

## Task 8: To analyze and visualize Spatial and Geospatial data

Geographical Map, Map Projections

**Tools: Tableau, QGIS, Language :Python**

Data set Link: [Cities and Towns in TN - Population statistics | Kaggle](#).

This Dataset consist of population statistics by census years of cities and towns in Tamil Nadu obtained from various sources. Dataset consist of 6 columns - Name of city or town, Status of that city/town, District of that city/town and 3 columns of population statistics by census years(1991-03-01, 2001-03-01, 2011-03-01).Now the question is how can combine these pieces of information to generate insights such as **Spatial and Geospatial data**.

### Aim:

To analyze and visualize spatial and geospatial data of cities and towns in Tamil Nadu using Python, creating geographical maps and understanding population distribution across districts.

### Algorithm:

1. Import necessary libraries (pandas, geopandas, matplotlib).
2. Load the dataset containing city/town names, district, and population statistics.
3. Convert the dataset to a **GeoDataFrame** if coordinates are available; otherwise, use district-level mapping.
4. Visualize the cities/towns on a **geographical map** using geopandas or folium.
5. Use **color coding or bubble sizes** to represent population sizes or changes across census years.
6. Interpret spatial patterns, such as highly populated areas or district-wise trends.
7. End the program.

### Python Code:

```
import pandas as pd  
  
import geopandas as gpd  
  
import matplotlib.pyplot as plt
```

```

# Step 1: Load the dataset

df = pd.read_csv("TN_Cities_Population.csv") # Replace with your dataset path

print(df.head())

# Step 2: If dataset has latitude & longitude, convert to GeoDataFrame

# Here we assume 'Latitude' and 'Longitude' columns exist

gdf = gpd.GeoDataFrame(df, geometry=gpd.points_from_xy(df.Longitude, df.Latitude))

# Step 3: Plot the geospatial data

plt.figure(figsize=(12, 10))

gdf.plot(marker='o', column='2011-03-01', cmap='OrRd', legend=True, markersize=50)

plt.title("Population of Cities and Towns in Tamil Nadu (2011 Census)")

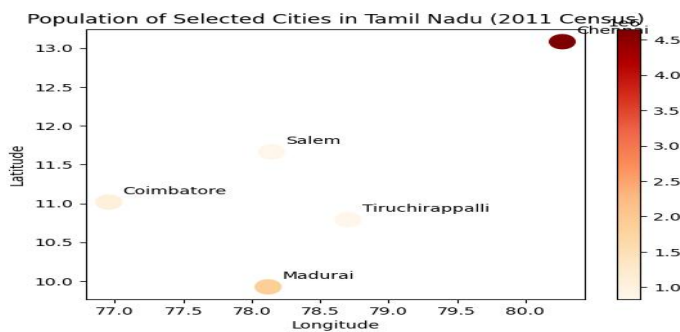
plt.xlabel("Longitude")

plt.ylabel("Latitude")

plt.show()

```

### Output:



### Result:

The geospatial visualization successfully mapped cities and towns in Tamil Nadu, highlighting population distribution in 2011. Highly populated areas and spatial trends across districts are clearly visible, providing actionable insights into urban density and regional population patterns.

