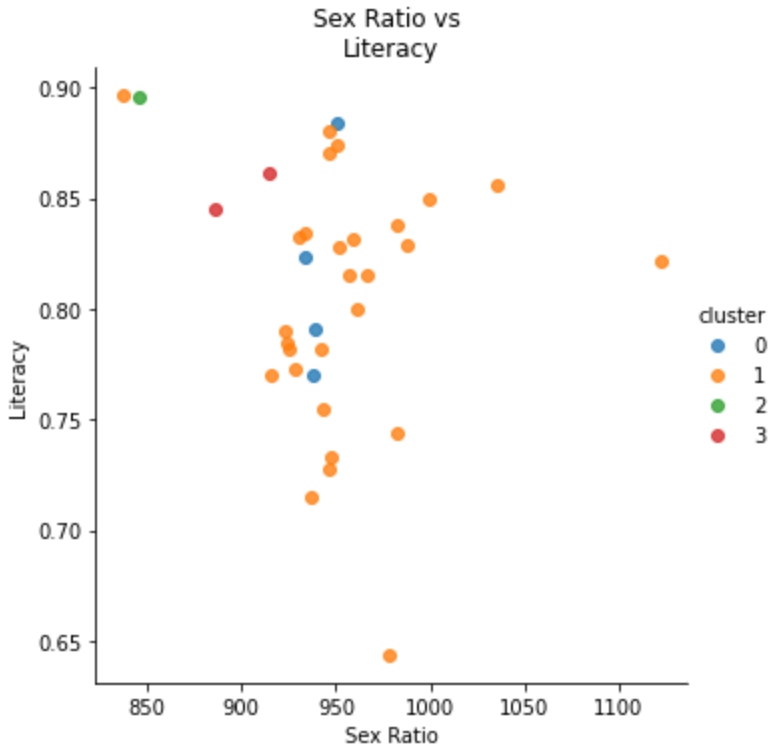

Miscellaneous vs
Others
8000
6000
4000
2000
0
Others
0
5000
10000
15000
20000
25000
30000
35000
Miscellaneous
cluster
0
1
2
3

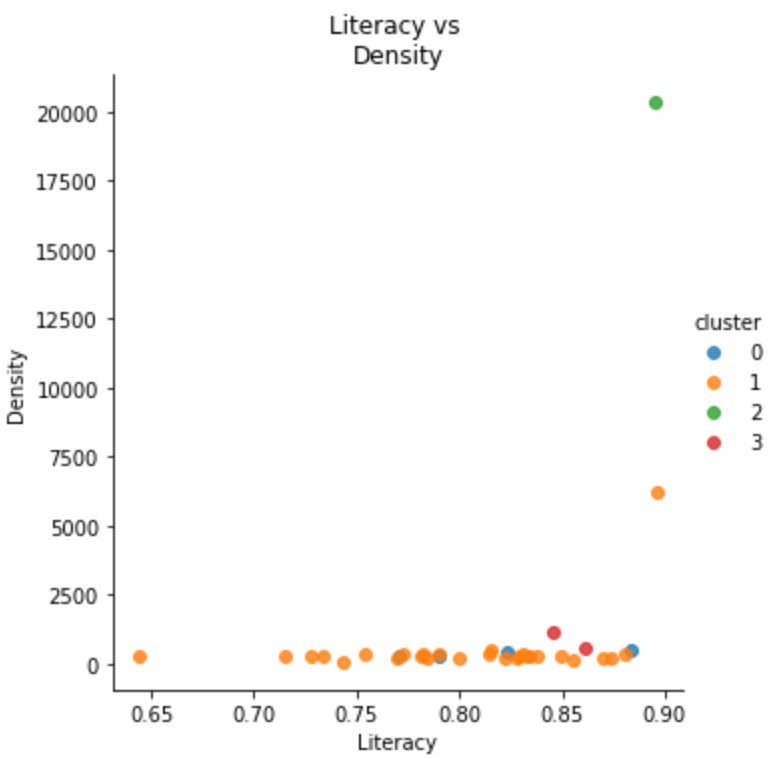

Others vs
Total
60000
50000
40000
30000
20000
10000
0
Total
0
2000
4000
6000
8000
Others
cluster
0
1
2
3

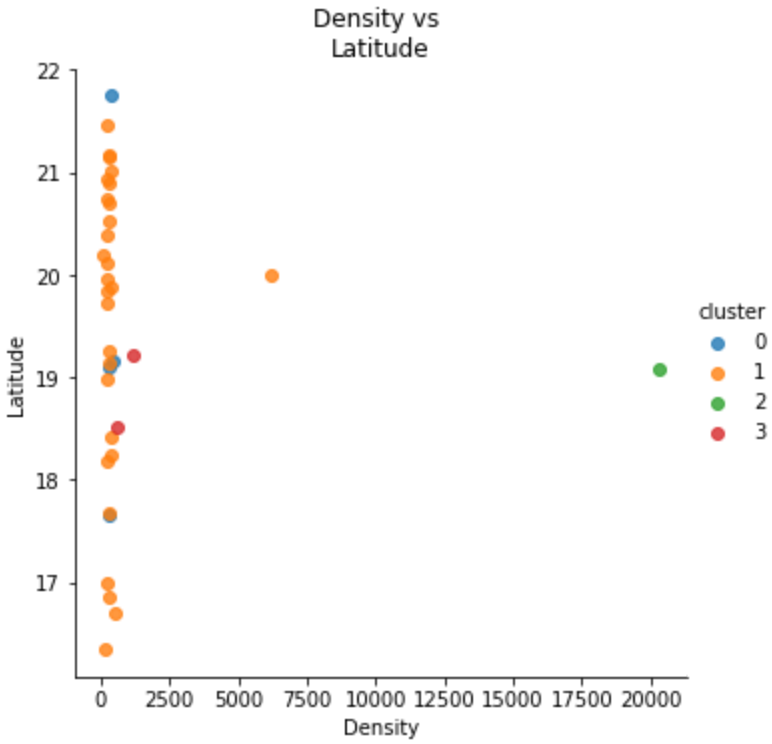

Total vs
Population
1e7
1.2
1.0
0.8
0.6
0.4
0.2
Population
0
10000
20000
30000
40000
50000
60000
Total
cluster
0
1
2
3

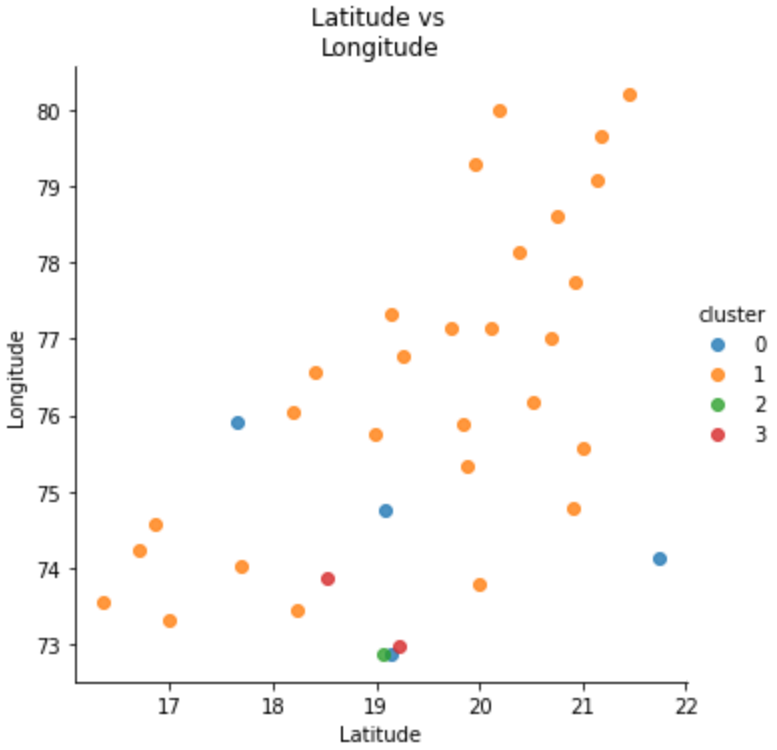

Population vs
Crime Rate
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Crime Rate
0.2
0.4
0.6
0.8
1.0
1.2
1e7
Population
cluster
0
1
2
3

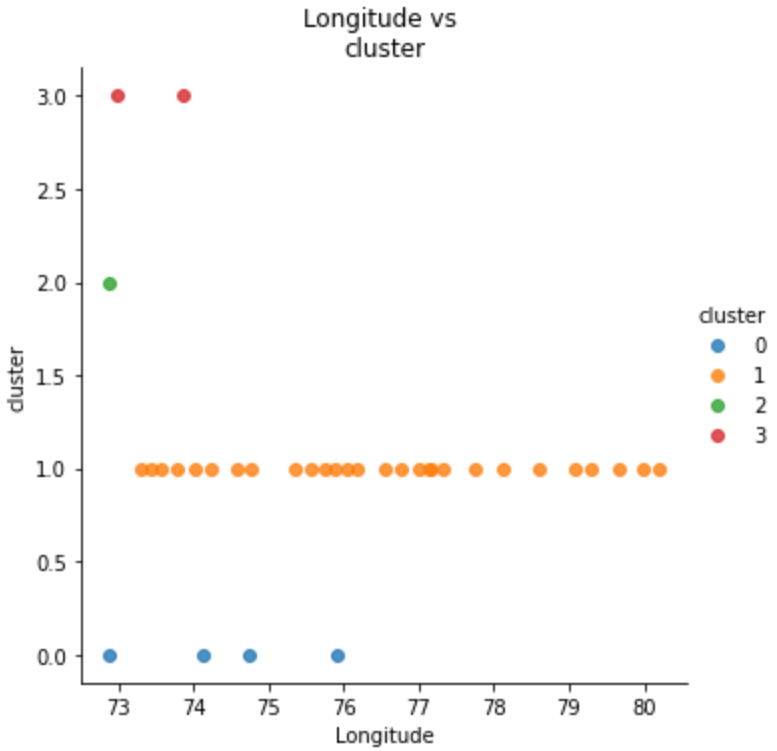

Crime Rate vs
Sex Ratio
Sex Ratio
1100
1050
1000
950
900
850
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Crime Rate
cluster
0
1
2
3


Sex Ratio vs
Literacy
Literacy
0.90
0.85
0.80
0.75
0.70
0.65
850
900
950
1000
1050
1100
Sex Ratio
cluster
0
1
2
3


Literacy vs
Density
20000
17500
15000
12500
10000
7500
5000
2500
0
Density
0.65
0.70
0.75
0.80
0.85
0.90
Literacy
cluster
0
1
2
3


Density vs
Latitude
22
21
20
19
18
17
Latitude
0
2500
5000
7500
10000
12500
15000
17500
20000
Density
cluster
0
1
2
3

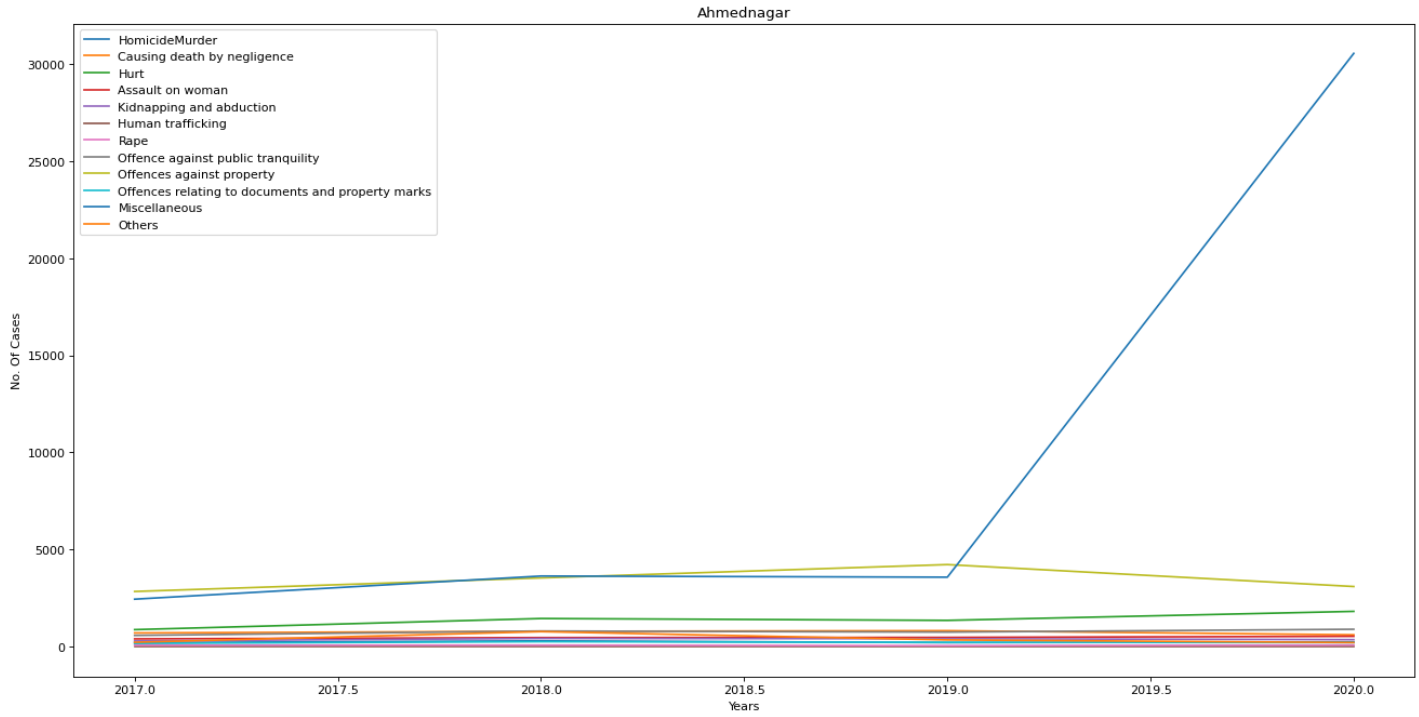


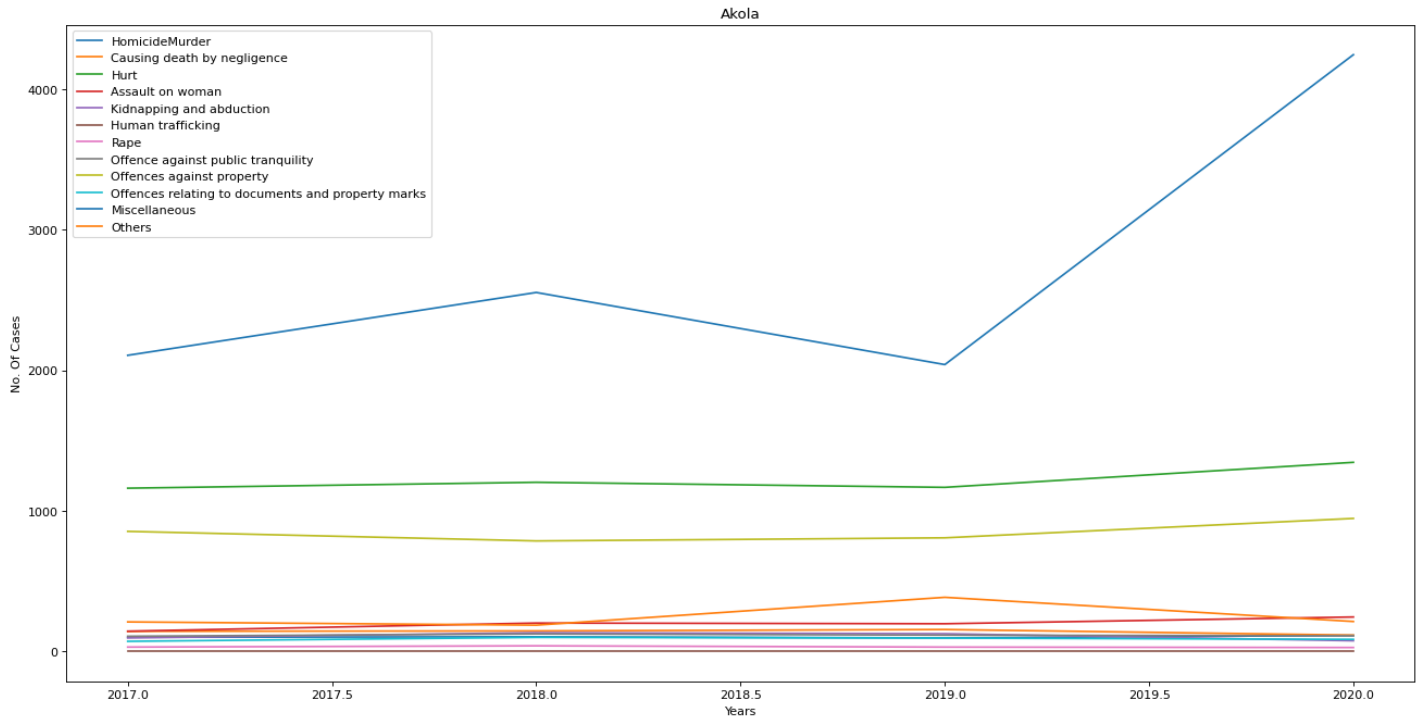


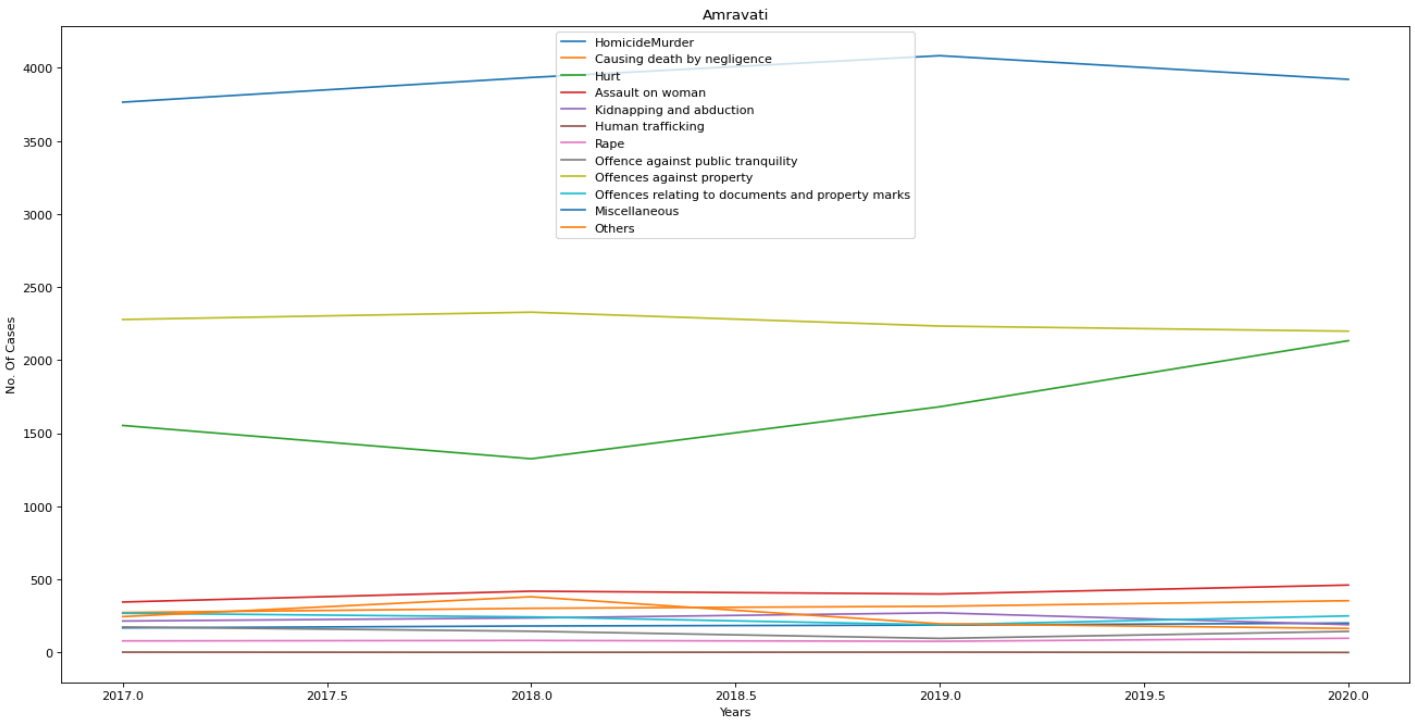
In [31]:

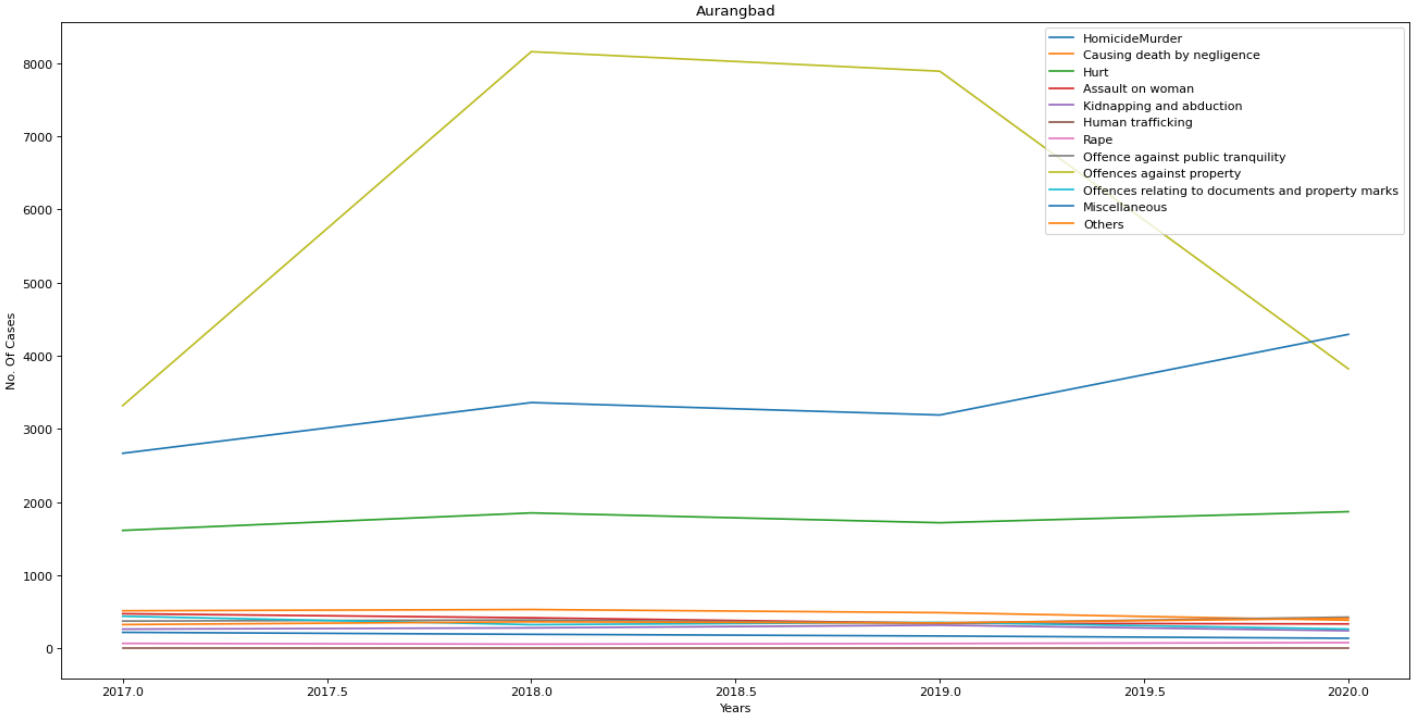
```
#District vs Crime in 4 yrs
df=pd.read_excel(r'DataFinal17-20.xlsx',sheet_name='practice')
df2=df.iloc[:,0:6]
years=[2017,2018,2019,2020]
Districts=df['District'].unique()
Crimes=df['Crime'].unique()
for district in Districts:
    fig=plt.figure(figsize=(20,10),dpi=80,facecolor='w',edgecolor='k')
    plt.title(district)
    plt.xlabel('Years')
    plt.ylabel('No. Of Cases')
    for case in Crimes:
        temp_df=df[(df['District']==district)&(df['Crime']==case)]
        N_cases=[temp_df[c].values[0] for c in years]
        plt.plot(years,N_cases)
        plt.legend(Crimes)
```

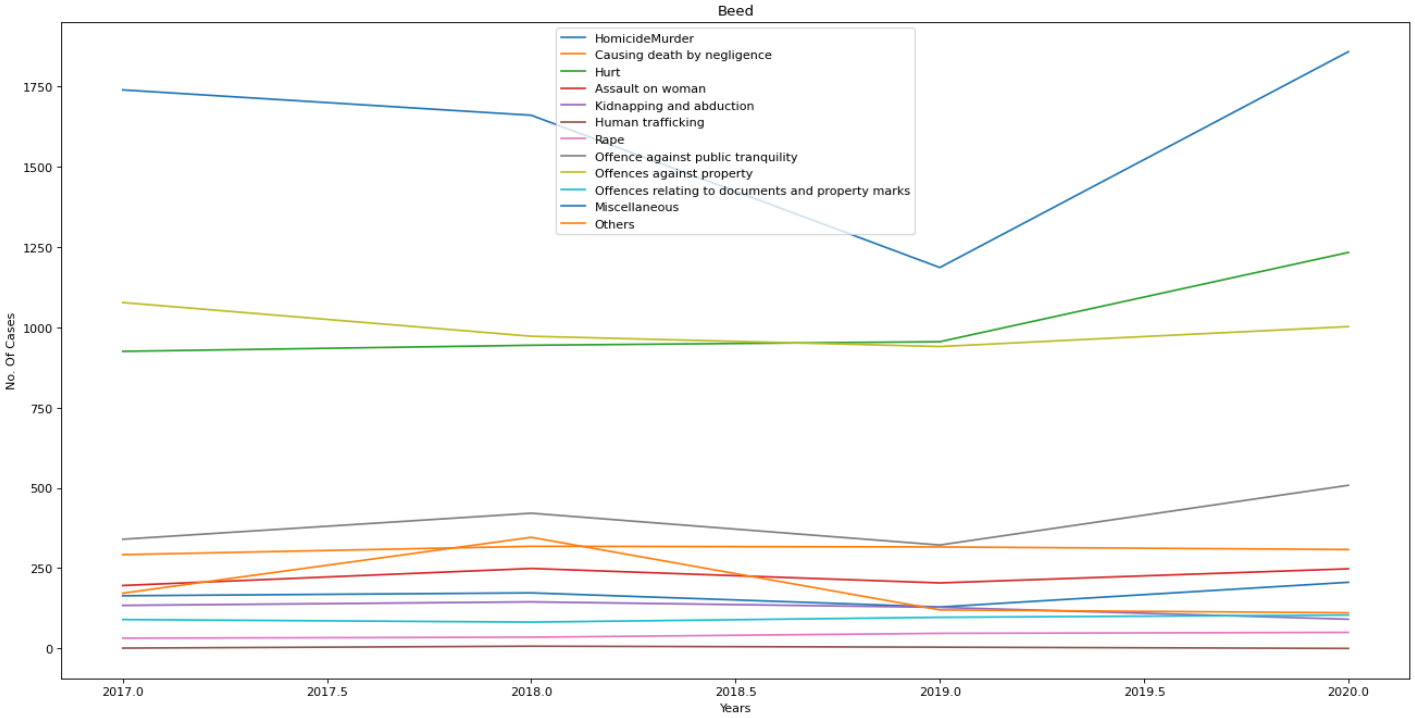
```
C:\Users\WELCOME\AppData\Local\Temp/ipykernel_2092/3855337537.py:8: RuntimeWarning: More t
han 20 figures have been opened. Figures created through the pyplot interface (`matplotli
b.pyplot.figure`) are retained until explicitly closed and may consume too much memory. (T
o control this warning, see the rcParam `figure.max_open_warning`).
  fig=plt.figure(figsize=(20,10),dpi=80,facecolor='w',edgecolor='k')
```






Amravati
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
500
1000
1500
2000
2500
3000
3500
4000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Aurangbad
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
1000
2000
3000
4000
5000
6000
7000
8000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Beed
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
0
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1250
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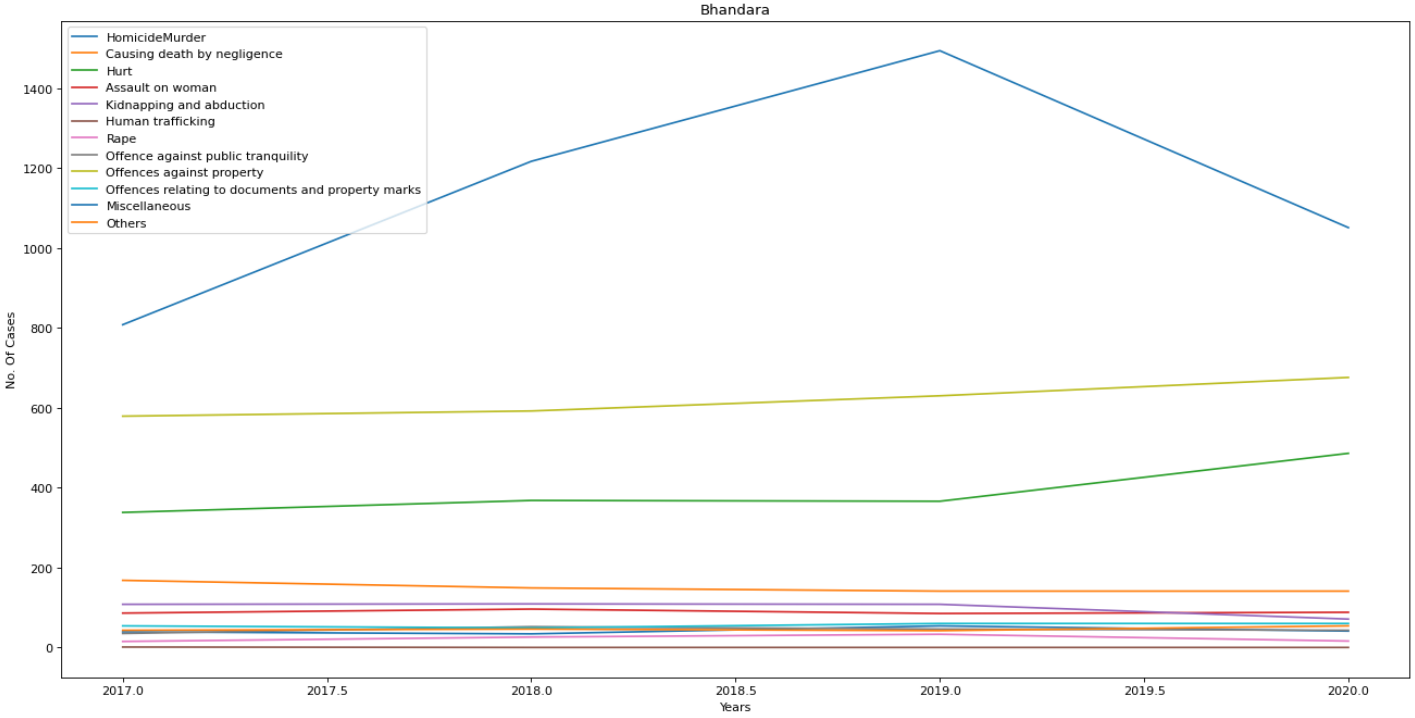
1750
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
Years


Bhandara
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
0
200
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600
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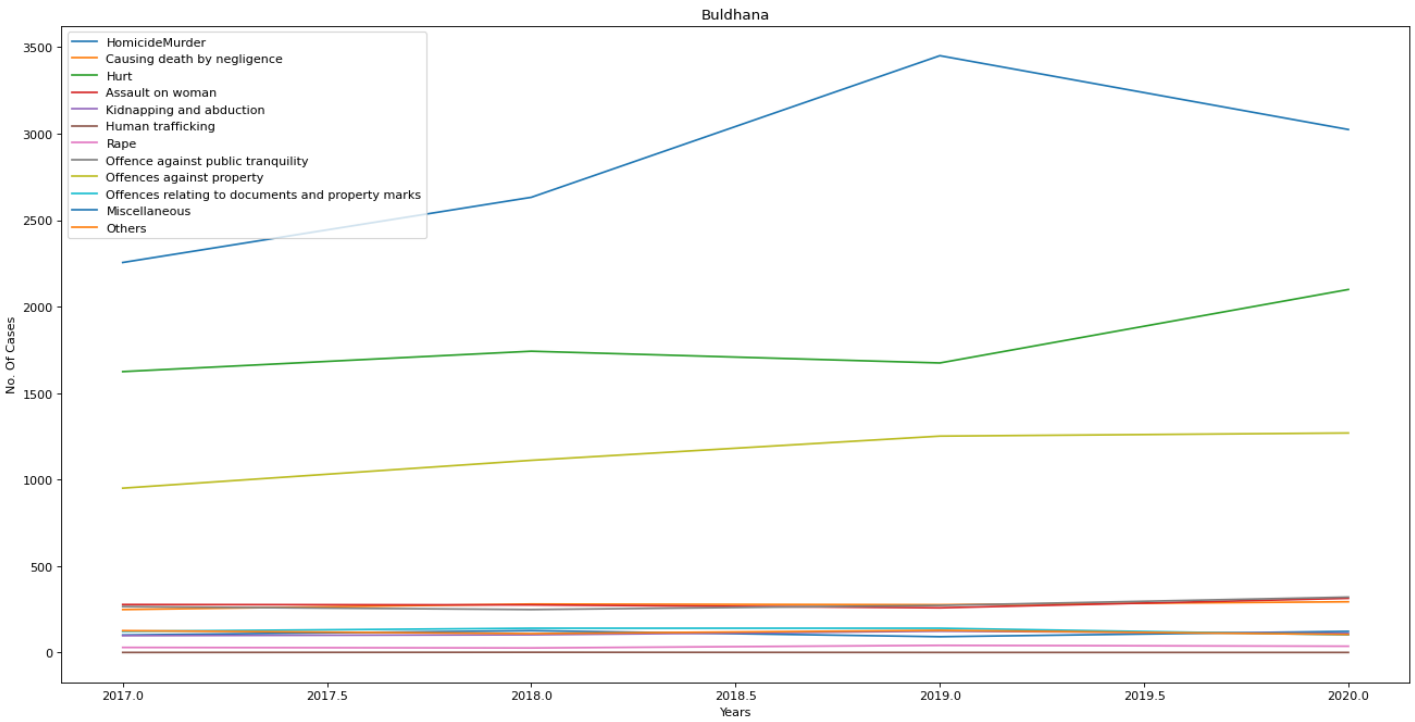
1000
1200
1400
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
Years


