Weather Data Analysis using Tableau for Indian Country

Introduction

The dataset contains weather data such as temperature, pressure, humidity, wind speed, sea level, ground level in different states of India in the year 2020 for four months (January, February, March, April) which is taken from Kaggle website. The data consists of Categorical variables and Quantitative variables which is plotted using Radial chart, Bar charts and Indian State maps in Tableau.

Dataset - Weather data taken from Kaggle contains Quantitative continuous and categorical attributes as mentioned below:

Temperature, Pressure, Humidity, Wind Speed, Sea Level, Ground Level, humidity, Date, Latitude, Longitude - Quantitative Continuous variables which gives the measurement of weather attributes for different states

Main - Categorical attribute which represents the four climatic conditions (clouds, clear, rain and snow)

Region – Categorical attribute representing the four regions of the country i.e., North, South, East and West.

Visualization

Radial Chart

To visualize the pressure patterns and the temperature, radial chart is chosen which is used to compare the weather patterns between different states in four different months (January to April) and also makes the visualization very appealing where the data is laid out in a circular form. Radial chart is created in tableau by using table joins (Union), cos and sin function calculated fields. Using the weather data taken from Kaggle, the visualization is done with use of different encoding channels which is explained below:

Visual Encoding Channels

Radial Position- Average Temperature of the state in each month is encoded using the Radial position which shows the state with lowest temperature near the origin of the circular chart and then the highest temperature along the radial positions of the chart.

Colour- Different states of the Indian country are represented using colour encoding channel as it will be easy to compare the weather patterns in different parts of the country using colour channels.

Size of the Circle - Average Humidity is represented using the size of the circle which is present at the end points of the arc. The higher the size of the circle in each arc, the higher is the humidity and vice versa. Size of the circles in the ends of the radial chart helps to differentiate the humidity level in different states of India in an accurate manner.

Length of the circular arc - Wind Speed is given by the length of the radial arcs which represents the speed of the wind in different states of the country.

Label - Average Temperature and Average Pressure is represented using labels

Bar Chart

Bar chart is chosen to compare the Continuous Quantitative variables (Sea Level, Ground Level and Temperature) in different regions (North, South, East, West) of the country. Using a bar chart helps to summarize a large amount of data and displays categorical data according to the frequency distribution.

Ground Level and Sea Level

Ground Level and Sea Level for different regions are plotted in a bar chart for four different categories (Snow, Rain, Clouds, Clear) which is represent by colour channels.

Temperature in Different Regions of India Visualization

Average Temperature in different Regions (North, South, East, West) during four different climates (Snow, Rain, Clouds and Clear) are plotted using the Bar chart which shows the temperature according to the month selected using a drop-down filter.

Indian Map

Brightness - Average Temperature for various climate categories is shown using the temperature diverging (Gold-Green) colour palette for all the States in India. Brightness is chosen as an encoding channel as it is easy to find the states with lower and higher temperature during different climates.

Size - Average Humidity for different states of the country are represented using the size of the white coloured circles inside each state in the visualization for all the different climatic categories available. Size is chosen to visualize pressure points in every state in order to compare the continuous quantitative values among each state during different climates.

Label – Average Pressure of each Indian States are represented using the Text Labels

Tasks

Present – The visualization presenting the Temperature, Pressure, Wind Speed, Humidity, Pressure across different states if India during the months January, February, March and April. The Bar charts are used to compare the average sea and ground levels in different regions (South, North, East, West) during different climate categories. Indian map shows the temperature, pressure and humidity in all the states with changing climatic conditions.

Identify – The changes in weather pattern can be identified for all the states in different months, different regions and during different climatic conditions.

Analyse – The temperature between different regions of the country according to which the pressure and other weather factors change and also analysing different states of the country present within the range of humidity levels

Search – The visualization can be used to search for states with different climatic categories such as snow, which is present only in the northern region of the state.

Compare – Comparing the weather patterns in different states and regions of the country using the encoding channels.

Interactive Visualization

Radial and Bar charts are changed according to different months as the user selects the month using drop down filter "**Month"** present on the top of the visualization. Average Humidity values can be changed using a slider **"Avg. Humidity"** to select the range of values which will return the states in the radial chart according to the values selected. Indian maps are visualized according to different categories of climate using the filter drop down **"Main". Interface Controls** are used in the Visualization for different months and different climatic categories present.
Interactive visualization is created using Tableau Dashboard using filter actions for different worksheets developed.

Analysis of Strength and Weakness of Visualization:

Strength:

- Radial chart is most suitable for categorical data which is the Indian "States" in our visualization
- Comparison of different entities easily using encoding channels
- Easy to Understand

Weakness:

- Marking labels is difficult in radar charts as there are high chances for the text to overlap
- Not suitable if there are lot of variables to compare

Novelty of the Visualization

When it comes to world data, maps are commonly used for visualization to represent the data. Here Radial chart is used instead of maps in order to interpret the categorical data of different states present in India. Radial chart helps to visualize the difference in weather pattern more clearly by sliding over different months which can be done with the help of a filter. The data is voluminous with around 10 Lakh data and idioms with data encoding channels and filters are used to visualize the complexity of the weather data.