In [1]:
```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import warnings
warnings.filterwarnings('ignore')
```

In [3]:
```
df = pd.read_csv('Capstone project phase 2.csv')
df
```

Out[3]:

	State	Year	Population of Each state	Litracy rate	Area in Sq Km	Type of Crime	Total Crimes	MURDER	ATTE MUF
0	Andhra Pradesh	2001	75728400	66.40	1,62,975	MURDER	130089	1555	
1	Arunachal Pradesh	2001	1098328	66.95	83,743	ATTEMPT TO MURDER	2342	53	
2	Assam	2001	26638600	73.18	78,438	CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	36877	481	
3	Bihar	2001	82879910	69.82	94,163	RAPE	88432	3419	
4	Chhattisgarh	2001	20834530	71.04	1,35,192	CUSTODIAL RAPE	38460	529	
...	...	...	...	...	...	...	...	...	
319	Tamil Nadu	2012	635963102	81.33	1,30,058	DOWRY DEATHS	200474	2954	
320	Tripura	2012	32659810	88.75	1,12,077	ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MO...	6264	79	
321	Uttar Pradesh	2012	179673604	69.78	2,40,928	INSULT TO MODESTY OF WOMEN	198093	4811	
322	Uttarakhand	2012	89449107	79.64	53,483	CRUELTY BY HUSBAND OR HIS RELATIVES	8882	161	
323	West Bengal	2012	86571309	78.08	88,752	IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES	161427	2854	

324 rows × 37 columns

In [4]:
```
# Display the first few rows of the dataset
print(df.head())
```

```
              State  Year  Population of Each state  Litracy rate  \
0     Andhra Pradesh  2001                  75728400         66.40
1  Arunachal Pradesh  2001                   1098328         66.95
2              Assam  2001                  26638600         73.18
3              Bihar  2001                  82879910         69.82
4       Chhattisgarh  2001                  20834530         71.04

  Area in Sq Km                                Type of Crime  Total Crimes
\
0       1,62,975                                      MURDER        130089
1         83,743                           ATTEMPT TO MURDER          2342
2         78,438  CULPABLE HOMICIDE NOT AMOUNTING TO MURDER         36877
3         94,163                                        RAPE         88432
4       1,35,192                              CUSTODIAL RAPE         38460

   MURDER  ATTEMPT TO MURDER  CULPABLE HOMICIDE NOT AMOUNTING TO MURDER
...  \
0    1555               1555                                       136
...
1      53                 53                                         3
...
2     481                481                                        40
...
3    3419               3419                                       250
...
4     529                529                                        45
...

   ARSON  HURT/GREVIOUS HURT  DOWRY DEATHS  \
0    872               34947           420
1     13                 466             0
2    441                5805            59
3    502                7544           859
4    215                5477            70

   ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MODESTY  \
0                                               3544
1                                                 78
2                                                850
3                                                562
4                                               1763

   INSULT TO MODESTY OF WOMEN  CRUELTY BY HUSBAND OR HIS RELATIVES  \
0                        2271                                5791
1                           3                                  11
2                           4                                1248
3                          21                                1558
4                         161                                 840

   IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES  CAUSING DEATH BY NEGLIGENC
E  \
0                                            7                        740
0
1                                            0
0
2                                            0                        201
0
3                                           83                        240
6
4                                            0                         68
9
```

	OTHER IPC CRIMES	TOTAL IPC CRIMES
0	34344	130089
1	618	2342
2	9315	36877
3	36667	88432
4	15790	38460

[5 rows x 37 columns]

In [6]:
```
# Convert 'Year' column to datetime format
df['Year'] = pd.to_datetime(df['Year'], format='%Y')
df
```

Out[6]:

	State	Year	Population of Each state	Litracy rate	Area in Sq Km	Type of Crime	Total Crimes	MURDER	ATT MU
0	Andhra Pradesh	2001-01-01	75728400	66.40	1,62,975	MURDER	130089	1555	
1	Arunachal Pradesh	2001-01-01	1098328	66.95	83,743	ATTEMPT TO MURDER	2342	53	
2	Assam	2001-01-01	26638600	73.18	78,438	CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	36877	481	
3	Bihar	2001-01-01	82879910	69.82	94,163	RAPE	88432	3419	
4	Chhattisgarh	2001-01-01	20834530	71.04	1,35,192	CUSTODIAL RAPE	38460	529	
...	...	...	...	...	...	...	...	...	
319	Tamil Nadu	2012-01-01	635963102	81.33	1,30,058	DOWRY DEATHS	200474	2954	
320	Tripura	2012-01-01	32659810	88.75	1,12,077	ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MO...	6264	79	
321	Uttar Pradesh	2012-01-01	179673604	69.78	2,40,928	INSULT TO MODESTY OF WOMEN	198093	4811	
322	Uttarakhand	2012-01-01	89449107	79.64	53,483	CRUELTY BY HUSBAND OR HIS RELATIVES	8882	161	
323	West Bengal	2012-01-01	86571309	78.08	88,752	IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES	161427	2854	

324 rows × 37 columns

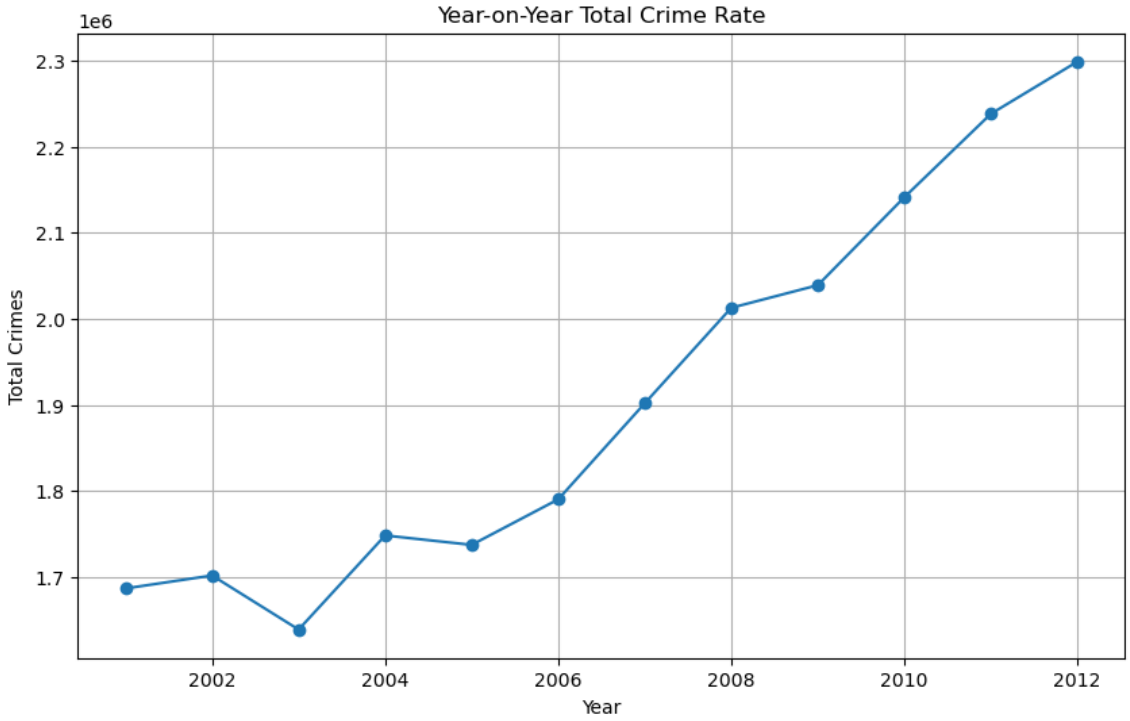
In [12]:
```
# Group by year and sum the total crime rates
crime_by_year = df.groupby(df['Year'].dt.year)['Total Crimes'].sum().reset_
df
```

Out[12]:

	State	Year	Population of Each state	Litracy rate	Area in Sq Km	Type of Crime	Total Crimes	MURDER	ATT MU
0	Andhra Pradesh	2001-01-01	75728400	66.40	1,62,975	MURDER	130089	1555	
1	Arunachal Pradesh	2001-01-01	1098328	66.95	83,743	ATTEMPT TO MURDER	2342	53	
2	Assam	2001-01-01	26638600	73.18	78,438	CULPABLE HOMICIDE NOT AMOUNTING TO MURDER	36877	481	
3	Bihar	2001-01-01	82879910	69.82	94,163	RAPE	88432	3419	
4	Chhattisgarh	2001-01-01	20834530	71.04	1,35,192	CUSTODIAL RAPE	38460	529	
...	...	...	...	...	...	...	...	...	
319	Tamil Nadu	2012-01-01	635963102	81.33	1,30,058	DOWRY DEATHS	200474	2954	
320	Tripura	2012-01-01	32659810	88.75	1,12,077	ASSAULT ON WOMEN WITH INTENT TO OUTRAGE HER MO...	6264	79	
321	Uttar Pradesh	2012-01-01	179673604	69.78	2,40,928	INSULT TO MODESTY OF WOMEN	198093	4811	
322	Uttarakhand	2012-01-01	89449107	79.64	53,483	CRUELTY BY HUSBAND OR HIS RELATIVES	8882	161	
323	West Bengal	2012-01-01	86571309	78.08	88,752	IMPORTATION OF GIRLS FROM FOREIGN COUNTRIES	161427	2854	

324 rows × 37 columns

In [13]:
```
# Plot the year-on-year total crime rates
plt.figure(figsize=(10, 6))
plt.plot(crime_by_year['Year'], crime_by_year['Total Crimes'], marker='o')
plt.title('Year-on-Year Total Crime Rate')
plt.xlabel('Year')
plt.ylabel('Total Crimes')
plt.grid(True)
plt.show()
```



In [ ]: