University Institute of Engineering

Department of Computer Science & Engineering

Experiment:3

Date of Experiment: 29-07-2025

1. Aim of the practical: To demonstrate geospatial data visualization in Tableau using symbol maps and filled maps based on latitude and longitude fields.

2. Objective: To learn how to create location-based visualizations such as symbol maps and filled maps in Tableau and analyze geographic patterns using spatial fields like country, state, latitude, and longitude.

3. Tool Used/ Apparatus Required:

- Internet connectivity.
- A system with Tableau Desktop or Tableau Public installed.
- Sample geospatial dataset (e.g., GlobalStores.xls).
- Fields containing: Country, State, City, Latitude, Longitude.

4. Theory:

Geospatial data visualization involves displaying data with geographic components—such as country, state, latitude, and longitude—on a map. Tableau makes this process easy by recognizing geographic fields and allowing users to create interactive maps.

Two main types of maps in Tableau are:

- **Symbol Maps:** These use marks (usually circles) to represent data at specific locations. The size and color of symbols can represent different values or categories. They're ideal for showing point data like store locations or cities.
- **Filled Maps:** Also known as choropleth maps, these shade geographic areas (like countries or states) based on a measure. They are useful for comparing data across regions, such as sales by state or population density.

Tableau also supports custom mapping using latitude and longitude fields, which allows plotting precise points on the map—even when the location names are not recognized by default.

Geospatial visualization helps in identifying trends, patterns, and outliers across locations, making it a valuable tool

in fields like business, public health, and environmental studies.

5. Procedure:

- **Open Tableau and Load Dataset**
  - Launch Tableau and connect to the dataset containing location fields (e.g., GlobalStores.xls).
  - Ensure fields like Country, State, City, Latitude, and Longitude are available.
- **Create a Symbol Map**
  - Drag Country or State to *Detail* under *Marks*.
 - Drag Latitude and Longitude to Rows and Columns respectively (or Tableau auto-detects them).
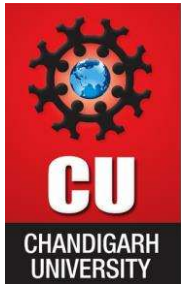
- o Set *Marks* type to **Map** → then change to **Circle** (Symbol).
- o Add Sales or Profit to *Size* and/or *Color*.
- **Create a Filled Map**
  - o Drag Country or State to the *View*.
  - o Tableau automatically creates a filled map using geographic roles.
  - o Drag Sales or Profit to *Color*.
  - o Modify color gradient to reflect data intensity.
- **Customize the Map**
  - o Add labels (e.g., City, State).
  - o Use color palettes, borders, and tooltips.
  - o Add filters (e.g., show data only for specific region or time).
- **Interpret the Visuals**
  - o Analyze which regions perform better based on chosen metric.
  - o Compare symbol map and filled map usage scenarios.

