unemployment-analysis

February 2, 2024

0.1 Unemployment Analysis

Import required lib

[26]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Reading dataset

[27]:
```
df = pd.read_csv(r'E:\PYTHON\Unemployment analysis\Dataset\Unemployment in␣
↪India.csv')
```

[28]:
```
df
```

[28]:

	Region	Date	Frequency	Estimated Unemployment Rate (%)	\
0	Andhra Pradesh	31-05-2019	Monthly	3.65	
1	Andhra Pradesh	30-06-2019	Monthly	3.05	
2	Andhra Pradesh	31-07-2019	Monthly	3.75	
3	Andhra Pradesh	31-08-2019	Monthly	3.32	
4	Andhra Pradesh	30-09-2019	Monthly	5.17	
..	…	…	…	…	
735	West Bengal	29-02-2020	Monthly	7.55	
736	West Bengal	31-03-2020	Monthly	6.67	
737	West Bengal	30-04-2020	Monthly	15.63	
738	West Bengal	31-05-2020	Monthly	15.22	
739	West Bengal	30-06-2020	Monthly	9.86	

	Estimated Employed	Estimated Labour Participation Rate (%)	Area
0	11999139	43.24	Rural
1	11755881	42.05	Rural
2	12086707	43.50	Rural
3	12285693	43.97	Rural
4	12256762	44.68	Rural
..	…	…	…
735	10871168	44.09	Urban
736	10806105	43.34	Urban
737	9299466	41.20	Urban
738	9240903	40.67	Urban

```
739             9088931                                  37.57  Urban

[740 rows x 7 columns]
```

Finding Null Values

[29]:
```
df.isna().sum()
```

[29]:
```
Region                                    0
Date                                      0
Frequency                                 0
Estimated Unemployment Rate (%)           0
Estimated Employed                        0
Estimated Labour Participation Rate (%)   0
Area                                      0
dtype: int64
```

Extract Year from Date Column

[30]:
```
# df['Date'] = pd.to_datetime(df['Date'])
# df['Year'] = df['Date'].dt.year
```

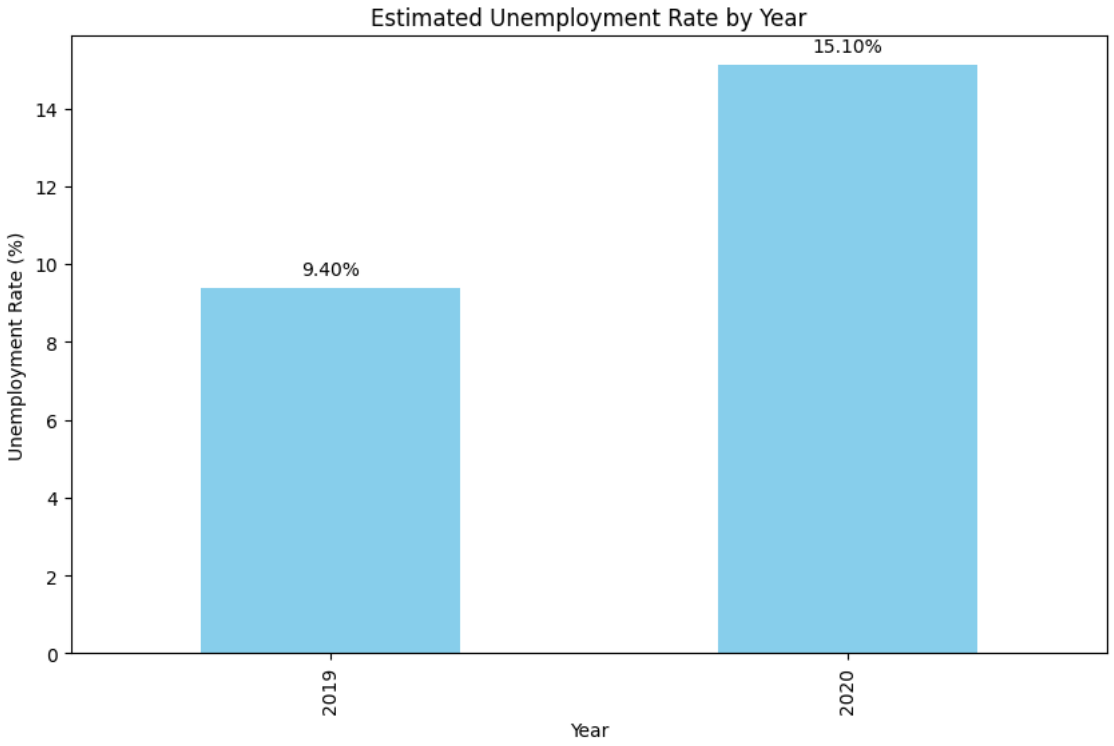
Another Simple Method

[31]:
```
df['Year'] = pd.DatetimeIndex(df['Date']).year
```

0.2 Data Visualizations

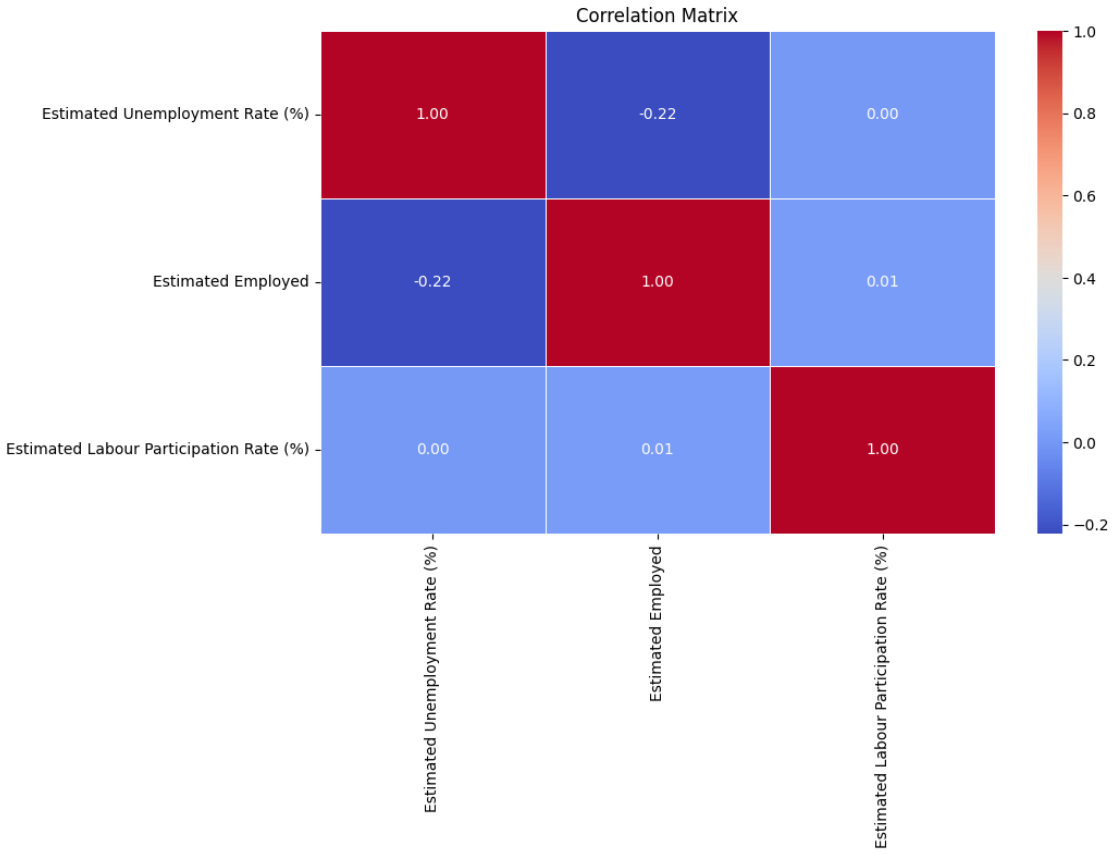
Unemployment Rate by Year

[32]:
```
plt.figure(figsize=(10, 6))
ax = df.groupby('Year')['Estimated Unemployment Rate (%)'].mean().
 ↪plot(kind='bar', color='skyblue')
plt.title('Estimated Unemployment Rate by Year')
plt.xlabel('Year')
plt.ylabel('Unemployment Rate (%)')

# Add percentage numbers on top of each bar
for p in ax.patches:
    ax.annotate(f'{p.get_height():.2f}%', (p.get_x() + p.get_width() / 2., p.
 ↪get_height()),
                ha='center', va='center', xytext=(0, 10), textcoords='offset␣
 ↪points')
```



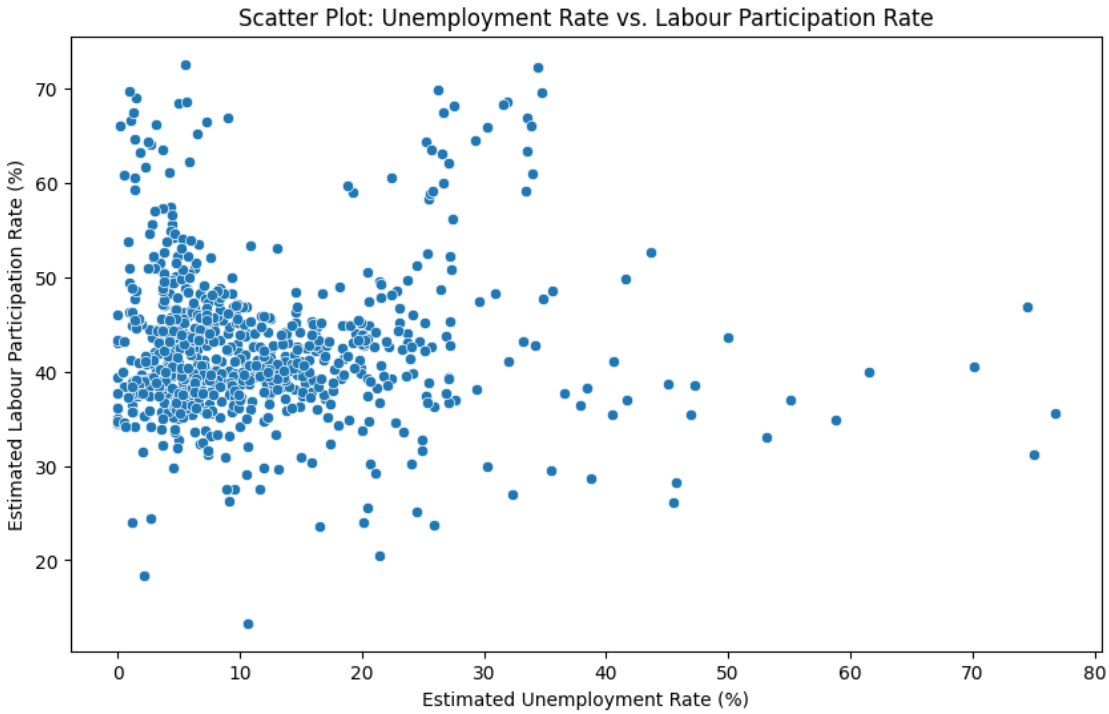
Plot a heatmap of the correlation matrix

[33]:
```
# Calculate correlation matrix
correlation_matrix = df[['Estimated Unemployment Rate (%)', 'Estimated␣
 ↪Employed', 'Estimated Labour Participation Rate (%)']].corr()

plt.figure(figsize=(10, 6))
sns.heatmap(correlation_matrix, annot=True, cmap='coolwarm', fmt='.2f',␣
 ↪linewidths=0.5)
plt.title('Correlation Matrix')
plt.show()
```



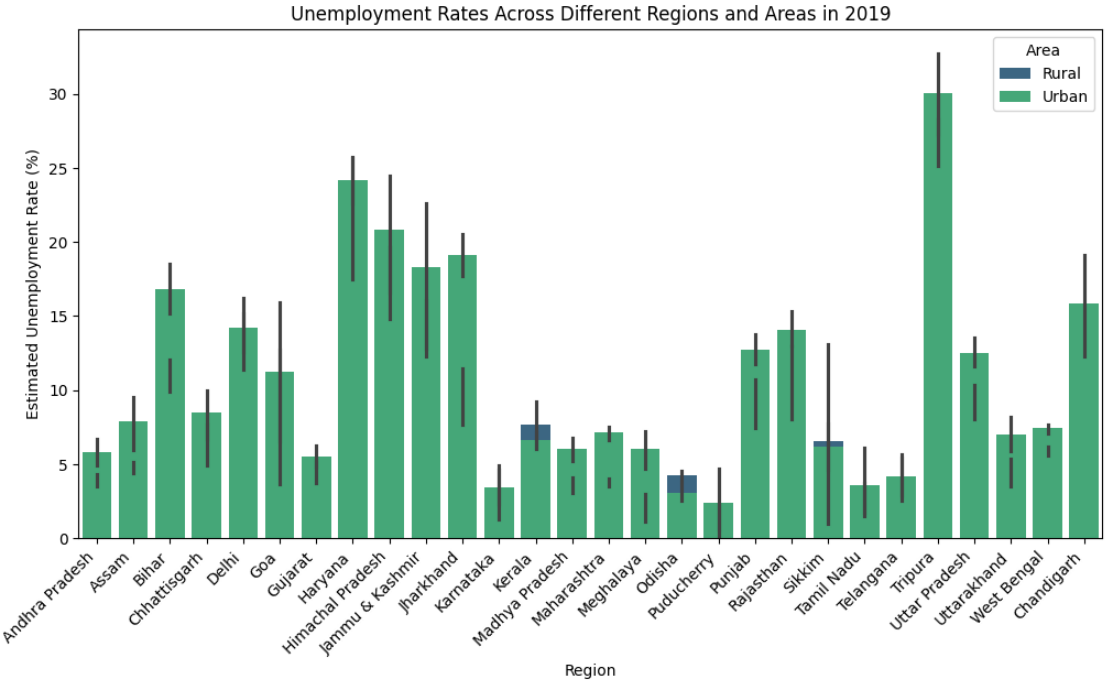
Scatter plot between Unemployment Rate and Labour Participation Rate

[34]:
```
plt.figure(figsize=(10, 6))
sns.scatterplot(x='Estimated Unemployment Rate (%)', y='Estimated Labour␣
↪Participation Rate (%)', data=df)
plt.title('Scatter Plot: Unemployment Rate vs. Labour Participation Rate')
plt.xlabel('Estimated Unemployment Rate (%)')
plt.ylabel('Estimated Labour Participation Rate (%)')
plt.show()
```



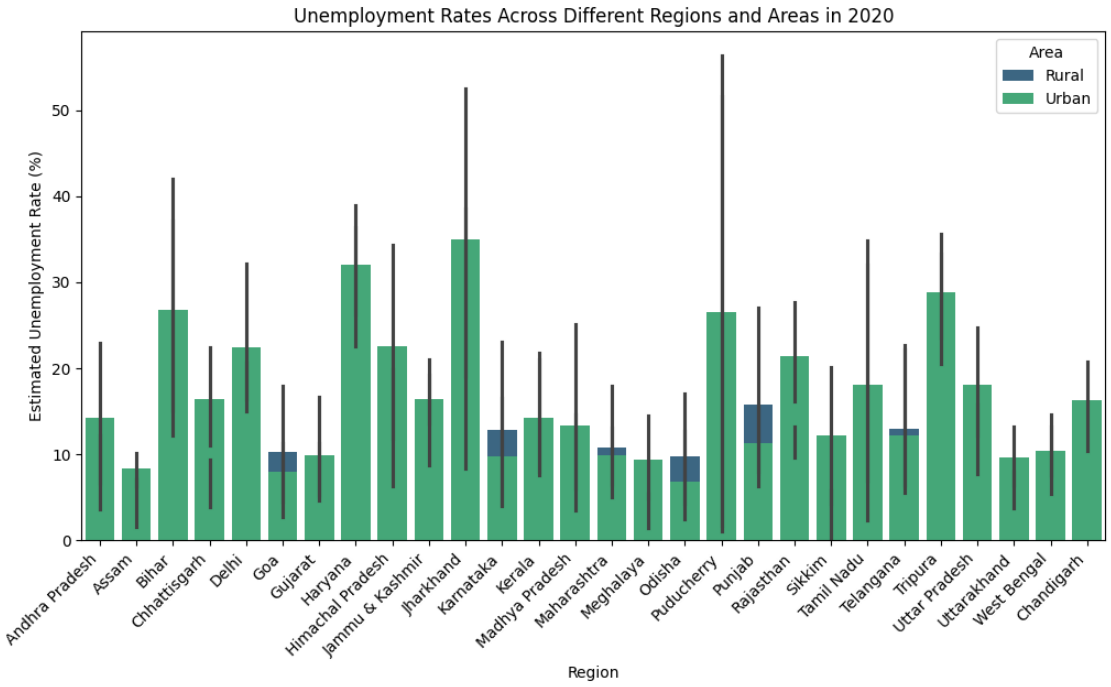
Bar Plot to compare unemployment rates across different regions in Year 2019

[55]:
```
# Filter the DataFrame for the year 2019
df_2019 = df[df['Year'] == 2019]

plt.figure(figsize=(12, 6))
sns.barplot(x='Region', y='Estimated Unemployment Rate (%)', hue='Area',␣
 ↪data=df_2019, dodge=False, palette='viridis')
plt.title('Unemployment Rates Across Different Regions and Areas in 2019')
plt.xlabel('Region')
plt.ylabel('Estimated Unemployment Rate (%)')
plt.xticks(rotation=45, ha='right')
plt.show()
```



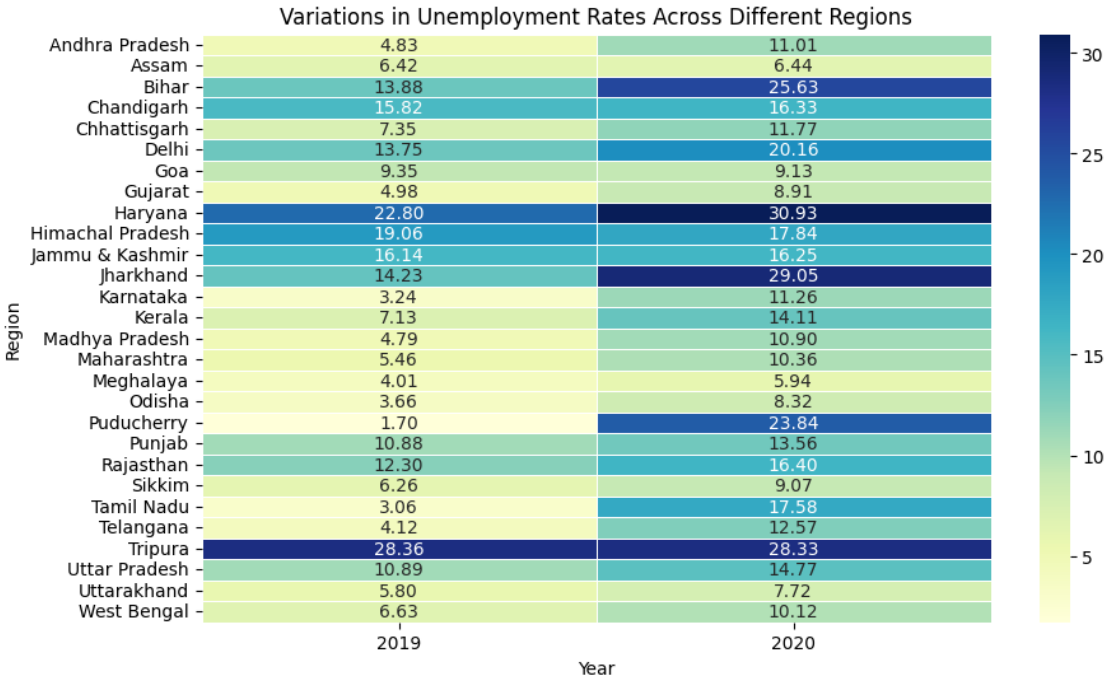
Bar Plot to compare unemployment rates across different regions in Year 2020

[56]:
```
# Filter the DataFrame for the year 2019
df_2020 = df[df['Year'] == 2020]

plt.figure(figsize=(12, 6))
sns.barplot(x='Region', y='Estimated Unemployment Rate (%)', hue='Area',␣
 ↪data=df_2020, dodge=False, palette='viridis')
plt.title('Unemployment Rates Across Different Regions and Areas in 2020')
plt.xlabel('Region')
plt.ylabel('Estimated Unemployment Rate (%)')
plt.xticks(rotation=45, ha='right')
plt.show()
```



Variations in Unemployment Rates Across Different Regions

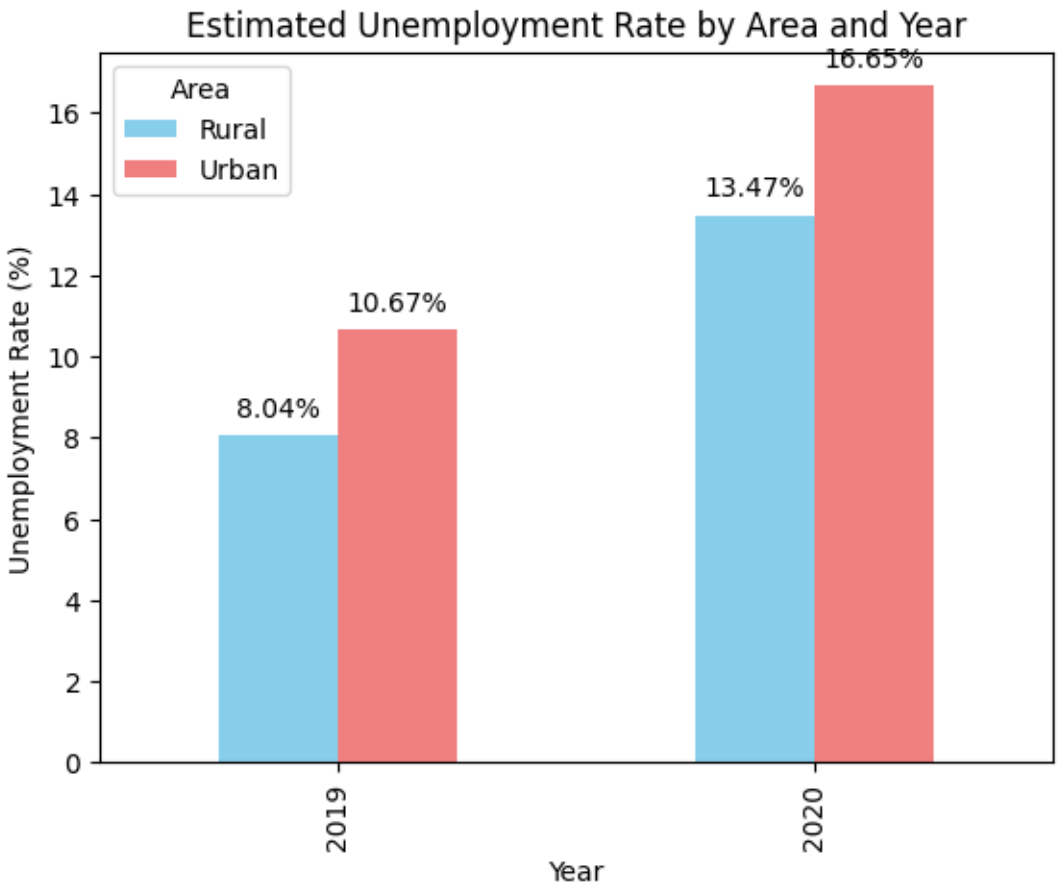
[37]:
```
# Convert 'Estimated Unemployment Rate (%)' to numeric
df_var = df['Estimated Unemployment Rate (%)'] = pd.to_numeric(df['Estimated␣
 ↪Unemployment Rate (%)'], errors='coerce')

# Handle duplicates by taking the mean
df_var = df.groupby(['Year', 'Region'])['Estimated Unemployment Rate (%)'].
 ↪mean().reset_index()

# Pivot the DataFrame for the heatmap
heatmap_data = df_var.pivot(index='Region', columns='Year', values='Estimated␣
 ↪Unemployment Rate (%)')

plt.figure(figsize=(10, 6))
sns.heatmap(heatmap_data, annot=True, cmap='YlGnBu', fmt='.2f', linewidths=0.5)
plt.title('Variations in Unemployment Rates Across Different Regions')
plt.xlabel('Year')
plt.ylabel('Region')
plt.show()
```



Estimated Unemployment Rate by Area and Year

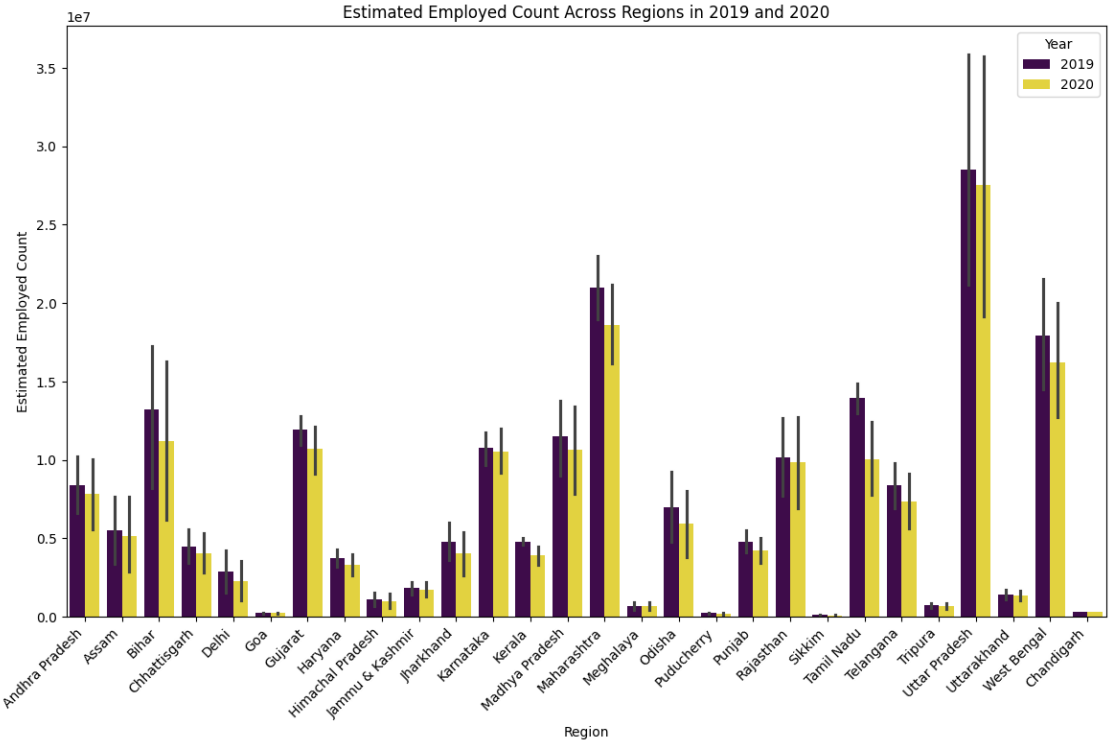
[50]:
```
plt.figure(figsize=(20, 10))
ax = df.groupby(['Year', 'Area'])['Estimated Unemployment Rate (%)'].mean().
 ↪unstack().plot(kind='bar', color=['skyblue', 'lightcoral'])
plt.title('Estimated Unemployment Rate by Area with Year')
plt.xlabel('Year')
plt.ylabel('Unemployment Rate (%)')
plt.legend(title='Area', loc='upper left')

# Add percentage numbers on top of each bar
for p in ax.patches:
    ax.annotate(f'{p.get_height():.2f}%', (p.get_x() + p.get_width() / 2., p.
 ↪get_height()),
                ha='center', va='center', xytext=(0, 10), textcoords='offset␣
 ↪points')

plt.show()
```

```
<Figure size 2000x1000 with 0 Axes>
```



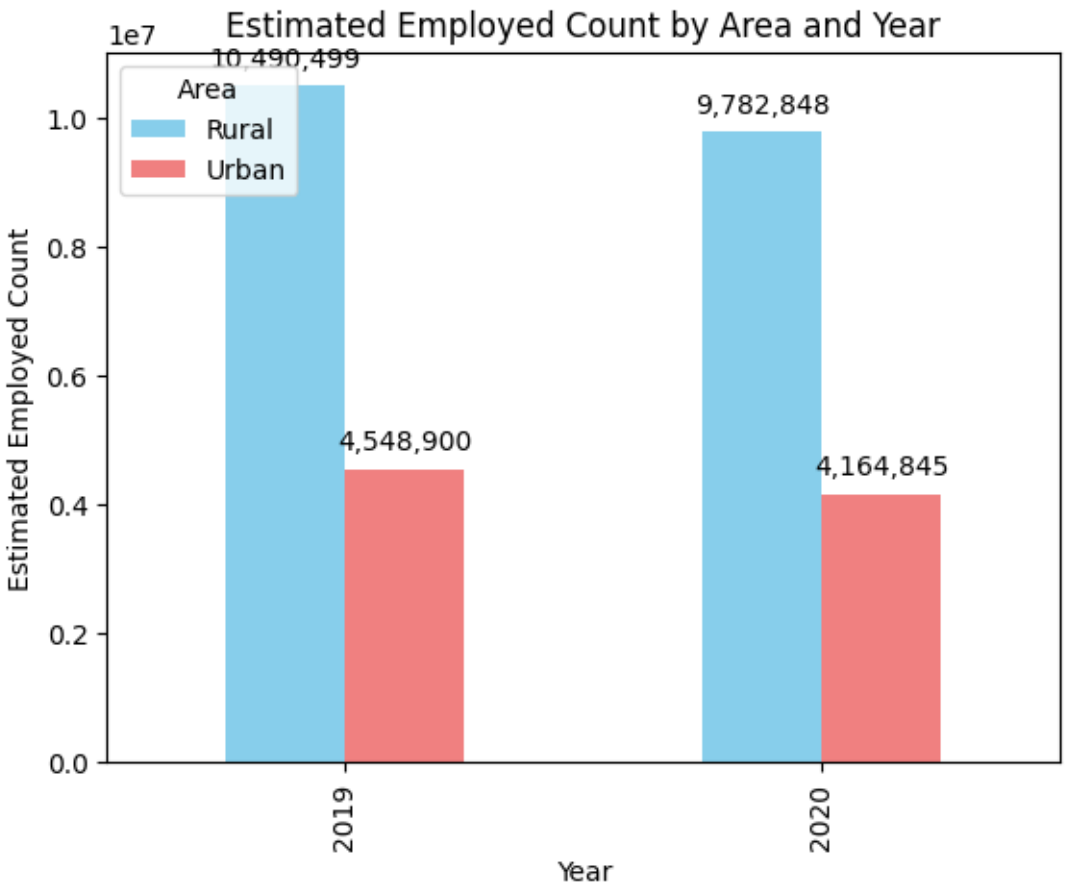
Plotting estimated employed count across regions for each year

[57]:
```
plt.figure(figsize=(14, 8))
sns.barplot(x='Region', y='Estimated Employed', hue='Year', data=df,␣
 ↪palette='viridis')

plt.title('Estimated Employed Count Across Regions in 2019 and 2020')
plt.xlabel('Region')
plt.ylabel('Estimated Employed Count')
plt.xticks(rotation=45, ha='right')
plt.legend(title='Year')

plt.show()
```



[74]:
```
# Plotting estimated employed count across areas for each year
plt.figure(figsize=(20, 10))
ax = df.groupby(['Year', 'Area'])['Estimated Employed'].mean().unstack().
 ↪plot(kind='bar', color=['skyblue', 'lightcoral'])
plt.title('Estimated Employed Count by Area and Year')
plt.xlabel('Year')
plt.ylabel('Estimated Employed Count')
plt.legend(title='Area', loc='upper left')

# Add actual employed count on top of each bar
for p in ax.patches:
    ax.annotate(f'{int(p.get_height()):,}', (p.get_x() + p.get_width() / 2., p.
 ↪get_height()),
                ha='center', va='center', xytext=(0, 10), textcoords='offset␣
 ↪points')
```

```
<Figure size 2000x1000 with 0 Axes>
```


Estimated Employed Count by Area and Year
1e7
10,490,499
9,782,848
4,548,900
4,164,845
Area
Rural
Urban
Estimated Employed Count
1.0
0.8
0.6
0.4
0.2
0.0
2019
2020
Year