Buldhana
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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500
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2500
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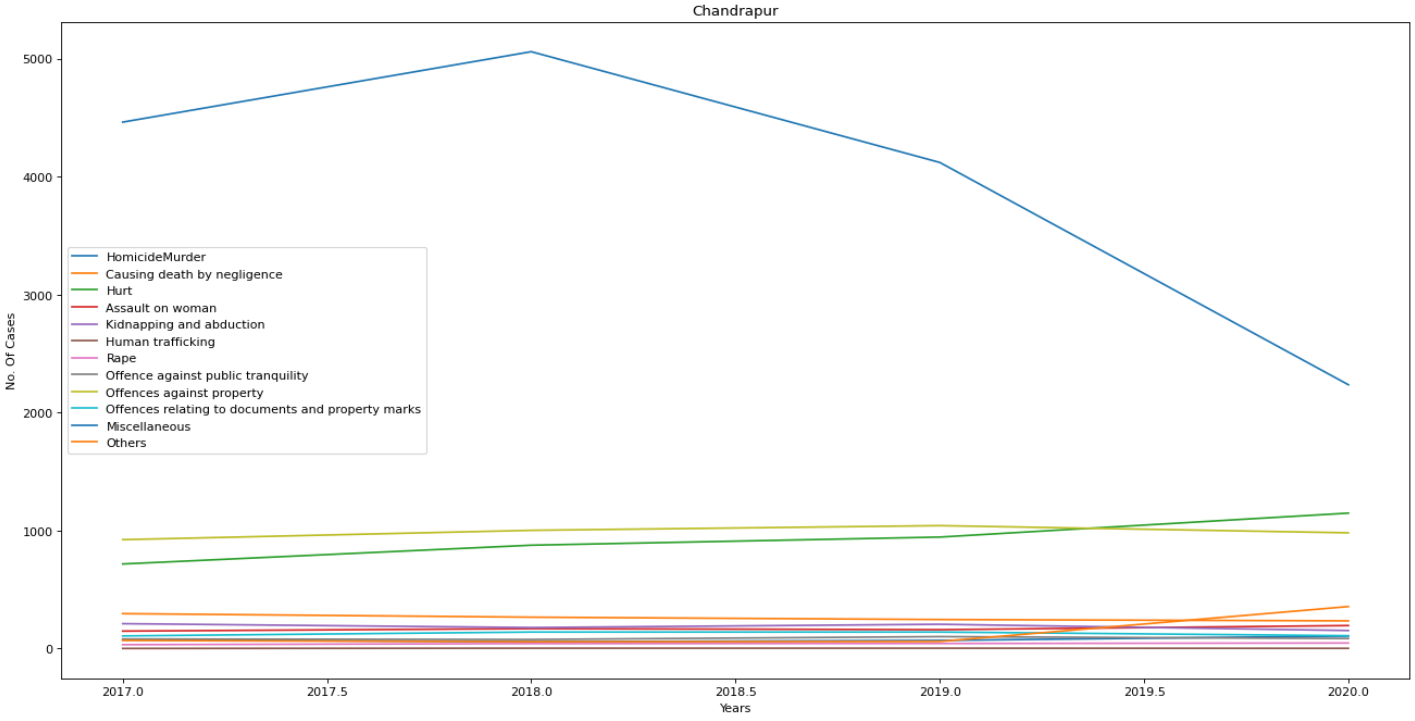
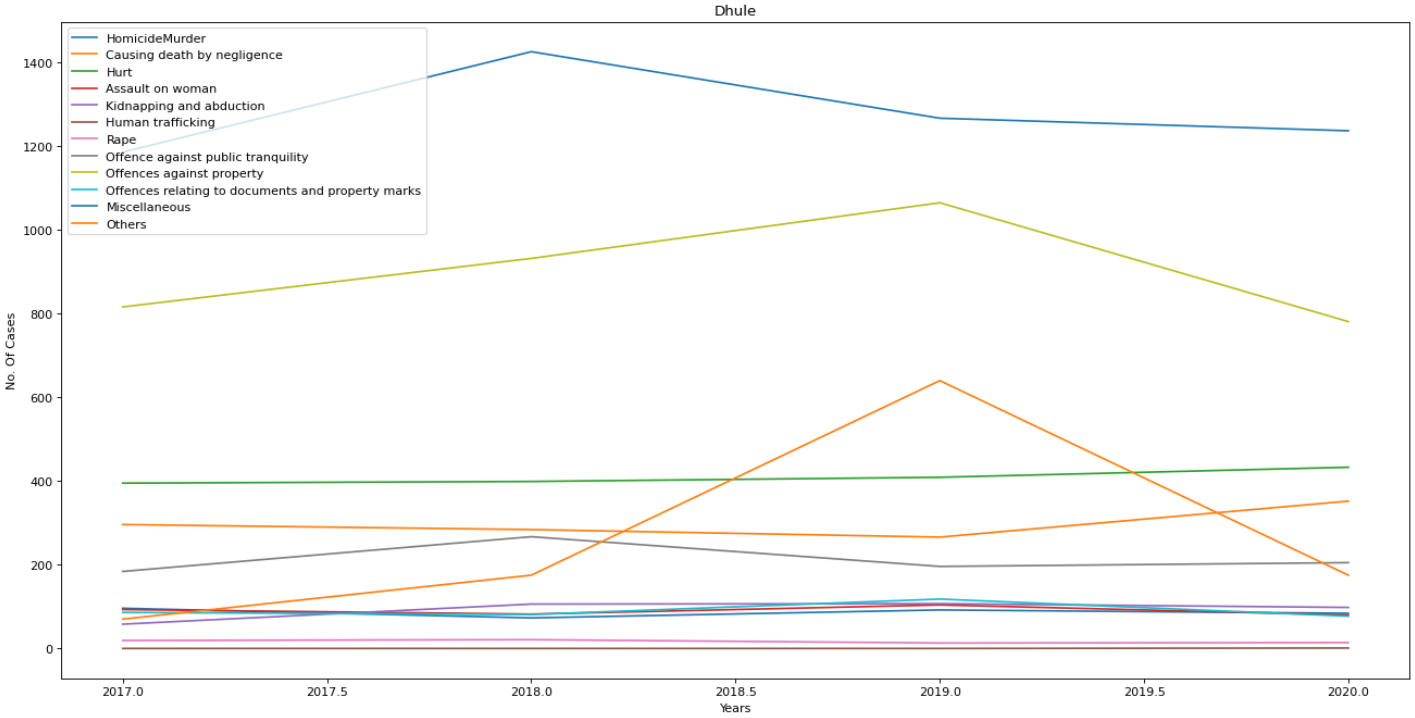
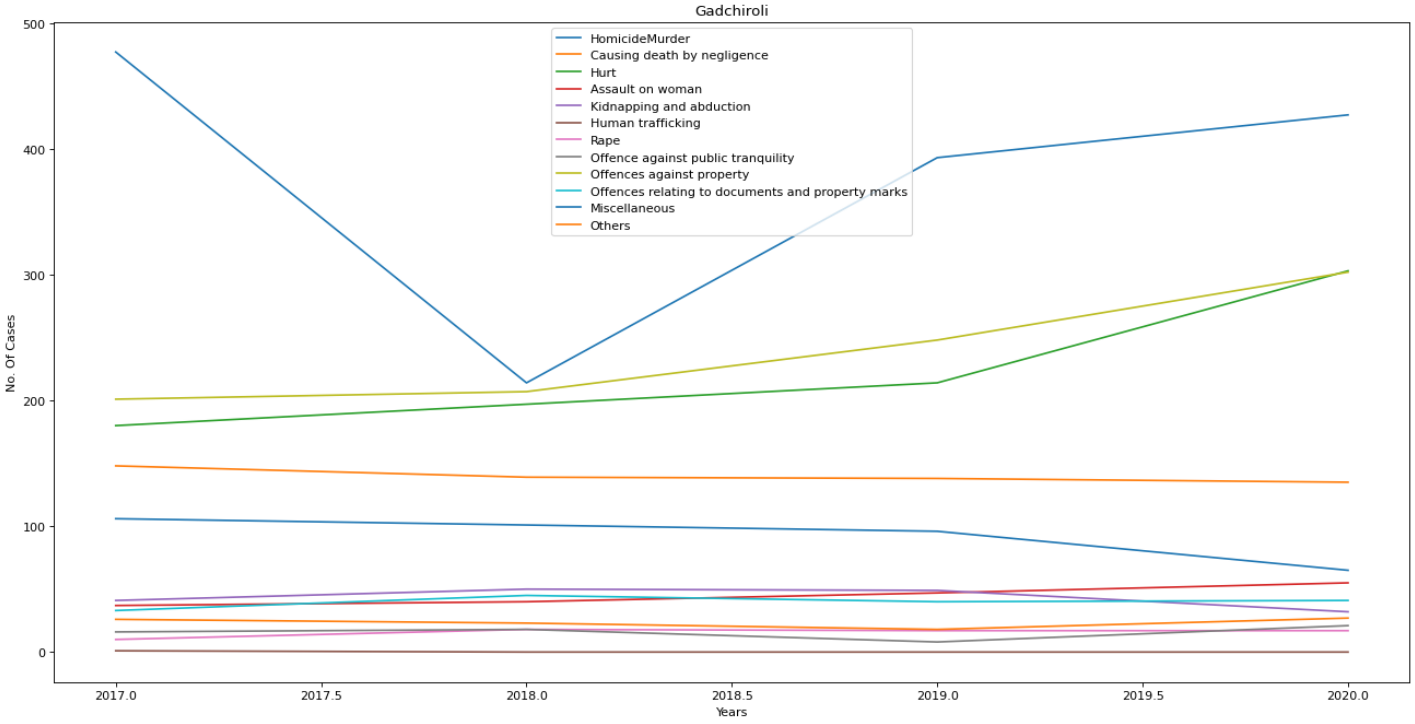
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Chandrapur
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
1000
2000
3000
4000
5000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Dhule
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
200
400
600
800
1000
1200
1400
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Gadchiroli
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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100
200
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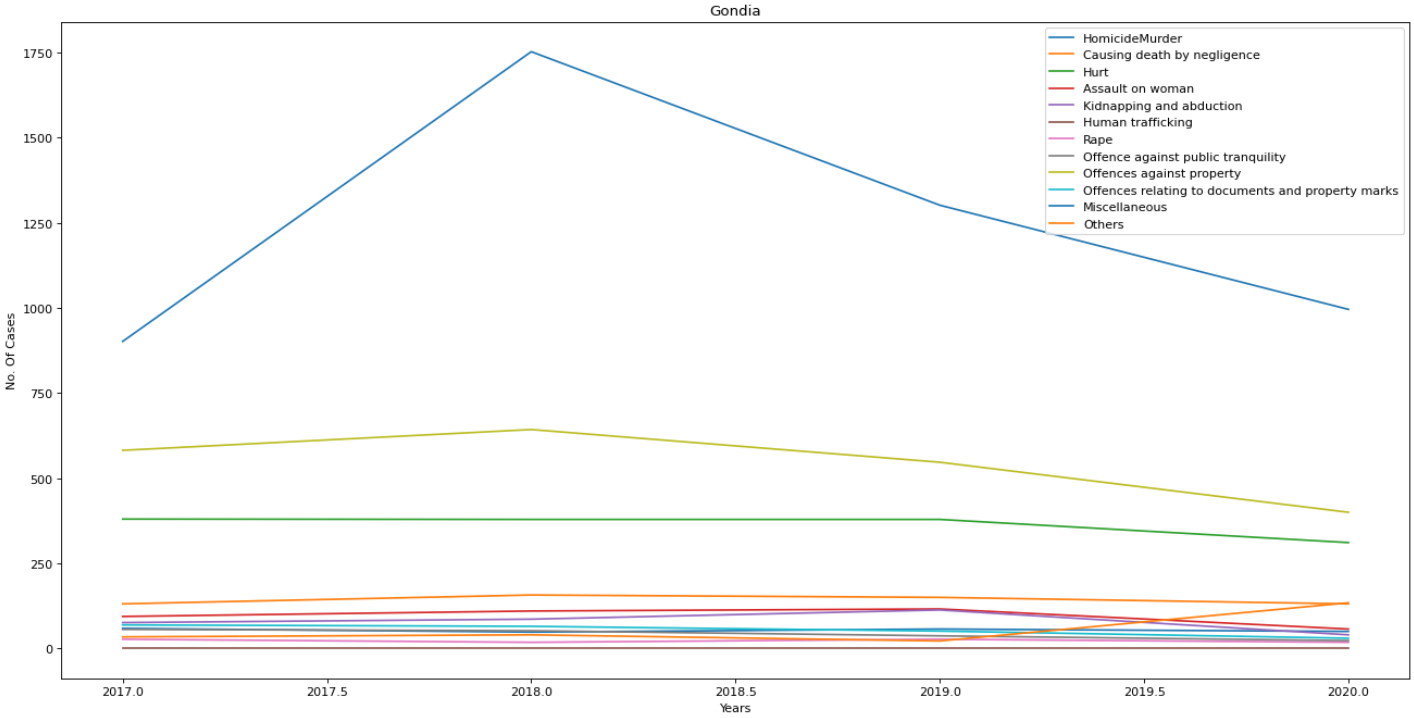
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Gondia
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
250
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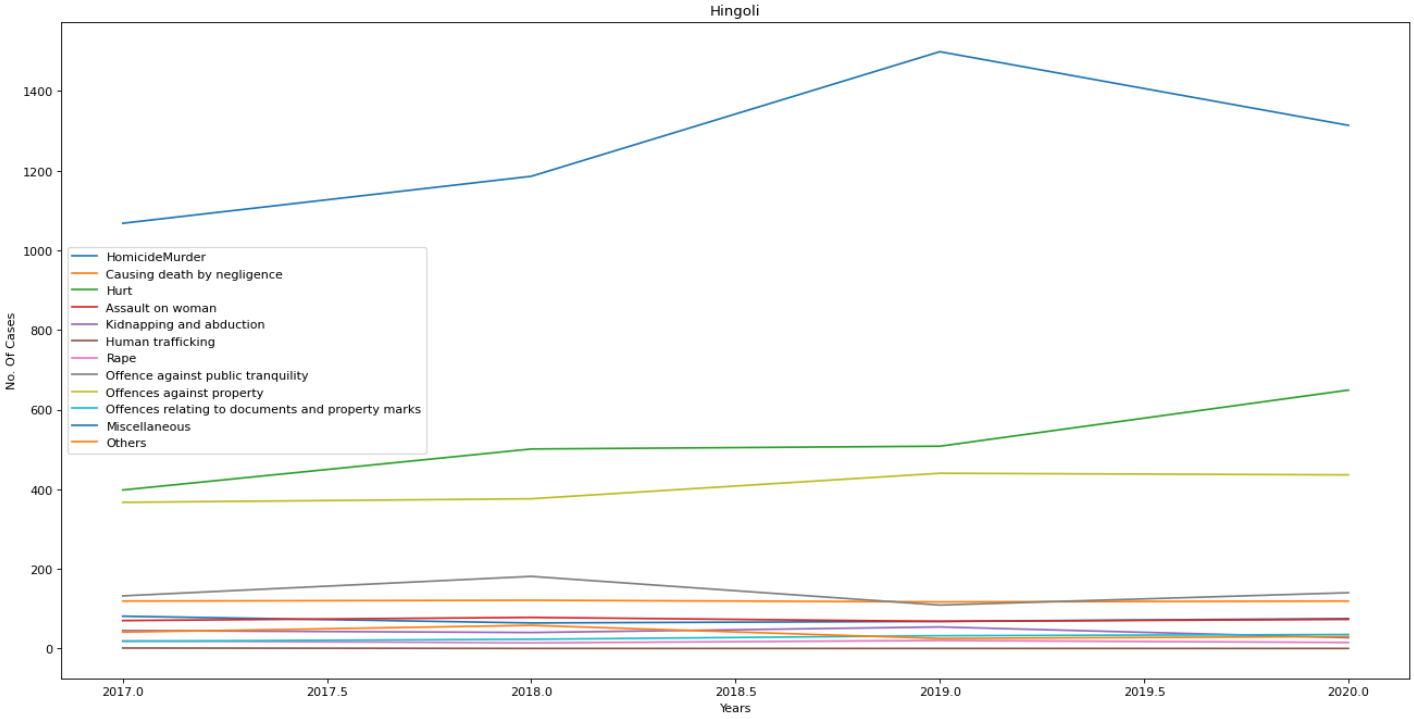
750
1000
1250
1500
1750
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Hingoli
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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2017.5
2018.0
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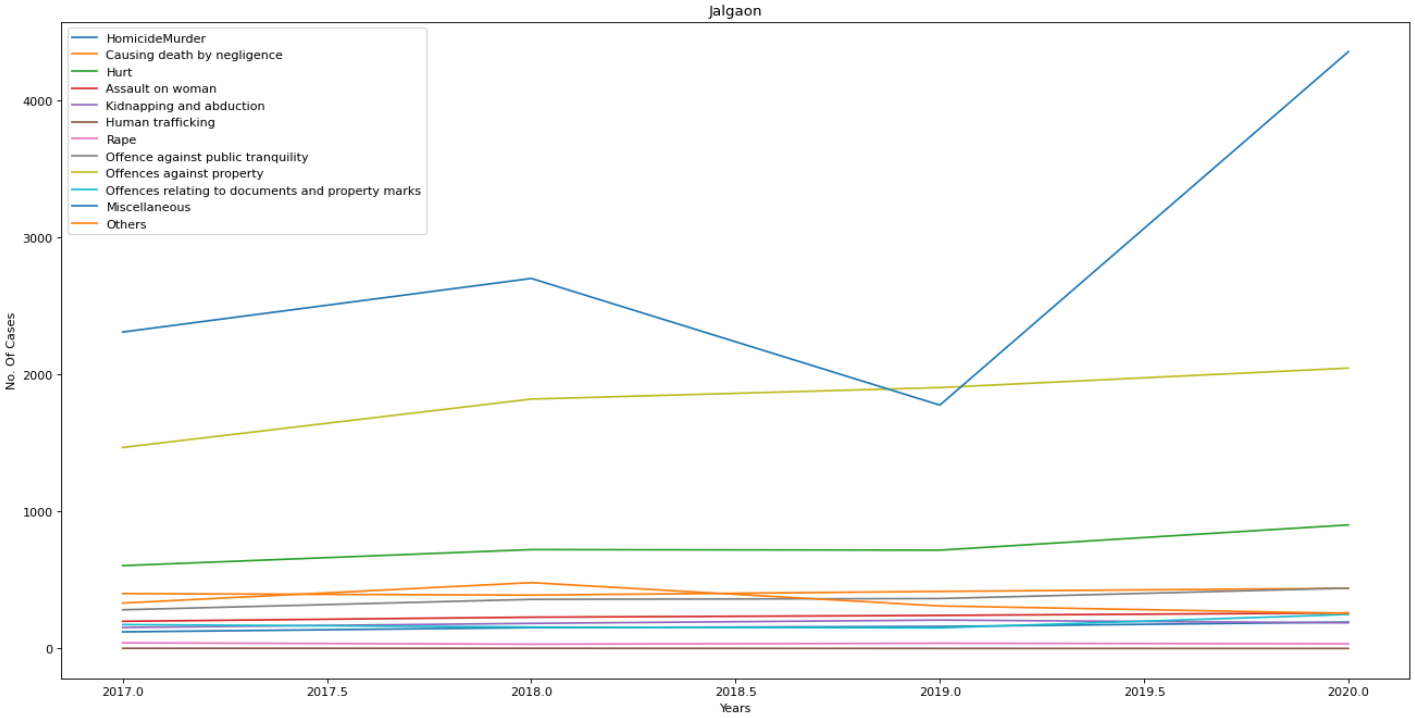
2020.0


Jalgaon
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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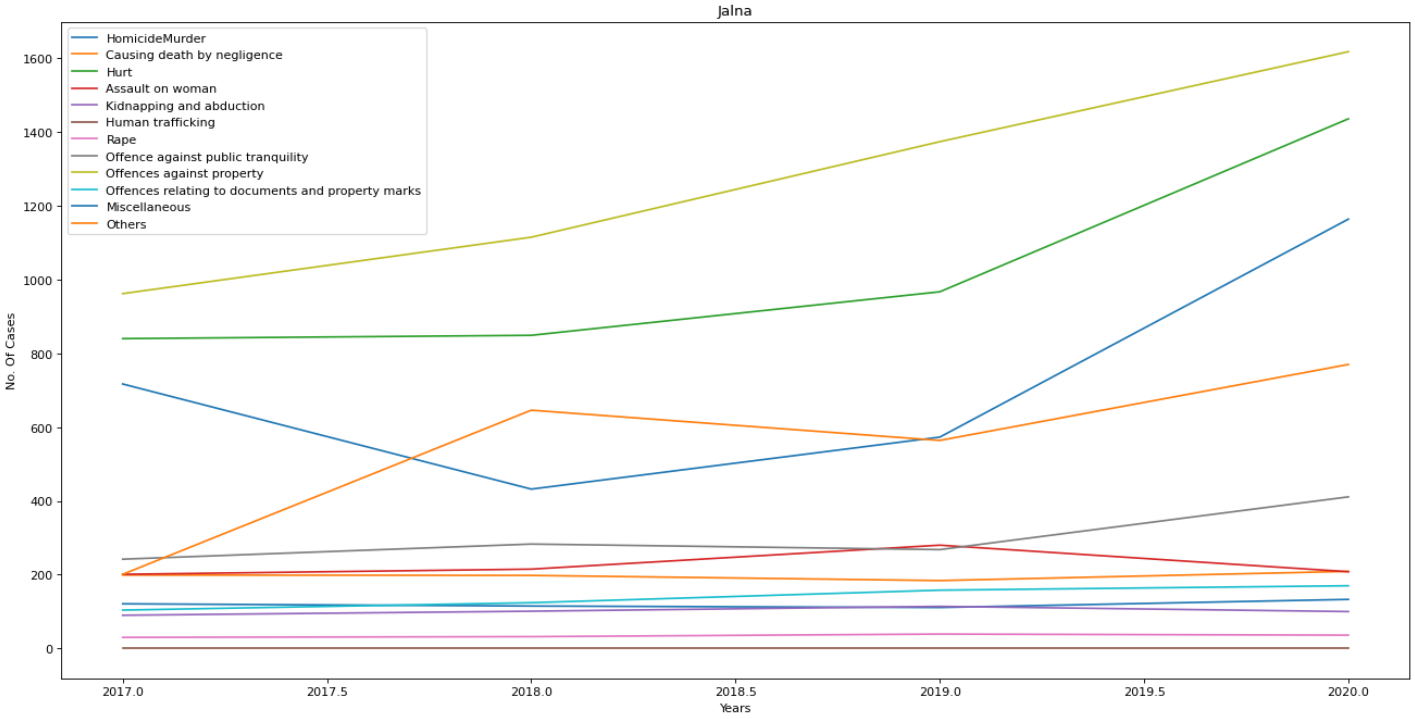
2019.5
2020.0


Jalna
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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2017.5
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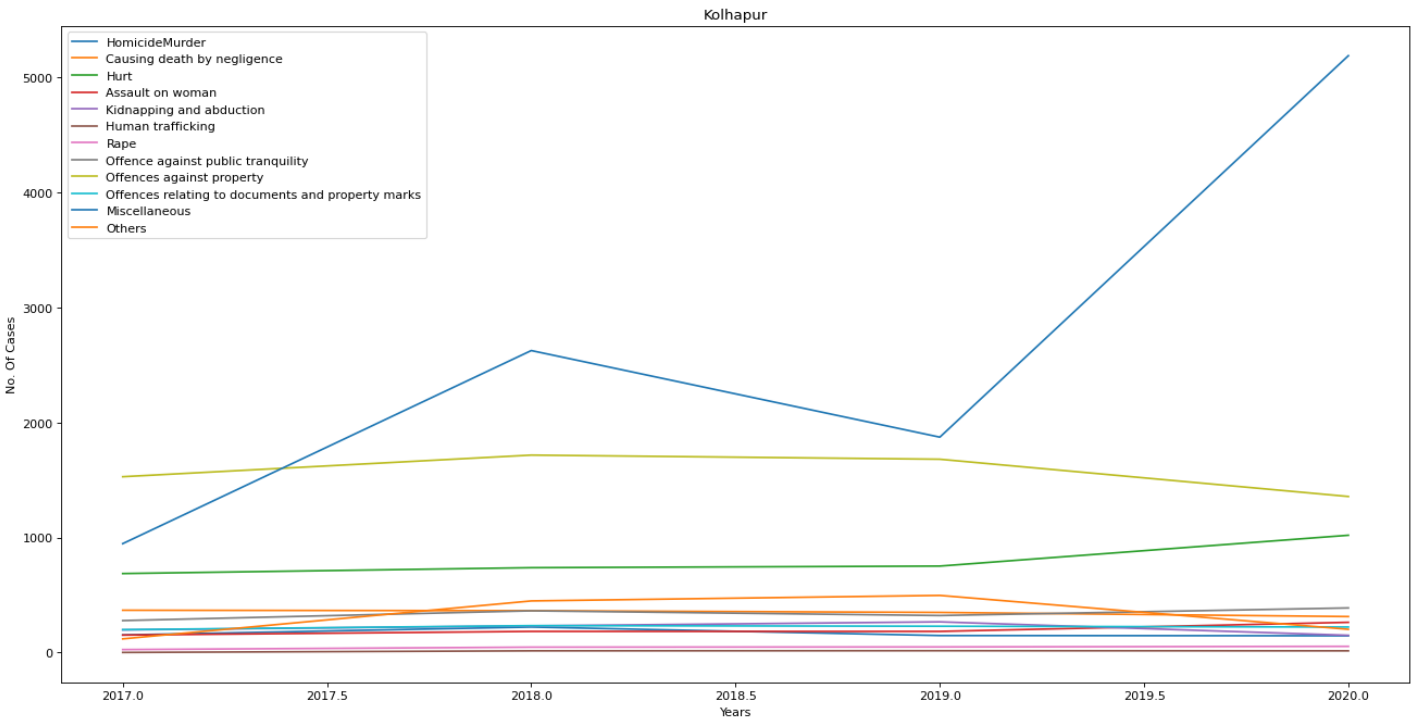
2019.5
2020.0


Kolhapur
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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2017.0
2017.5
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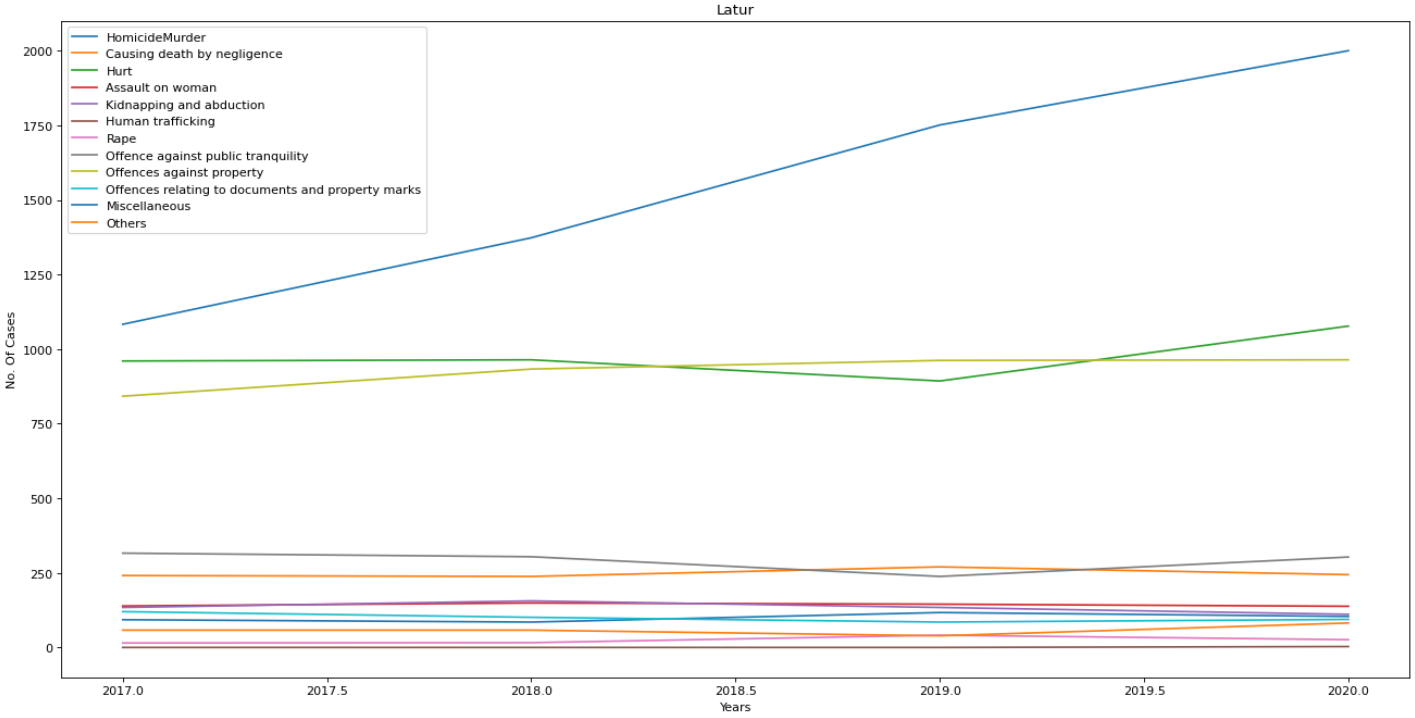
2018.5
2019.0
2019.5
2020.0


Latur
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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1250
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1750
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2017.0
2017.5
2018.0
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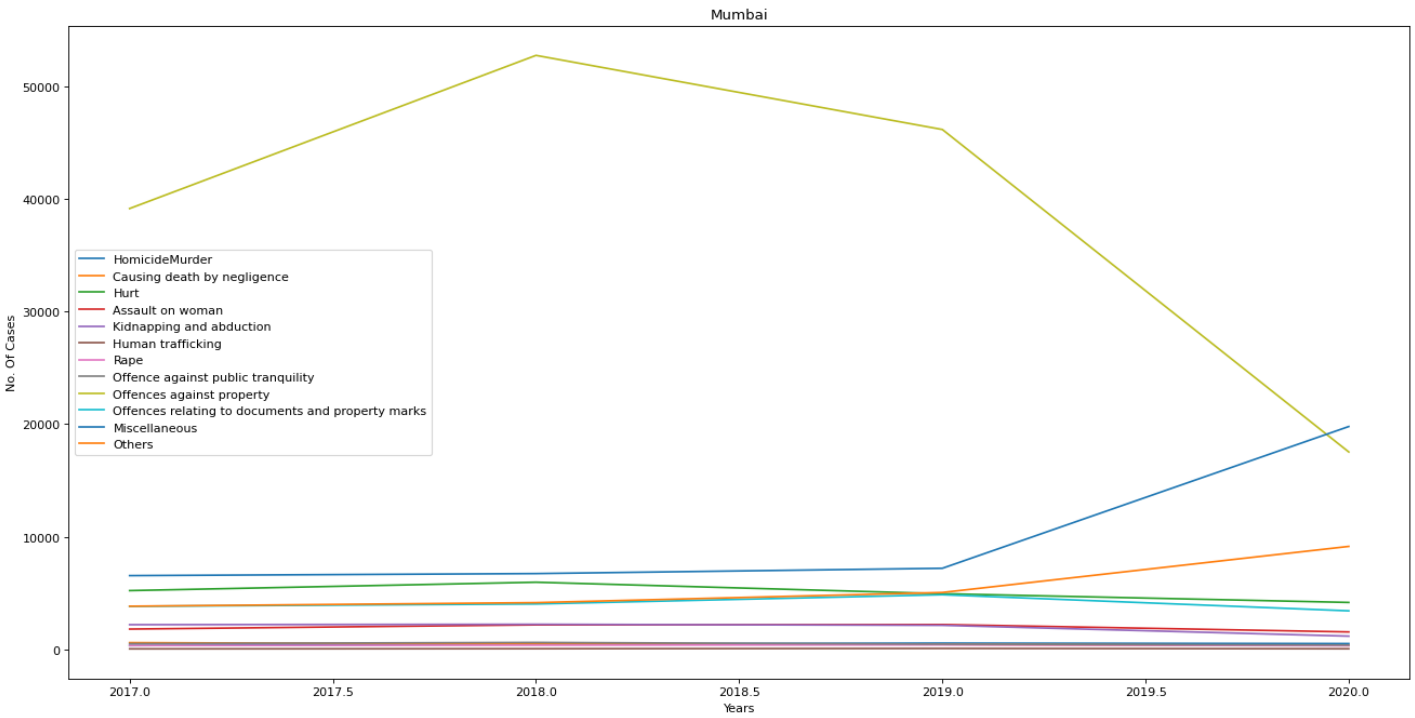
2019.0
2019.5
2020.0


Mumbai
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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30000
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2017.0
2017.5
2018.0
2018.5
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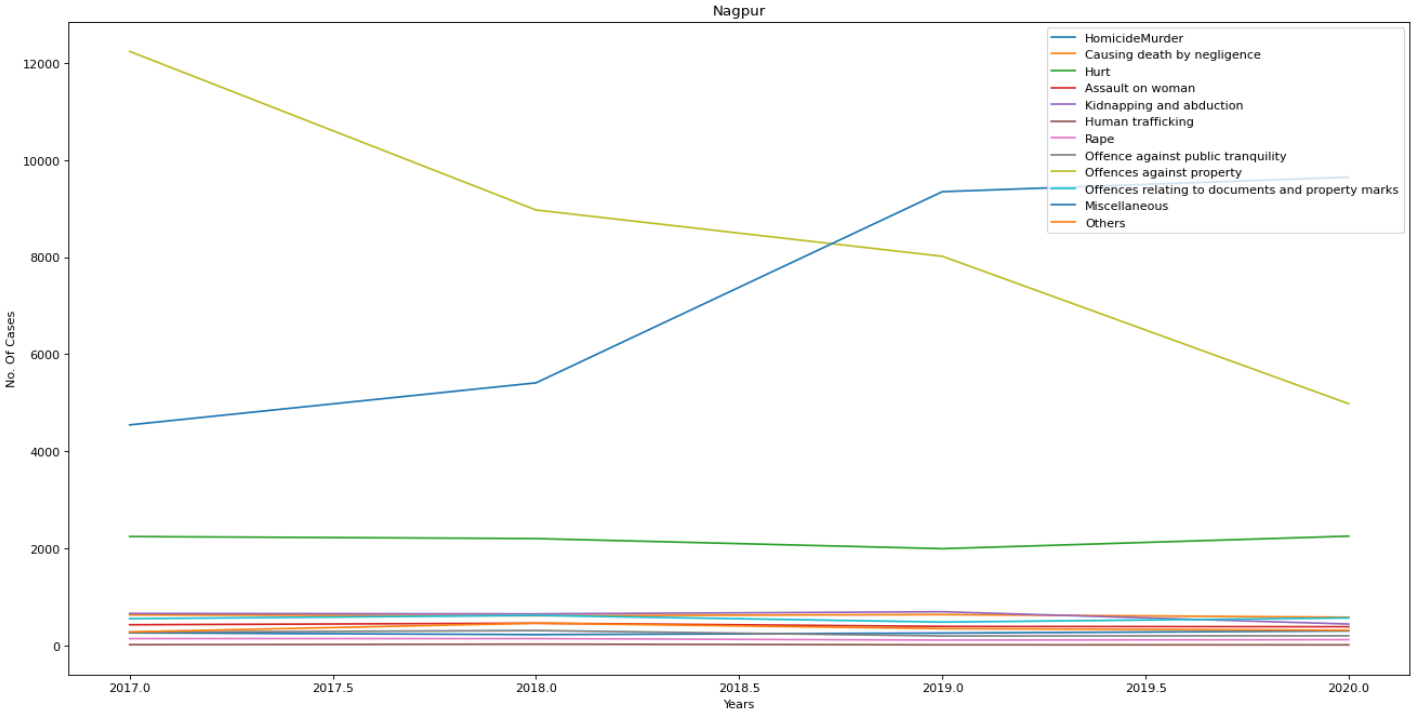
2019.5
2020.0


Nagpur
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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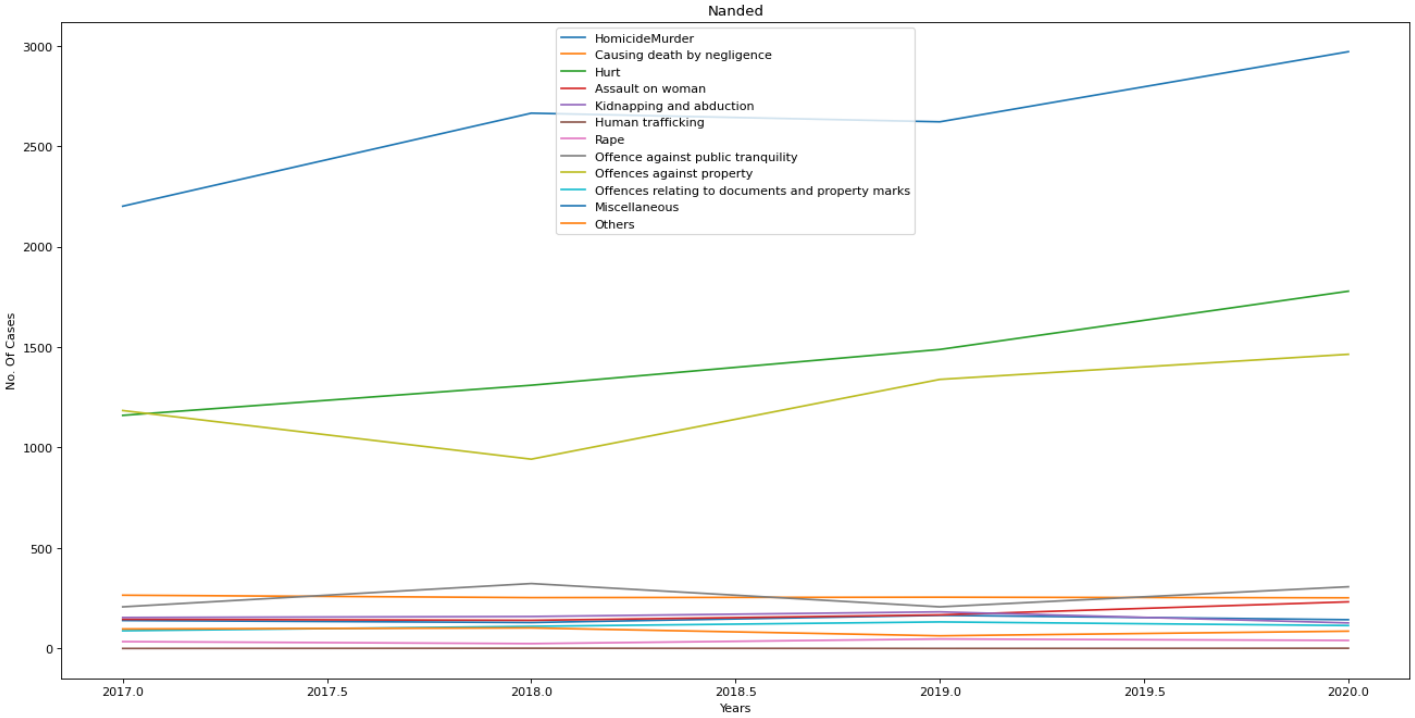
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Nanded
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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2017.0
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2018.0
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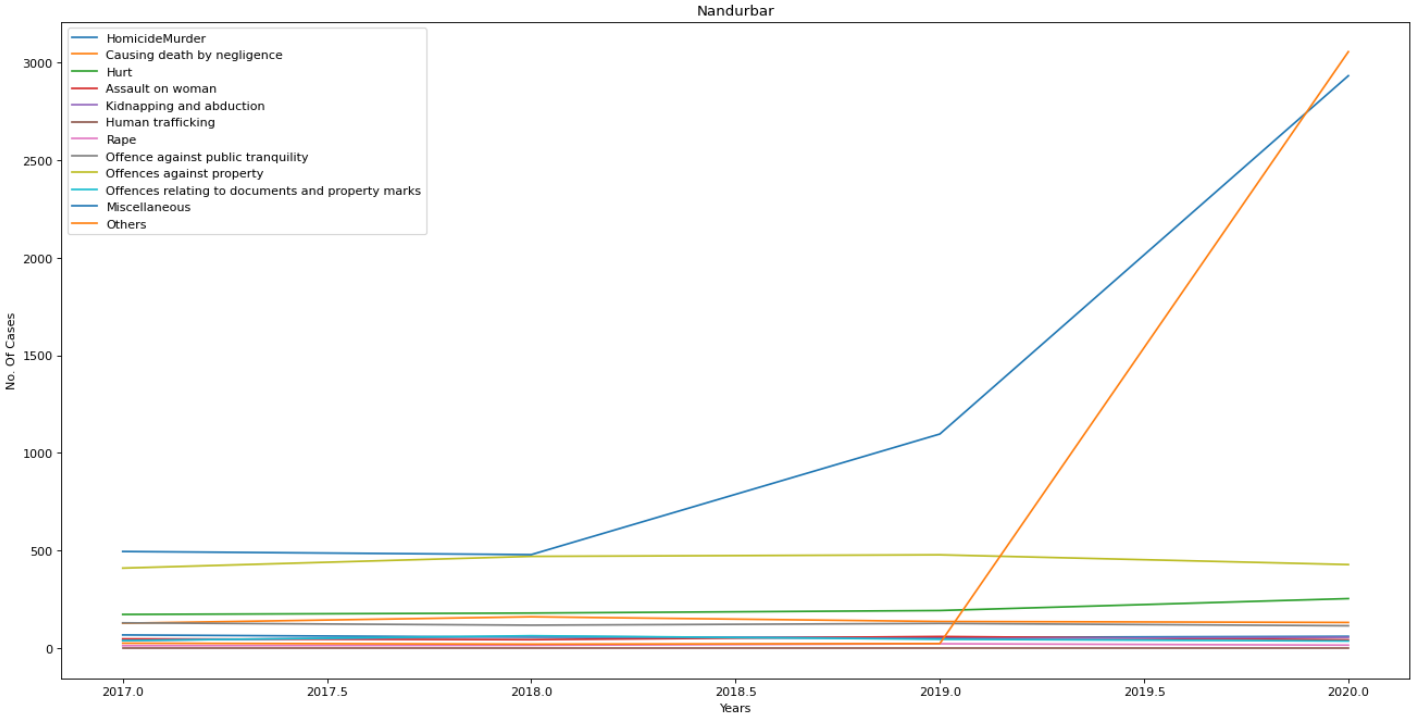
2019.0
2019.5
2020.0


