TITLE: AIR QUALITY ANALYSIS IN TAMIL NADU

Introduction:
Air quality analysis in Tamil Nadu, or any region, typically involves monitoring various air pollutants and assessing their concentrations against established air quality standards. Tamil Nadu, like many other states in India, faces air quality challenges, especially in urban areas. The primary pollutants of concern in air quality analysis include:
Particulate Matter (PM2.5 and PM10): These are tiny solid or liquid particles suspended in the air. PM2.5 particles are less than 2.5 micrometers in diameter, and PM10 particles are less than 10 micrometers.

Ground-Level Ozone (O3): Ground-level ozone is formed when pollutants from vehicles and industrial sources react with sunlight. It can cause respiratory problems and other health issues.

Nitrogen Dioxide (NO2): NO2 is a byproduct of combustion processes, mainly from vehicles and industrial activities. High levels of NO2 can lead to respiratory problems and contribute to the formation of NO2.

Sulfur Dioxide (SO2): SO2 emissions primarily come from industrial sources and can lead to respiratory issues and acid rain.

Carbon Monoxide (CO): CO is a colorless, odorless gas produced by incomplete combustion of carbon-containing fuels. It can be harmful at high concentrations.

Volatile Organic Compounds (VOCs): VOCs are emitted from various sources, including vehicles, industrial processes, and natural sources. They can react with other pollutants to form ground-level ozone and smog.

Source Code:

```
import pandas as pd
data = pd.read_csv('location-wise-daily-ambient-air-quality-tamil-nadu-year-2014.csv')
print(data.head())
print(data.info())
print(data.describe())
data['Date'] = pd.to_datetime(data['Date'])
data.set_index('Date', inplace=True)
data.dropna(inplace=True)
def plot_feature_similarities(dataframe, feature_groups, columns=2):
   rows = int((len(feature_groups)/columns)//1)
   fig, axes = plt.subplots(rows, columns, figsize=(13, 4*rows))
fig.tight_layout()
row_num = 0
col_num = 0
   for pos, group in enumerate(feature_groups):
      if pos % columns == 0 and pos != 0:
row_num += 1
col_num = 1
         for feature in feature_groups[group]:
```

```
df_feature = dataframe[dataframe[feature].notnull()][feature]
df_feature = df_feature.groupby([df_feature.index.year]).mean(numeric_only=True)
sns.lineplot(data=df_feature, label=feature, ax=axes[row_num, col_num])
axes[row_num, col_num].set_title(group)
axes[row_num, col_num].set(xlabel=None)
col_num += 1

plt.plot()
import matplotlib.pyplot as plt
import seaborn as sns
plt.figure(figsize=(12, 6))
sns.lineplot(data=data, x=data.index, y='PM2.5')
plt.xlabel('Date')
plt.ylabel('Concentration (PM2.5)')
plt.title('PM2.5 Time Series (2014)')
plt.show()
```

Visualisation: