```
# 📦 Import required libraries
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# 📂 Load the dataset (change path if necessary)
df = pd.read_csv("/kaggle/input/data-analytics/districtwise-crime-
against-women-2017-onwards (1).csv")

#  Rename columns (if needed)
df.columns = ['id', 'year', 'state_name', 'state_code',
'district_name', 'district_code', 'registration_circles',
              'murder_with_rape_gang_rape', 'dowry_deaths',
'abetment_to_suicide_of_women', 'miscarriage',
              'acid_attack', 'attempt_to_acid_attack',
'cruelty_by_husband_or_his_relatives', 'kidnapping_and_abduction',
              'kidnapping_abduction_in_order_to_murder',
'kidnapping_for_ransom',
              'kidnp_and_abductn_of_women_above_18_for_marrg',
'kidnp_and_abductn_of_girls_below_18_for_marrg',
              'procuration_of_minor_girls',
'importation_of_girls_from_foreign',
              'kidnapping_and_abduction_of_women_others',
'human_trafficking', 'selling_of_minor_girls',
              'buying_of_minor_girls', 'rape_women_above_18',
'rape_girls_below_18',
              'attempt_to_commit_rape_above_18',
'attempt_to_commit_rape_girls_below_18',
              'assault_on_womenabove_18', 'assault_on_women_below_18',
              'insult_to_the_modesty_of_women_above_18',
'insult_to_the_modesty_of_women_below_18',
              'dowry_prohibition',
'procuring_inducing_children_for_the_sake_of_prostitution',
              'detaining_a_prsn_in_premises_where_prost_is_carried',
              'prostitution_in_or_in_the_vicinity_of_public_places',
              'seducing_or_soliciting_for_purpose_of_prostitution',
'other_sections_under_itp_act',
              'protection_of_women_from_domestic_violence',
              'publshng_or_transmitting_of_sexually_explicit_mtrl',
              'other_women_centric_cyber_crimes', 'child_rape',
'sexual_assault_of_children',
              'child_sexual_harassment',
'use_of_child_for_pornography',
              'offences_of_pocso_act', 'pocso_act_unnatural_offences',
'indecent_representation_of_women']

# 📊 Create Total_Crimes column
crime_cols = df.columns[7:]
df["Total_Crimes"] = df[crime_cols].sum(axis=1)
```

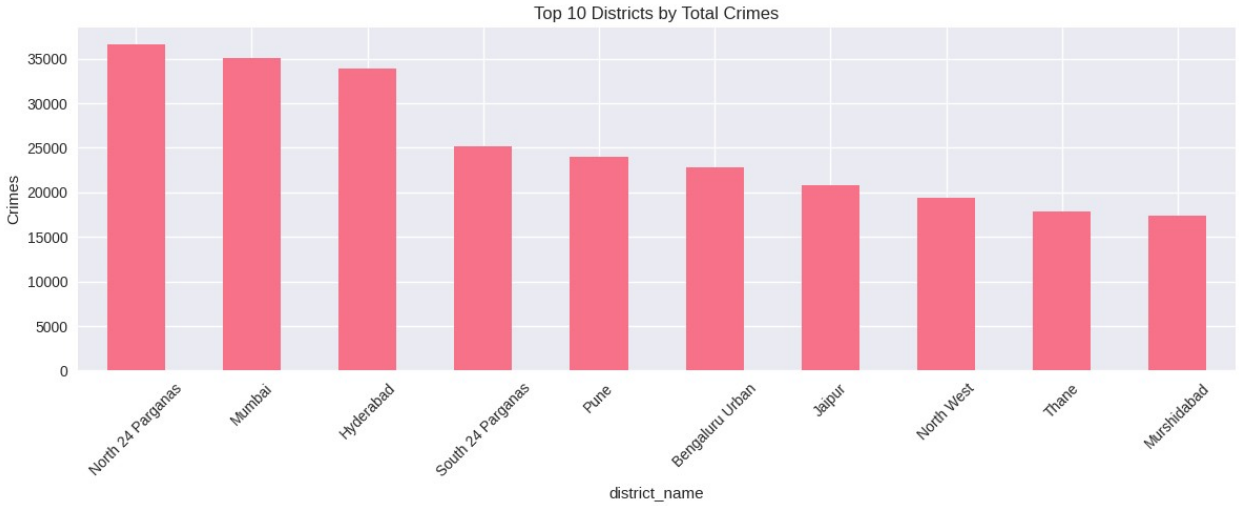
```
# 📊 Summary Statistics
print("\nSummary Statistics:")
print(df[crime_cols.tolist() + ["Total_Crimes"]].describe())

# 🏙 Top 10 Districts
top_districts = df.groupby("district_name")
["Total_Crimes"].sum().sort_values(ascending=False).head(10)
top_districts.plot(kind='bar', figsize=(12, 5), title="Top 10
Districts by Total Crimes")
plt.ylabel("Crimes"); plt.xticks(rotation=45); plt.tight_layout();
plt.show()

# 🌍 Top 10 States and their Top 5 Districts
top_states = df.groupby("state_name")
["Total_Crimes"].sum().sort_values(ascending=False).head(10).index.tol
ist()
df_top_states = df[df["state_name"].isin(top_states)]

plt.figure(figsize=(14, 8))
for i, state in enumerate(top_states):
    top5_districts = df_top_states[df_top_states["state_name"] ==
state].groupby("district_name")
["Total_Crimes"].sum().sort_values(ascending=False).head(5)
    plt.subplot(2, 5, i+1)
    top5_districts.plot(kind="bar")
    plt.title(state)
    plt.xticks(rotation=45)
    plt.tight_layout()

plt.suptitle("Top 5 Districts in Top 10 States by Total Crimes",
fontsize=16, y=1.05)
plt.tight_layout()
plt.show()

# 📈 Year-wise Trend (Overall)
yearly_trend = df.groupby("year")["Total_Crimes"].sum()
yearly_trend.plot(marker='o', figsize=(10, 5), title="Year-wise Trend
of Total Crimes")
plt.ylabel("Crimes"); plt.grid(True); plt.tight_layout(); plt.show()

# 📉 Year-wise Trend (State-wise)
plt.figure(figsize=(14, 8))
for state in top_states:
    state_data = df[df["state_name"] == state].groupby("year")
["Total_Crimes"].sum()
    plt.plot(state_data, marker='o', label=state)
plt.title("Year-wise Crime Trend for Top 10 States")
plt.ylabel("Crimes")
plt.legend()
plt.grid(True)
```

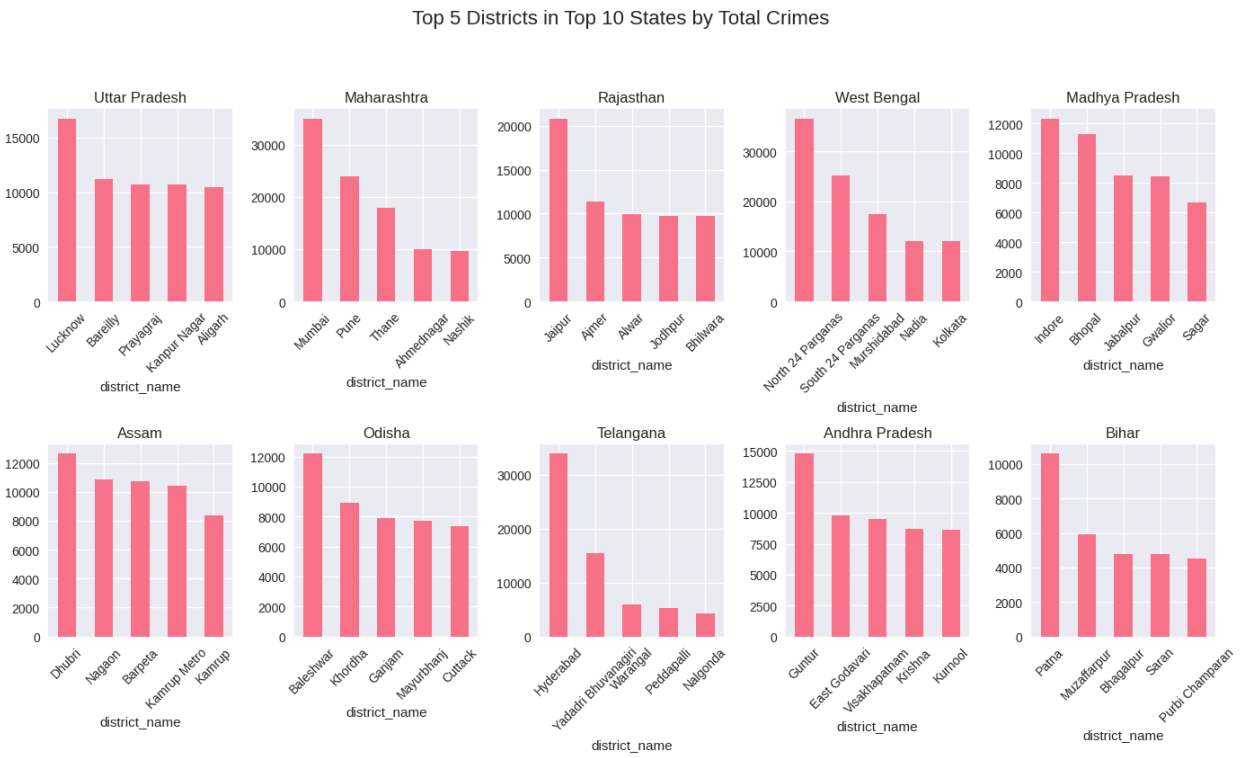
```
plt.tight_layout()
plt.show()

# 🔢 Step 1: Calculate total for each crime column
crime_totals = df[crime_cols].sum().sort_values(ascending=False)

# 🔢 Step 2: Select top 10 crime columns
top_10_crimes = crime_totals.head(10).index.tolist()

# 🔢 Step 3: Add 'Total_Crimes' for context
heatmap_cols = top_10_crimes + ['Total_Crimes']

# 🔥 Step 4: Plot the heatmap
plt.figure(figsize=(12, 8))
sns.heatmap(df[heatmap_cols].corr(), cmap="YlOrRd", annot=True,
linewidths=0.5)
plt.title("Correlation Heatmap: Top 10 Crimes + Total Crimes")
plt.tight_layout()
plt.show()
state_crime_totals = df.groupby("state_name")
["Total_Crimes"].sum().sort_values(ascending=False)

# 🥧 Plot pie chart
#📊 Group total crimes by state
state_crimes = df.groupby("state_name")["Total_Crimes"].sum()

# 🔢 Calculate percentages
state_percent = (state_crimes / state_crimes.sum()) * 100

# 📋 Print state-wise percentages
print("📊 Percentage of Total Crimes by State:\n")
for state, percent in state_percent.items():
    print(f"{state}: {percent:.2f}%")

# 🥧 Pie chart
plt.figure(figsize=(10, 10))
plt.pie(state_crimes, labels=state_crimes.index, autopct='%1.1f%%',
startangle=140)
plt.title("Total Crimes by State (Pie Chart)")
plt.axis('equal')  # Equal aspect ratio ensures pie is a circle.
plt.tight_layout()
plt.show()


Summary Statistics:
       murder_with_rape_gang_rape  dowry_deaths
abetment_to_suicide_of_women  \
count                 5322.000000   5322.000000
5322.000000
mean                     0.291432      7.875986
```

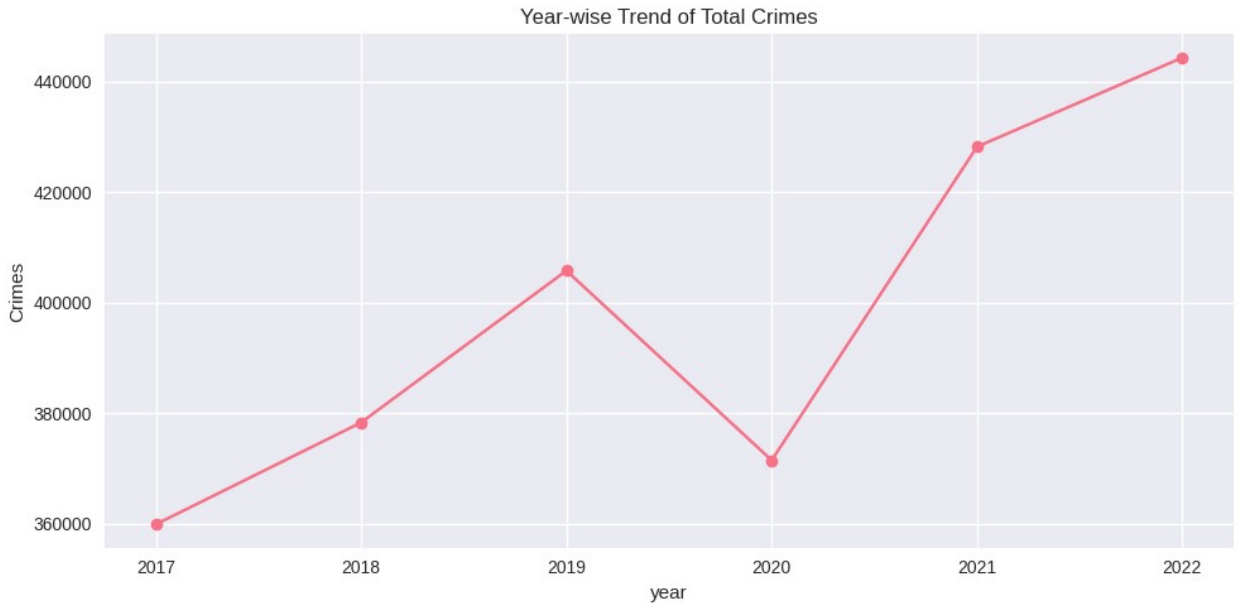
```
5.753100
std                        1.182866     12.460878
9.189005
min                        0.000000      0.000000
0.000000
25%                        0.000000      0.000000
0.000000
50%                        0.000000      3.000000
2.000000
75%                        0.000000     10.000000
8.000000
max                       34.000000    107.000000
134.000000

       miscarriage  acid_attack  attempt_to_acid_attack  \
count  5322.000000  5322.000000             5322.000000
mean      0.257610     0.142803                0.043781
std       1.389534     0.506576                0.258950
min       0.000000     0.000000                0.000000
25%       0.000000     0.000000                0.000000
50%       0.000000     0.000000                0.000000
75%       0.000000     0.000000                0.000000
max      31.000000     5.000000                5.000000

       cruelty_by_husband_or_his_relatives
kidnapping_and_abduction  \
count                              5322.000000                5322.000000

mean                                135.394213                  37.117625

std                                 212.937265                  83.082579

min                                   0.000000                   0.000000

25%                                   7.000000                   0.000000

50%                                  51.000000                   3.000000

75%                                 168.000000                  35.000000

max                                1704.000000                1344.000000


       kidnapping_abduction_in_order_to_murder  kidnapping_for_ransom
...  \
count                                5322.000000             1708.000000
...
mean                                    0.118752                0.125878
...
std                                     1.183021                0.820767
```

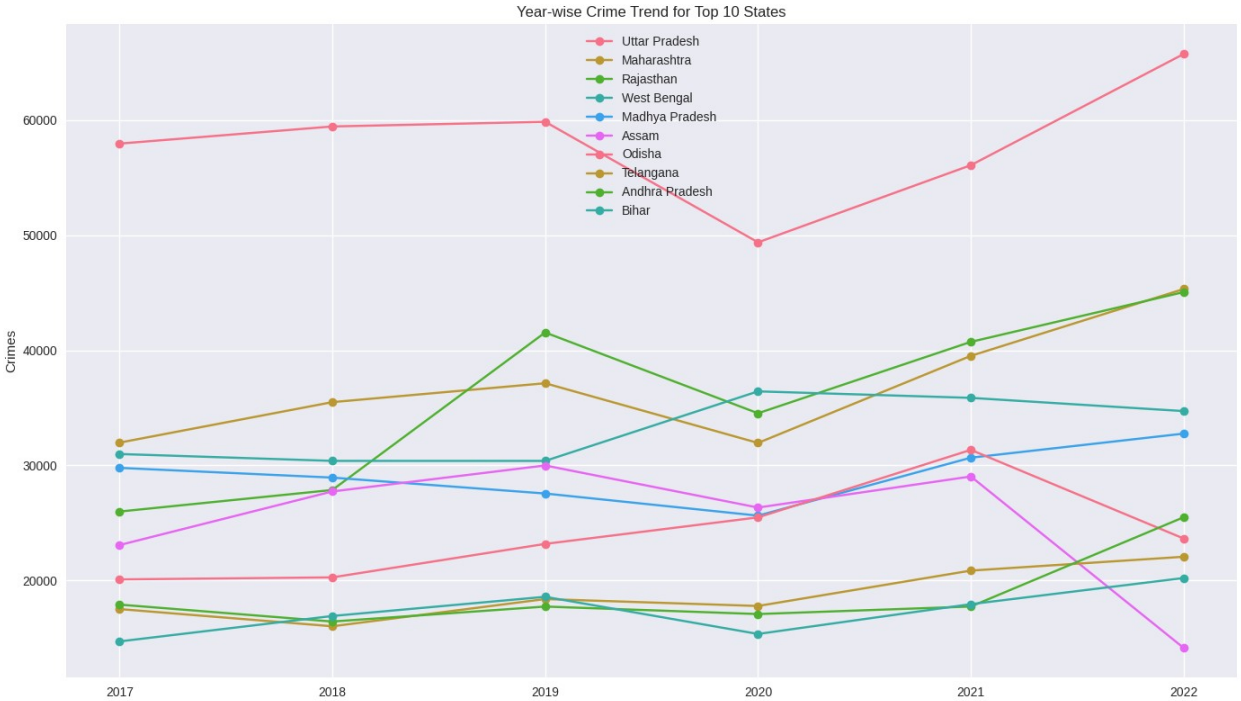
```
...
min                                        0.000000                0.000000
...
25%                                        0.000000                0.000000
...
50%                                        0.000000                0.000000
...
75%                                        0.000000                0.000000
...
max                                       58.000000               22.000000
...

       publshng_or_transmitting_of_sexually_explicit_mtrl  \
count                                        5322.000000
mean                                            1.520481
std                                             5.349929
min                                             0.000000
25%                                             0.000000
50%                                             0.000000
75%                                             1.000000
max                                           134.000000

       other_women_centric_cyber_crimes   child_rape  \
count                       5322.000000  5322.000000
mean                           0.609357    30.630214
std                            4.528447    40.257474
min                            0.000000     0.000000
25%                            0.000000     1.000000
50%                            0.000000    20.000000
75%                            0.000000    44.000000
max                          175.000000   622.000000

       sexual_assault_of_children  child_sexual_harassment  \
count                 5322.000000              5322.000000
mean                    17.759489                 2.085494
std                     31.629688                 6.358903
min                      0.000000                 0.000000
25%                      0.000000                 0.000000
50%                      6.000000                 0.000000
75%                     24.000000                 1.000000
max                    609.000000               198.000000

       use_of_child_for_pornography  offences_of_pocso_act  \
count                   5322.000000             5322.00000
mean                       0.739759                0.84705
std                        4.566627                5.94660
min                        0.000000                0.00000
25%                        0.000000                0.00000
50%                        0.000000                0.00000
75%                        0.000000                0.00000
```

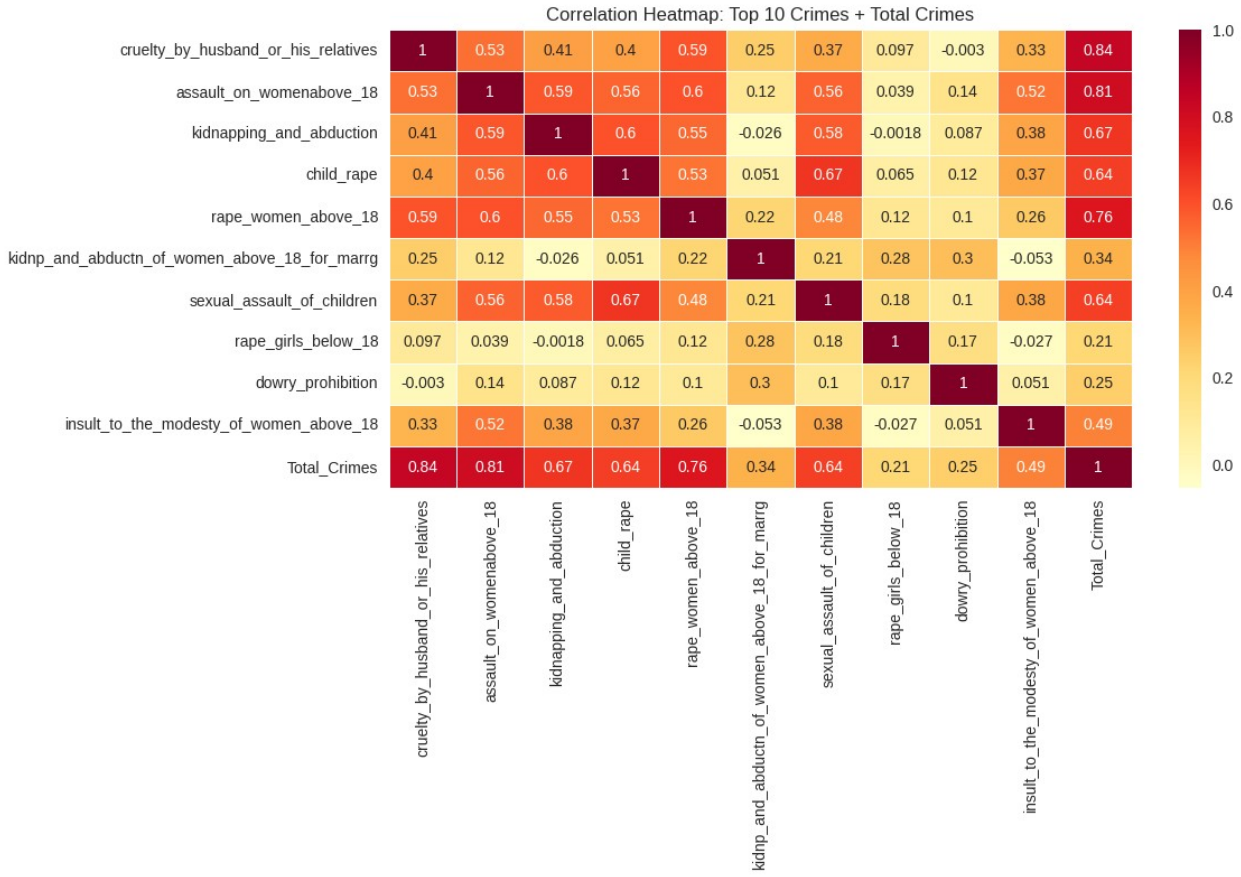
```
max                          148.000000                 184.00000

       pocso_act_unnatural_offences  indecent_representation_of_women
\
count                   5322.000000                       5322.000000

mean                       0.058249                          0.025930

std                        1.153013                          0.289652

min                        0.000000                          0.000000

25%                        0.000000                          0.000000

50%                        0.000000                          0.000000

75%                        0.000000                          0.000000

max                       79.000000                         10.000000


       Total_Crimes
count   5322.000000
mean     448.690718
std      519.822170
min        0.000000
25%       86.000000
50%      292.000000
75%      642.000000
max     6519.000000

[8 rows x 43 columns]
```




Top 5 Districts in Top 10 States by Total Crimes
Uttar Pradesh
Lucknow
Bareilly
Prayagraj
Kanpur Nagar
Aligarh
Maharashtra
Mumbai
Pune
Thane
Ahmednagar
Nashik
Rajasthan
Jaipur
Ajmer
Alwar
Jodhpur
Bhilwara
West Bengal
North 24 Parganas
South 24 Parganas
Murshidabad
Nadia
Kolkata
Madhya Pradesh
Indore
Bhopal
Jabalpur
Gwalior
Sagar
Assam
Dhubri
Nagaon
Barpeta
Kamrup Metro
Kamrup
Odisha
Baleshwar
Khordha
Ganjam
Mayurbhanj
Cuttack
Telangana
Hyderabad
Yadadri Bhuvanagiri
Warangal
Peddapalli
Nalgonda
Andhra Pradesh
Guntur
East Godavari
Visakhapatnam
Krishna
Kurnool
Bihar
Patna
Muzaffarpur
Bhagalpur
Saran
Purbi Champaran
district_name


Year-wise Trend of Total Crimes
Crimes
year
360000
380000
400000
420000
440000
2017
2018
2019
2020
2021
2022


Year-wise Crime Trend for Top 10 States
Uttar Pradesh
Maharashtra
Rajasthan
West Bengal
Madhya Pradesh
Assam
Odisha
Telangana
Andhra Pradesh
Bihar
Crimes
60000
50000
40000
30000
20000
2017
2018
2019
2020
2021
2022


Correlation Heatmap: Top 10 Crimes + Total Crimes
cruelty_by_husband_or_his_relatives 1 0.53 0.41 0.4 0.59 0.25 0.37 0.097 -0.003 0.33 0.84
assault_on_womenabove_18 0.53 1 0.59 0.56 0.6 0.12 0.56 0.039 0.14 0.52 0.81
kidnapping_and_abduction 0.41 0.59 1 0.6 0.55 -0.026 0.58 -0.0018 0.087 0.38 0.67
child_rape 0.4 0.56 0.6 1 0.53 0.051 0.67 0.065 0.12 0.37 0.64
rape_women_above_18 0.59 0.6 0.55 0.53 1 0.22 0.48 0.12 0.1 0.26 0.76
kidnp_and_abductn_of_women_above_18_for_marrg 0.25 0.12 -0.026 0.051 0.22 1 0.21 0.28 0.3 -0.053 0.34
sexual_assault_of_children 0.37 0.56 0.58 0.67 0.48 0.21 1 0.18 0.1 0.38 0.64
rape_girls_below_18 0.097 0.039 -0.0018 0.065 0.12 0.28 0.18 1 0.17 -0.027 0.21
dowry_prohibition -0.003 0.14 0.087 0.12 0.1 0.3 0.1 0.17 1 0.051 0.25
insult_to_the_modesty_of_women_above_18 0.33 0.52 0.38 0.37 0.26 -0.053 0.38 -0.027 0.051 1 0.49
Total_Crimes 0.84 0.81 0.67 0.64 0.76 0.34 0.64 0.21 0.25 0.49 1
cruelty_by_husband_or_his_relatives
assault_on_womenabove_18
kidnapping_and_abduction
child_rape
rape_women_above_18
kidnp_and_abductn_of_women_above_18_for_marrg
sexual_assault_of_children
rape_girls_below_18
dowry_prohibition
insult_to_the_modesty_of_women_above_18
Total_Crimes
1.0
0.8
0.6
0.4
0.2
0.0

 Percentage of Total Crimes by State:

Andaman And Nicobar Islands: 0.04%
Andhra Pradesh: 4.71%
Arunachal Pradesh: 0.08%
Assam: 6.30%
Bihar: 4.34%
Chandigarh: 0.10%
Chhattisgarh: 2.00%
Delhi: 3.30%
Goa: 0.07%
Gujarat: 2.03%
Haryana: 3.63%
Himachal Pradesh: 0.39%
Jammu And Kashmir: 0.87%
Jharkhand: 1.89%
Karnataka: 3.62%
Kerala: 2.98%
Ladakh: 0.00%
Lakshadweep: 0.01%
Madhya Pradesh: 7.34%
Maharashtra: 9.27%
Manipur: 0.07%
Meghalaya: 0.15%
Mizoram: 0.05%
Nagaland: 0.01%
Odisha: 6.03%
Puducherry: 0.03%
Punjab: 1.34%
Rajasthan: 9.03%
Sikkim: 0.04%
Tamil Nadu: 1.74%
Telangana: 4.72%
The Dadra And Nagar Haveli And Daman And Diu: 0.02%
Tripura: 0.23%
Uttar Pradesh: 14.59%
Uttarakhand: 0.67%
West Bengal: 8.33%

Total Crimes by State (Pie Chart)