Nandurbar
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
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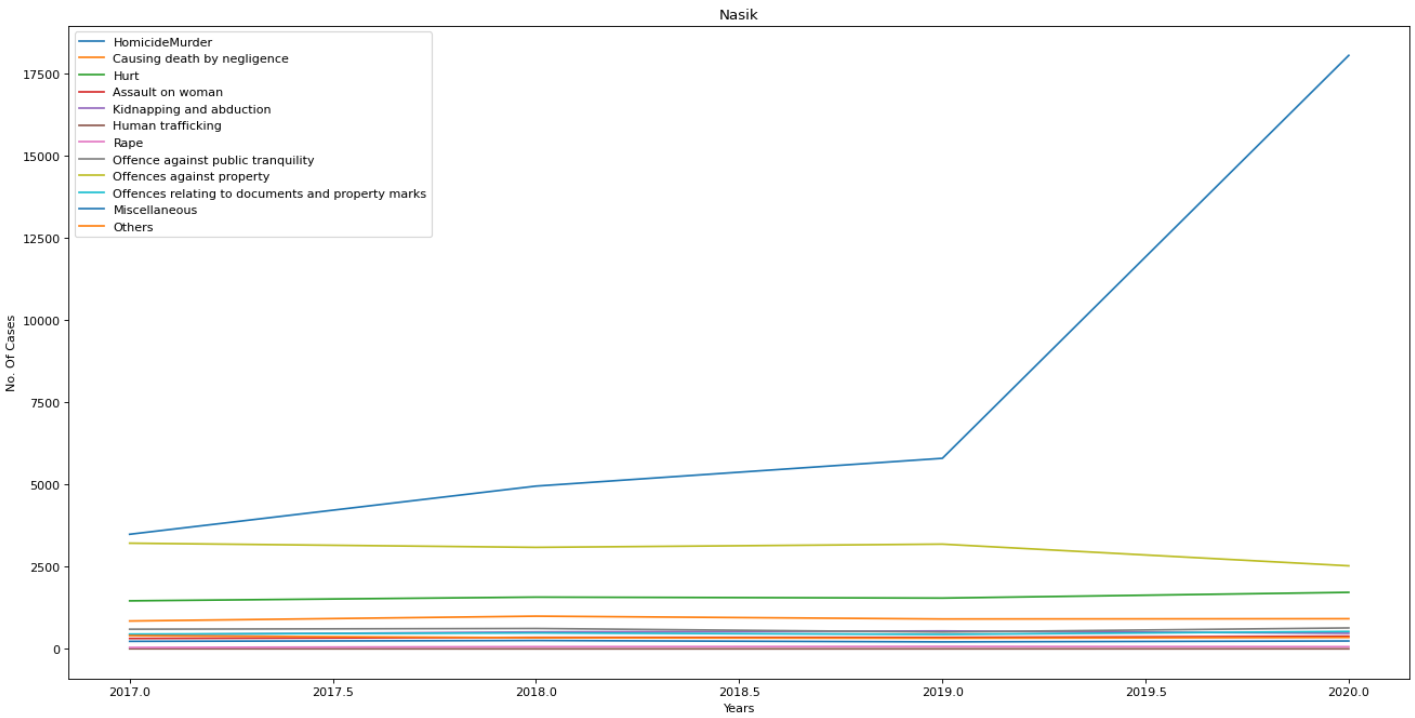
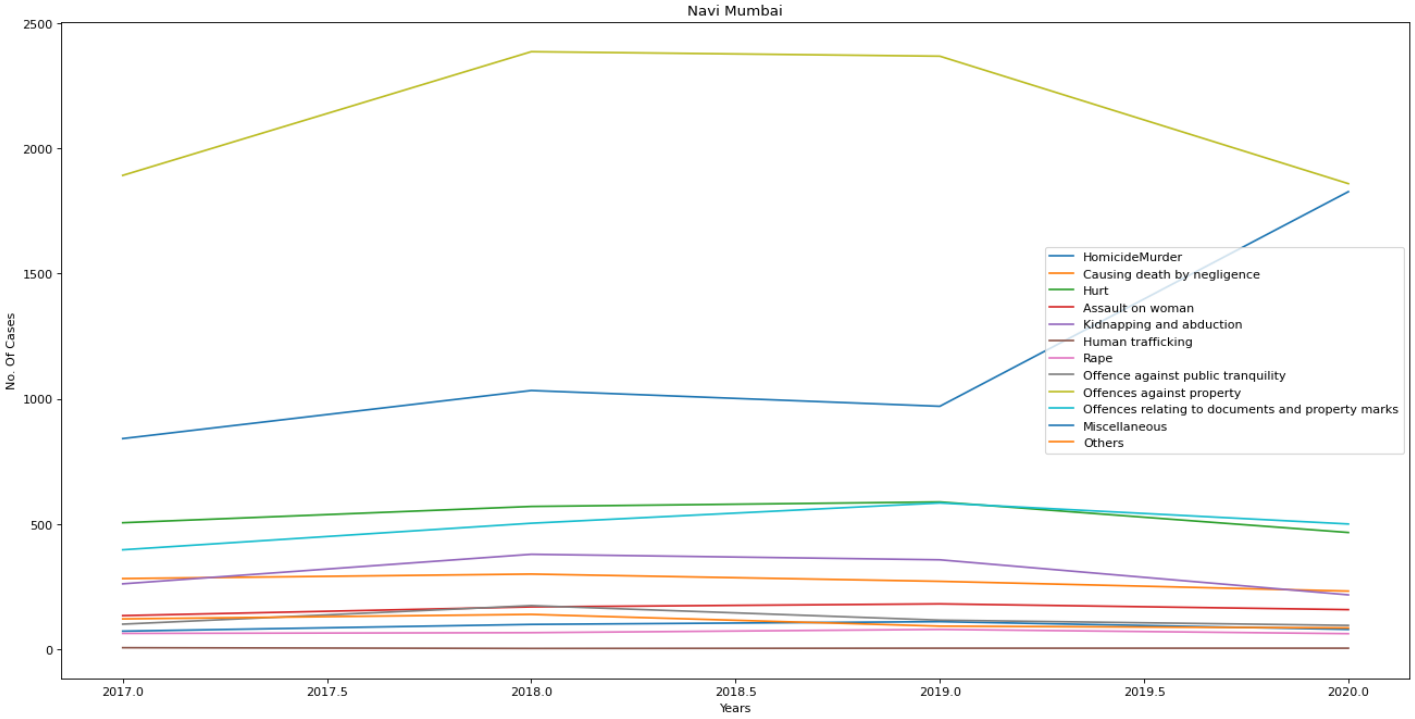
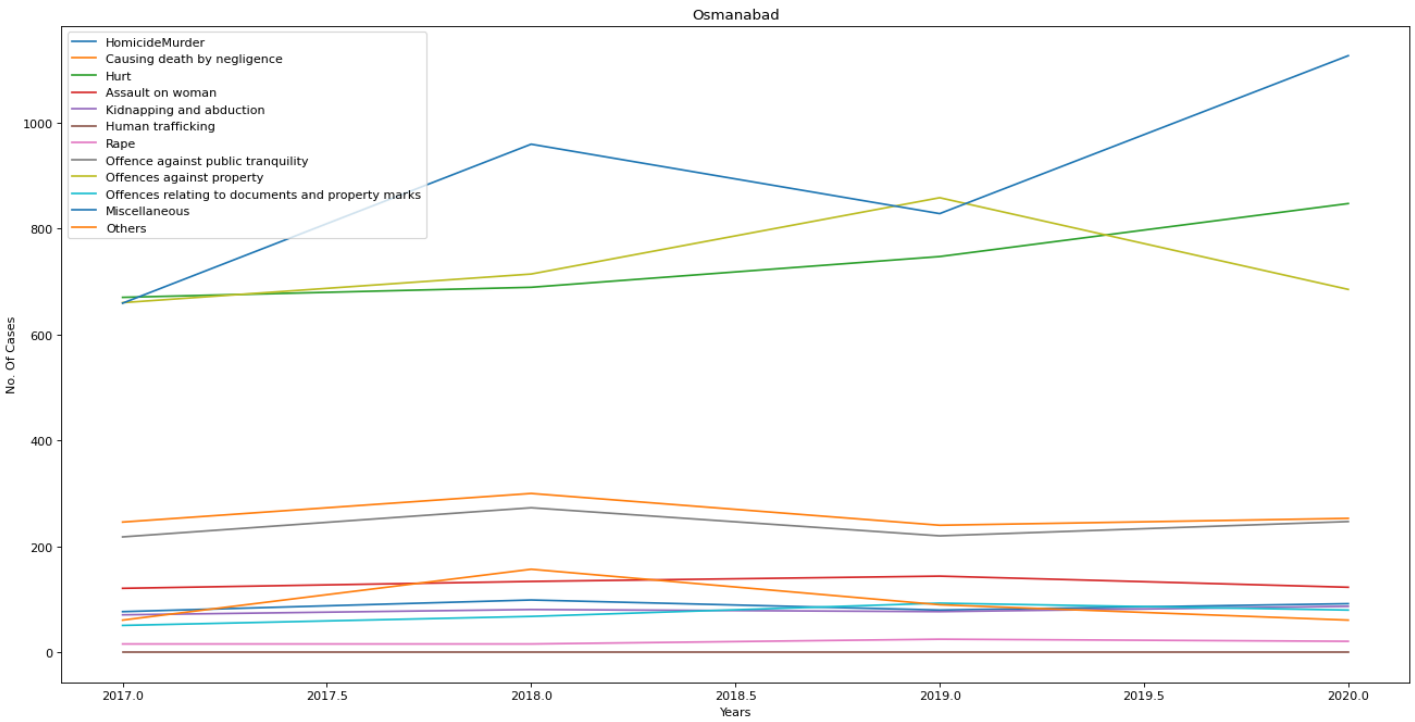
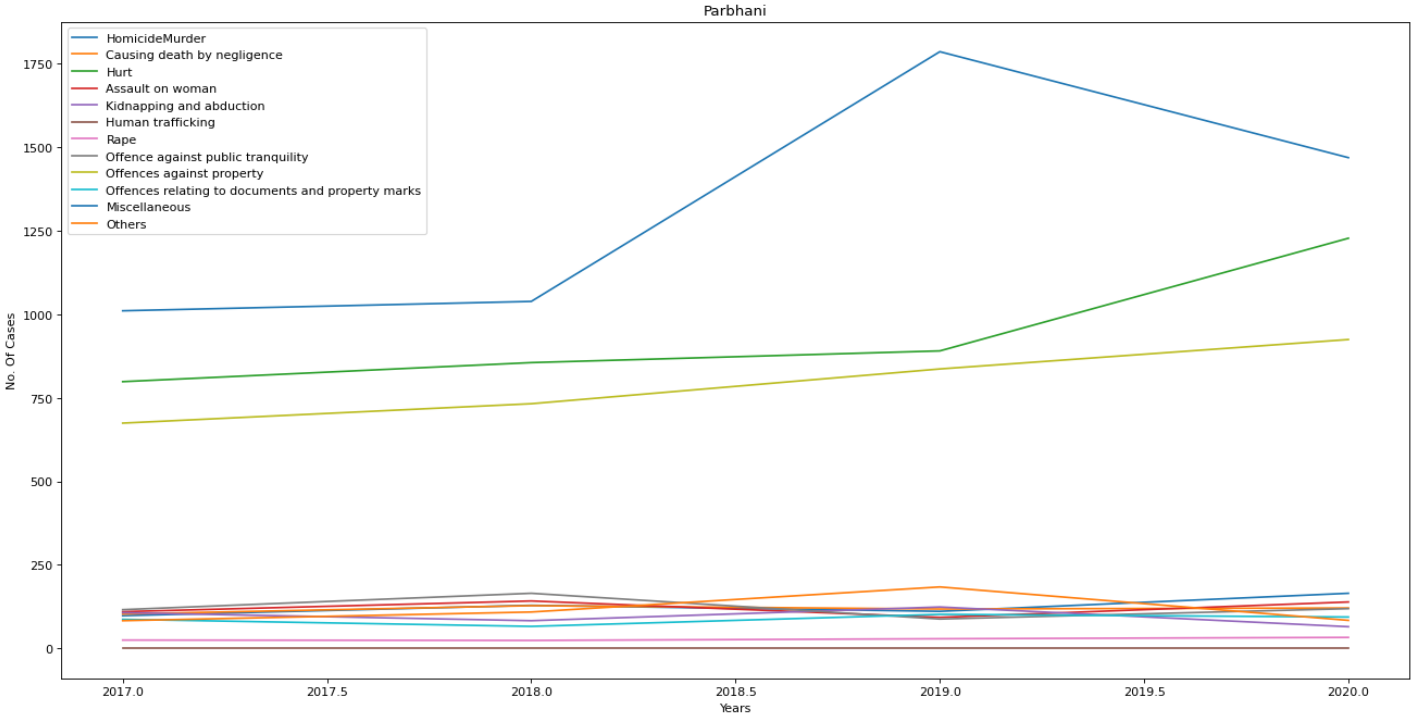
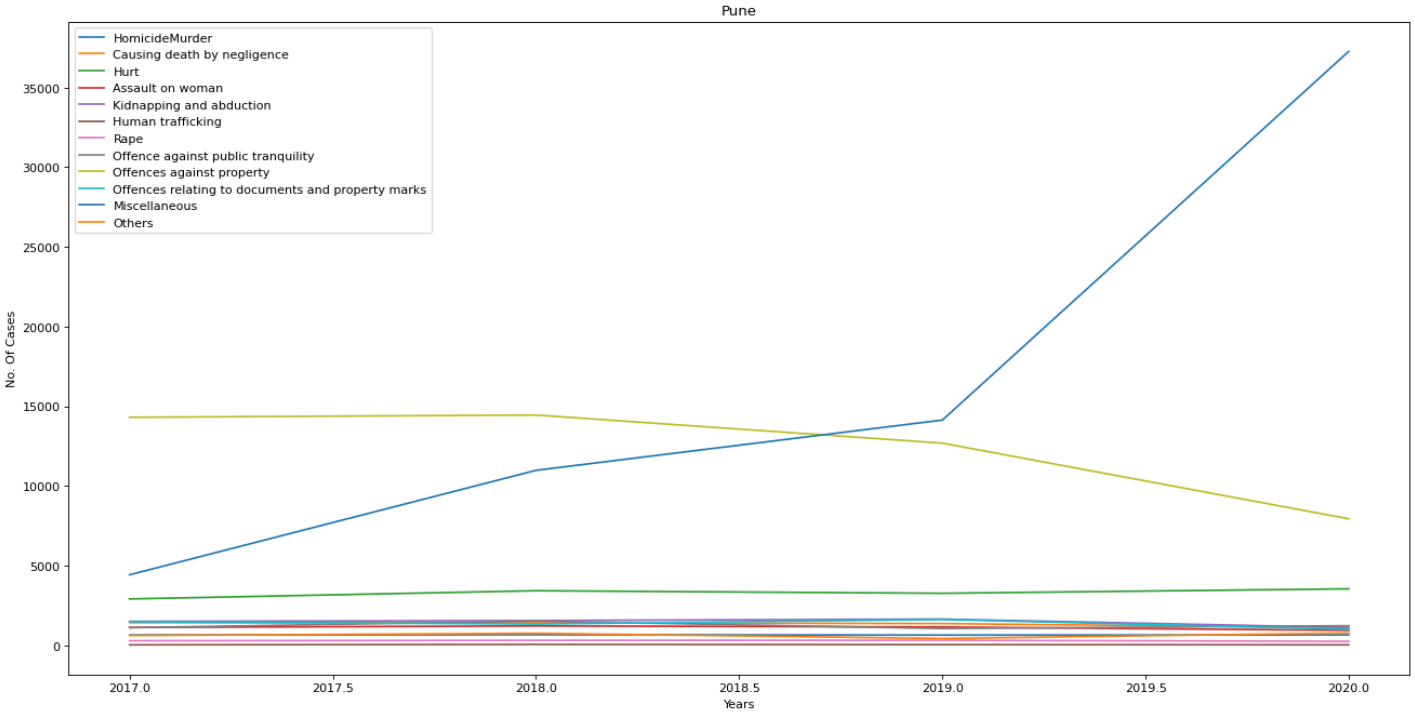
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

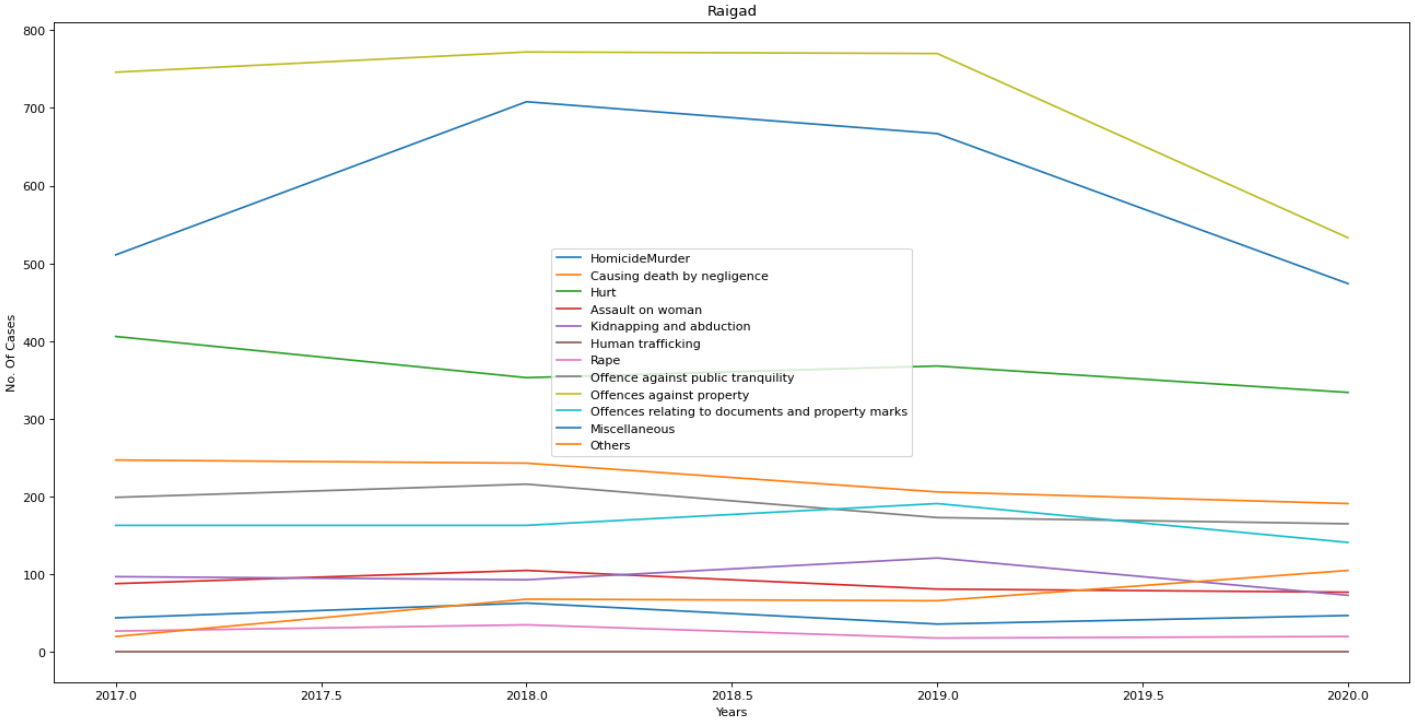

Nasik
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
2500
5000
7500
10000
12500
15000
17500
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

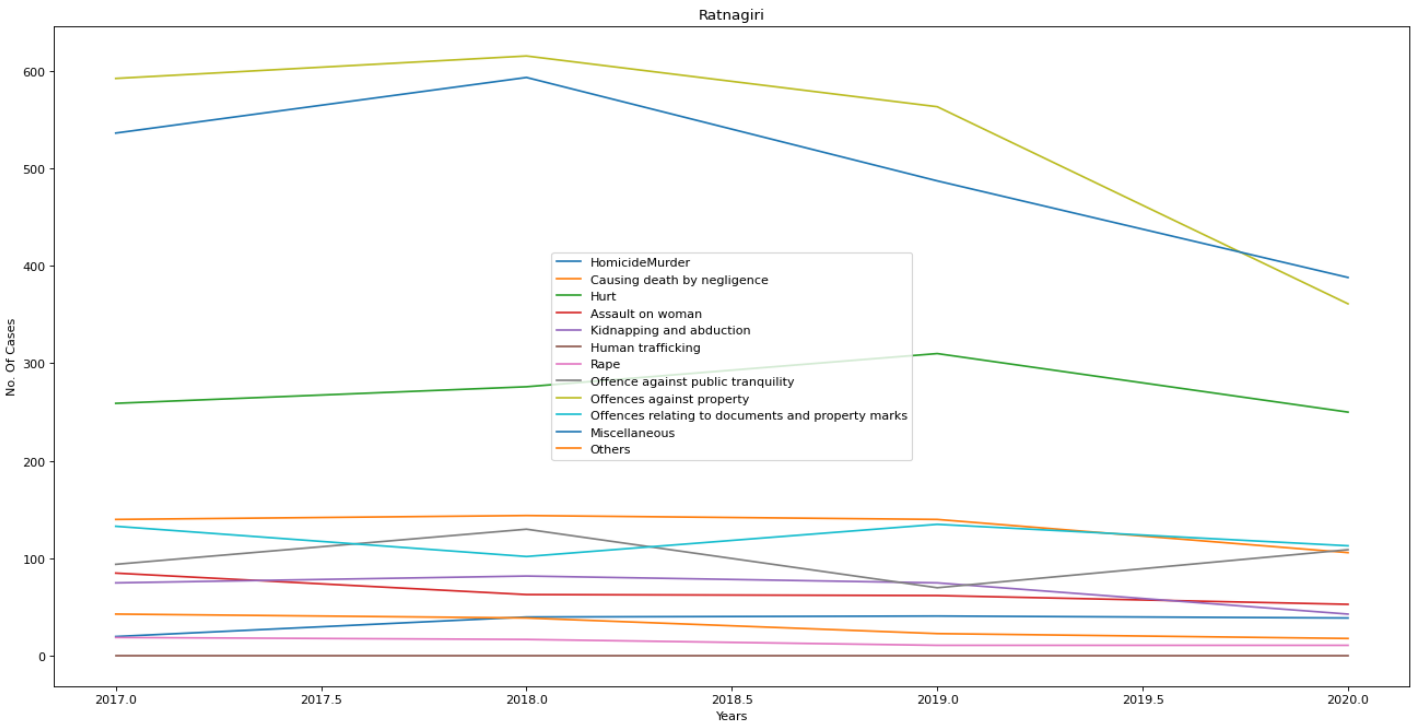

Navi Mumbai
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
500
1000
1500
2000
2500
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

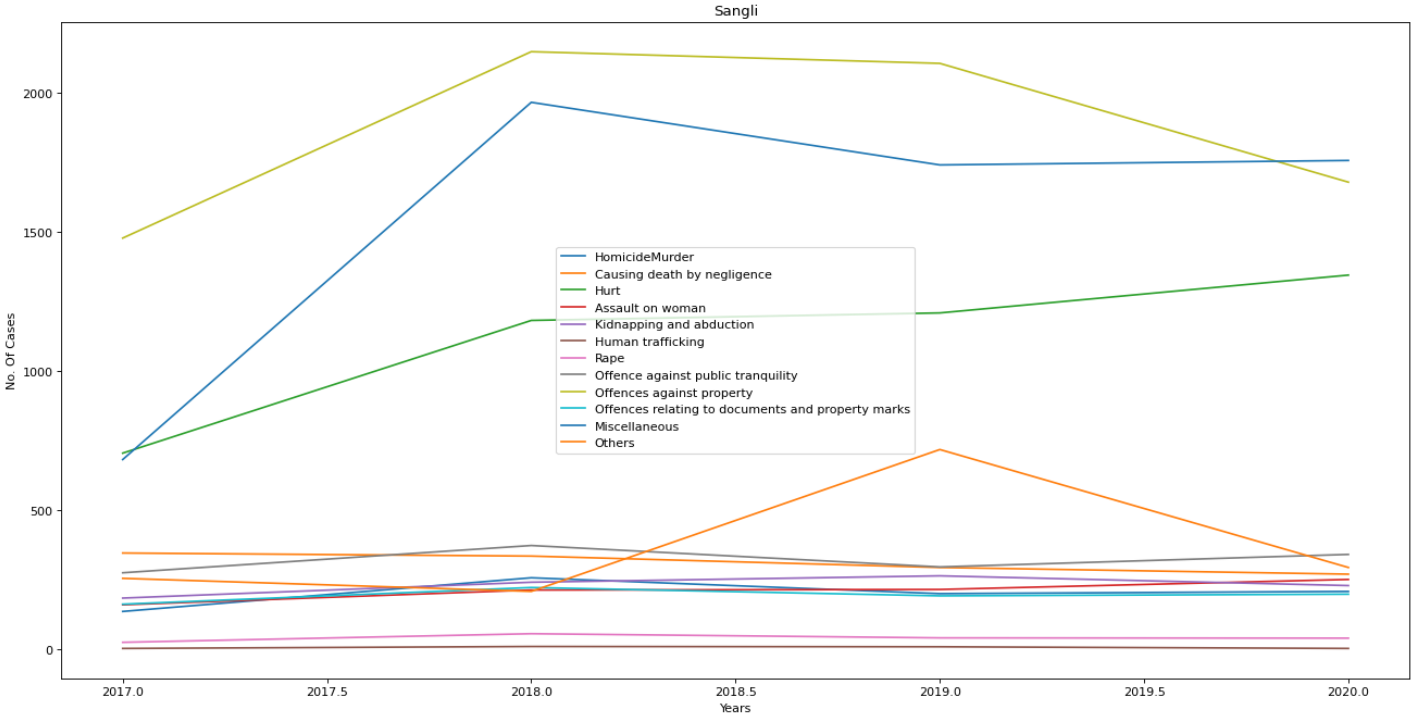

Osmanabad
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
200
400
600
800
1000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

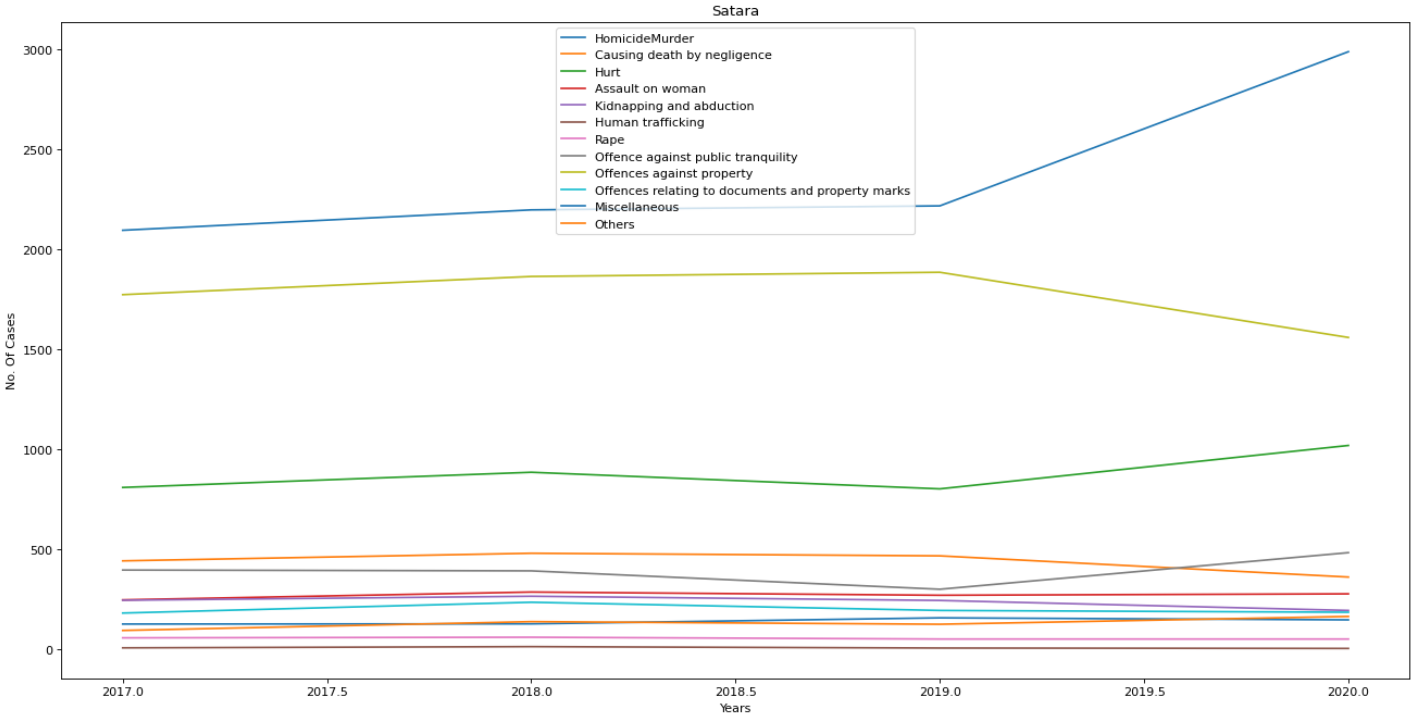

Parbhani
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
250
500
750
1000
1250
1500
1750
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

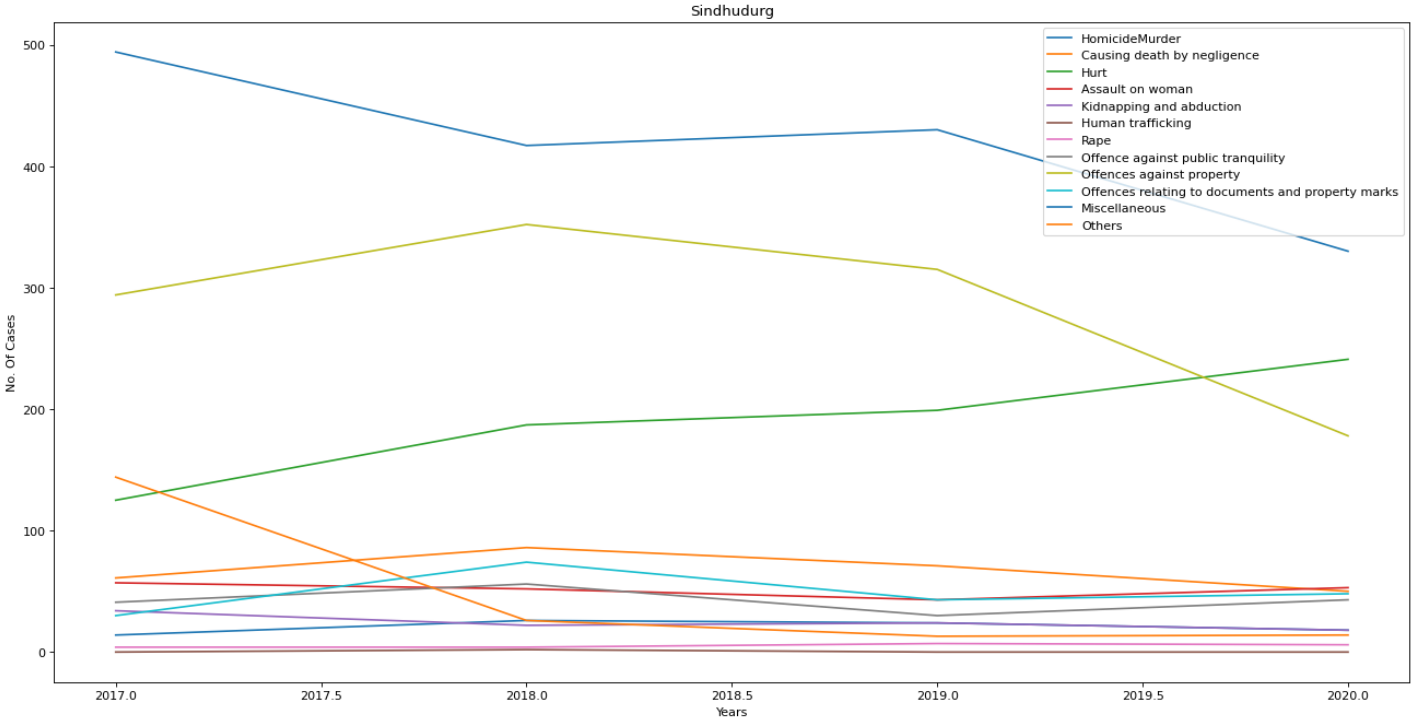

Pune
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years

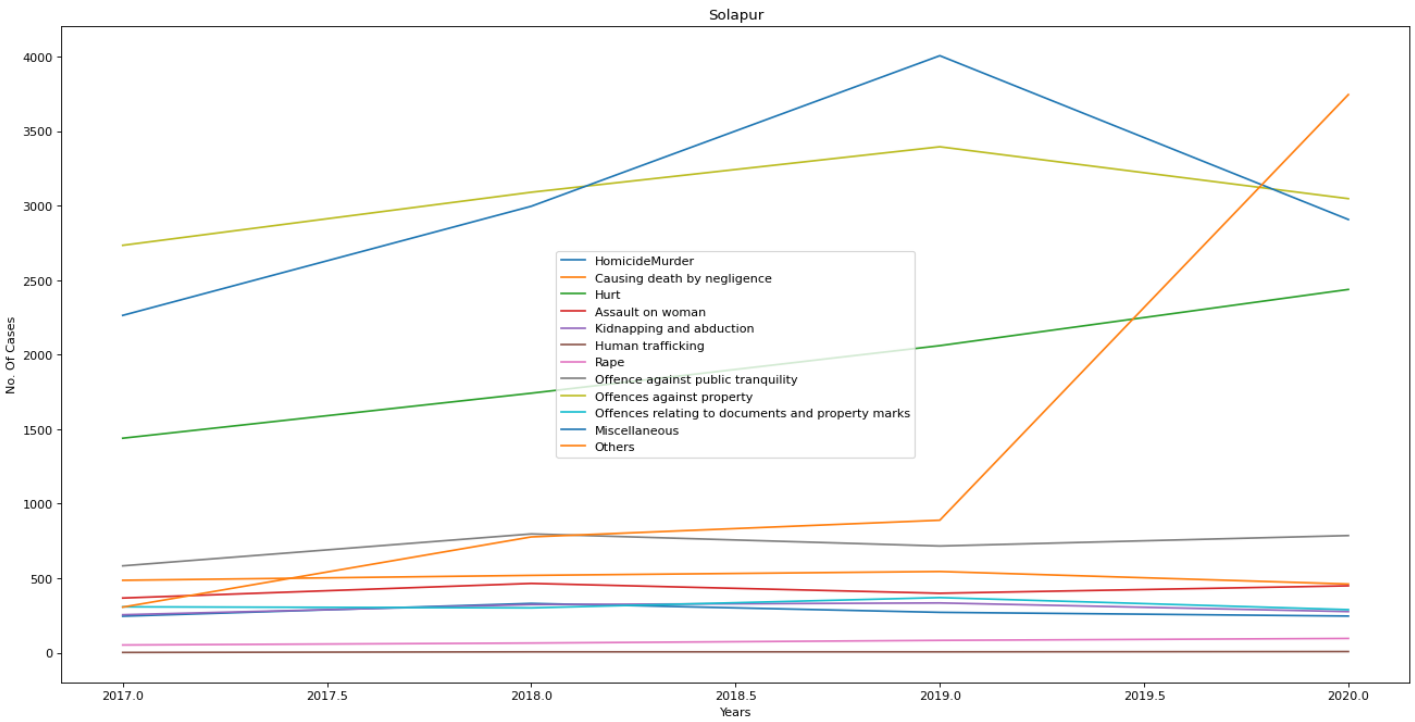

Raigad
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years

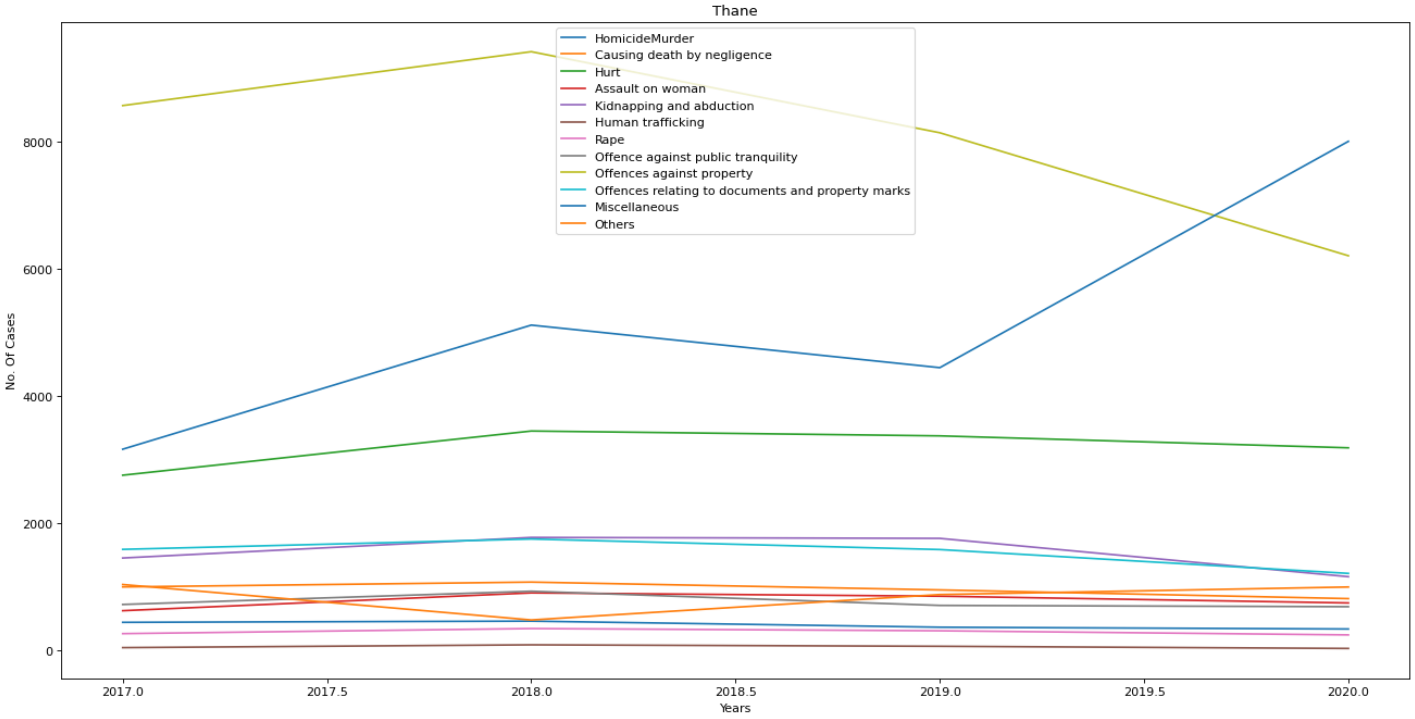

Ratnagiri
No. Of Cases
Years
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others

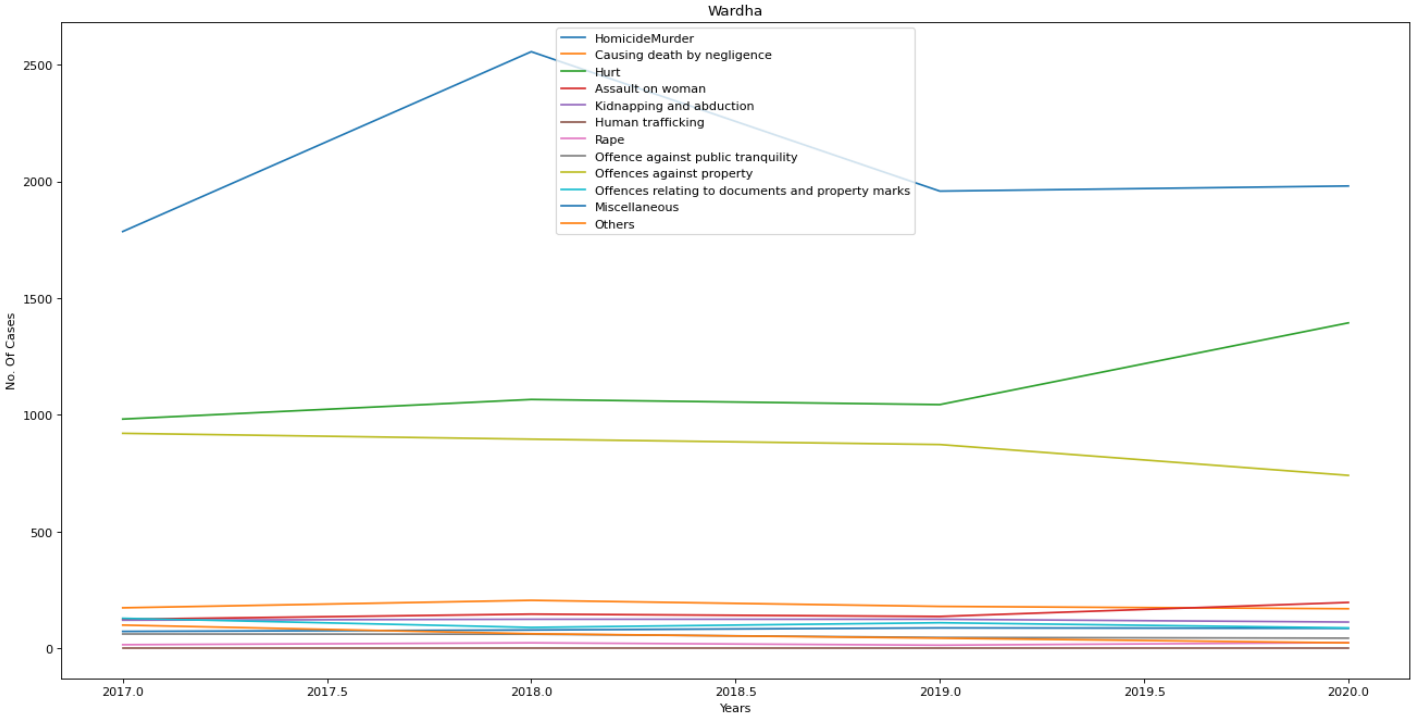

Sangli
No. Of Cases
Years
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others

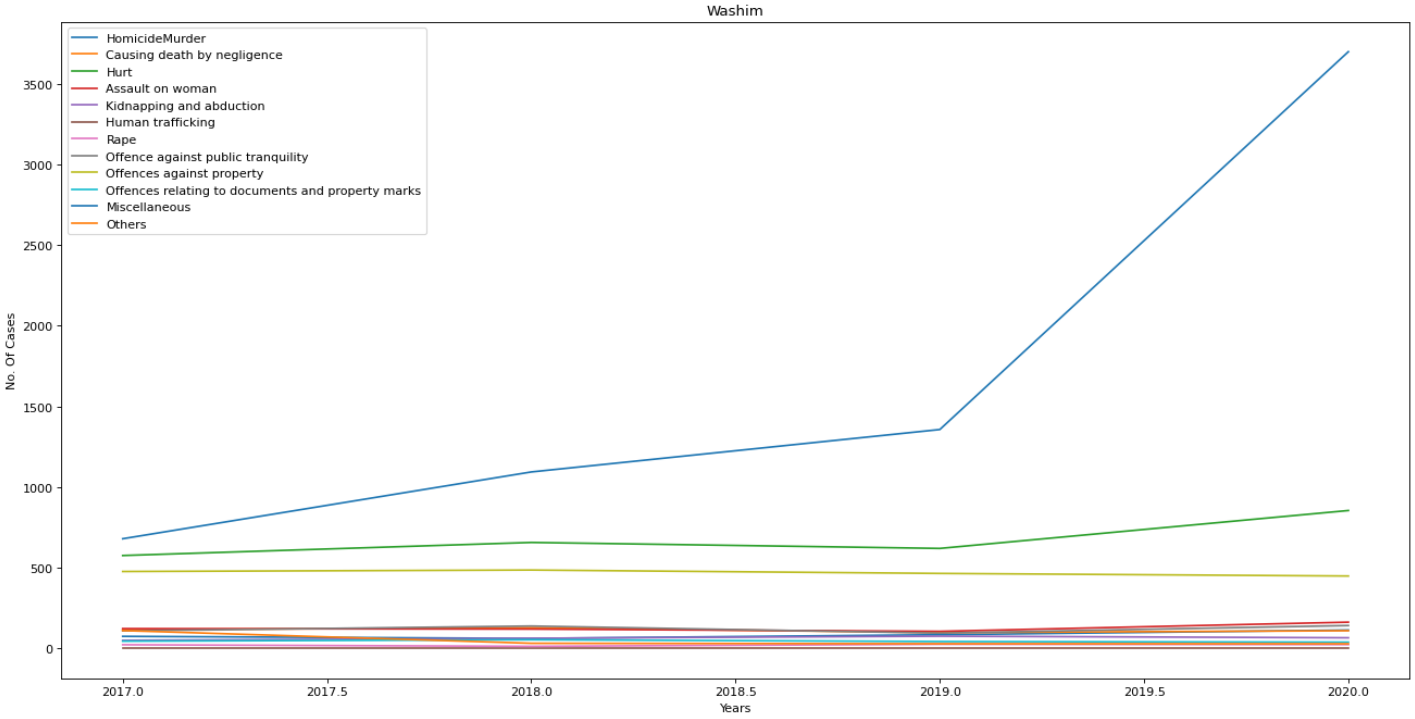

Satara
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
500
1000
1500
2000
2500
3000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

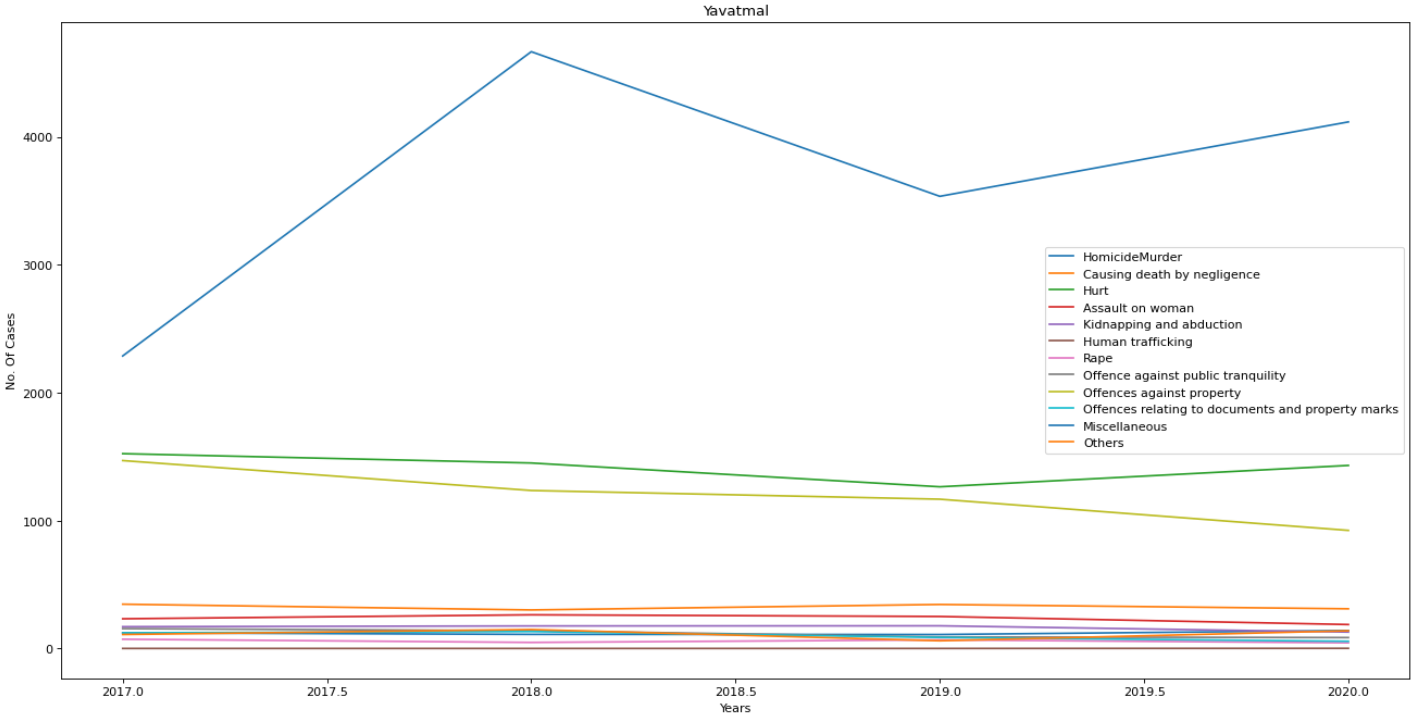

Sindhudurg
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
100
200
300
400
500
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0


Solapur
No. Of Cases
Years
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others


Thane
No. Of Cases
Years
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others

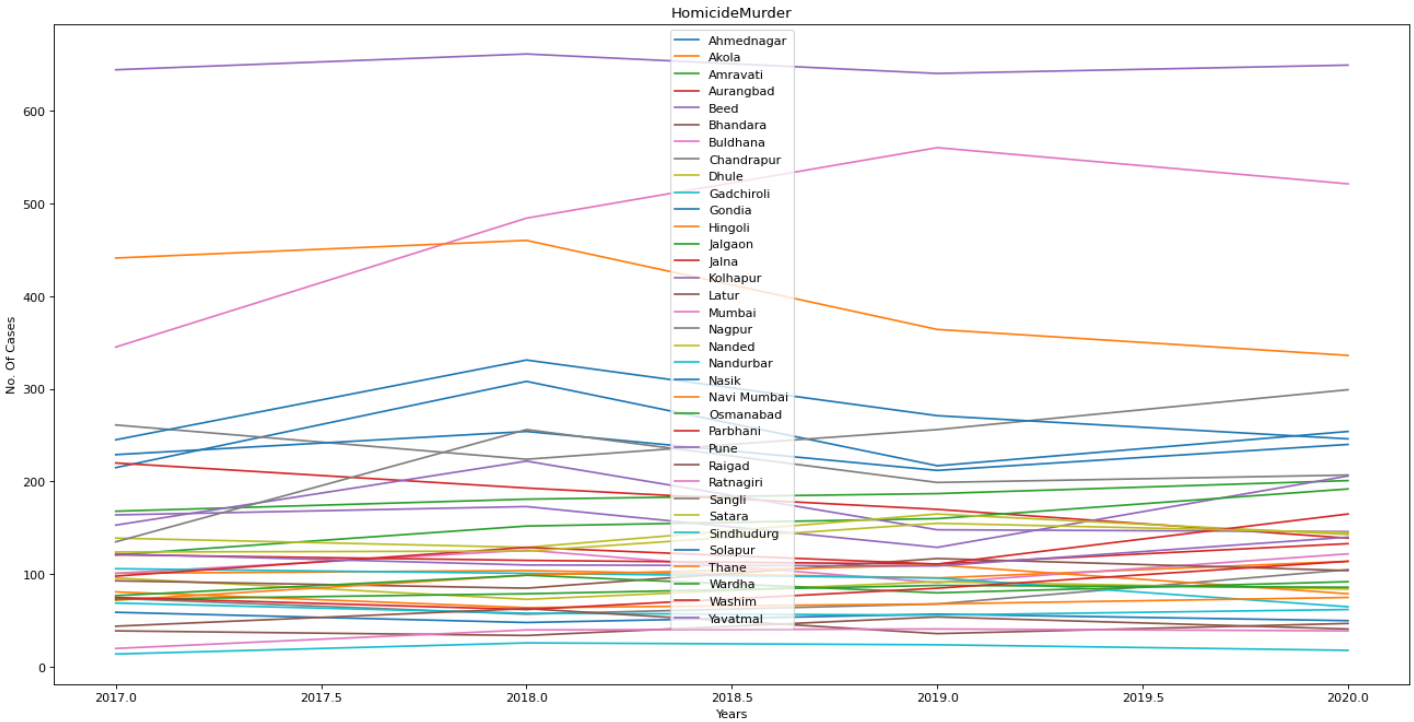

Wardha
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
500
1000
1500
2000
2500
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

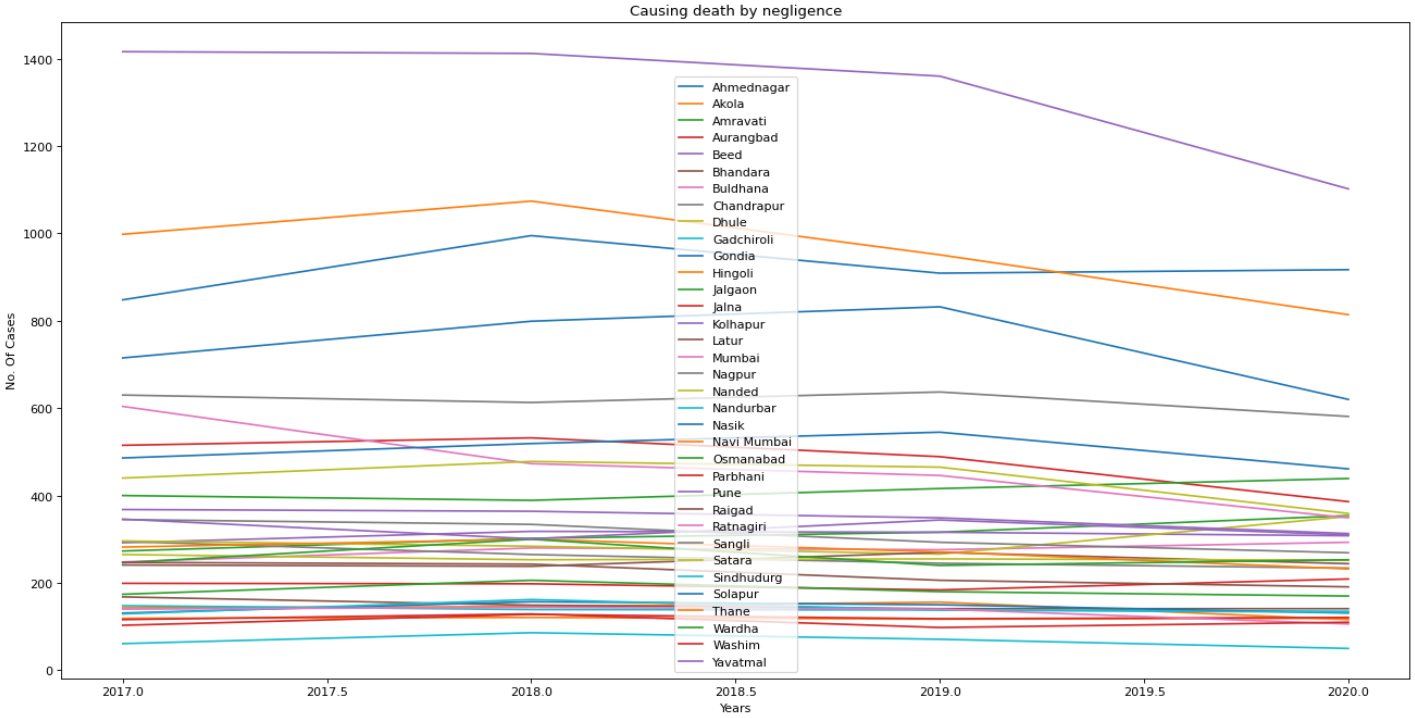

Washim
HomicideMurder
Causing death by negligence
Hurt
Assault on woman
Kidnapping and abduction
Human trafficking
Rape
Offence against public tranquility
Offences against property
Offences relating to documents and property marks
Miscellaneous
Others
No. Of Cases
Years
0
500
1000
1500
2000
2500
3000
3500
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0

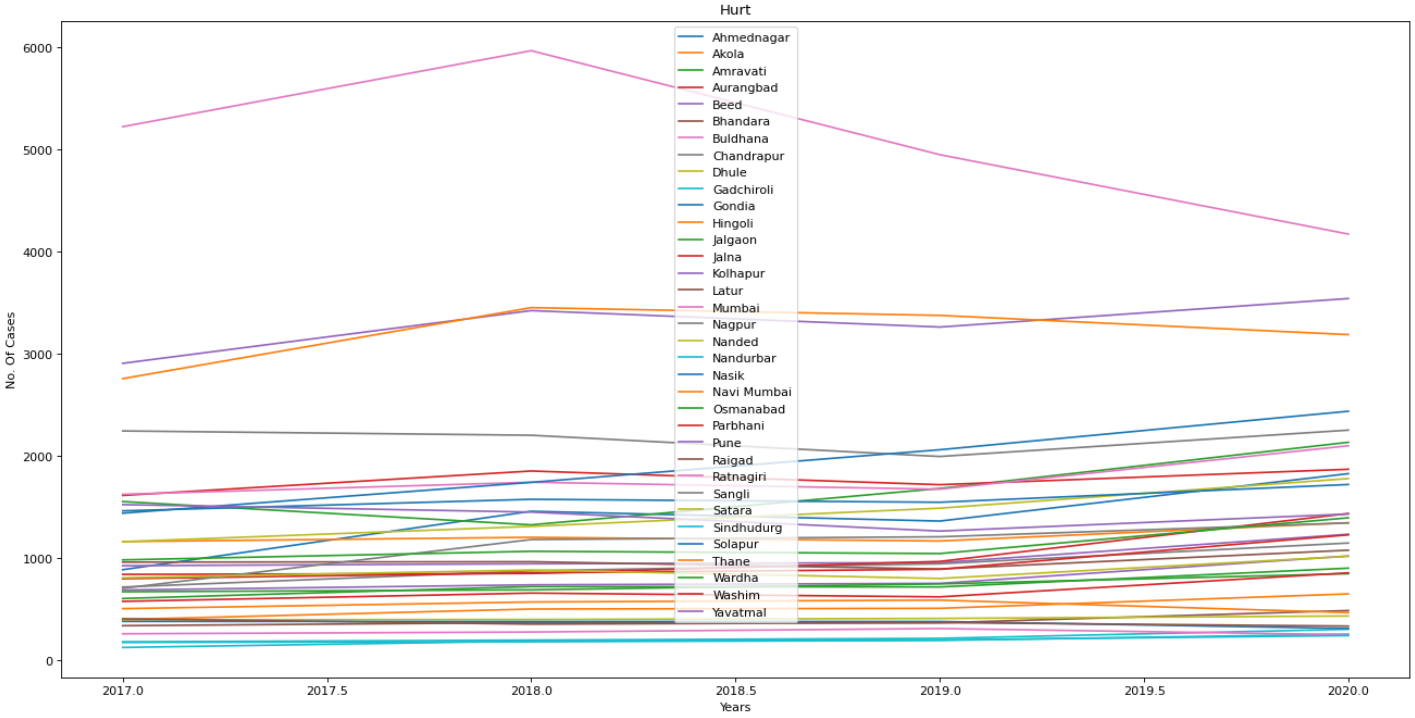


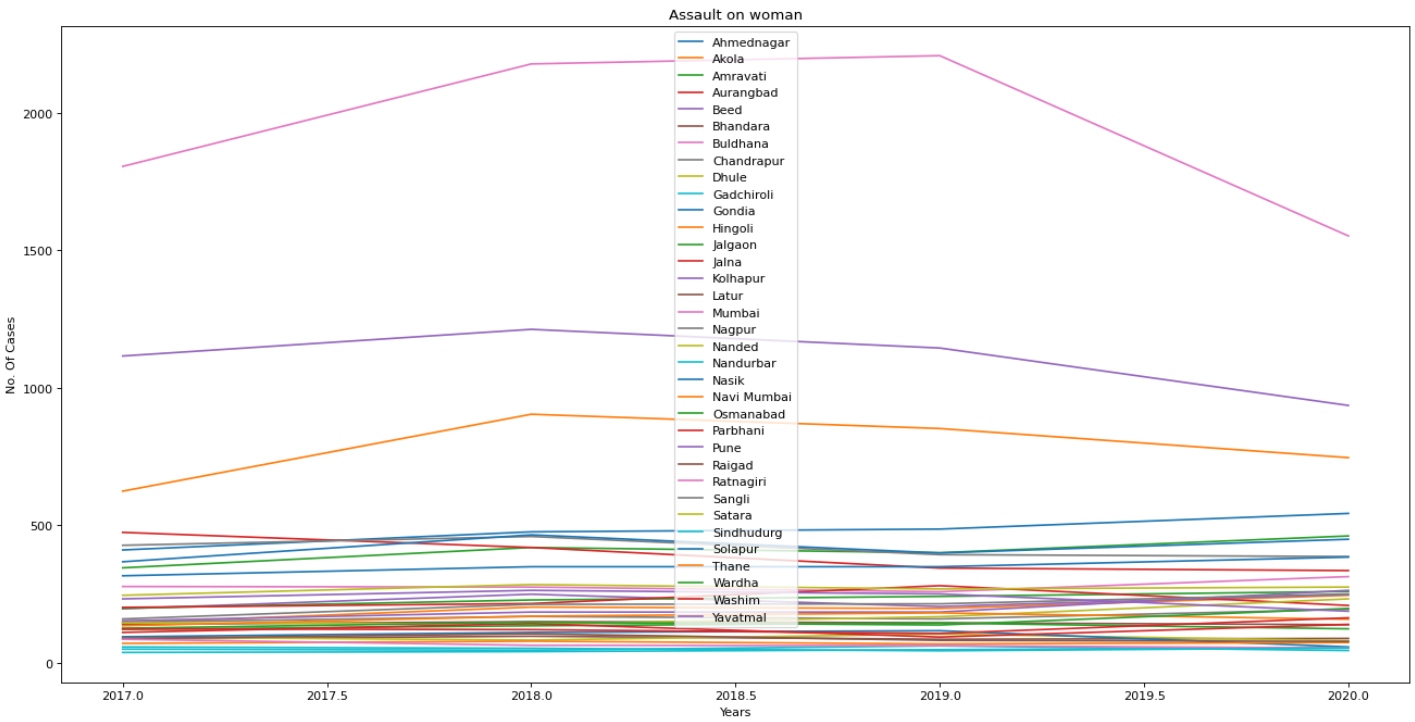
In [32]:

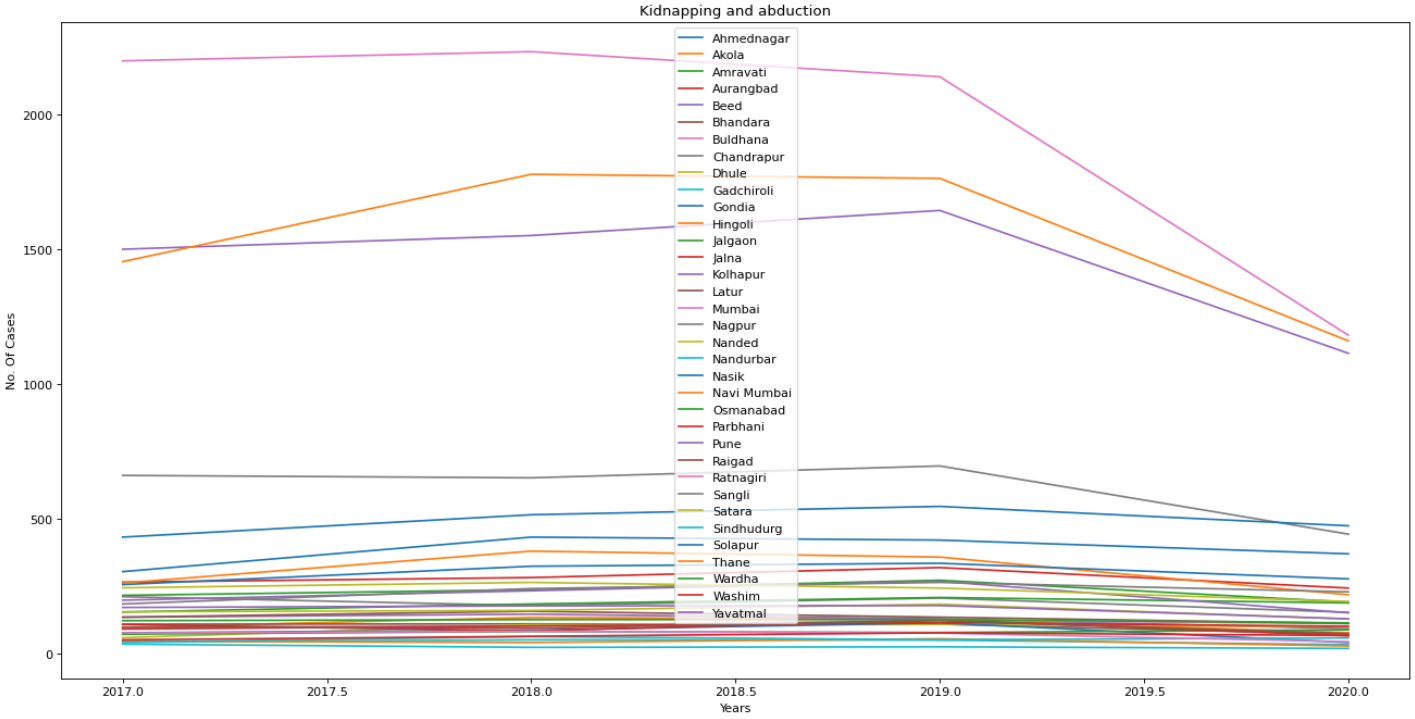
```
#Crime vs Time(4yrs) for all district
for Crime in Crimes:
    fig=plt.figure(figsize=(20,10),dpi=80,facecolor='w',edgecolor='k')
    plt.title(Crime)
    plt.xlabel('Years')
    plt.ylabel('No. Of Cases')
    for district in Districts:
        temp_df=df[(df['District']==district)&(df['Crime']==Crime)]
        N_cases=[temp_df[c].values[0] for c in years]
        plt.plot(years,N_cases)
        plt.legend(Districts)
```

