COVID-19 INDIA : EDA

Description: The Exploratory Data Analysis (EDA) of COVID-19 in India is a comprehensive and insightful examination of the impact and dynamics of the COVID-19 pandemic on the Indian subcontinent. This analysis leverages data collected from various sources, including government health departments, international organizations, and research institutions, to provide a detailed understanding of the virus's spread, its effects on public health, and the societal and economic implications it has had on one of the world's most populous countries.

Importing required Modules

1. Importing Required Modules
2. importing numpy for mathematical operation on arrays and dataframe.
3. importing pandas for reading data and data manipulation.
4. importing matplotlib and seaborn to show the insights and visualization from the dataset.
5. importing warnings for Warning messages that are typically issued in dataframe where it is useful to alert the user of some condition in a program, where that condition (normally) doesn't warrant raising an exception and terminating the program.

- Importing required libraries
- loading the data set
- Basic understanding of data

  -- checking shape

  -- checking info

  -- fetching columns names

  --- checking unique values

Importing Libraries

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Loading the Data

In [2]:

```
df = pd.read_csv("latest Covid-19 India Status1 (3).csv")
df
```

Out[2]:

	State/UTs	Total Cases	Active	Deaths	Active Ratio (%)	Death Ratio (%)
0	Maharashtra	6122893	117869	123857	1.93	2.02
1	Kerala	3011694	108400	14108	3.60	0.47
2	Karnataka	2862338	39626	35601	1.38	1.24
3	Tamil Nadu	2506848	34076	33196	1.36	1.32
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33
6	West Bengal	1508223	16655	17850	1.10	1.18
7	Delhi	1434780	858	25005	0.06	1.74
8	Chhattisgarh	996689	5017	13464	0.50	1.35
9	Rajasthan	952887	935	8942	0.10	0.94
10	Odisha	929788	25148	4358	2.70	0.47
11	Gujarat	824029	1969	10072	0.24	1.22
12	Madhya Pradesh	790070	441	9019	0.06	1.14
13	Haryana	769093	1066	9515	0.14	1.24
14	Bihar	722850	1183	9612	0.16	1.33
15	Telengana	629054	11472	3710	1.82	0.59
16	Punjab	596970	1964	16141	0.33	2.70
17	Assam	524556	23371	4743	4.46	0.90
18	Jharkhand	346113	532	5118	0.15	1.48
19	Uttarakhand	340959	1506	7338	0.44	2.15
20	Jammu and Kashmir	317761	34391	4349	1.08	1.37
21	Himachal Pradesh	203117	1338	3486	0.66	1.72
22	Goa	168015	1950	3082	1.16	1.83
23	Puducherry	118416	1753	1765	1.48	1.49
24	Manipur	74341	6534	1229	8.79	1.65
25	Tripura	69019	4122	703	5.97	1.02
26	Chandigarh	61780	99	809	0.16	1.31
27	Meghalaya	52712	4229	886	8.02	1.68
28	Arunachal Pradesh	38283	3363	184	8.78	0.48
29	Nagaland	25663	1070	505	4.17	1.97
30	Mizoram	22703	3960	100	17.44	0.44
31	Sikkim	21573	1975	311	9.15	1.44
32	Ladakh	20143	183	204	0.91	1.01
33	Dadra and Nagar Haveli and Daman and Diu	10576	38	4	0.36	0.04
34	Lakshadweep	9965	246	49	2.47	0.49
35	Andaman and Nicobar	7491	14	128	0.19	1.71

Preview of the Data

In [3]:

```
df.head()
```

Out[3]:

	State/UTs	Total Cases	Active	Deaths	Active Ratio (%)	Death Ratio (%)
0	Maharashtra	6122893	117869	123857	1.93	2.02
1	Kerala	3011694	108400	14108	3.60	0.47
2	Karnataka	2862338	39626	35601	1.38	1.24
3	Tamil Nadu	2506848	34076	33196	1.36	1.32
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68

In [4]:

```
df.shape
```

Out[4]:

```
(36, 6)
```

In [5]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 36 entries, 0 to 35
Data columns (total 6 columns):
 #   Column            Non-Null Count  Dtype  
---  ------            --------------  -----  
 0   State/UTs         36 non-null     object 
 1   Total Cases       36 non-null     int64  
 2   Active            36 non-null     int64  
 3   Deaths            36 non-null     int64  
 4   Active Ratio (%)  36 non-null     float64
 5   Death Ratio (%)   36 non-null     float64
dtypes: float64(2), int64(3), object(1)
memory usage: 1.8+ KB
```

In [6]:

```
df.isnull().sum()
```

Out[6]:

```
State/UTs           0
Total Cases         0
Active              0
Deaths              0
Active Ratio (%)    0
Death Ratio (%)     0
dtype: int64
```

In [7]:

```
df.columns
```

Out[7]:

```
Index(['State/UTs', 'Total Cases', 'Active', 'Deaths', 'Active Ratio (%)',
       'Death Ratio (%)'],
      dtype='object')
```

Featuring Engineering and Insights

In [8]:

```
df.columns = ["States","total_cases","active_cases","death_cases","active_ratio","death_
```

In [9]:

```
df
```

Out[9]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio
0	Maharashtra	6122893	117869	123857	1.93	2.02
1	Kerala	3011694	108400	14108	3.60	0.47
2	Karnataka	2862338	39626	35601	1.38	1.24
3	Tamil Nadu	2506848	34076	33196	1.36	1.32
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33
6	West Bengal	1508223	16655	17850	1.10	1.18
7	Delhi	1434780	858	25005	0.06	1.74
8	Chhattisgarh	996689	5017	13464	0.50	1.35
9	Rajasthan	952887	935	8942	0.10	0.94
10	Odisha	929788	25148	4358	2.70	0.47
11	Gujarat	824029	1969	10072	0.24	1.22
12	Madhya Pradesh	790070	441	9019	0.06	1.14
13	Haryana	769093	1066	9515	0.14	1.24
14	Bihar	722850	1183	9612	0.16	1.33
15	Telengana	629054	11472	3710	1.82	0.59
16	Punjab	596970	1964	16141	0.33	2.70
17	Assam	524556	23371	4743	4.46	0.90
18	Jharkhand	346113	532	5118	0.15	1.48
19	Uttarakhand	340959	1506	7338	0.44	2.15
20	Jammu and Kashmir	317761	34391	4349	1.08	1.37
21	Himachal Pradesh	203117	1338	3486	0.66	1.72
22	Goa	168015	1950	3082	1.16	1.83
23	Puducherry	118416	1753	1765	1.48	1.49
24	Manipur	74341	6534	1229	8.79	1.65
25	Tripura	69019	4122	703	5.97	1.02
26	Chandigarh	61780	99	809	0.16	1.31
27	Meghalaya	52712	4229	886	8.02	1.68
28	Arunachal Pradesh	38283	3363	184	8.78	0.48
29	Nagaland	25663	1070	505	4.17	1.97
30	Mizoram	22703	3960	100	17.44	0.44
31	Sikkim	21573	1975	311	9.15	1.44
32	Ladakh	20143	183	204	0.91	1.01
33	Dadra and Nagar Haveli and Daman and Diu	10576	38	4	0.36	0.04
34	Lakshadweep	9965	246	49	2.47	0.49
35	Andaman and Nicobar	7491	14	128	0.19	1.71

In [10]:

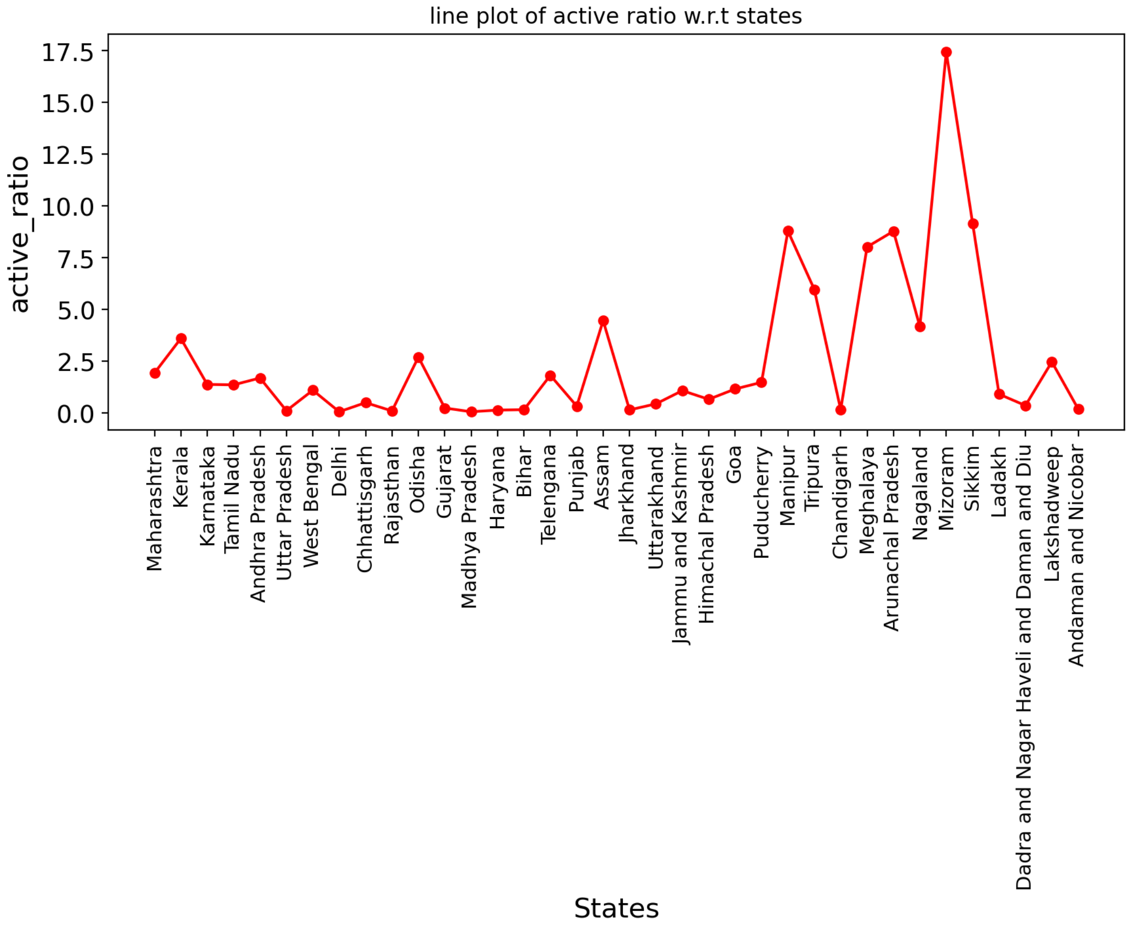
```
df.sort_values(by="active_ratio",ascending=False)
```

Out[10]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio
30	Mizoram	22703	3960	100	17.44	0.44
31	Sikkim	21573	1975	311	9.15	1.44
24	Manipur	74341	6534	1229	8.79	1.65
28	Arunachal Pradesh	38283	3363	184	8.78	0.48
27	Meghalaya	52712	4229	886	8.02	1.68
25	Tripura	69019	4122	703	5.97	1.02
17	Assam	524556	23371	4743	4.46	0.90
29	Nagaland	25663	1070	505	4.17	1.97
1	Kerala	3011694	108400	14108	3.60	0.47
10	Odisha	929788	25148	4358	2.70	0.47
34	Lakshadweep	9965	246	49	2.47	0.49
0	Maharashtra	6122893	117869	123857	1.93	2.02
15	Telengana	629054	11472	3710	1.82	0.59
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68
23	Puducherry	118416	1753	1765	1.48	1.49
2	Karnataka	2862338	39626	35601	1.38	1.24
3	Tamil Nadu	2506848	34076	33196	1.36	1.32
22	Goa	168015	1950	3082	1.16	1.83
6	West Bengal	1508223	16655	17850	1.10	1.18
20	Jammu and Kashmir	317761	34391	4349	1.08	1.37
32	Ladakh	20143	183	204	0.91	1.01
21	Himachal Pradesh	203117	1338	3486	0.66	1.72
8	Chhattisgarh	996689	5017	13464	0.50	1.35
19	Uttarakhand	340959	1506	7338	0.44	2.15
33	Dadra and Nagar Haveli and Daman and Diu	10576	38	4	0.36	0.04
16	Punjab	596970	1964	16141	0.33	2.70
11	Gujarat	824029	1969	10072	0.24	1.22
35	Andaman and Nicobar	7491	14	128	0.19	1.71
26	Chandigarh	61780	99	809	0.16	1.31
14	Bihar	722850	1183	9612	0.16	1.33
18	Jharkhand	346113	532	5118	0.15	1.48
13	Haryana	769093	1066	9515	0.14	1.24
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33
9	Rajasthan	952887	935	8942	0.10	0.94
12	Madhya Pradesh	790070	441	9019	0.06	1.14
7	Delhi	1434780	858	25005	0.06	1.74

In [11]:

