Task 5C: Tableau Dashboard

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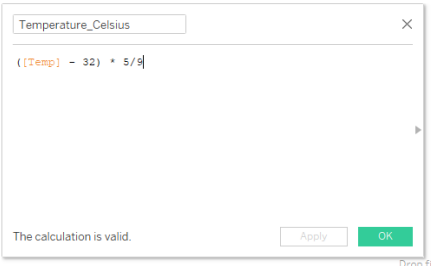
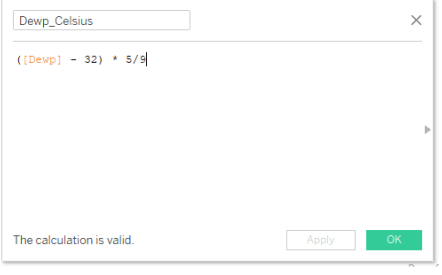
Abstract

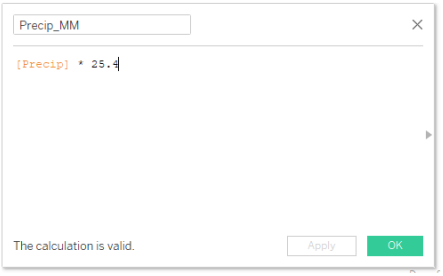
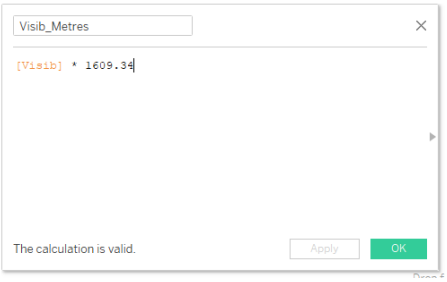
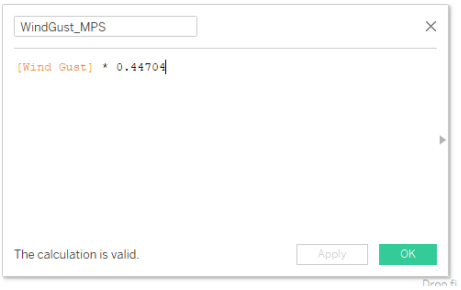
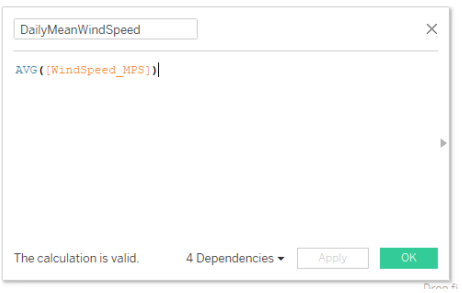
In this task, we will create a data visualisation dashboard using Tableau that can be viewed by the marking tutors through a web browser. Through dashboard, we will analyze and visualize weather data related to flights in New York City. The dataset includes various meteorological parameters such as temperature, dew point, precipitation, visibility, wind speed, and wind gusts. Tableau has been used to perform Key functionalities such as unit conversions, daily mean wind speed calculations, plots, and monthly average wind speed visualizations. The goal is to explore and present patterns and trends in wind speeds across different time scales and airport origins.

The following tasks have been covered:

- Convert all columns so that they use metric (International System of Units, SI) or derived units. Create new columns with modified values and name the columns accordingly.
    - Temperature and Dewp to Celsius,
    - Precip to millimetres,
    - Visibility to metres
    - wind_speed and wind_gust to metres per second.
- Computing daily mean wind speeds for the LGA airport.
- Presenting the daily mean wind speeds at LGA on a plot.
- Identify the 10 windiest days at LGA.
- Visualise the monthly mean wind speeds at the three airports (on a single plot).

Use of Conversion Functions to create new Calculated Fields

Fahrenheit to Celsius Conversion Fields *Temp* and *Dewp* which are specified in Fahrenheit (x) are converted to Celsius using the formula (x - 32) * 5 / 9 New fields "*Temperature_Celsius*" and "*Dewp_Celsius*" are created.	 

Inches to Millimeters Conversion Convert Precipitation field *Precip* value specified in inches (x) to millimeters by multiplying it by the conversion factor 25.4. x * 25.4 Name the new calculated field as *Precip_MM*.	
Miles to Meters Conversion Convert the Visibility field *Visib* value in miles (x) to meters using the conversion factor 1609.34 (1 mile = 1609.34 meters) x * 1609.34 New field name is *Visib_Metres*.	
Miles per Hour to Meters per Second Conversion Convert the fields *wind_speed* and *wind_gust* in miles per hour (x) to meters per second using the conversion factor 0.44704. (1 mph = 0.44704 meters per second). x * 0.44704 New fields will be named *WindSpeed_MPS* and *WindGust_MPS*.	 
Corrected Date To accommodate to a bug in the dataset which is incorrectly shifted by 1 hour, readjust the time by reducing it by 1 hour. Use the built-in function DATEADD(). New field will be called *CorrectedDate*.	
Daily Mean of Wind Speed Calculate the average of the field *WindSpeed* using the builtin function AVG() and create the new calculated field as *DailyMeanWindSpeed* which will be used for further visualization.	

Link to access Tableau Dashboard

https://public.tableau.com/views/SIG7312023Task5C_17067932062040/NYCAirportWeatherSummary?:language=en-US&:display_count=n&:origin=viz_share_link

Screenshot of the Dashboard and Worksheets

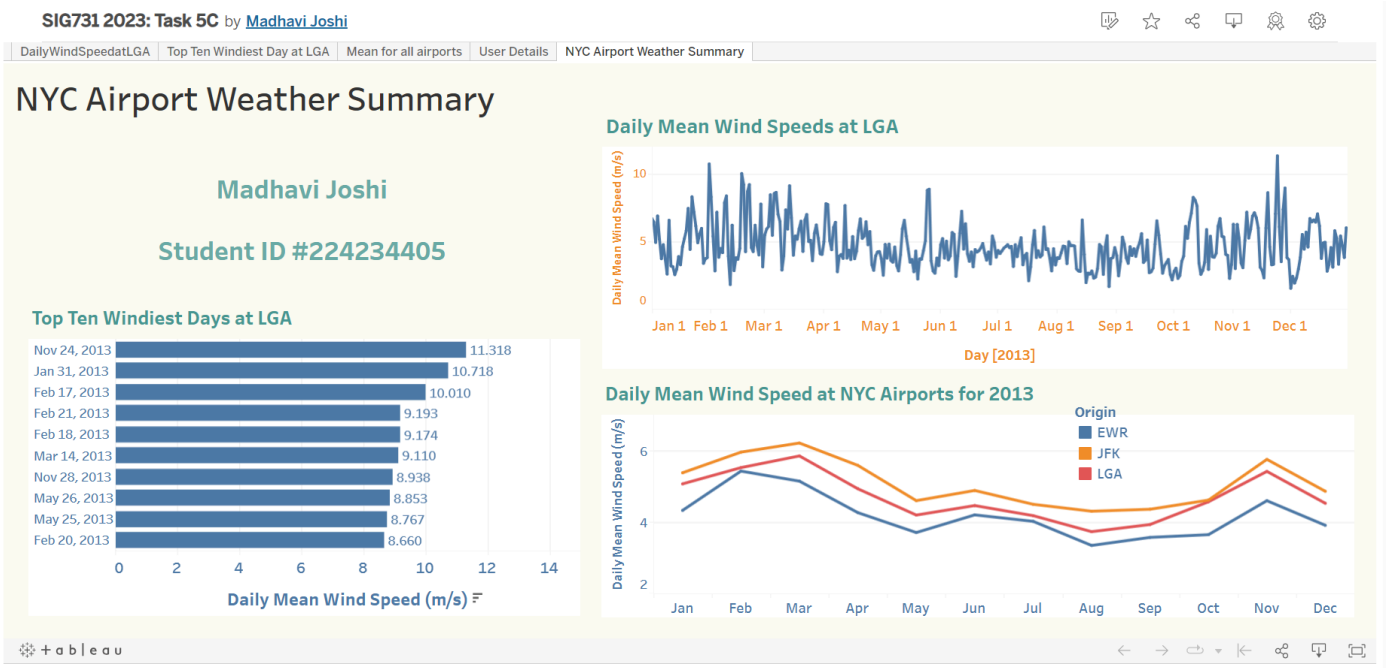


Fig 1 : Tableau Dashboard to visualize the Weather Summary at NYC Airports

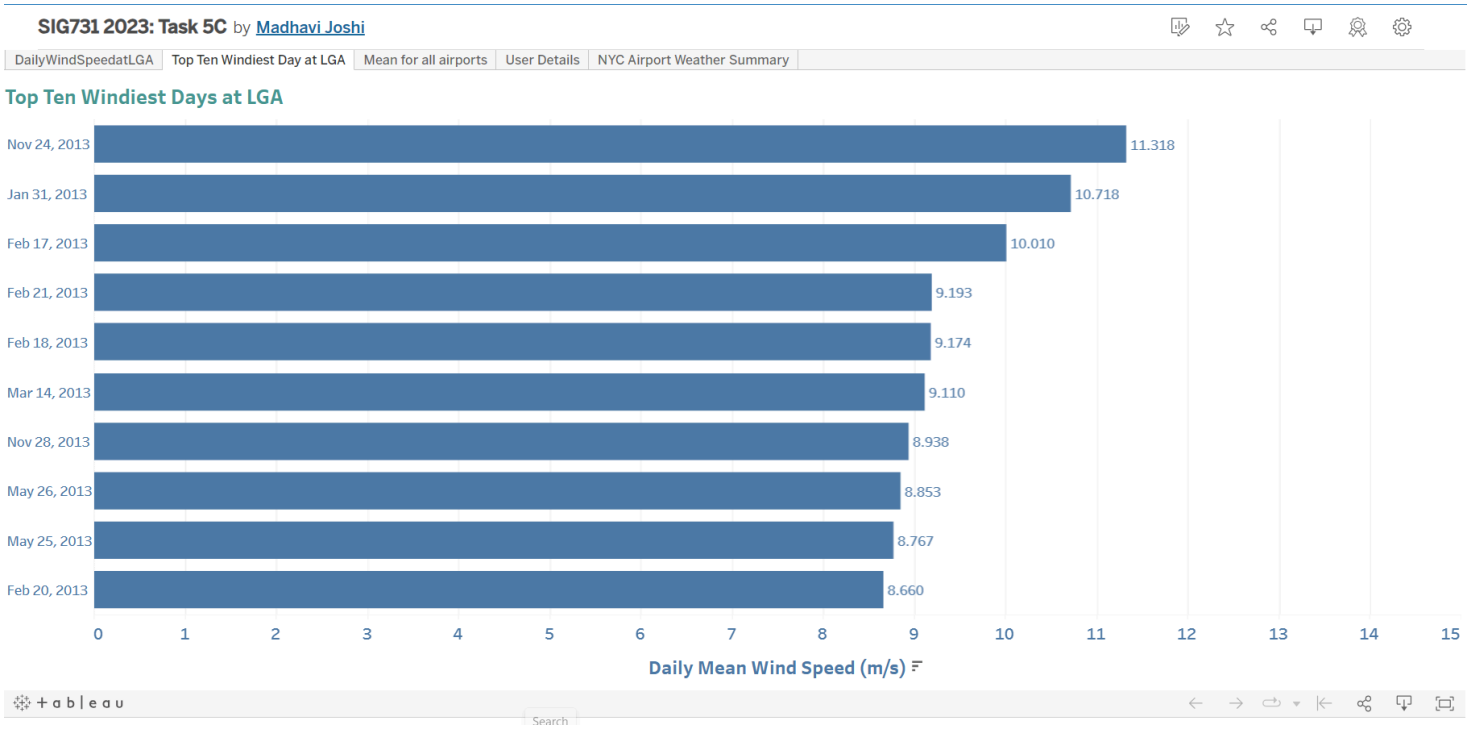


Fig 2 : Top Ten Windiest Days at LGA Airport

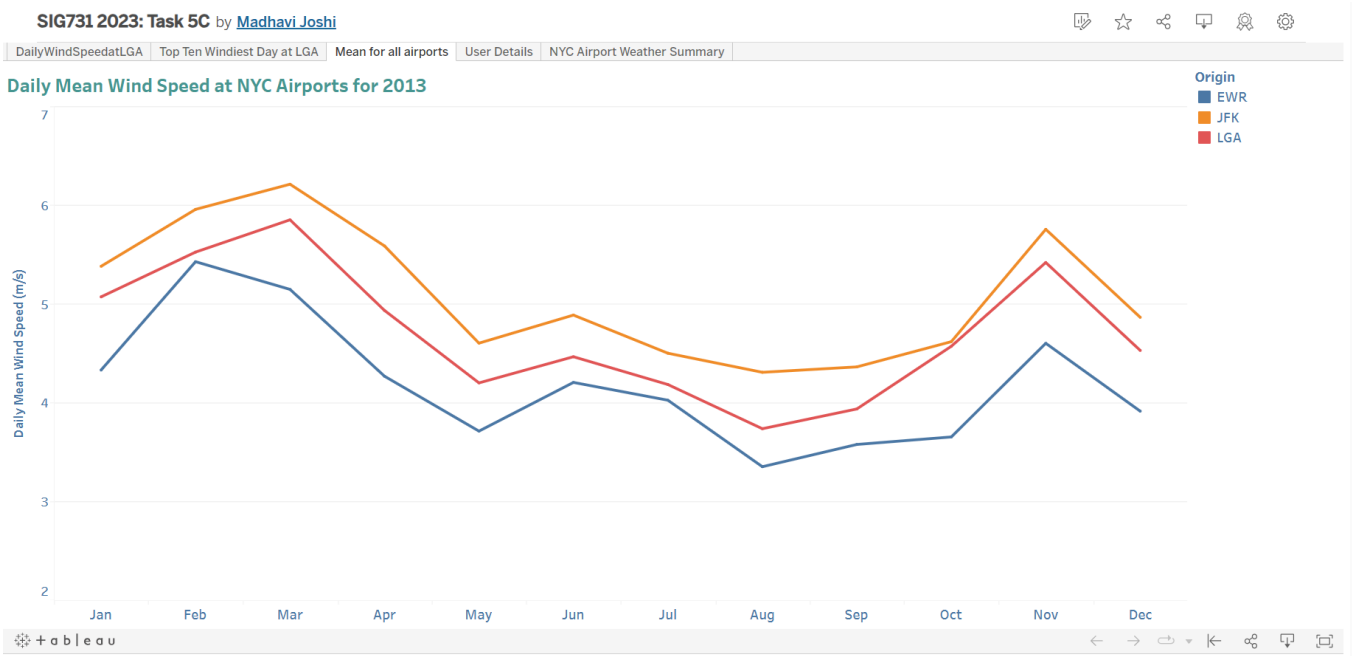


Fig 3 : Daily Mean Wind Speed at NYC Airports

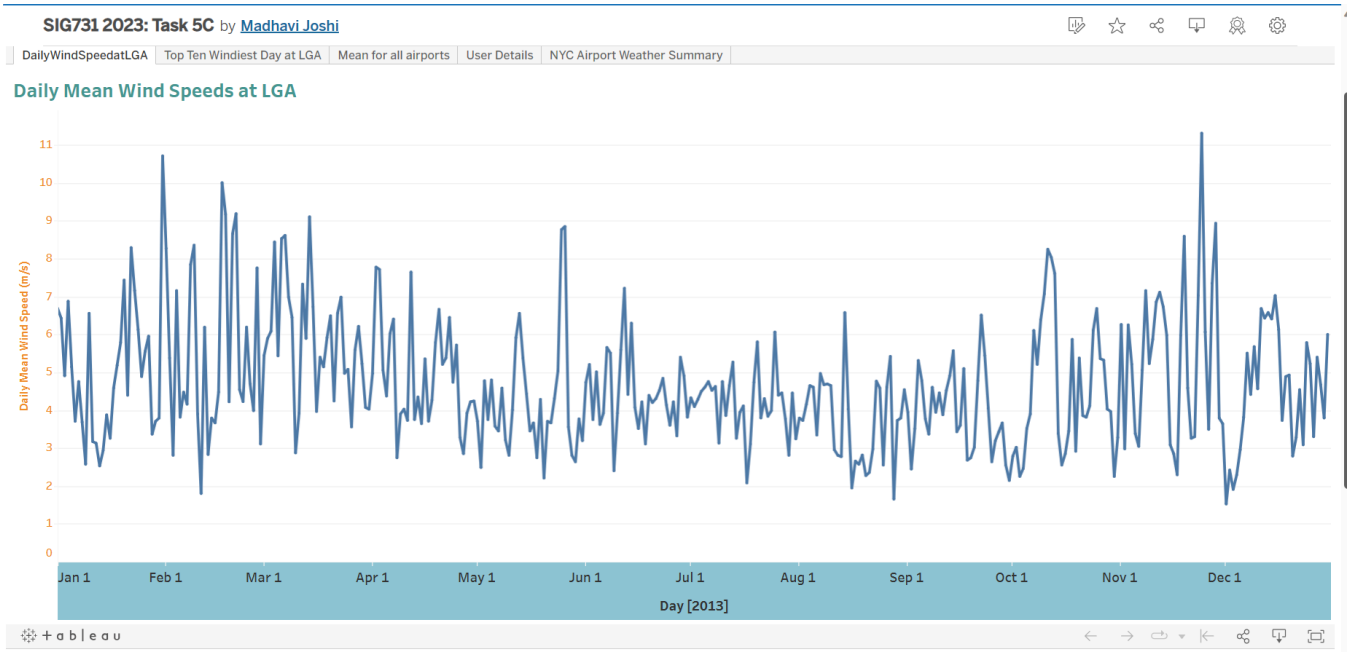


Fig 4 : Daily Mean Wind Speed at LGA Airport

Conclusion

The visualization provides insights into the monthly variation of wind speeds across different airports. It can be observed there are specific months where wind speeds tend to be higher or lower for each airport origin. Mostly, during winter season November-March months, there is evident high wind speed across all three airports. Due to close proximity of all three locations, there is a similarity in the wind speed behavior.

In conclusion, the tool Tableau can be used to process and visualize the weather data, offering insights into the temporal variations of wind speed. The conversion functions ensure consistency in measurement units, allowing for meaningful analysis. The daily mean wind speed analysis and plots reveal the distribution and central tendencies of wind speeds over time. Monthly average wind speed visualizations provide a broader perspective, showcasing trends across different airports. This is definitely a comprehensive tool for understanding and interpreting wind speed patterns, which can be valuable for weather-related decision-making and further research in aviation and meteorology.