

'''Statistical Analysis of Crime Data

Overview

In this section, we perform statistical analysis on the Crimes in India dataset.
The analysis aims to uncover meaningful insights and patterns in crime trends across Indian

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import os
import math
import statistics
import scipy.stats as stats
file_path = 'crimes_cleaned.csv'
if os.path.exists(file_path):
    crime = pd.read_csv(file_path)
    print("Dataset loaded successfully.")
else:
    raise FileNotFoundError(f"File not found: {file_path}")
```

➡ Dataset loaded successfully.

```
crime.describe()
```



	YEAR	MURDER	ATTEMPT TO MURDER	CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	RAPE	CUSTODIAL RAPE	OTHI
count	9397.000000	9397.000000	9397.000000	9397.000000	9397.000000	9397.000000	9397
mean	2007.168884	47.030861	41.786847	5.201341	29.718846	0.002873	29
std	3.755781	45.666528	53.614888	10.039063	37.168683	0.076455	37
min	2001.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0
25%	2004.000000	18.000000	10.000000	0.000000	8.000000	0.000000	8
50%	2007.000000	36.000000	27.000000	2.000000	20.000000	0.000000	20
75%	2010.000000	62.000000	54.000000	6.000000	40.000000	0.000000	40
max	2013.000000	565.000000	741.000000	241.000000	706.000000	5.000000	706

8 rows × 31 columns



```
crime_modified = crime.iloc[:, 2:]
crime_modified.mean()
```



0

YEAR	2007.168884
MURDER	47.030861
ATTEMPT TO MURDER	41.786847
CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	5.201341
RAPE	29.718846
CUSTODIAL RAPE	0.002873
OTHER RAPE	29.715973
KIDNAPPING & ABDUCTION	47.611046
KIDNAPPING AND ABDUCTION OF WOMEN AND GIRLS	35.270618
KIDNAPPING AND ABDUCTION OF OTHERS	12.340428
DACOITY	6.845695
PREPARATION AND ASSEMBLY FOR DACOITY	3.867298
ROBBERY	30.504948
BURGLARY	132.520485
THEFT	436.809407
AUTO THEFT	166.337874
OTHER THEFT	270.471533
RIOTS	90.246781
CRIMINAL BREACH OF TRUST	22.174417
CHEATING	95.887517
COUNTERFIETING	3.148558
ARSON	13.155794
HURT/GREVIOUS HURT	396.802703
DOWRY DEATHS	10.733958
ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MODESTY	56.552942
INSULT TO MODESTY OF WOMEN	14.720656
CRUELTY BY HUSBAND OR HIS RELATIVES	107.404278
IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES	0.098329
CAUSING DEATH BY NEGLIGENCE	119.281047
OTHER IPC CRIMES	1184.730339
TOTAL IPC CRIMES	2896.834096

```
crime_modified.median()
```



0

YEAR	2007.0
MURDER	36.0
ATTEMPT TO MURDER	27.0
CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	2.0
RAPE	20.0
CUSTODIAL RAPE	0.0
OTHER RAPE	20.0
KIDNAPPING & ABDUCTION	25.0
KIDNAPPING AND ABDUCTION OF WOMEN AND GIRLS	18.0
KIDNAPPING AND ABDUCTION OF OTHERS	5.0
DACOITY	3.0
PREPARATION AND ASSEMBLY FOR DACOITY	0.0
ROBBERY	16.0
BURGLARY	80.0
THEFT	209.0
AUTO THEFT	47.0
OTHER THEFT	145.0
RIOTS	44.0
CRIMINAL BREACH OF TRUST	11.0
CHEATING	37.0
COUNTERFEITING	1.0
ARSON	8.0
HURT/GREIVIOUS HURT	192.0
DOWRY DEATHS	5.0
ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MODESTY	31.0
INSULT TO MODESTY OF WOMEN	2.0
CRUELTY BY HUSBAND OR HIS RELATIVES	47.0
IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES	0.0
CAUSING DEATH BY NEGLIGENCE	68.0
OTHER IPC CRIMES	724.0
TOTAL IPC CRIMES	2039.0

```
statistics.variance(crime['THEFT'])
```

```
→ 1080909.0776552148
```

```
numeric_data = crime_modified.select_dtypes(exclude='object')
for col in numeric_data.columns:
    Q1 = crime_modified[col].quantile(.25)
    Q3 = crime_modified[col].quantile(.75)
    IQR = Q3 - Q1
    print('IQR of %s : %d' %(col,IQR))
```

```
→ IQR of YEAR : 6
    IQR of MURDER : 44
    IQR of ATTEMPT TO MURDER : 44
    IQR of CULPABLE HOMICIDE NOT AMOUNTING TO MURDER : 6
    IQR of RAPE : 32
    IQR of CUSTODIAL RAPE : 0
    IQR of OTHER RAPE : 32
    IQR of KIDNAPPING & ABDUCTION : 46
    IQR of KIDNAPPING AND ABDUCTION OF WOMEN AND GIRLS : 36
    IQR of KIDNAPPING AND ABDUCTION OF OTHERS : 11
    IQR of DACOITY : 7
    IQR of PREPARATION AND ASSEMBLY FOR DACOITY : 2
    IQR of ROBBERY : 29
    IQR of BURGLARY : 137
    IQR of THEFT : 349
    IQR of AUTO THEFT : 120
    IQR of OTHER THEFT : 230
    IQR of RIOTS : 105
    IQR of CRIMINAL BREACH OF TRUST : 22
    IQR of CHEATING : 87
    IQR of COUNTERFIETING : 3
    IQR of ARSON : 16
    IQR of HURT/GREVIOUS HURT : 456
    IQR of DOWRY DEATHS : 14
    IQR of ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MODESTY : 66
    IQR of INSULT TO MODESTY OF WOMEN : 12
    IQR of CRUELTY BY HUSBAND OR HIS RELATIVES : 120
    IQR of IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES : 0
    IQR of CAUSING DEATH BY NEGLIGENCE : 165
    IQR of OTHER IPC CRIMES : 1290
    IQR of TOTAL IPC CRIMES : 3036
```

```
crime_modified.corr()
```



	YEAR	MURDER	ATTEMPT TO MURDER	CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	RAPE	CUSTODIAL RAPE	OTHER RAPE
YEAR	1.000000	-0.058564	0.003433	-0.025945	0.117192	-0.003173	0.117208
MURDER	-0.058564	1.000000	0.697122	0.504745	0.567113	0.043717	0.567066
ATTEMPT TO MURDER	0.003433	0.697122	1.000000	0.393557	0.453365	0.035019	0.453328
CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	-0.025945	0.504745	0.393557	1.000000	0.342023	0.009230	0.342030
RAPE	0.117192	0.567113	0.453365	0.342023	1.000000	0.038373	0.999998
CUSTODIAL RAPE	-0.003173	0.043717	0.035019	0.009230	0.038373	1.000000	0.036319
OTHER RAPE	0.117208	0.567066	0.453328	0.342030	0.999998	0.036319	1.000000
KIDNAPPING & ABDUCTION	0.139400	0.574875	0.467756	0.397432	0.657844	0.018398	0.657844
KIDNAPPING AND ABDUCTION OF WOMEN AND GIRLS	0.188757	0.559306	0.472738	0.418994	0.683972	0.017048	0.683972
KIDNAPPING AND ABDUCTION OF OTHERS	0.036546	0.517560	0.391571	0.303687	0.518682	0.017989	0.518682
DACOITY	-0.095927	0.514519	0.324725	0.162245	0.220755	0.059303	0.220755
PREPARATION AND ASSEMBLY FOR DACOITY	0.019487	0.319137	0.280558	0.266969	0.352423	0.020925	0.352423
ROBBERY	0.053627	0.530815	0.444413	0.210154	0.428226	0.033824	0.428226
BURGLARY	-0.032378	0.517783	0.406470	0.117830	0.503069	0.019773	0.503069
THEFT	0.030964	0.564367	0.443495	0.267185	0.577785	0.017785	0.577785
AUTO THEFT	0.078344	0.521111	0.413334	0.267189	0.552546	0.012088	0.552546
OTHER THEFT	-0.018321	0.545705	0.425114	0.238481	0.540204	0.021401	0.540204
RIOTS	-0.010335	0.364860	0.294538	0.219784	0.264195	0.018916	0.264195
CRIMINAL BREACH OF TRUST	0.028702	0.541802	0.438173	0.373104	0.431955	0.026246	0.431955
CHEATING	0.101922	0.463213	0.430494	0.217178	0.443327	0.015970	0.443327
COUNTERFEITING	0.030062	0.356911	0.309683	0.161814	0.278357	0.008299	0.278357

ARSON	-0.027253	0.204793	0.173980	0.018432	0.175018	0.008396	0.171
HURT/GREIVIOUS HURT	0.015672	0.424389	0.413769	0.080672	0.407337	0.018008	0.407
DOWRY DEATHS	0.027423	0.692987	0.583334	0.547724	0.446875	0.007712	0.446
ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MODESTY	0.099288	0.431519	0.424348	0.193298	0.700139	0.004182	0.700
INSULT TO MODESTY OF WOMEN	-0.014320	0.301118	0.245892	0.142075	0.209905	0.006565	0.209
CRUELTY BY HUSBAND OR HIS RELATIVES	0.137120	0.470499	0.401721	0.379016	0.624883	0.022080	0.624
IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES	-0.019891	0.090900	0.086188	0.064050	0.031364	-0.002685	0.031
CAUSING DEATH BY NEGLIGENCE	0.131168	0.502127	0.364182	0.158588	0.347918	0.044348	0.347
OTHER IPC CRIMES	0.057802	0.470959	0.424010	0.216834	0.519457	0.005443	0.519
TOTAL IPC CRIMES	0.061502	0.643455	0.556045	0.290788	0.658661	0.019779	0.658

31 rows × 31 columns

```
plt.figure(figsize=(25,15))
sns.heatmap(crime_modified.corr(),annot=True,cmap='icefire')
```



<Axes: >