6. Result:
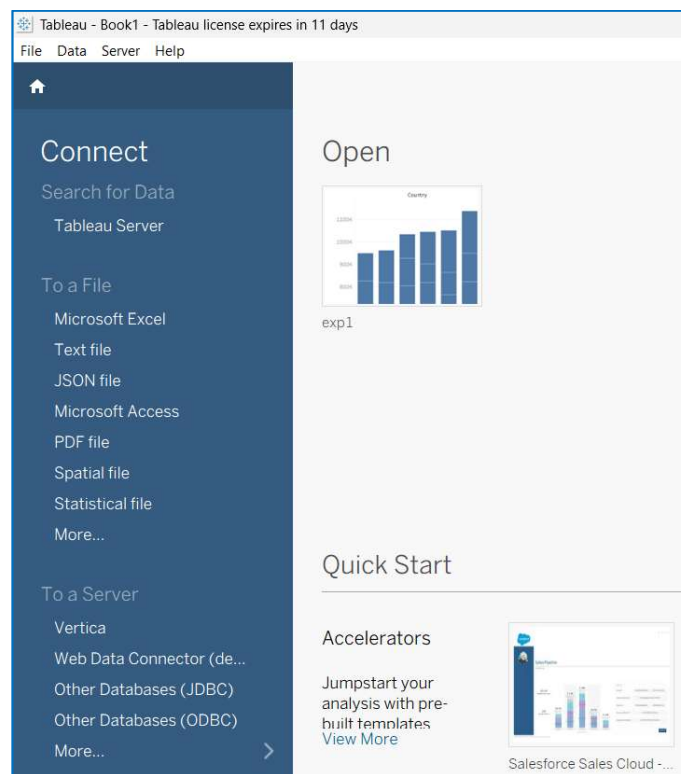
Figure 3.1: Tableau Interface
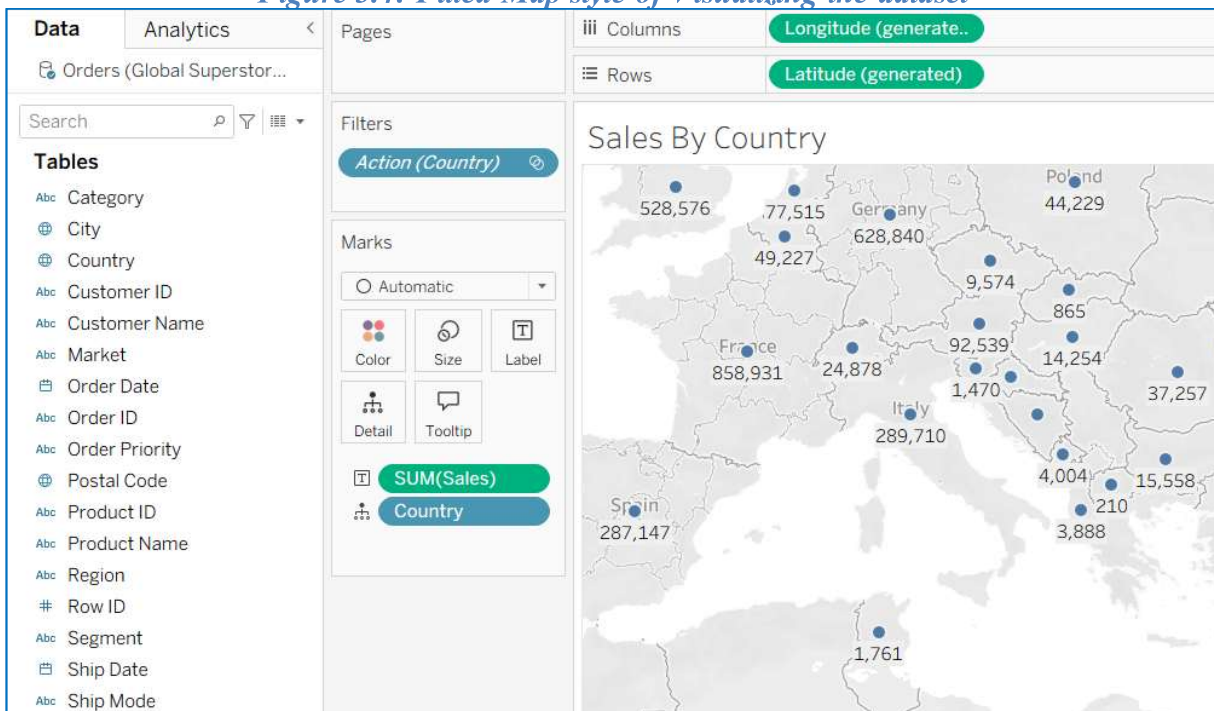
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Figure 3.2: Dataset file in CSV Format
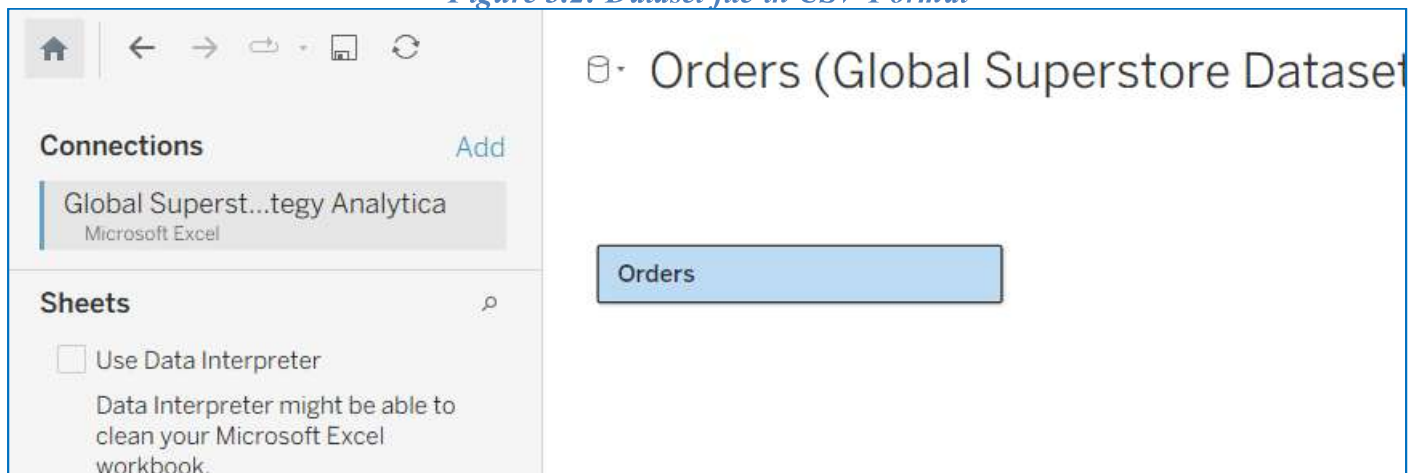
Figure 3.3: Importing the data in Tableau
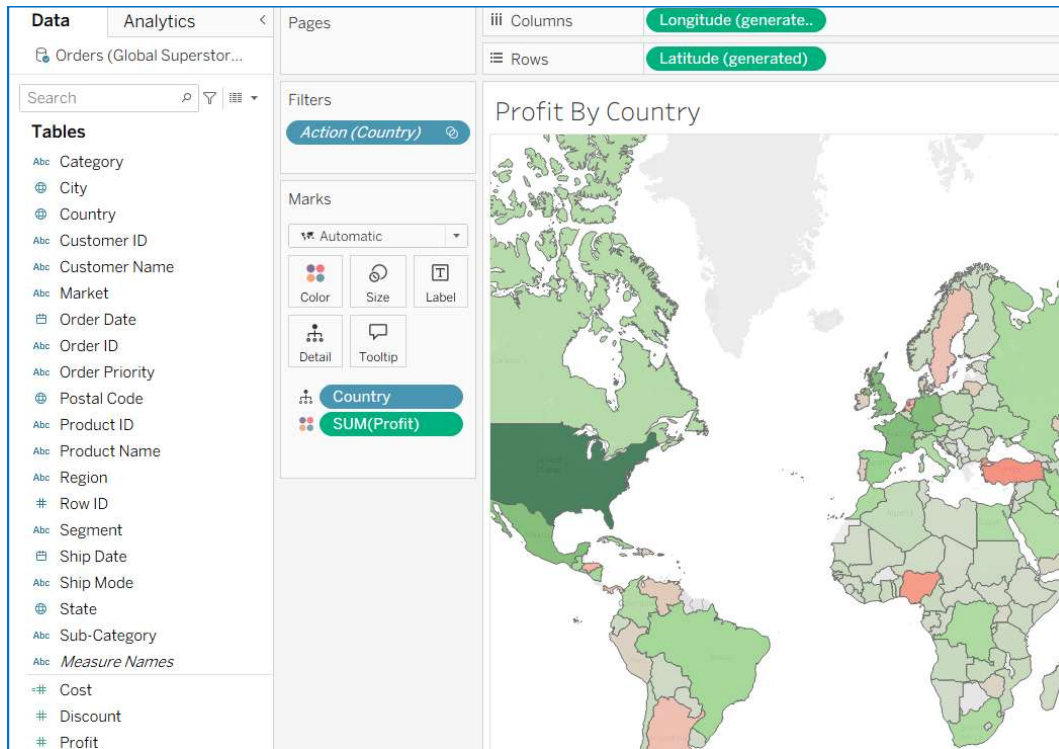
Figure 3.4: Filled Map style of Visualizing the dataset