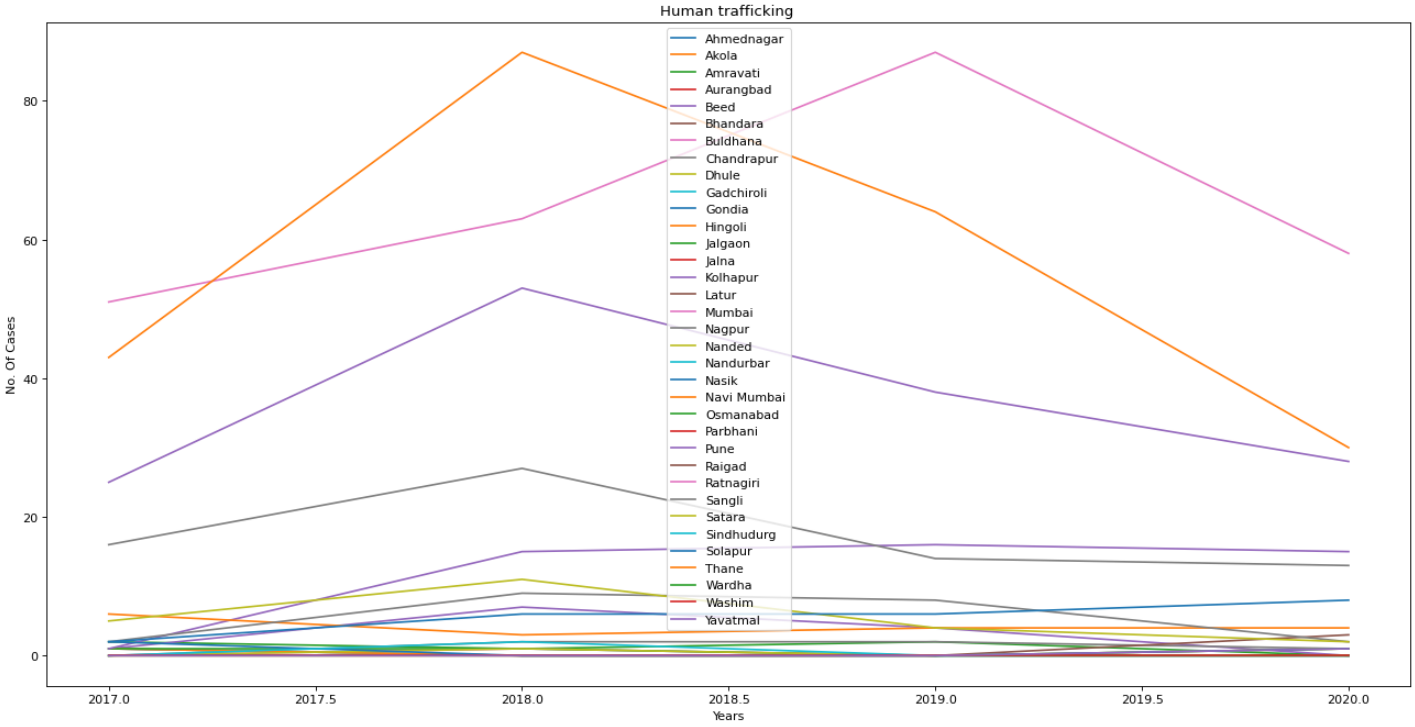


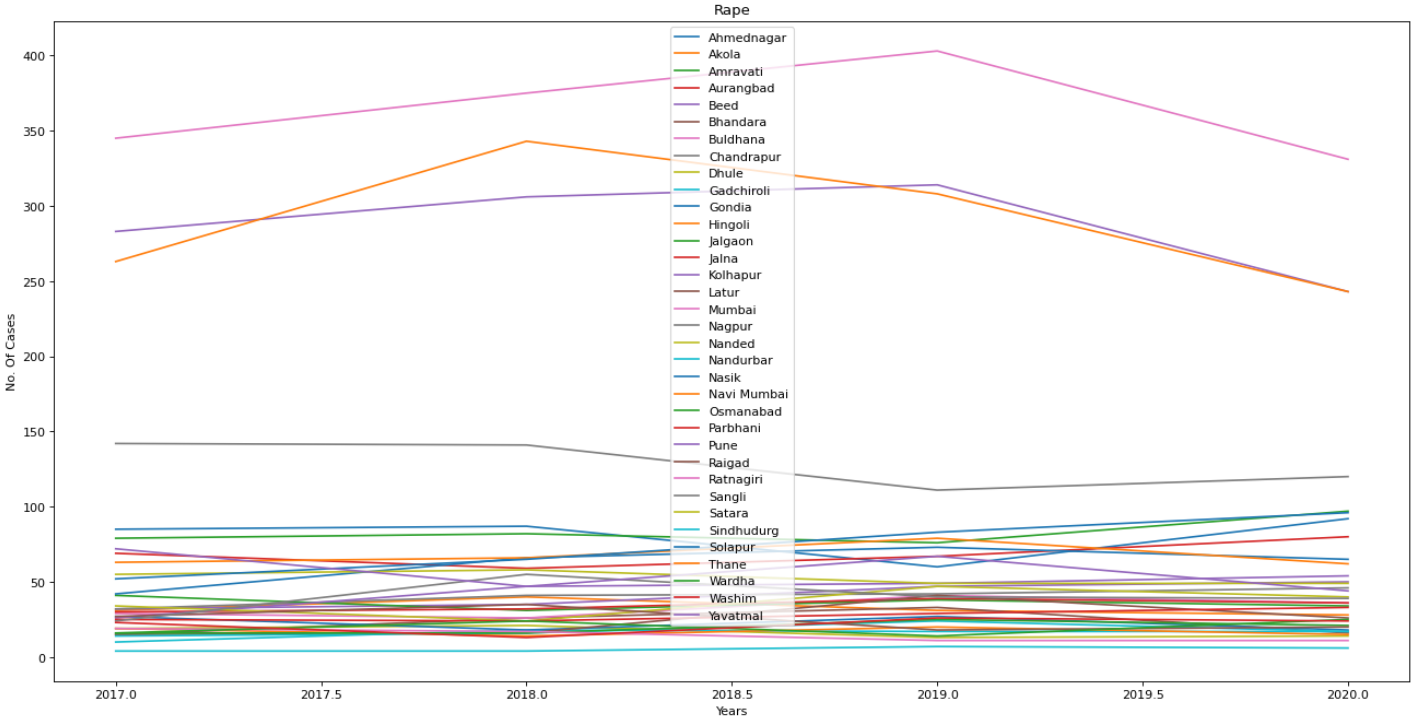

Causing death by negligence
No. Of Cases
Years
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal

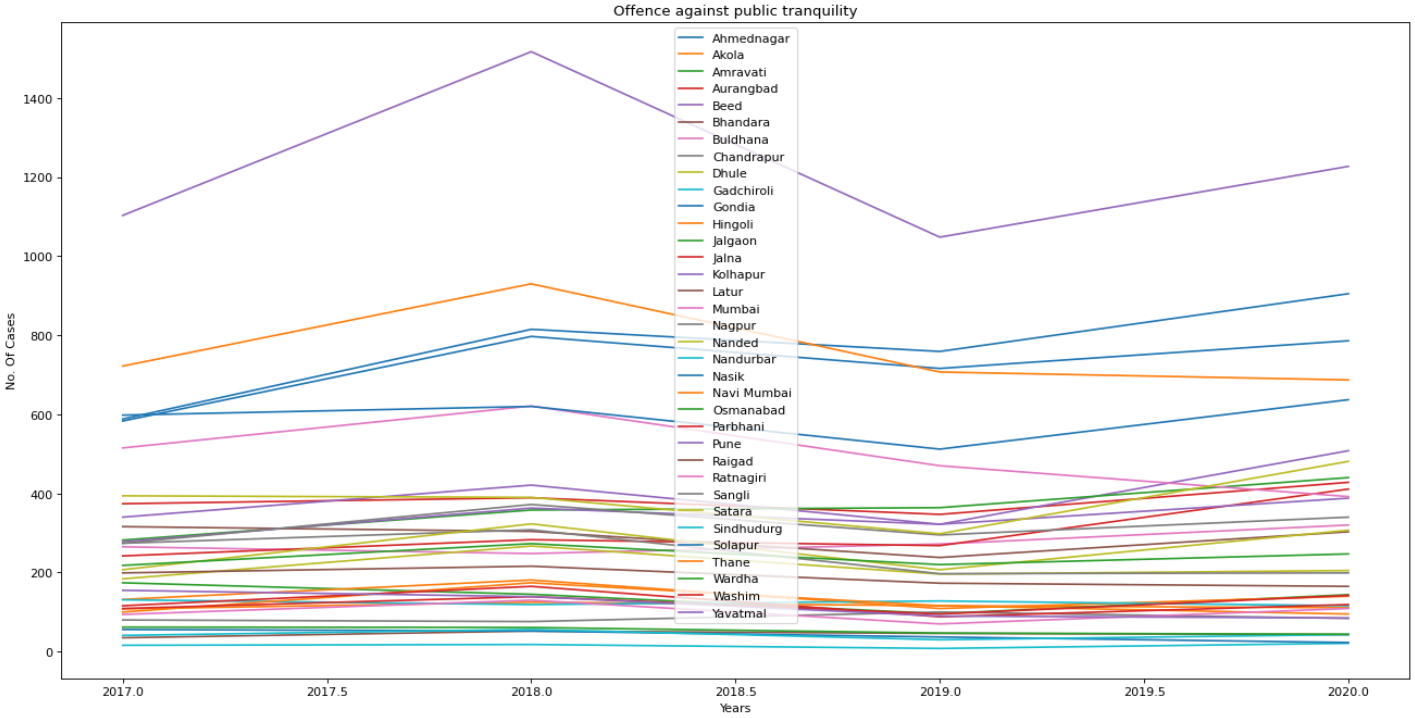

Hurt
No. Of Cases
Years
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal

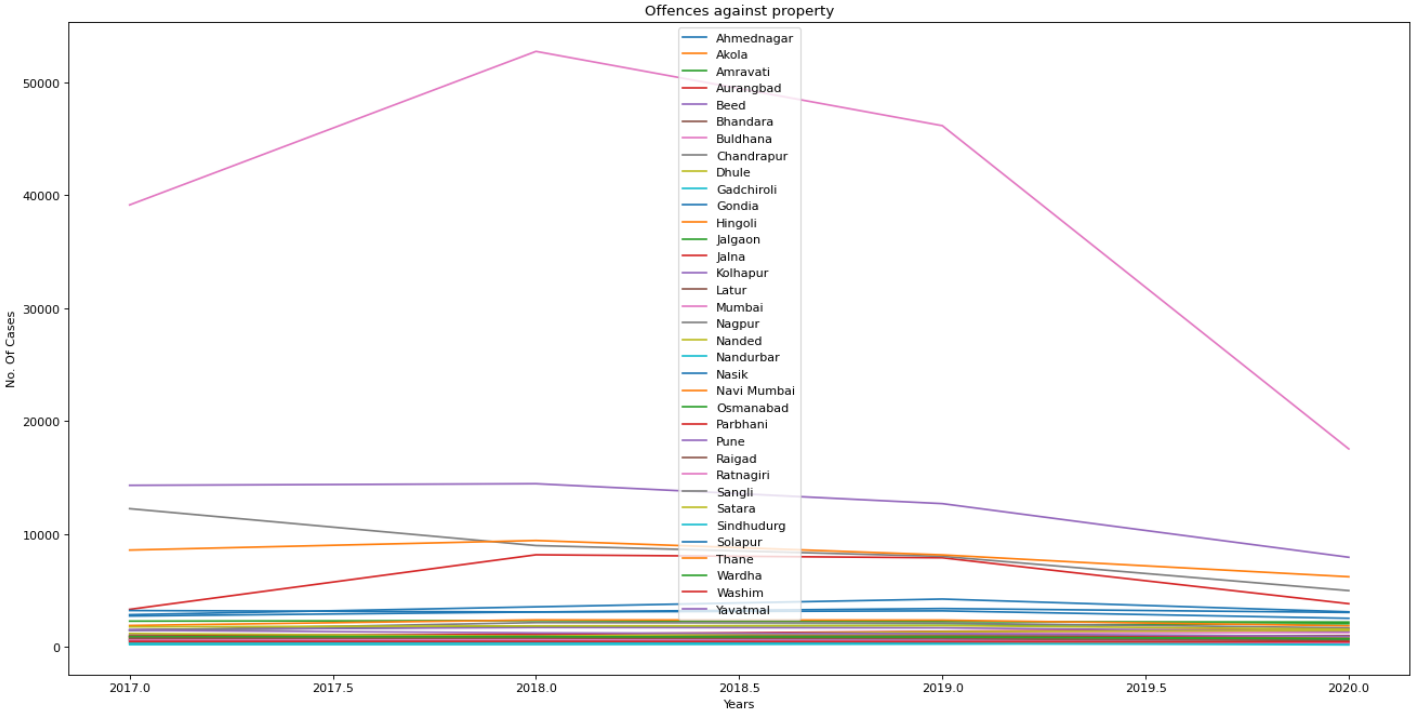

Assault on woman
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal
No. Of Cases
0
500
1000
1500
2000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
Years

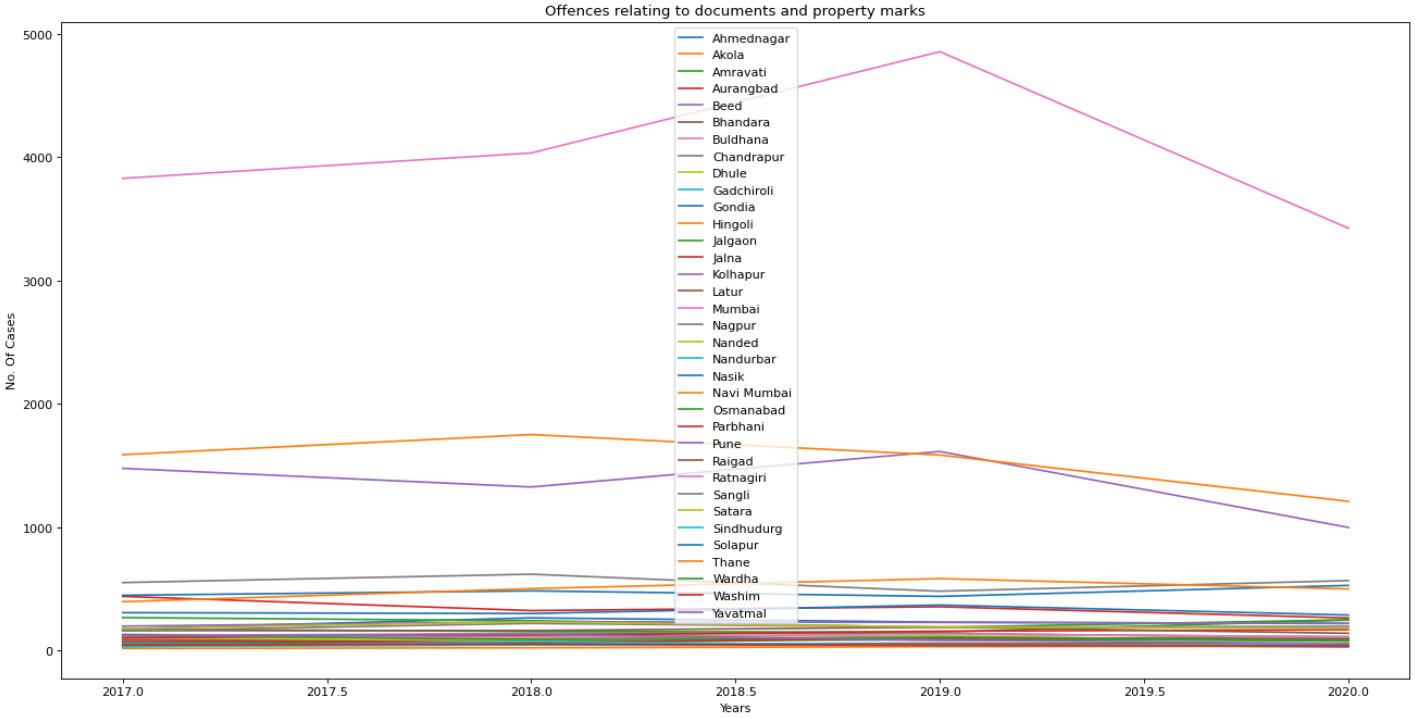

Kidnapping and abduction
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal
No. Of Cases
0
500
1000
1500
2000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
Years

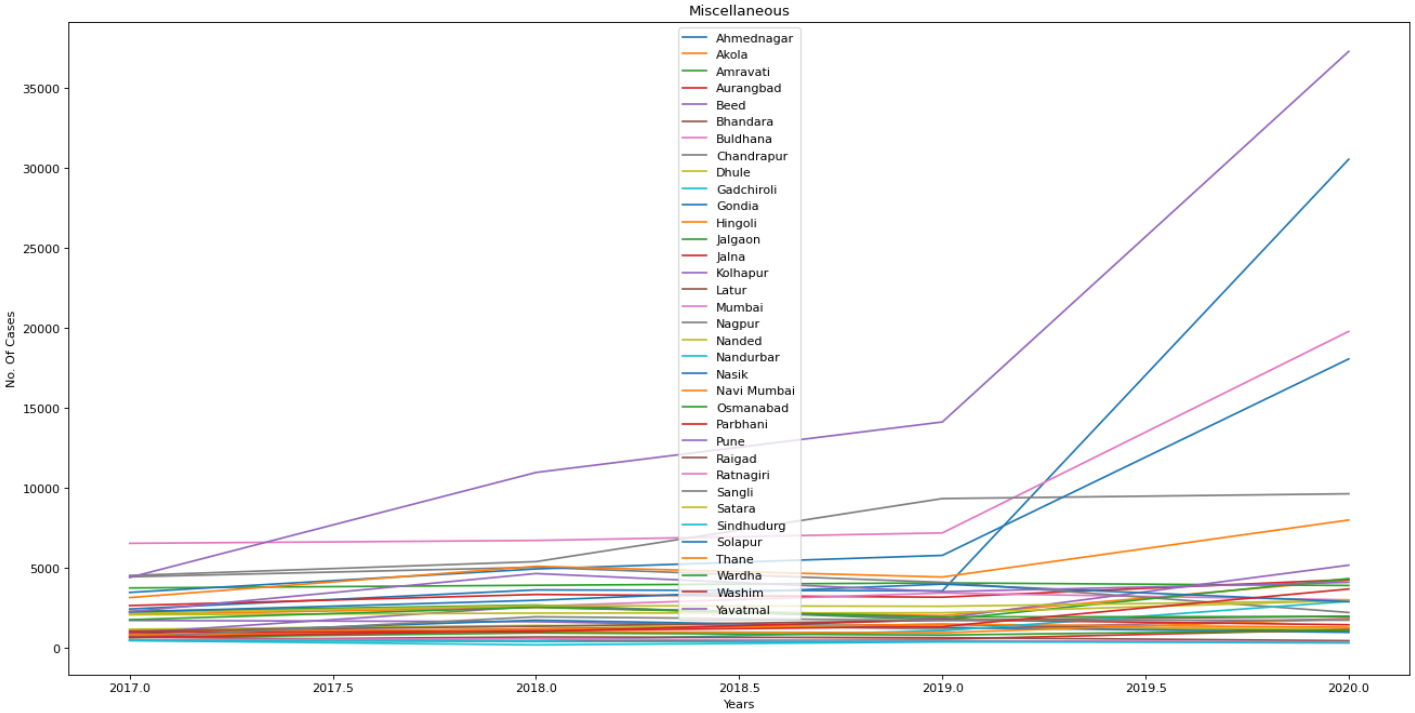

Human trafficking
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal
No. Of Cases
0
20
40
60
80
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
Years

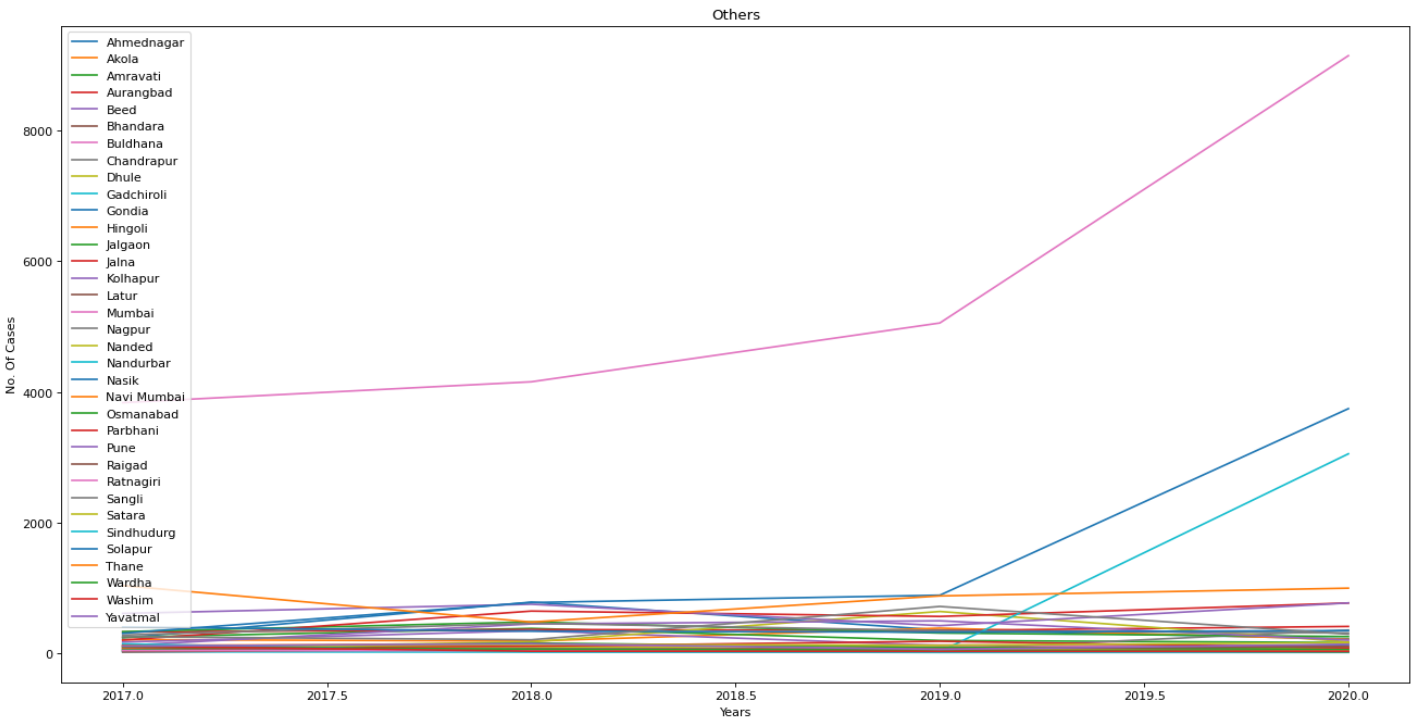

Rape
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal
No. Of Cases
0
50
100
150
200
250
300
350
400
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
Years


Offence against public tranquility
No. Of Cases
Years
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal


Offences against property
No. Of Cases
Years
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal


Offences relating to documents and property marks
No. Of Cases
Years
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal


Miscellaneous
No. Of Cases
Years
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal


Others
Ahmednagar
Akola
Amravati
Aurangbad
Beed
Bhandara
Buldhana
Chandrapur
Dhule
Gadchiroli
Gondia
Hingoli
Jalgaon
Jalna
Kolhapur
Latur
Mumbai
Nagpur
Nanded
Nandurbar
Nasik
Navi Mumbai
Osmanabad
Parbhani
Pune
Raigad
Ratnagiri
Sangli
Satara
Sindhudurg
Solapur
Thane
Wardha
Washim
Yavatmal
No. Of Cases
0
2000
4000
6000
8000
2017.0
2017.5
2018.0
2018.5
2019.0
2019.5
2020.0
Years

In [ ]: