MLDS 411
DATA VISUALIZATION

Winter 2024 Labs

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Schedule

Week	Date	Time	Tableau Topics	Python Topics
1	January 12	11am	Tableau Review	Library Overview
2	January 19	12pm	Joining, Blending & Relationships	Plotly, Dash
3	January 26	11am	Hierarchies, Groups & Sets	Bokeh
4	February 2	11am	Filters, Parameters & Tooltips	Wordcloud
5	February 9	11am	Dashboards, Stories & Actions	NetworkX
6	February 16	11am	Maps	GeoPandas, Folium
7	February 23	11am	Calculated Fields, Calculations	Plotnine
8	March 1	11am	Forecasting, Clustering	Python + Tableau

Lab 4 & 5 Follow Ups

- **How to get Canadian provinces to display**
  - Created a hierarchy of Country >> State / Province

- **How to add shapes to a dashboard**
  - Add annotation or images (in exercise)

- **How to clear existing colors on a map**
  - Update the data layers (in demo 1)

Today's Theme: Maps

Demo 1: UFO Sightings

- Background layers

How do we change what the map looks like?

Demo 2: SF Crimes

- Spatial data

How do we create our own mappings?

Demo 3: Disneyland Ratings

- Background image

How do we create our own background?

Demo 1: UFO Sightings

Connect
- To a File >> Microsoft Excel >> UFO Sightings.xls

Marks
- Detail: Country / State / City
- Mark Type: Automatic / Map / Density

Background Layers
- Right click >> Background Layers
- Style / Background Map Layers / Data Layer
- Search

Dashboard
- Sightings by Year Bar Chart
- Add filter action

Demo 2: SF Crimes

Connect
- To a File >> Spatial Data >> .shp file

Sheet 1: Marks
- Drag on Geometry
- Color & Text by District

Connect
- To a File >> Microsoft Excel >> SF Crimes.xlsx
- District = Police District

Sheet 1: Marks
- Number of Incidents on Tooltip

Sheet 2: Marks
- Drag on Latitude & Longitude
- Detail by Incident ID
- Decrease the Size

Sheet 2: Background Layer
- Streets

Dashboard
- Number of Incidents by Category
- Add filter action

Demo 3: Disneyland Ratings

Connect

- To a File >> Microsoft Excel >> Disneyland Rides.xlsx

Marks

- Drag on X and Y

Background Image

- Map >> Background Images
- Add Image >> Disneyland Map.jpg
- Change range to 0 to 10
- Check Always Show Entire Image

Marks

- Attraction Area on Color
- Attraction Name on Label

Dashboard

- Average Rating by Attraction Area and Name
- Color by Attraction Area
- Add filter action
- Change legend to floating

Map Exercise

- Replicate this dashboard
    - Bar chart
    - Map
    - Title
    - Image
    - Annotation
    - Text
- Add an action
    - When you hover over a bar, the map should filter only to sightings within that year
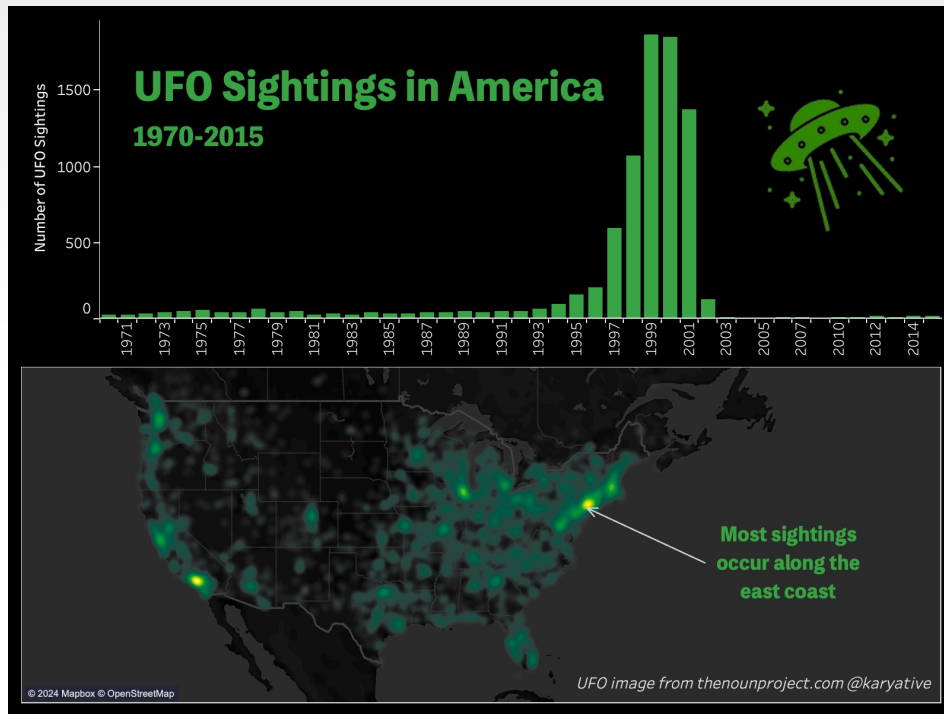
Map Summary

1. If you have standard geographical data (city, state, etc.)

- Tableau can easily identify the geographical locations for mapping

2. If your geographical data is in a spatial format

- Import the data (shape files, etc.) into Tableau

3. If your data has custom coordinates

- Import the coordinates as columns and specify the coordinate ranges in Tableau
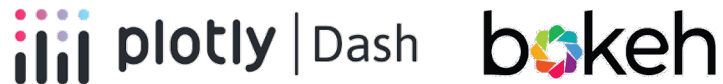
Data Visualization in Python Overview

Standard Libraries

Mapping

Interactive Visualizations

Specialty

Mapping in Python

GeoPandas

- Extends the Pandas DataFrame to work with geospatial data

Folium

- Allows you to create and display interactive maps within Jupyter Notebook

Gallery

- https://geopandas.org/en/stable/gallery/index.html

Demo

- Mapping_Demo.ipynb