```
# density of pixel which increases the clarity
plt.figure(figsize=(10,4),dpi=200)
plt.plot(df['States'],df['active_ratio'],color="red",marker="o",markersize=5)
plt.xticks(rotation=90,fontsize=11)
#plt.xticks(rotation="vertical",fontsize=11)
plt.yticks(fontsize = 13.5)
plt.xlabel("States",fontsize=15)
plt.ylabel("active_ratio",fontsize=15)
plt.title("line plot of active ratio w.r.t states")
plt.show()
```



In [20]:

```
# total cases by each state  and the highest one
a = df.sort_values(by="total_cases",ascending=False)
a
```

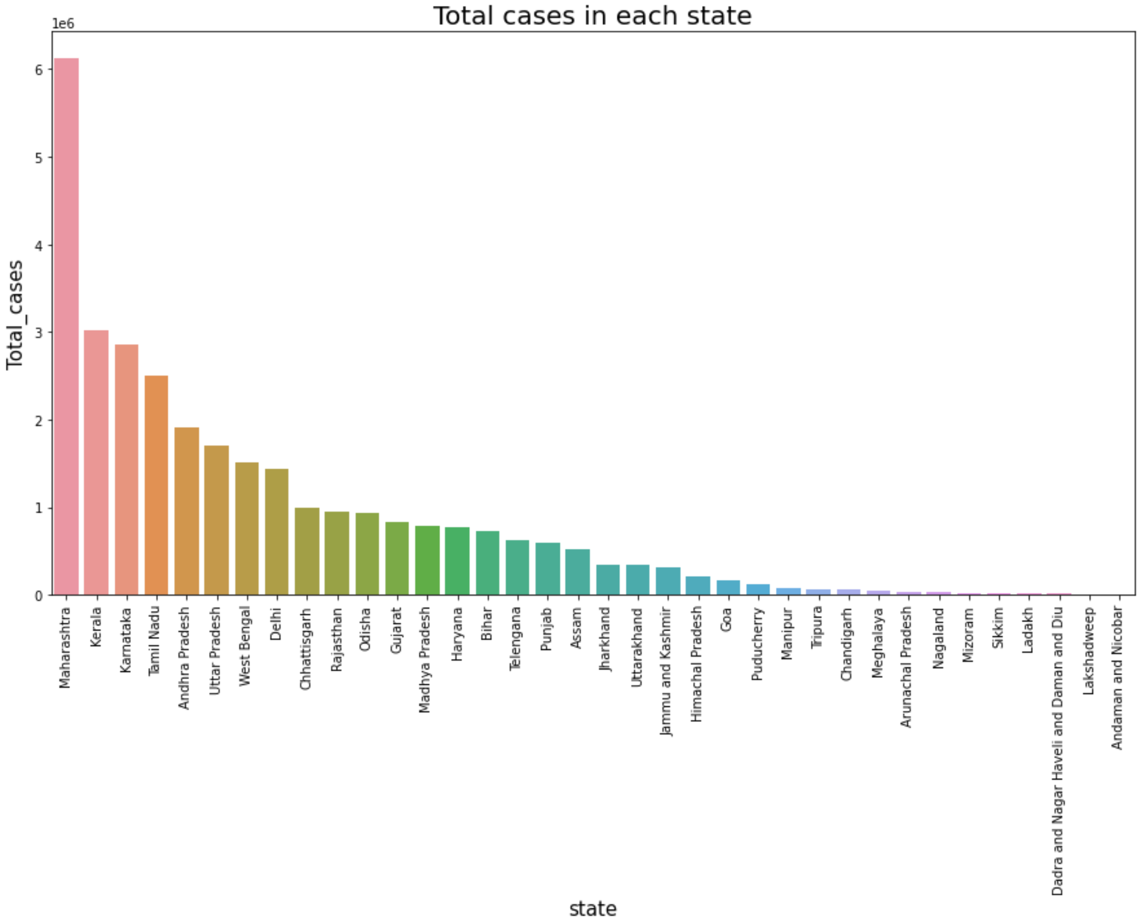
Out[20]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
0	Maharashtra	6122893	117869	123857	1.93	2.02	5
1	Kerala	3011694	108400	14108	3.60	0.47	2
2	Karnataka	2862338	39626	35601	1.38	1.24	2
3	Tamil Nadu	2506848	34076	33196	1.36	1.32	2
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68	1
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33	1
6	West Bengal	1508223	16655	17850	1.10	1.18	1
7	Delhi	1434780	858	25005	0.06	1.74	1
8	Chhattisgarh	996689	5017	13464	0.50	1.35	
9	Rajasthan	952887	935	8942	0.10	0.94	
10	Odisha	929788	25148	4358	2.70	0.47	
11	Gujarat	824029	1969	10072	0.24	1.22	
12	Madhya Pradesh	790070	441	9019	0.06	1.14	
13	Haryana	769093	1066	9515	0.14	1.24	
14	Bihar	722850	1183	9612	0.16	1.33	
15	Telengana	629054	11472	3710	1.82	0.59	
16	Punjab	596970	1964	16141	0.33	2.70	
17	Assam	524556	23371	4743	4.46	0.90	
18	Jharkhand	346113	532	5118	0.15	1.48	
19	Uttarakhand	340959	1506	7338	0.44	2.15	
20	Jammu and Kashmir	317761	34391	4349	1.08	1.37	
21	Himachal Pradesh	203117	1338	3486	0.66	1.72	
22	Goa	168015	1950	3082	1.16	1.83	
23	Puducherry	118416	1753	1765	1.48	1.49	
24	Manipur	74341	6534	1229	8.79	1.65	
25	Tripura	69019	4122	703	5.97	1.02	
26	Chandigarh	61780	99	809	0.16	1.31	
27	Meghalaya	52712	4229	886	8.02	1.68	
28	Arunachal Pradesh	38283	3363	184	8.78	0.48	
29	Nagaland	25663	1070	505	4.17	1.97	
30	Mizoram	22703	3960	100	17.44	0.44	
31	Sikkim	21573	1975	311	9.15	1.44	
32	Ladakh	20143	183	204	0.91	1.01	

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
33	Dadra and Nagar Haveli and Daman and Diu	10576	38	4	0.36	0.04	
34	Lakshadweep	9965	246	49	2.47	0.49	
35	Andaman and Nicobar	7491	14	128	0.19	1.71	

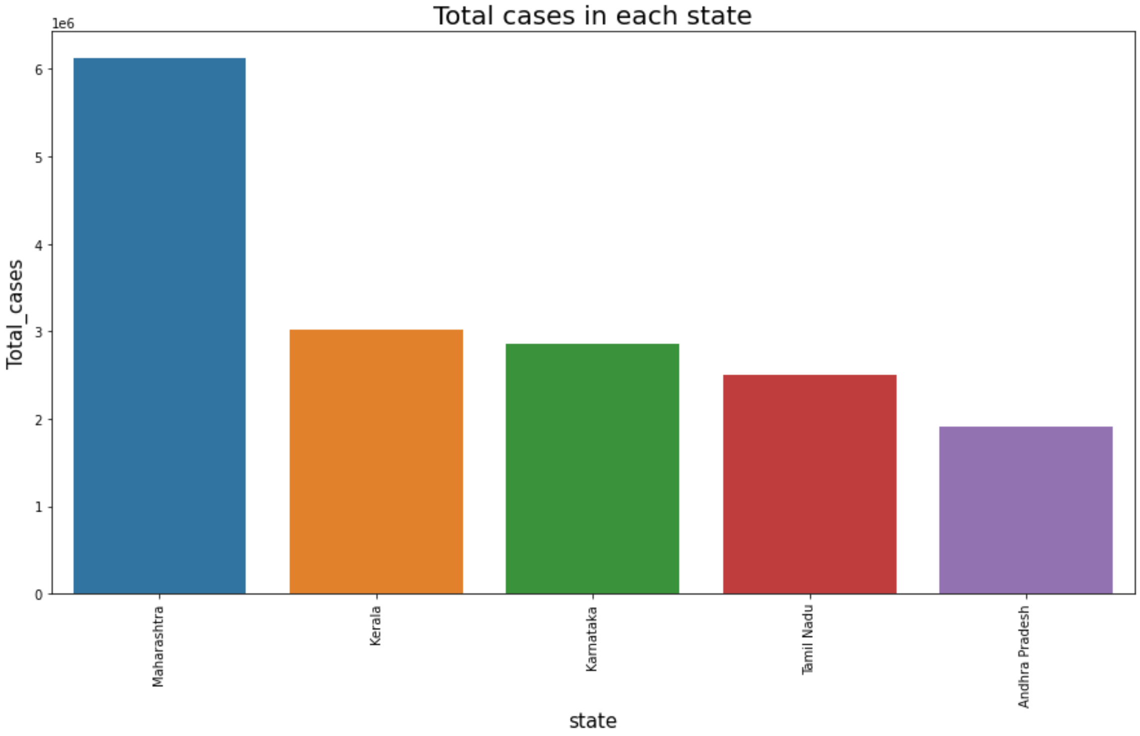
In [22]:

```
plt.figure(figsize=(15,8))
plt.xticks(rotation=90)
sns.barplot(x="States",y="total_cases",data=a)
plt.title("Total cases in each state",fontsize=20)
plt.xlabel("state",fontsize=15)
plt.ylabel("Total_cases",fontsize=15)
plt.show()
```



In [24]:

```
# for top 5
plt.figure(figsize=(15,8))
plt.xticks(rotation=90)
sns.barplot(x="States",y="total_cases",data=a.head())
plt.title("Total cases in each state",fontsize=20)
plt.xlabel("state",fontsize=15)
plt.ylabel("Total_cases",fontsize=15)
plt.show()
```



Maharashtra has the highest number of total cases in India, Kerala and Karnataka rank second and third although there is not much difference between their total counts.

In [26]:

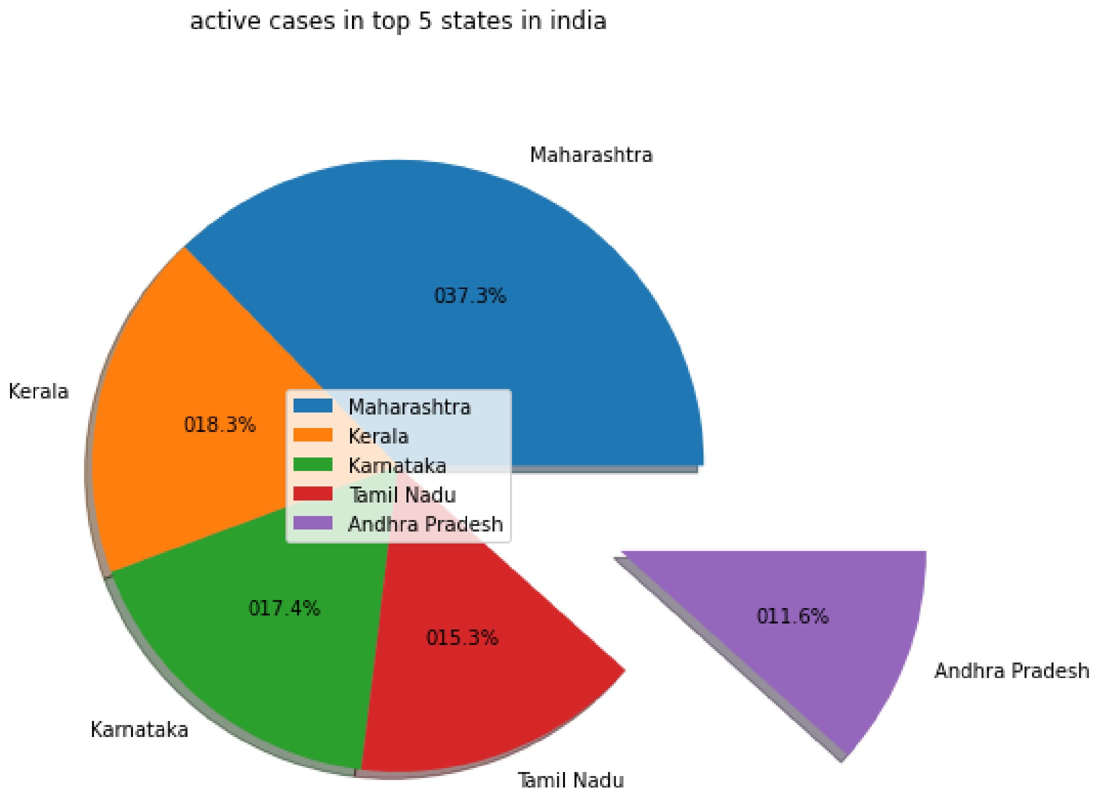
```
top_10 = a[:10]
top_10
```

Out[26]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered_c
0	Maharashtra	6122893	117869	123857	1.93	2.02	588
1	Kerala	3011694	108400	14108	3.60	0.47	288
2	Karnataka	2862338	39626	35601	1.38	1.24	278
3	Tamil Nadu	2506848	34076	33196	1.36	1.32	243
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68	186
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33	168
6	West Bengal	1508223	16655	17850	1.10	1.18	147
7	Delhi	1434780	858	25005	0.06	1.74	140
8	Chhattisgarh	996689	5017	13464	0.50	1.35	97
9	Rajasthan	952887	935	8942	0.10	0.94	94

In [25]:

```
# pie chart of active cases in top 5 states in india
plt.figure(figsize=(8,8))
L = [0,0,0,0,0.7]
plt.pie(x="total_cases",data=a.head(),labels="States",autopct="0%.1f%%",radius=0.9,explo
plt.title("active cases in top 5 states in india")
plt.legend(loc="center")
plt.show()
```



In [28]:

```
df.sort_values(by='death_ratio',ascending=False)
```

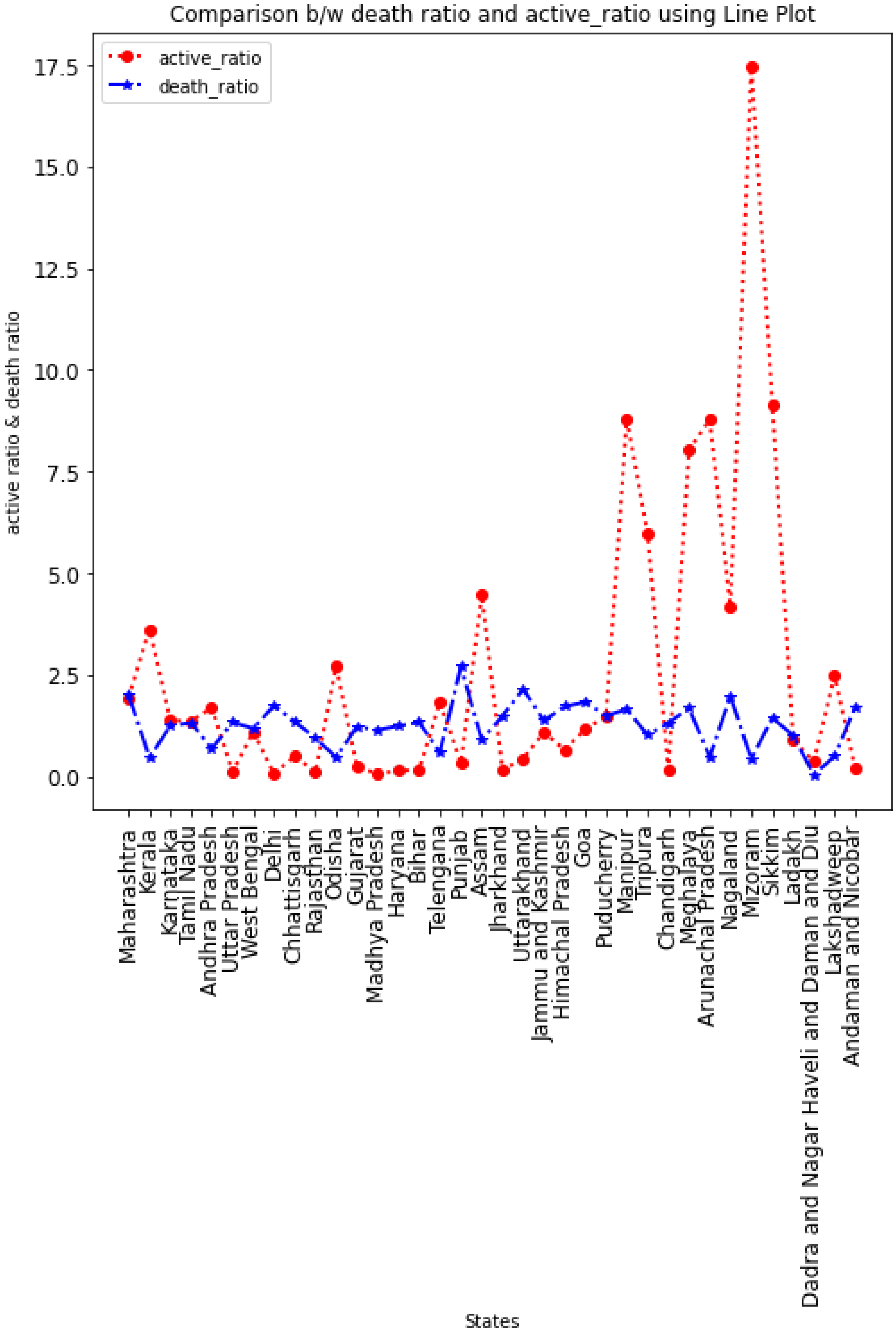
Out[28]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
16	Punjab	596970	1964	16141	0.33	2.70	
19	Uttarakhand	340959	1506	7338	0.44	2.15	
0	Maharashtra	6122893	117869	123857	1.93	2.02	5
29	Nagaland	25663	1070	505	4.17	1.97	
22	Goa	168015	1950	3082	1.16	1.83	
7	Delhi	1434780	858	25005	0.06	1.74	1
21	Himachal Pradesh	203117	1338	3486	0.66	1.72	
35	Andaman and Nicobar	7491	14	128	0.19	1.71	
27	Meghalaya	52712	4229	886	8.02	1.68	
24	Manipur	74341	6534	1229	8.79	1.65	
23	Puducherry	118416	1753	1765	1.48	1.49	
18	Jharkhand	346113	532	5118	0.15	1.48	
31	Sikkim	21573	1975	311	9.15	1.44	
20	Jammu and Kashmir	317761	34391	4349	1.08	1.37	
8	Chhattisgarh	996689	5017	13464	0.50	1.35	
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33	1
14	Bihar	722850	1183	9612	0.16	1.33	
3	Tamil Nadu	2506848	34076	33196	1.36	1.32	2
26	Chandigarh	61780	99	809	0.16	1.31	
2	Karnataka	2862338	39626	35601	1.38	1.24	2
13	Haryana	769093	1066	9515	0.14	1.24	
11	Gujarat	824029	1969	10072	0.24	1.22	
6	West Bengal	1508223	16655	17850	1.10	1.18	1
12	Madhya Pradesh	790070	441	9019	0.06	1.14	
25	Tripura	69019	4122	703	5.97	1.02	
32	Ladakh	20143	183	204	0.91	1.01	
9	Rajasthan	952887	935	8942	0.10	0.94	
17	Assam	524556	23371	4743	4.46	0.90	
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68	1
15	Telengana	629054	11472	3710	1.82	0.59	
34	Lakshadweep	9965	246	49	2.47	0.49	
28	Arunachal Pradesh	38283	3363	184	8.78	0.48	
1	Kerala	3011694	108400	14108	3.60	0.47	2
10	Odisha	929788	25148	4358	2.70	0.47	

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
30	Mizoram	22703	3960	100	17.44	0.44	
33	Dadra and Nagar Haveli and Daman and Diu	10576	38	4	0.36	0.04	

In [29]:

```
plt.figure(figsize=(8,8))
plt.plot(df["States"],df["active_ratio"],color="red",linestyle=":",linewidth=2,marker="o
plt.title("Comparison b/w death ratio and active_ratio using Line Plot")
plt.plot(df["States"],df["death_ratio"],color="blue",linestyle="-.",linewidth=2,marker="
plt.xticks(rotation=90,fontsize=12)
plt.yticks(fontsize=12)
plt.xlabel("States")
plt.ylabel("active ratio & death ratio")
plt.legend()
plt.show()
```

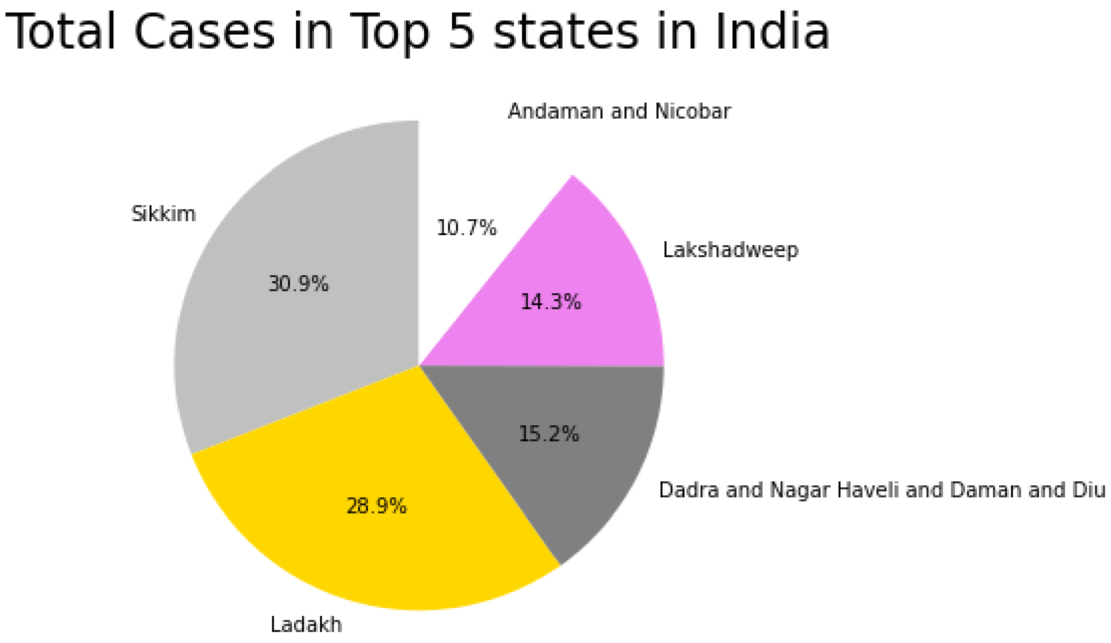


pie chart of total cases in top 5 states in India

In [31]:

```
plt.figure(figsize=(7,7))

l=['silver','gold','grey','violet','white']
plt.pie(x='total_cases', data=df.tail(5),colors=l, labels='States', startangle=90,autopc
plt.title("Total Cases in Top 5 states in India", fontsize = 24)
plt.tight_layout()
plt.show()
```



In [16]:

```
# calculating recovered cases
df["recovered_cases"]= df["total_cases"]-(df["active_cases"]+df["death_cases"])
df
```

Out[16]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
0	Maharashtra	6122893	117869	123857	1.93	2.02	5
1	Kerala	3011694	108400	14108	3.60	0.47	2
2	Karnataka	2862338	39626	35601	1.38	1.24	2
3	Tamil Nadu	2506848	34076	33196	1.36	1.32	2
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68	1
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33	1
6	West Bengal	1508223	16655	17850	1.10	1.18	1
7	Delhi	1434780	858	25005	0.06	1.74	1
8	Chhattisgarh	996689	5017	13464	0.50	1.35	
9	Rajasthan	952887	935	8942	0.10	0.94	
10	Odisha	929788	25148	4358	2.70	0.47	
11	Gujarat	824029	1969	10072	0.24	1.22	
12	Madhya Pradesh	790070	441	9019	0.06	1.14	
13	Haryana	769093	1066	9515	0.14	1.24	
14	Bihar	722850	1183	9612	0.16	1.33	
15	Telengana	629054	11472	3710	1.82	0.59	
16	Punjab	596970	1964	16141	0.33	2.70	
17	Assam	524556	23371	4743	4.46	0.90	
18	Jharkhand	346113	532	5118	0.15	1.48	
19	Uttarakhand	340959	1506	7338	0.44	2.15	
20	Jammu and Kashmir	317761	34391	4349	1.08	1.37	
21	Himachal Pradesh	203117	1338	3486	0.66	1.72	
22	Goa	168015	1950	3082	1.16	1.83	
23	Puducherry	118416	1753	1765	1.48	1.49	
24	Manipur	74341	6534	1229	8.79	1.65	
25	Tripura	69019	4122	703	5.97	1.02	
26	Chandigarh	61780	99	809	0.16	1.31	
27	Meghalaya	52712	4229	886	8.02	1.68	
28	Arunachal Pradesh	38283	3363	184	8.78	0.48	
29	Nagaland	25663	1070	505	4.17	1.97	
30	Mizoram	22703	3960	100	17.44	0.44	
31	Sikkim	21573	1975	311	9.15	1.44	
32	Ladakh	20143	183	204	0.91	1.01	

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
33	Dadra and Nagar Haveli and Daman and Diu	10576	38	4	0.36	0.04	
34	Lakshadweep	9965	246	49	2.47	0.49	
35	Andaman and Nicobar	7491	14	128	0.19	1.71	

In [17]:

```
(5881167/6122893)*100
```

Out[17]:

```
96.05209498189826
```

In [18]:

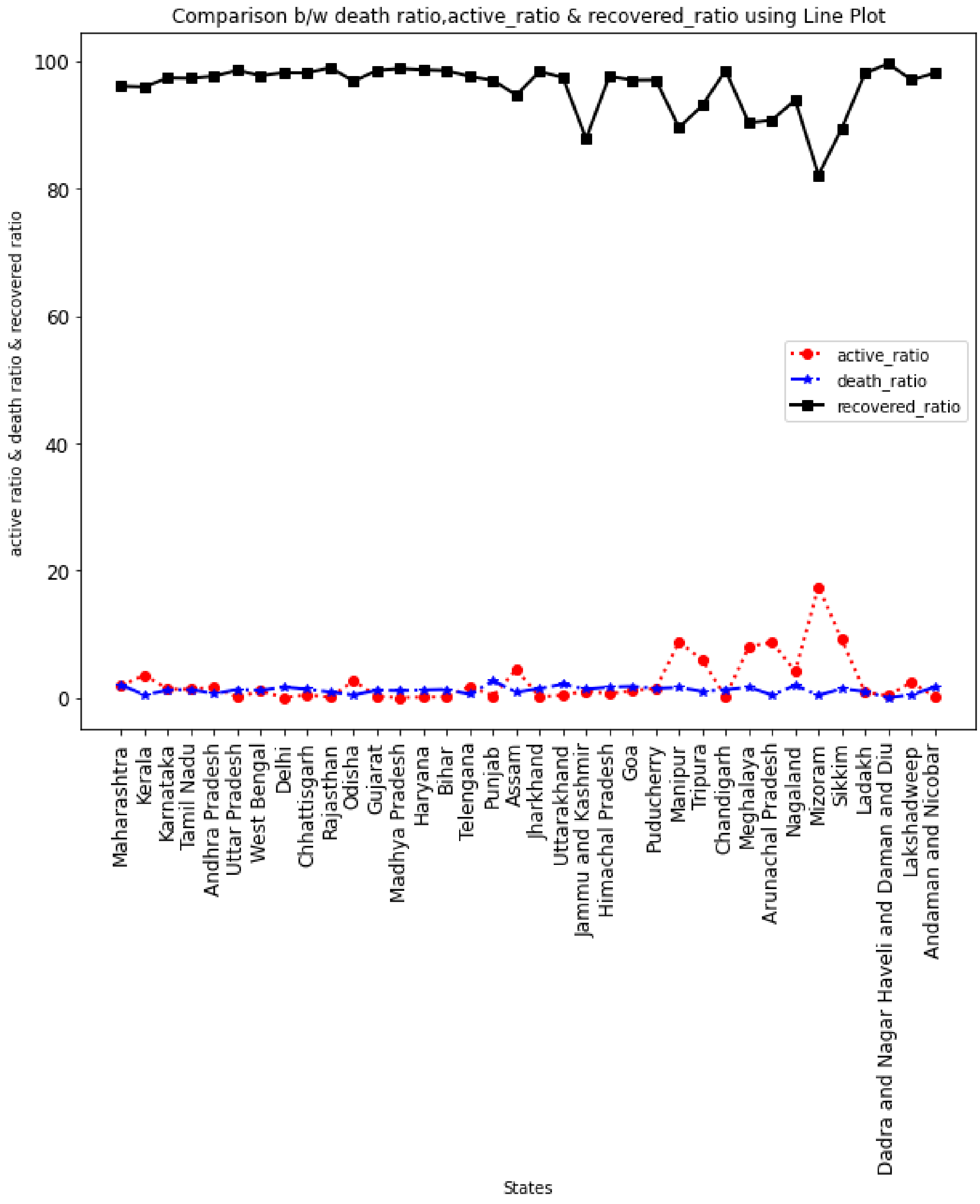
```
df["recovered_ratio"]=(df["recovered_cases"]/df["total_cases"])*100
df
```

Out[18]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered_cases	recov
0	Maharashtra	6122893	117869	123857	1.93	2.02	5881167	
1	Kerala	3011694	108400	14108	3.60	0.47	2889186	
2	Karnataka	2862338	39626	35601	1.38	1.24	2787111	
3	Tamil Nadu	2506848	34076	33196	1.36	1.32	2439576	
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68	1865956	
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33	1682321	
6	West Bengal	1508223	16655	17850	1.10	1.18	1473718	
7	Delhi	1434780	858	25005	0.06	1.74	1408917	
8	Chhattisgarh	996689	5017	13464	0.50	1.35	978208	

In [19]:

```
plt.figure(figsize=(10,8))
plt.plot(df["States"],df["active_ratio"],color="red",linestyle=":",linewidth=2,marker="o
plt.title("Comparison b/w death ratio,active_ratio & recovered_ratio using Line Plot")
plt.plot(df["States"],df["death_ratio"],color="blue",linestyle="-.",linewidth=2,marker="
plt.plot(df["States"],df["recovered_ratio"],color="black",linestyle="-",linewidth=2,mark
plt.xticks(rotation=90,fontsize=12)
plt.yticks(fontsize=12)
plt.xlabel("States")
plt.ylabel("active ratio & death ratio & recovered ratio")
plt.legend()
plt.show()
```



In [32]:

```
df.sort_values(by='recovered_cases',ascending=False)
```

Out[32]:

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
0	Maharashtra	6122893	117869	123857	1.93	2.02	5
1	Kerala	3011694	108400	14108	3.60	0.47	2
2	Karnataka	2862338	39626	35601	1.38	1.24	2
3	Tamil Nadu	2506848	34076	33196	1.36	1.32	2
4	Andhra Pradesh	1911231	32356	12919	1.69	0.68	1
5	Uttar Pradesh	1706934	1947	22666	0.11	1.33	1
6	West Bengal	1508223	16655	17850	1.10	1.18	1
7	Delhi	1434780	858	25005	0.06	1.74	1
8	Chhattisgarh	996689	5017	13464	0.50	1.35	
9	Rajasthan	952887	935	8942	0.10	0.94	
10	Odisha	929788	25148	4358	2.70	0.47	
11	Gujarat	824029	1969	10072	0.24	1.22	
12	Madhya Pradesh	790070	441	9019	0.06	1.14	
13	Haryana	769093	1066	9515	0.14	1.24	
14	Bihar	722850	1183	9612	0.16	1.33	
15	Telengana	629054	11472	3710	1.82	0.59	
16	Punjab	596970	1964	16141	0.33	2.70	
17	Assam	524556	23371	4743	4.46	0.90	
18	Jharkhand	346113	532	5118	0.15	1.48	
19	Uttarakhand	340959	1506	7338	0.44	2.15	
20	Jammu and Kashmir	317761	34391	4349	1.08	1.37	
21	Himachal Pradesh	203117	1338	3486	0.66	1.72	
22	Goa	168015	1950	3082	1.16	1.83	
23	Puducherry	118416	1753	1765	1.48	1.49	
24	Manipur	74341	6534	1229	8.79	1.65	
25	Tripura	69019	4122	703	5.97	1.02	
26	Chandigarh	61780	99	809	0.16	1.31	
27	Meghalaya	52712	4229	886	8.02	1.68	
28	Arunachal Pradesh	38283	3363	184	8.78	0.48	
29	Nagaland	25663	1070	505	4.17	1.97	
32	Ladakh	20143	183	204	0.91	1.01	
31	Sikkim	21573	1975	311	9.15	1.44	
30	Mizoram	22703	3960	100	17.44	0.44	

	States	total_cases	active_cases	death_cases	active_ratio	death_ratio	recovered
33	Dadra and Nagar Haveli and Daman and Diu	10576	38	4	0.36	0.04	
34	Lakshadweep	9965	246	49	2.47	0.49	
35	Andaman and Nicobar	7491	14	128	0.19	1.71	

In [33]:

```
rec_cases = df.groupby('States')['recovered_cases'].max().sort_values(ascending=False).r
rec_cases
```

Out[33]:

	States	recovered_cases
0	Maharashtra	5881167
1	Kerala	2889186
2	Karnataka	2787111
3	Tamil Nadu	2439576
4	Andhra Pradesh	1865956
5	Uttar Pradesh	1682321
6	West Bengal	1473718
7	Delhi	1408917
8	Chhattisgarh	978208
9	Rajasthan	943010
10	Odisha	900282
11	Gujarat	811988
12	Madhya Pradesh	780610
13	Haryana	758512
14	Bihar	712055
15	Telengana	613872
16	Punjab	578865
17	Assam	496442
18	Jharkhand	340463
19	Uttarakhand	332115
20	Jammu and Kashmir	279021
21	Himachal Pradesh	198293
22	Goa	162983
23	Puducherry	114898
24	Manipur	66578
25	Tripura	64194
26	Chandigarh	60872
27	Meghalaya	47597
28	Arunachal Pradesh	34736
29	Nagaland	24088
30	Ladakh	19756
31	Sikkim	19287
32	Mizoram	18643
33	Dadra and Nagar Haveli and Daman and Diu	10534
34	Lakshadweep	9670
35	Andaman and Nicobar	7349