TASK 2 - UNEMPLOYMENT ANALYSIS WITH PYTHON

Annapoornima task2

Description of the dataset

Importing necessary libraries

```
# data processing
import numpy as np
import pandas as pd

# data visualization
import matplotlib.pyplot as plt
import seaborn as sns


import warnings
warnings.filterwarnings('ignore')
```

Loading the dataset

```
df = pd.read_csv('Unemployment in India.csv')
df.head()
```

	Region	Date	Frequency	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area
0	Andhra Pradesh	31-05-2019	Monthly	3.65	11999139.0	43.24	Rural
1	Andhra Pradesh	30-06-2019	Monthly	3.05	11755881.0	42.05	Rural

Understanding the structure of the dataset

```
df.shape
```

```
(768, 7)
```

Renaming the column

```
df.rename(columns={'Region.1': 'Area'}, inplace=True)
```

Checking for missing values

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

```
Region                                   28
 Date                                    28
 Frequency                               28
 Estimated Unemployment Rate (%)         28
 Estimated Employed                      28
 Estimated Labour Participation Rate (%) 28
Area                                     28
dtype: int64
```

Checking for duplicate values

```
df.duplicated().sum()
```

```
27
```

Summary of the dataframe

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 768 entries, 0 to 767
Data columns (total 7 columns):
 #   Column                                    Non-Null Count  Dtype  
---  ------                                    --------------  -----  
 0   Region                                    740 non-null    object 
 1    Date                                     740 non-null    object 
 2    Frequency                                740 non-null    object 
 3    Estimated Unemployment Rate (%)          740 non-null    float64
 4    Estimated Employed                       740 non-null    float64
 5    Estimated Labour Participation Rate (%)  740 non-null    float64
 6   Area                                      740 non-null    object 
dtypes: float64(3), object(4)
memory usage: 42.1+ KB
```

Removing unintentional spaces in columns

```
df.columns = df.columns.str.strip()
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 768 entries, 0 to 767
Data columns (total 7 columns):
 #   Column                                  Non-Null Count  Dtype  
---  ------                                  --------------  -----  
 0   Region                                  740 non-null    object 
 1   Date                                    740 non-null    object 
 2   Frequency                               740 non-null    object 
 3   Estimated Unemployment Rate (%)         740 non-null    float64
 4   Estimated Employed                      740 non-null    float64
 5   Estimated Labour Participation Rate (%) 740 non-null    float64
 6   Area                                    740 non-null    object 
dtypes: float64(3), object(4)
memory usage: 42.1+ KB
```

Converting data types

```
df['Date'] = pd.to_datetime(df['Date'])
df.dtypes
```

```
Region                                        object
Date                                  datetime64[ns]
Frequency                                     object
Estimated Unemployment Rate (%)              float64
Estimated Employed                           float64
Estimated Labour Participation Rate (%)      float64
Area                                          object
dtype: object
```

Summary Statistics

```
# selecting the categorical variables
categorical_var = df.select_dtypes(include='object')
# Obtaining summary statistics for the categorical variables
categorical_stat = categorical_var.describe().T
categorical_stat
```

	count	unique	top	freq
Region	740	28	Andhra Pradesh	28
Frequency	740	2	Monthly	381
Area	740	2	Urban	381

```
# selecting numerical variables
numerical_var = df.select_dtypes(exclude='object')
# Obtaining summar statistics for the numerical variables
numerical_stat = numerical_var.describe().T
numerical_stat
```

	count	mean	std	min	25%	50%
Estimated Unemployment Rate (%)	740.0	1.178795e+01	1.072130e+01	0.00	4.657500e+00	8.35

Dropping irrelevent column

```
df = df.drop('Frequency', axis=1)
df.head()
```

	Region	Date	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area
0	Andhra Pradesh	2019-05-31	3.65	11999139.0	43.24	Rural
1	Andhra Pradesh	2019-06-30	3.05	11755881.0	42.05	Rural
2	Andhra Pradesh	2019-07-31	3.75	12086707.0	43.50	Rural

Outlier detection

```
colors = ['lightblue', 'lightgreen', 'lightcoral']

# Create a figure with three subplots
plt.figure(figsize=(12, 6))

# Subplot 1: Unemployment Rate
plt.subplot(131)
df.boxplot(column='Estimated Unemployment Rate (%)', patch_artist=True)
plt.gca().get_children()[0].set_facecolor(colors[0])  # Set the color of the first box
plt.title('Unemployment Rate')

# Subplot 2: Employed
plt.subplot(132)
df.boxplot(column='Estimated Employed', patch_artist=True)
plt.gca().get_children()[0].set_facecolor(colors[1])  # Set the color of the second box
plt.title('Employed')

# Subplot 3: Labor Participation Rate
plt.subplot(133)
df.boxplot(column='Estimated Labour Participation Rate (%)', patch_artist=True)
plt.gca().get_children()[0].set_facecolor(colors[2])  # Set the color of the third box
plt.title('Labor Participation Rate')

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

Correlation plot

```
sns.set_context('notebook', font_scale=1.3)
sns.heatmap(df.corr(), annot=True, cmap='YlGnBu', linewidths=0.5)
```

```
<Axes: >
```

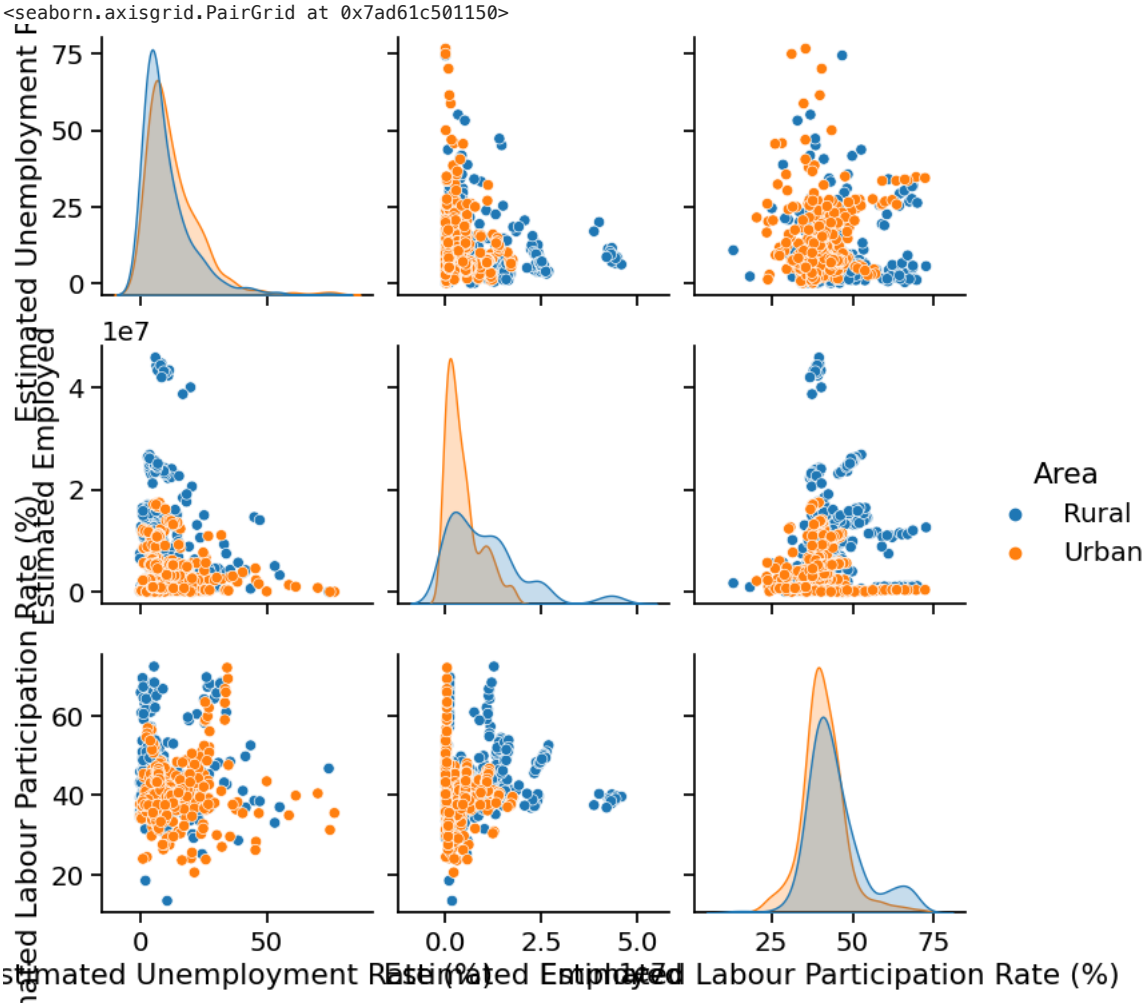
Unemployment rate in India during Covid-19

```
plt.figure(figsize=(12, 6))
sns.lineplot(data=df, x='Date', y='Estimated Unemployment Rate (%)')
plt.xticks(rotation=45)
plt.show()
```

Pair plot

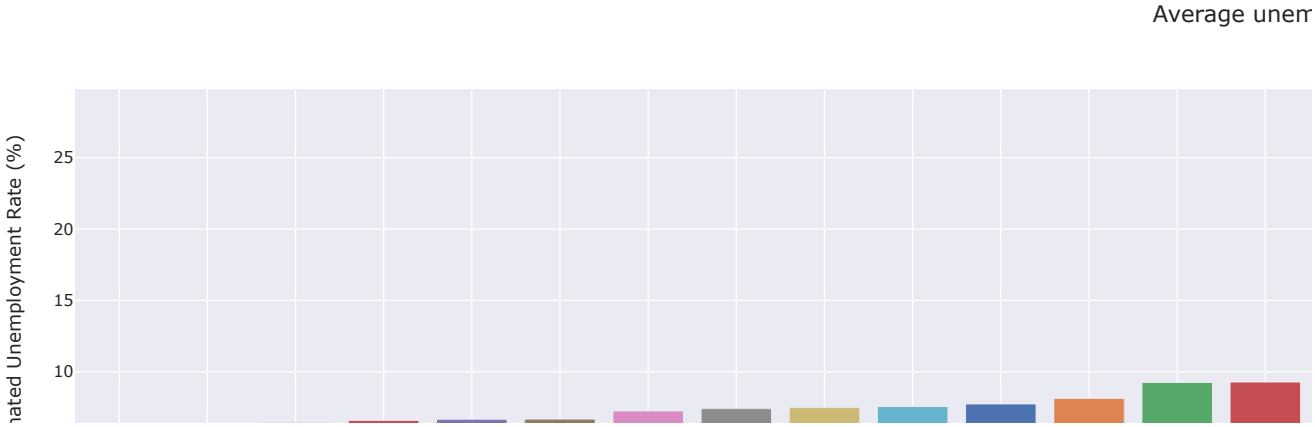
```
sns.pairplot(df, hue='Area')
```

```
<seaborn.axisgrid.PairGrid at 0x7ad61c501150>
```



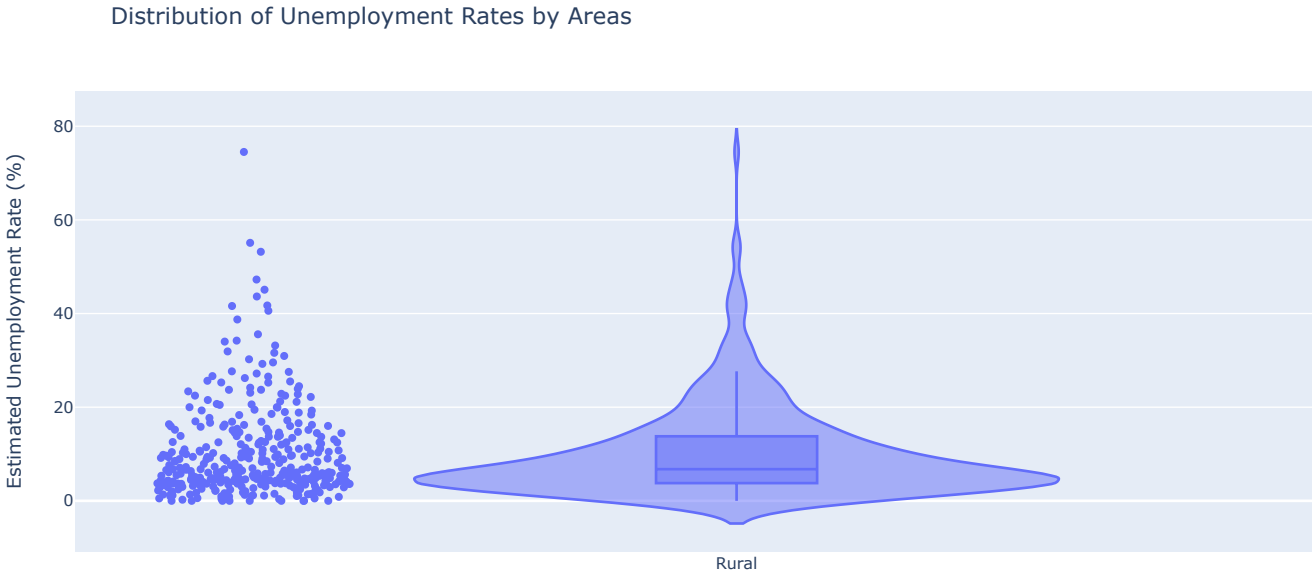
Unemployment rate in each state

```
import plotly.express as px
plot_unemp = df[['Estimated Unemployment Rate (%)','Region']]
df_unemployed = plot_unemp.groupby('Region').mean().reset_index()

df_unemployed = df_unemployed.sort_values('Estimated Unemployment Rate (%)')

fig = px.bar(df_unemployed, x='Region',y='Estimated Unemployment Rate (%)',color = 'Region',title = 'Average unemployment r
             template='seaborn')
fig.show()
```



Visualizes the distribution of unemployment rates within different areas

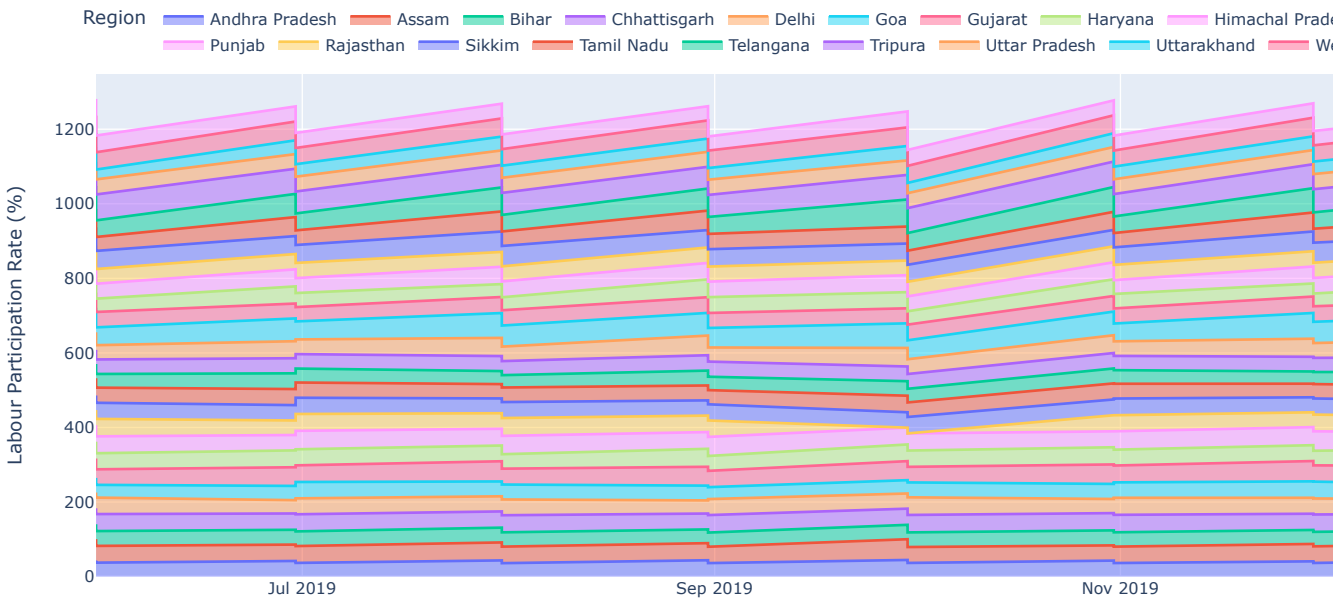
```
fig = px.violin(
    df,
    x='Area',
    y='Estimated Unemployment Rate (%)',
    title='Distribution of Unemployment Rates by Areas',
    box=True,  # Include box plot inside the violin
    points='all',  # Show individual data points
)

fig.show()
```



Composition of Labour Participation Rates by Region Over Time

```
fig = px.area(
    df,
    x='Date',
    y='Estimated Labour Participation Rate (%)',
    color='Region',
    labels={'Estimated Labour Participation Rate (%)': 'Labour Participation Rate (%)'},
    category_orders={'Region': df['Region'].unique()}  # Preserve the order of regions
)

fig.update_layout(
    xaxis_title='Date',
    yaxis_title='Labour Participation Rate (%)',
    legend_title='Region',
    legend=dict(orientation="h", yanchor="bottom", y=1.02, xanchor="right", x=1),
)
```

```
fig.show()
```



Extracting month from date

```
df['Month'] = df['Date'].dt.month
df
```

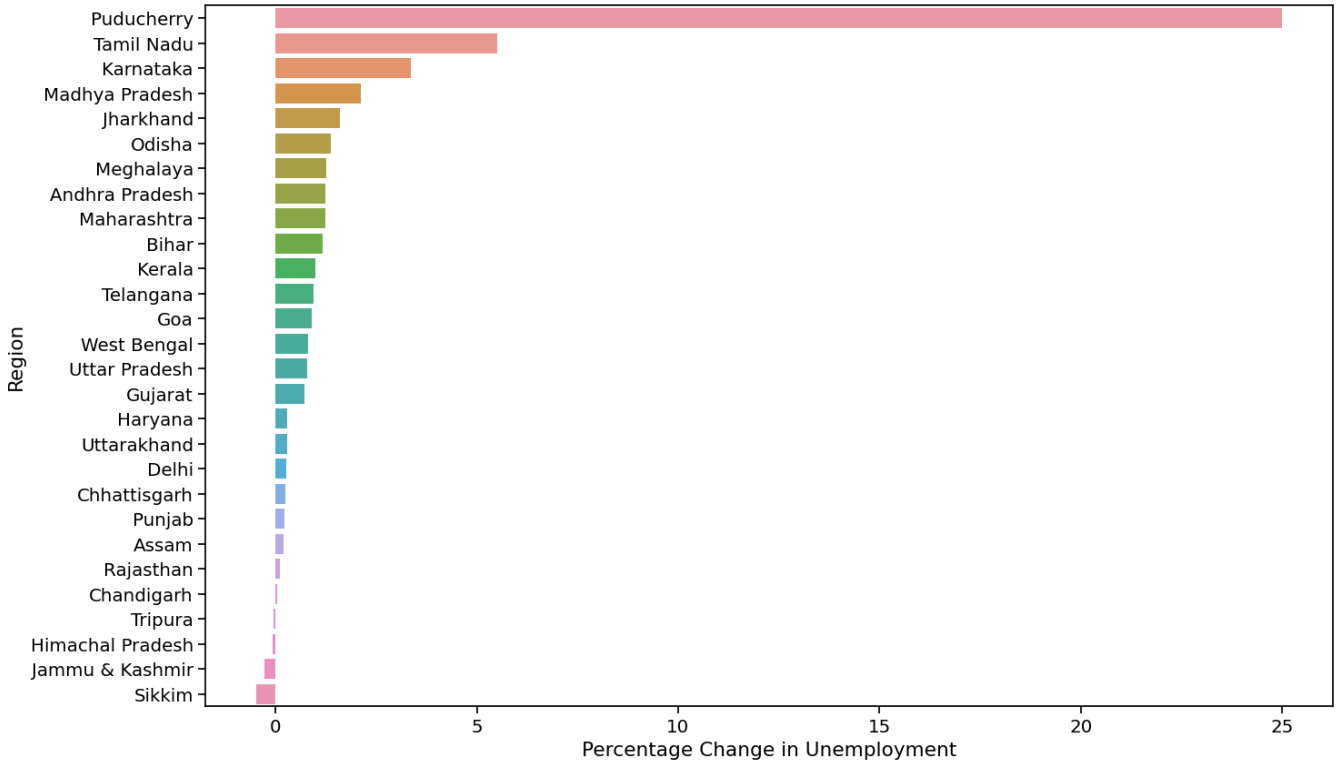
	Region	Date	Estimated Unemployment Rate (%)	Estimated Employed	Estimated Labour Participation Rate (%)	Area	Month
0	Andhra Pradesh	2019-05-31	3.65	11999139.0	43.24	Rural	5.0
1	Andhra Pradesh	2019-06-30	3.05	11755881.0	42.05	Rural	6.0
2	Andhra Pradesh	2019-07-31	3.75	12086707.0	43.50	Rural	7.0
3	Andhra Pradesh	2019-08-31	3.32	12285693.0	43.97	Rural	8.0
4	Andhra Pradesh	2019-09-30	5.17	12256762.0	44.68	Rural	9.0
...	...	...	...	...	...	...	...
763	NaN	NaT	NaN	NaN	NaN	NaN	NaN
764	NaN	NaT	NaN	NaN	NaN	NaN	NaN
765	NaN	NaT	NaN	NaN	NaN	NaN	NaN

Percentage change in unemployment

```
# Filter data for months 1 to 3 (before lockdown)
before_lock = df[(df['Month'] >= 1) & (df['Month'] <= 3)][['Region', 'Estimated Unemployment Rate (%)']]


# Filter data for months 3 to 5 (after lockdown)
after_lock = df[(df['Month'] >= 3) & (df['Month'] < 6)][['Region', 'Estimated Unemployment Rate (%)']]


before_lock = before_lock.groupby('Region')['Estimated Unemployment Rate (%)'].mean().reset_index().rename(
    columns={'Estimated Unemployment Rate (%)':'Unemployment Rate before Lock-Down'})


after_lock = after_lock.groupby('Region')['Estimated Unemployment Rate (%)'].mean().reset_index().rename(
    columns={'Estimated Unemployment Rate (%)':'Unemployment Rate after Lock-Down'})


before_lock['Percentage Change in Unemployment'] = round((after_lock['Unemployment Rate after Lock-Down'] - before_lock['Un
```

```
plot_df = before_lock.sort_values('Percentage Change in Unemployment', ascending=False)
plt.figure(figsize=(16, 10))
sns.barplot(data=plot_df, y='Region', x='Percentage Change in Unemployment')
```

```
<Axes: xlabel='Percentage Change in Unemployment', ylabel='Region'>
```



If the percentage change is positive (+X%), it means that unemployment has increased by X% compared to the previous period. In other words, more people are unemployed.

If the percentage change is negative (-X%), it means that unemployment has decreased by X% compared to the previous period. Fewer people are unemployed.

The magnitude of the percentage change indicates how significant the change is. A larger percentage change suggests a more substantial shift in unemployment rates compared to a smaller percentage change.

Puducherry's unemployment rate had been seriously impacted by the lock-down.

Sikkim, Jammu & Kashmir Chattisgar ,Himachal Pradesh and Tripur have negetive percentage change.That means these states are not highly impacted by the lock down.

Start coding or generate with AI.