unemployment-in-india

January 13, 2024

1 COGNORISE INFOTECH _ TASK 1 _ UNEMPLOYMENT IN INDIA

OBJECTIVE:

Unemployment is measured by the unemployment rate which is the number of people who are unemployed as a percentage of the total labour force. During the Covid-19 period there was a sharp increase in the unemployment rate. So in this assignment we have to analyze the unemployment rate using Python

2 Import Libraries

[7]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import datetime as dt
import calendar
import plotly.graph_objects as go
import warnings
warnings.filterwarnings("ignore")
%matplotlib inline
```

[6]:
```
data_set = r'C:\Users\KARTHIK\OneDrive\Desktop\CognoRise Intern\Task␣
 ↪1\Unemployment_Rate_upto_11_2020.csv'

# Read the CSV file into a DataFrame
try:
    df = pd.read_csv(data_set)

    # Now you can work with the DataFrame (df) as needed
    print(df.head())

except FileNotFoundError:
    print(f"File not found at the specified path: {file_path}")
```

```
            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
```

[8]:
```
df.head()
```

[8]:
```
            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
```

[9]:
```
#updating the column names
```

```
df.columns=["State","Date","Frequency","Estimated unemployment rate","Estimated␣
↪employed","Estimated labour participation␣
↪rate","Region","Longitude","Latitude"]
```

[10]:
```
df.head()
```

[10]:
```
             State         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  Longitude  \
0            16635535                                41.02  South    15.9129
1            16545652                                40.90  South    15.9129
2            15881197                                39.18  South    15.9129
3            11336911                                33.10  South    15.9129
4            12988845                                36.46  South    15.9129

   Latitude
0     79.74
1     79.74
2     79.74
3     79.74
4     79.74
```

[11]:
```
df.shape
```

[11]:
```
(267, 9)
```

[12]:
```
df.columns
```

[12]:
```
Index(['State', 'Date', 'Frequency', 'Estimated unemployment rate',
       'Estimated employed', 'Estimated labour participation rate', 'Region',
       'Longitude', 'Latitude'],
      dtype='object')
```

[13]:
```
df.describe()
```

[13]:
```
       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
```

[14]:
```
df= df.drop_duplicates()      #removing duplicates
df.shape
```

[14]:
```
(267, 9)
```

[11]:
```
df.dtypes
```

[11]:
```
State                                 object
Date                                  object
Frequency                             object
Estimated unemployment rate          float64
Estimated employed                     int64
Estimated labour participation rate  float64
Region                                object
Longitude                            float64
Latitude                             float64
dtype: object
```

[12]:
```
df["Date"]=pd.to_datetime(df["Date"])
```

[13]:
```
df.dtypes
```

[13]:
```
State                                        object
Date                                 datetime64[ns]
Frequency                                    object
Estimated unemployment rate                 float64
Estimated employed                            int64
Estimated labour participation rate         float64
Region                                       object
Longitude                                   float64
Latitude                                    float64
dtype: object
```

[14]:
```
df.isnull().sum()
```

[14]:
```
State                                    0
Date                                     0
Frequency                                0
Estimated unemployment rate              0
Estimated employed                       0
Estimated labour participation rate      0
Region                                   0
Longitude                                0
Latitude                                 0
dtype: int64
```

[15]:
```
df.duplicated().any()
```

[15]:
```
False
```

[18]:
```
#Converting 'Frequency' and 'Region' columns to categorical data type

df['Frequency'] = df['Frequency'].astype('category')
df['Region'] = df['Region'].astype('category')
```

[16]:
```
df.dtypes
```

[16]:
```
State                                     object
Date                                datetime64[ns]
Frequency                                 object
Estimated unemployment rate              float64
Estimated employed                         int64
Estimated labour participation rate      float64
Region                                    object
Longitude                                float64
Latitude                                 float64
dtype: object
```

[17]:
```
#extract month

df["month"]=df["Date"].dt.month

#converting 'month' to integer format

df['Month_int'] = df['month'].apply(lambda x: int(x))

# Mapping integer month values to abbreviated month names

df['Month_name'] = df['Month_int'].apply(lambda x: calendar.month_abbr[x])
```

[18]:
```
df.tail()
```

[18]:
```
            State       Date Frequency  Estimated unemployment rate  \
262  West Bengal 2020-06-30         M                          7.29
263  West Bengal 2020-07-31         M                          6.83
264  West Bengal 2020-08-31         M                         14.87
265  West Bengal 2020-09-30         M                          9.35
266  West Bengal 2020-10-31         M                          9.98

     Estimated employed  Estimated labour participation rate Region  \
262            30726310                                40.39   East
263            35372506                                46.17   East
264            33298644                                47.48   East
265            35707239                                47.73   East
266            33962549                                45.63   East

     Longitude  Latitude  month  Month_int Month_name
262    22.9868    87.855      6          6        Jun
263    22.9868    87.855      7          7        Jul
264    22.9868    87.855      8          8        Aug
265    22.9868    87.855      9          9        Sep
266    22.9868    87.855     10         10        Oct
```

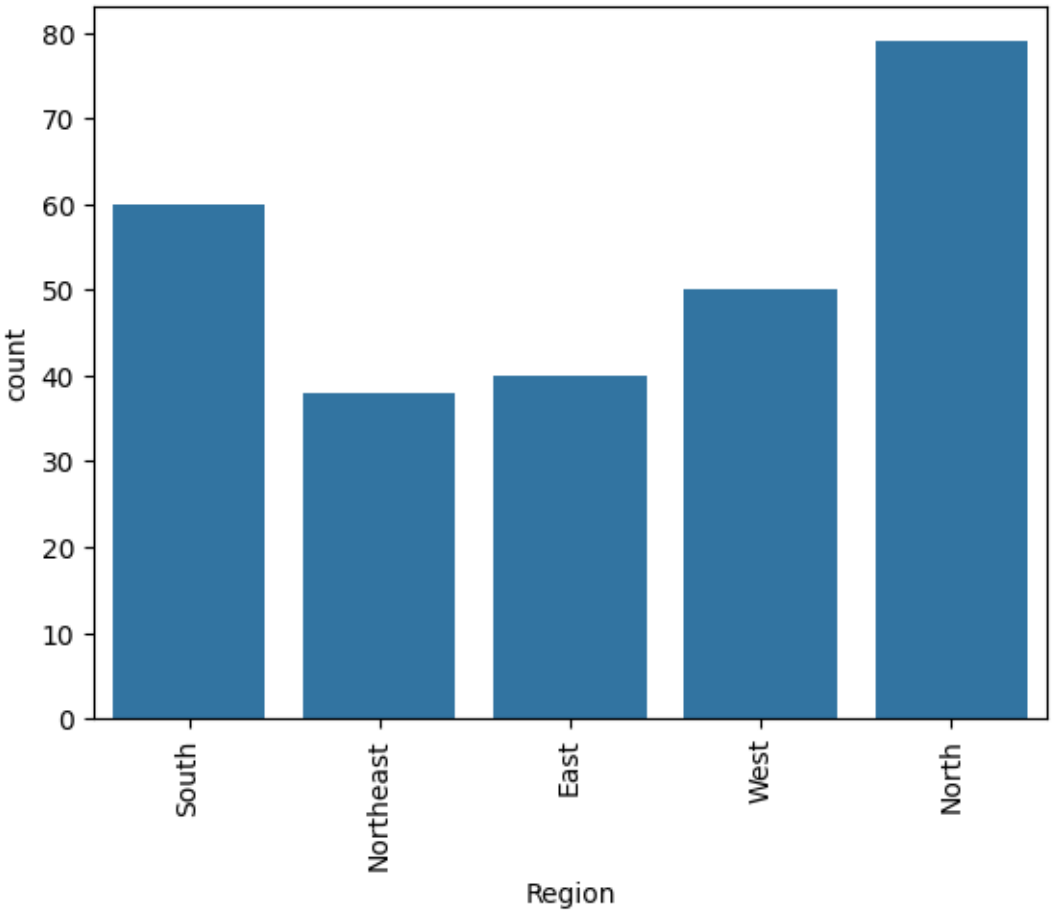
3 Exploratory Data Analysis

[17]:
```
df['Region'].value_counts()
```

[17]:
```
Region
North        79
South        60
West         50
East         40
Northeast    38
Name: count, dtype: int64
```

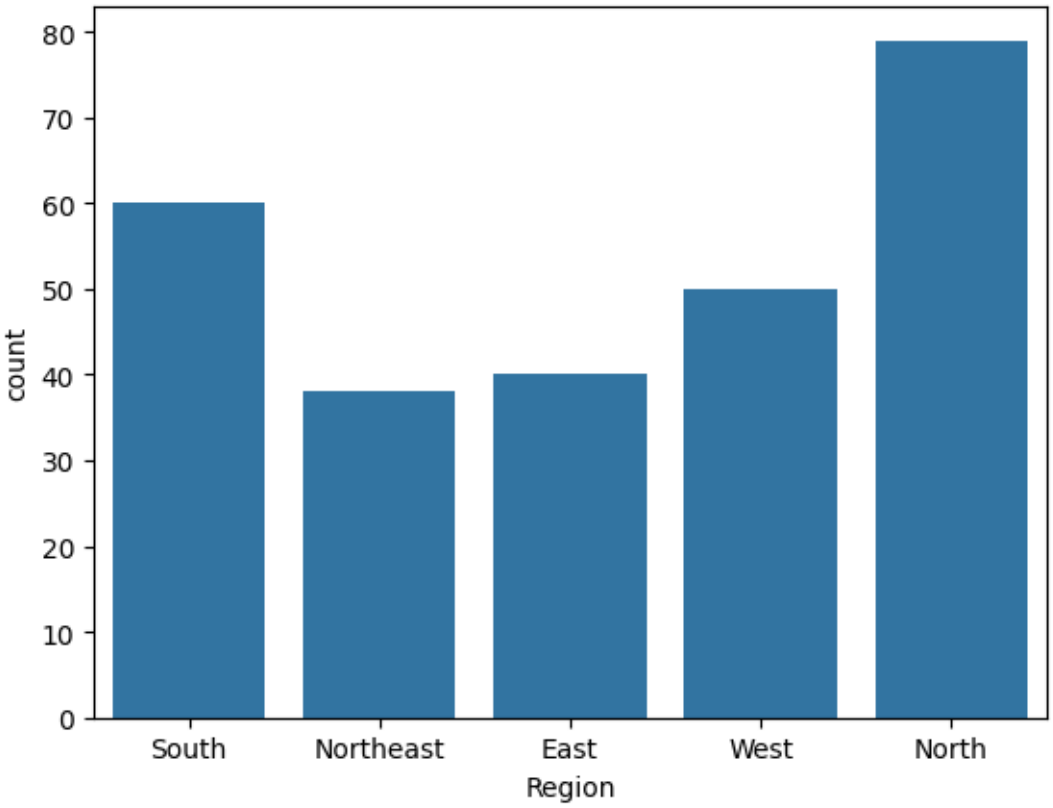
[19]:
```
sns.countplot(x=df['Region'])
plt.xticks(rotation=90)
```

[19]:
```
([0, 1, 2, 3, 4],
 [Text(0, 0, 'South'),
  Text(1, 0, 'Northeast'),
  Text(2, 0, 'East'),
  Text(3, 0, 'West'),
  Text(4, 0, 'North')])
```



[21]:
```
sns.countplot(x=df['Region'])
```

[21]:
```
<Axes: xlabel='Region', ylabel='count'>
```



[19]:
```
data_stats = df[['Estimated unemployment rate', 'Estimated employed',␣
↪'Estimated labour participation rate']]
round(data_stats.describe().T, 2)
```

[19]:

	count	mean	std	min	25%	50%	75%	max
Estimated unemployment rate	267.0	12.24	10.80	0.50	4.84	9.65	16.76	75.85
Estimated employed	267.0	13962105.72	13366318.36	117542.00	2838930.50	9732417.00	21878686.00	59433759.00
Estimated labour participation rate	267.0	41.68	7.85	16.77	37.26	40.39	44.06	69.69

[20]:

```
region_stats = df.groupby(['Region'])[['Estimated unemployment rate',␣
 ↪'Estimated employed', 'Estimated labour participation rate']].mean().
 ↪reset_index()
round(region_stats, 2)
```

[20]:

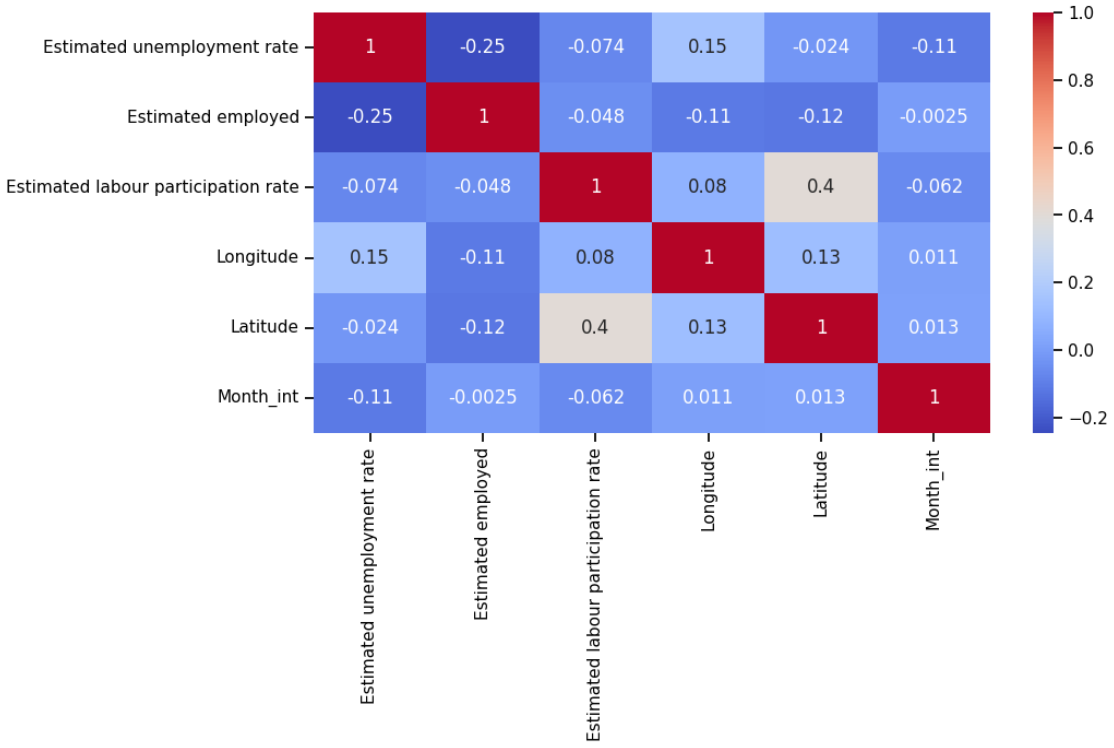
	Region	Estimated unemployment rate	Estimated employed	\
0	East	13.92	19602366.90	
1	North	15.89	13072487.92	
2	Northeast	10.95	3617105.53	
3	South	10.45	14040589.33	
4	West	8.24	18623512.72	

	Estimated labour participation rate
0	40.11
1	38.70
2	52.06
3	40.44
4	41.26

4 Visualization

[23]:
```
heat_maps = df[["Estimated unemployment rate", "Estimated employed","Estimated␣
 ↪labour participation rate",'Longitude','Latitude','Month_int']]
heat_maps = heat_maps.corr()
plt.figure(figsize=(10,5))
sns.set_context("notebook",font_scale=1)
sns.heatmap(heat_maps,annot=True , cmap='coolwarm')
```

[23]: <Axes: >



[26]:
```
# Renaming columns for easier access
df1= df.rename(columns={ ' Estimated Unemployment Rate (%)' : 'est_unemp_perc',␣
 ↪' Estimated Employed' : 'est_emp',
                         ' Estimated Labour Participation Rate (%)' :␣
 ↪'est_labour_perc'}).reset_index(drop = True)
```

[27]:
```
df1
```

[27]:

	State	Date	Estimated unemployment rate	\
0	Andhra Pradesh	31-01-2020	5.48	
1	Andhra Pradesh	29-02-2020	5.83	
2	Andhra Pradesh	31-03-2020	5.79	
3	Andhra Pradesh	30-04-2020	20.51	
4	Andhra Pradesh	31-05-2020	17.43	
..	…	…	…	
262	West Bengal	30-06-2020	7.29	
263	West Bengal	31-07-2020	6.83	
264	West Bengal	31-08-2020	14.87	
265	West Bengal	30-09-2020	9.35	
266	West Bengal	31-10-2020	9.98	

	Estimated employed	Estimated labour participation rate	Region	\
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
..                   …                                    …    …
262             30726310                                  40.39   East
263             35372506                                  46.17   East
264             33298644                                  47.48   East
265             35707239                                  47.73   East
266             33962549                                  45.63   East

     Longitude  Latitude
0      15.9129    79.740
1      15.9129    79.740
2      15.9129    79.740
3      15.9129    79.740
4      15.9129    79.740
..         …        …
262    22.9868    87.855
263    22.9868    87.855
264    22.9868    87.855
265    22.9868    87.855
266    22.9868    87.855

[267 rows x 8 columns]
```

[47]:
```
df1.isna().sum()
```

[47]:
```
State                                0
Date                                 0
Estimated unemployment rate          0
Estimated employed                   0
Estimated labour participation rate  0
Region                               0
Longitude                            0
Latitude                             0
dtype: int64
```