Unemployment Analysis with Python

Unemployment is measured by the unemployment rate which is the number of people who are unemployed as a percentage of the total labour force. We have seen a sharp increase in the unemployment rate during Covid-19, so analyzing the unemployment rate can be a good data science project. In this article, I will take you through the task of Unemployment analysis with Python.

The unemployment rate is calculated based on a particular region, so to analyze unemployment I will be using an unemployment dataset of India. The dataset I'm using here contains data on India's unemployment rate during Covid-19. So let's start the task of Unemployment analysis by importing the necessary Python libraries and the dataset

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import cv2
import plotly.express as px

%matplotlib inline
```

Data Collecting

In [2]:
```
data = pd.read_csv(r".\\data\Unemployment_Analysis_data.csv")
data.head()
```

Out[2]:

	Region	Date	Frequency	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Region.1	longitude	latitude
0	Andhra Pradesh	31-01-2020	M	5.48	16635535	41.02	South	15.9129	79.74
1	Andhra Pradesh	29-02-2020	M	5.83	16545652	40.90	South	15.9129	79.74
2	Andhra Pradesh	31-03-2020	M	5.79	15881197	39.18	South	15.9129	79.74
3	Andhra Pradesh	30-04-2020	M	20.51	11336911	33.10	South	15.9129	79.74
4	Andhra Pradesh	31-05-2020	M	17.43	12988845	36.46	South	15.9129	79.74

In [3]:
```
print(data.head())
```

```
          Region         Date  Frequency   Estimated Unemployment Rate (%)  \
0  Andhra Pradesh   31-01-2020          M                              5.48
1  Andhra Pradesh   29-02-2020          M                              5.83
2  Andhra Pradesh   31-03-2020          M                              5.79
3  Andhra Pradesh   30-04-2020          M                             20.51
4  Andhra Pradesh   31-05-2020          M                             17.43

    Estimated Employed   Estimated Labour Participation Rate (%) Region.1  \
0             16635535                                    41.02    South
1             16545652                                    40.90    South
2             15881197                                    39.18    South
3             11336911                                    33.10    South
4             12988845                                    36.46    South

   longitude  latitude
0    15.9129     79.74
1    15.9129     79.74
2    15.9129     79.74
3    15.9129     79.74
4    15.9129     79.74
```

Data Pre_Processing

In [5]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 267 entries, 0 to 266
Data columns (total 9 columns):
 #   Column                                   Non-Null Count  Dtype
---  ------                                   --------------  -----
 0   Region                                   267 non-null    object
 1   Date                                     267 non-null    object
 2    Frequency                               267 non-null    object
 3    Estimated Unemployment Rate (%)         267 non-null    float64
```

```
 4   Estimated Employed                            267 non-null    int64
 5   Estimated Labour Participation Rate (%)       267 non-null    float64
 6   Region.1                                      267 non-null    object
 7   longitude                                     267 non-null    float64
 8   latitude                                      267 non-null    float64
dtypes: float64(4), int64(1), object(4)
memory usage: 18.9+ KB
```

In [6]:
```
data.describe()
```

Out[6]:

	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	longitude	latitude
count	267.000000	2.670000e+02	267.000000	267.000000	267.000000
mean	12.236929	1.396211e+07	41.681573	22.826048	80.532425
std	10.803283	1.336632e+07	7.845419	6.270731	5.831738
min	0.500000	1.175420e+05	16.770000	10.850500	71.192400
25%	4.845000	2.838930e+06	37.265000	18.112400	76.085600
50%	9.650000	9.732417e+06	40.390000	23.610200	79.019300
75%	16.755000	2.187869e+07	44.055000	27.278400	85.279900
max	75.850000	5.943376e+07	69.690000	33.778200	92.937600

In [8]:
```
print(data.describe())
```

```
       Estimated Unemployment Rate (%)   Estimated Employed  \
count                       267.000000        2.670000e+02
mean                         12.236929        1.396211e+07
std                          10.803283        1.336632e+07
min                           0.500000        1.175420e+05
25%                           4.845000        2.838930e+06
50%                           9.650000        9.732417e+06
75%                          16.755000        2.187869e+07
max                          75.850000        5.943376e+07

       Estimated Labour Participation Rate (%)   longitude    latitude
count                                267.000000  267.000000  267.000000
mean                                  41.681573   22.826048   80.532425
std                                    7.845419    6.270731    5.831738
min                                   16.770000   10.850500   71.192400
25%                                   37.265000   18.112400   76.085600
50%                                   40.390000   23.610200   79.019300
75%                                   44.055000   27.278400   85.279900
max                                   69.690000   33.778200   92.937600
```

In [10]:
```
data.columns
```

Out[10]:
```
Index(['Region', 'Date', ' Frequency', ' Estimated Unemployment Rate (%)',
       ' Estimated Employed', ' Estimated Labour Participation Rate (%)',
       'Region.1', 'longitude', 'latitude'],
      dtype='object')
```

Let's see if this dataset contains missing values or not

In [15]:
```
data.isnull()
```

Out[15]:

	Region	Date	Frequency	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Region.1	longitude	latitude
0	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...
262	False	False	False	False	False	False	False	False	False
263	False	False	False	False	False	False	False	False	False
264	False	False	False	False	False	False	False	False	False
265	False	False	False	False	False	False	False	False	False
266	False	False	False	False	False	False	False	False	False

267 rows × 9 columns

In [18]:
```
print(data.isnull().sum())
```

```
Region                                        0
Date                                          0
 Frequency                                    0
 Estimated Unemployment Rate (%)              0
 Estimated Employed                           0
 Estimated Labour Participation Rate (%)      0
Region.1                                      0
longitude                                     0
latitude                                      0
dtype: int64
```

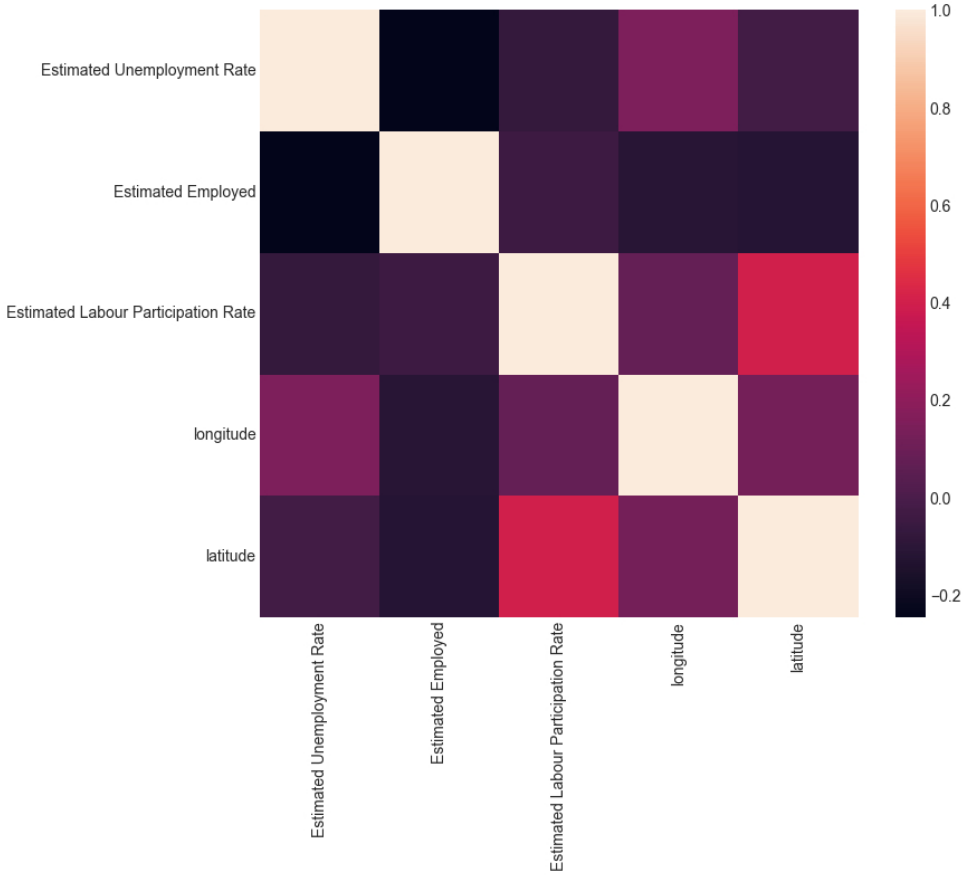
While analyzing the missing values, I found that the column names are not correct. So, for a better understanding of this data, I will rename all the columns

In [19]:
```
data.columns= ["States","Date","Frequency",
               "Estimated Unemployment Rate",
               "Estimated Employed",
               "Estimated Labour Participation Rate",
```

```
                "Region","longitude","latitude"]
```

Now let's have a look at the correlation between the features of this dataset

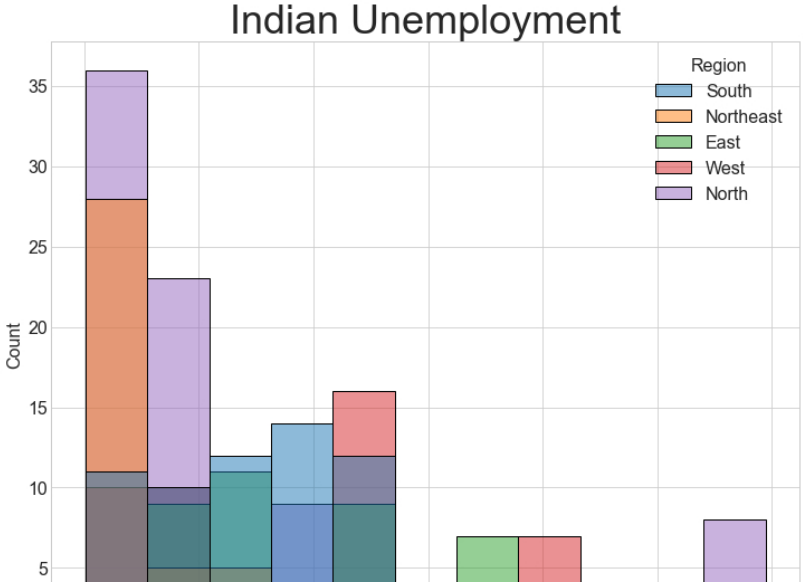
In [28]:
```
plt.style.use("seaborn-whitegrid")
plt.figure(figsize=(12,10))
plt.rc("font", size=14)
sns.heatmap(data.corr())
plt.show()
```



Unemployment Rate Analysis: Data Visualization

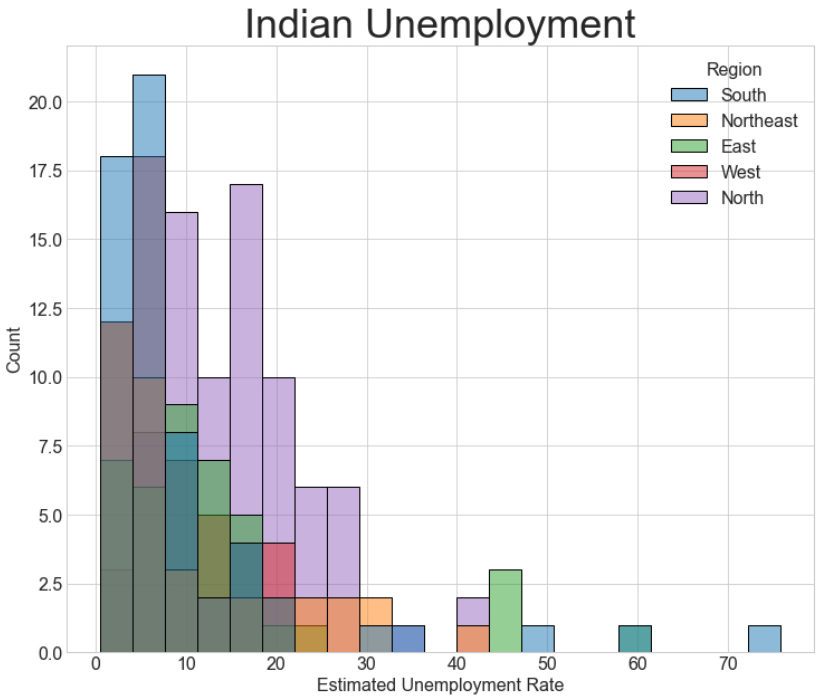
Now let's visualize the data to analyze the unemployment rate. I will first take a look at the estimated number of employees according to different regions of India

In [34]:
```
data.columns = ["States","Date","Frequency",
                "Estimated Unemployment Rate","Estimated Employed",
                "Estimated Labour Participation Rate","Region",
                "longitude","latitude"]
plt.figure(figsize=(12,10))
plt.rc("font",size=16)
plt.title("Indian Unemployment", fontsize=36)
sns.histplot(x="Estimated Employed", hue="Region", data=data)
plt.show()
```



Now let's see the unemployment rate according to different regions of India

In [35]:
```
plt.figure(figsize=(12, 10))
plt.rc("font", size=16)
plt.title("Indian Unemployment", fontsize=36)
sns.histplot(x="Estimated Unemployment Rate", hue="Region", data=data)
plt.show()
```

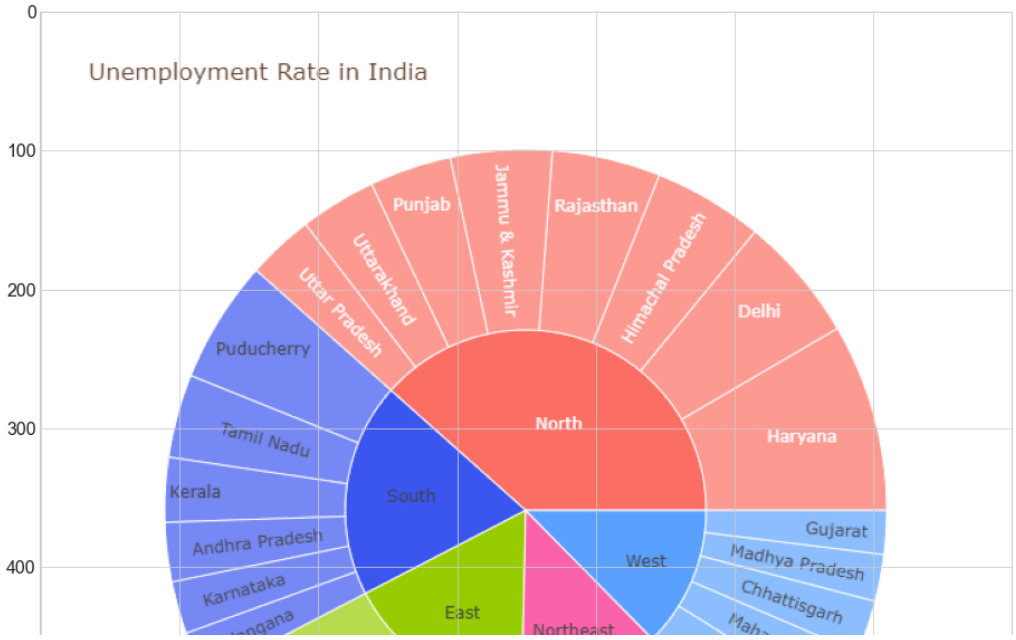


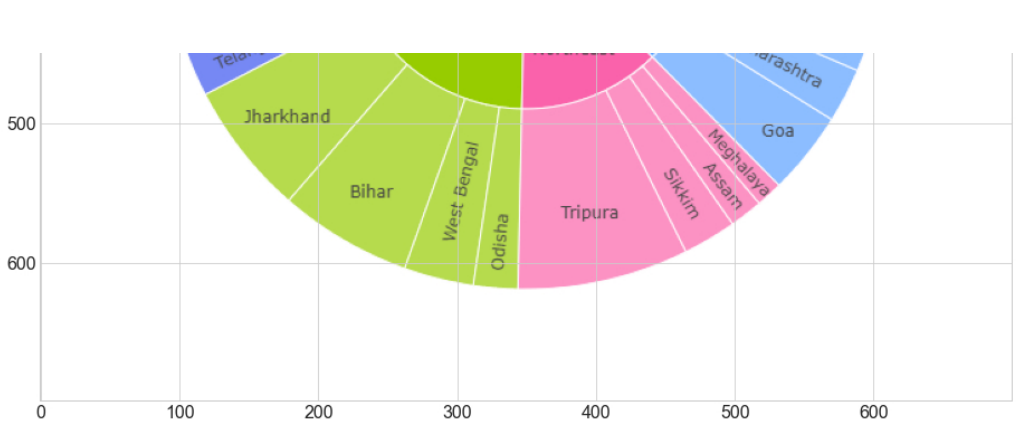
Now let's create a dashboard to analyze the unemployment rate of each Indian state by region. For this, I'll use a sunburst plot

In [45]:
```
unemplomentt = data[["States", "Region", "Estimated Unemployment Rate"]]
figure = px.sunburst(unemplomentt, path=["Region", "States"],
                     values="Estimated Unemployment Rate",
                     width=700, height=700, color_continuous_scale="RdY1Gn",
                     title="Unemployment Rate in India")
figure.show()
```

In [50]:
```
img = cv2.imread(".\\newplot.png")
plt.figure(figsize=(28,16))
plt.imshow(img)
```

Out[50]:
```
<matplotlib.image.AxesImage at 0x1f6968dbf40>
```





Summary

So this is how you can analyze the unemployment rate by using the Python programming language. Unemployment is measured by the unemployment rate which is the number of people who are unemployed as a percentage of the total labour force. I hope you liked this article on unemployment rate analysis with Python. Feel free to ask your valuable questions in the comments section below.

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In [51]:
```
# LinkedIn - https://www.linkedin.com/in/shekhnirob1

# GitHub - https://github.com/Rasel1435

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```