Figure 3.5: Dot Mapping Style of visualizing the dataset
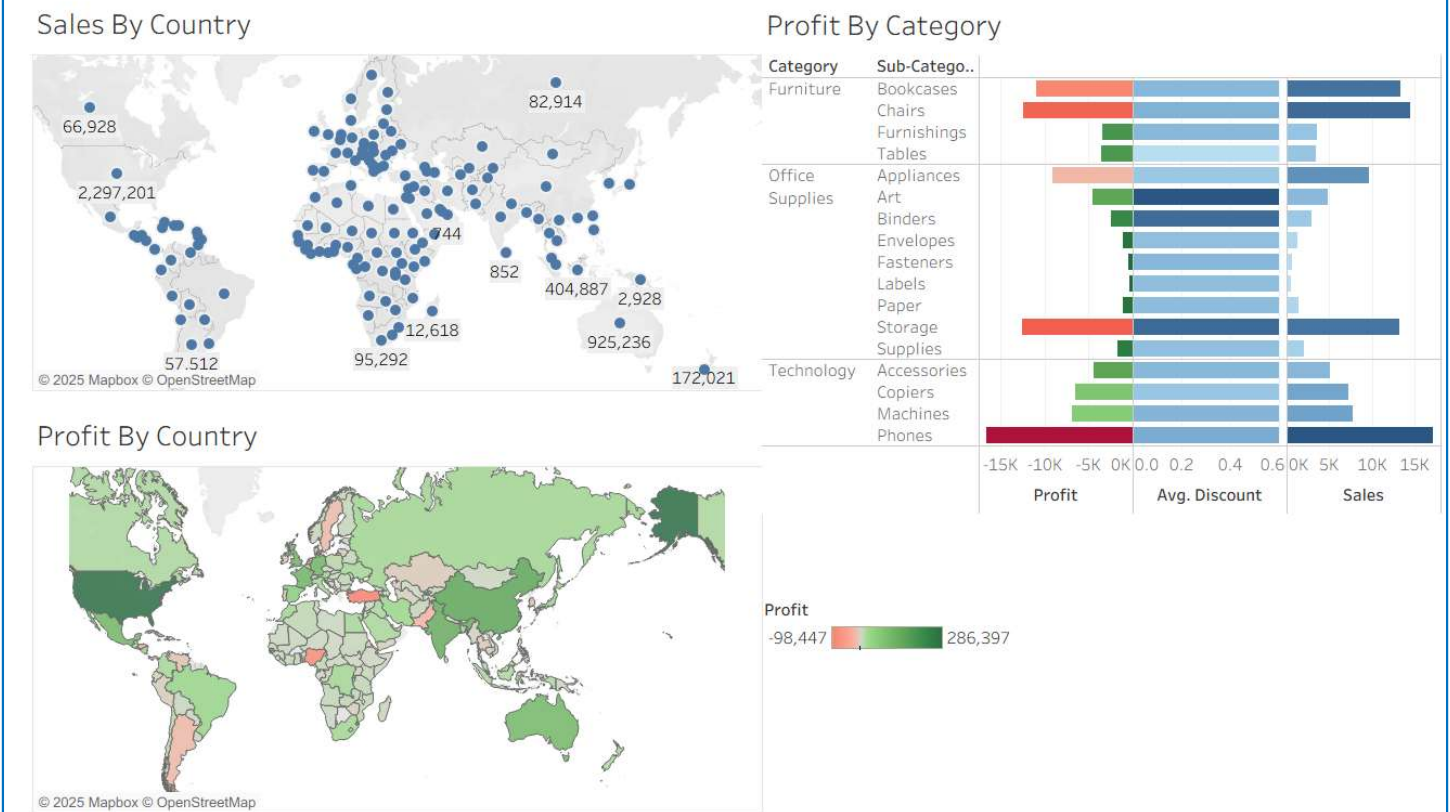
Figure 3.6: Comparison between two parameters of the dataset.

Conclusion:

In this experiment, we successfully demonstrated how to create geospatial visualizations in Tableau using symbol maps and filled maps. By working with geographic fields such as country, state, latitude, and longitude, we learned how to plot data points and analyze spatial patterns effectively. The ability to switch between different visualization types and customize them made the analysis more interactive and insightful. Creating a dashboard further enhanced our understanding of how changes in visual components can dynamically reflect across a unified interface. Overall, this experiment highlighted the power and simplicity of Tableau in visualizing and interpreting geospatial data.
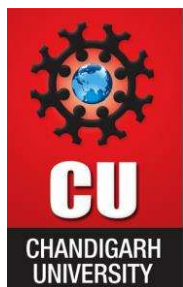
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Learning outcomes (What I have learnt):

1. **Understanding Geospatial Fields,** gained knowledge of how Tableau identifies and uses geographic fields like country, state, latitude, and longitude for map-based visualizations.
2. **Creating Symbol and Filled Maps,** learned how to create and customize symbol maps and filled (choropleth) maps to represent location-based data visually.
3. **Classifying Data Types,** developed the ability to distinguish between continuous and discrete data fields and apply them appropriately in visualizations.
4. **Using Interactive Dashboards,** learned how to build a dashboard by combining multiple worksheets and observed how changes in one view dynamically affect the overall dashboard.
5. **Hands-On Data Import and Visualization,** gained practical experience in importing a dataset, exploring different visualization options, applying filters, and interpreting spatial data trends using Tableau.

Evaluation Grid:

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.	Student Performance (Conduct of experiment)		12
2.	Viva Voce		10
3.	Submission of Work Sheet (Record)		8
	Signature of Faculty (with Date):	Total Marks Obtained:	30