



By Samiksha

# Weather Forecasting Analysis



Data Analysis Python Project

# Introduction

This Python project utilizes libraries like NumPy, Pandas, Matplotlib, and Seaborn for weather data analysis, visualization, and insights.

This Weather Forecasting project aims to analyze a dataset comprising atmospheric measurements like temperature, humidity, wind speed, and visibility. By delving into this data, we aim to uncover valuable insights into the dynamic nature of weather patterns. Utilizing graphical representations, we'll present findings to elucidate the complex atmospheric dynamics in a concise and informative manner.



# Objectives

In this weather forecasting data analysis project, our primary aim through exploratory data analysis (EDA) is to unveil patterns, trends, and relationships within the weather data. By utilizing statistical and visual analysis techniques, we aim to extract meaningful insights that deepen our understanding of atmospheric conditions, presented through graphs and insights.



# Weather Forecasting Analysis 🌤️ 🌧️ ☁️

Average Wind speed  
km/h

14.95

Average  
Temperature in C

8.80

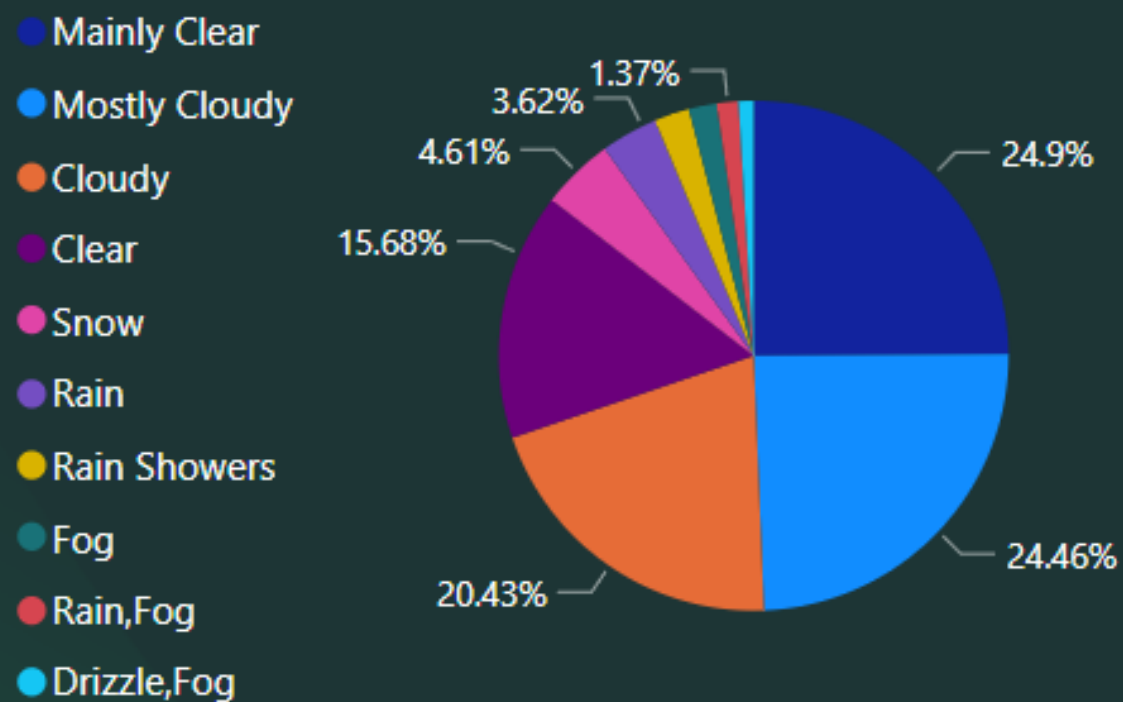
Average Humidity

67.43

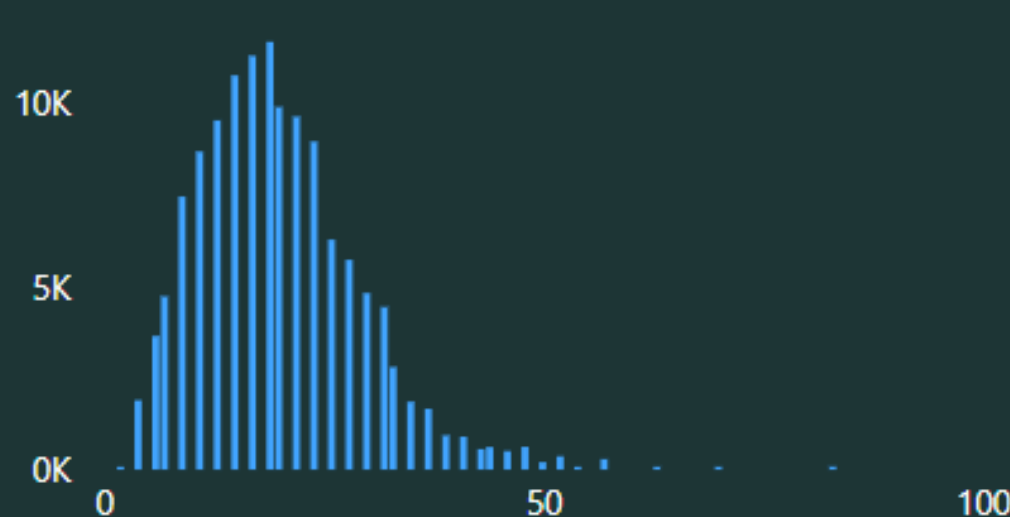
Count of Weather

50

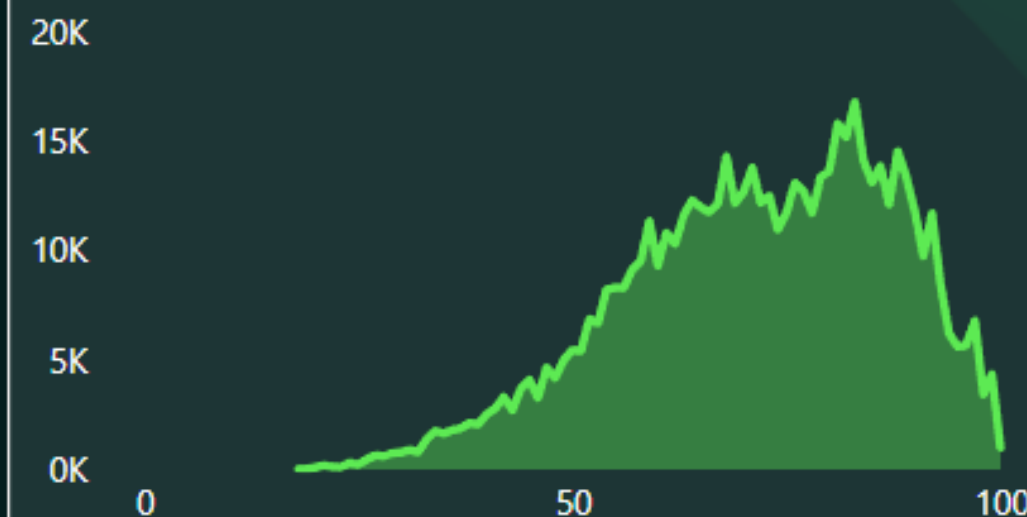
## Top 10 Weather Conditions



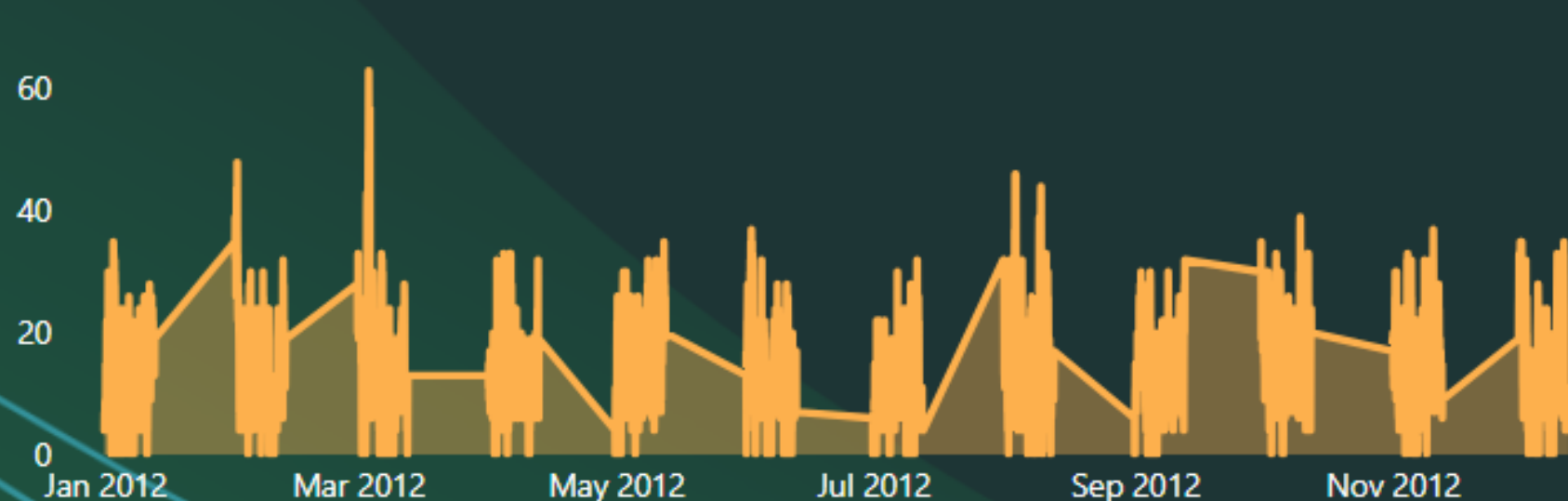
## Distribution of Wind Speed km/h



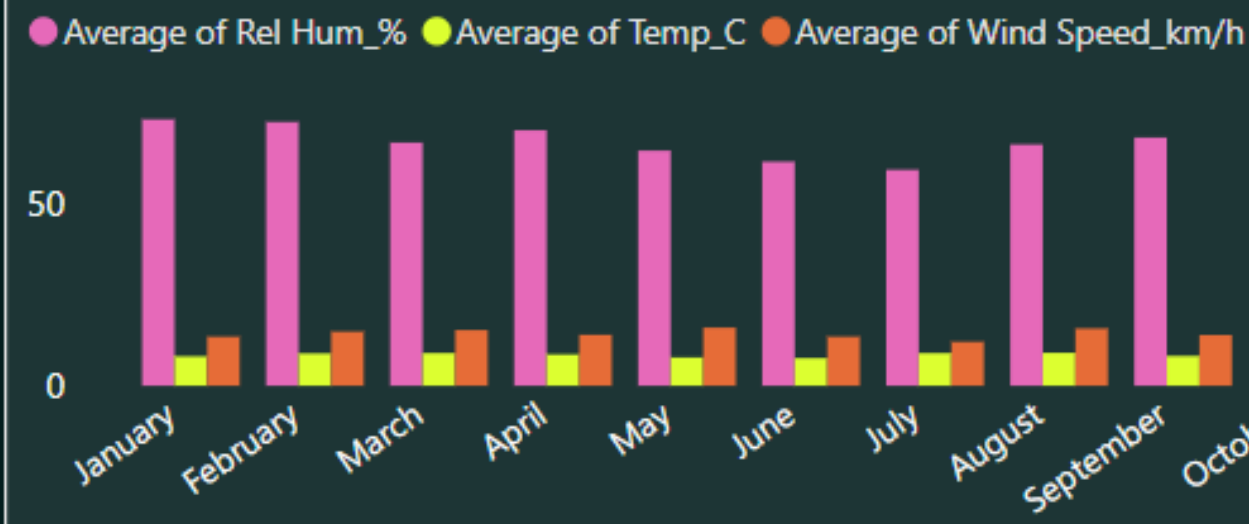
## Distribution of Humidity



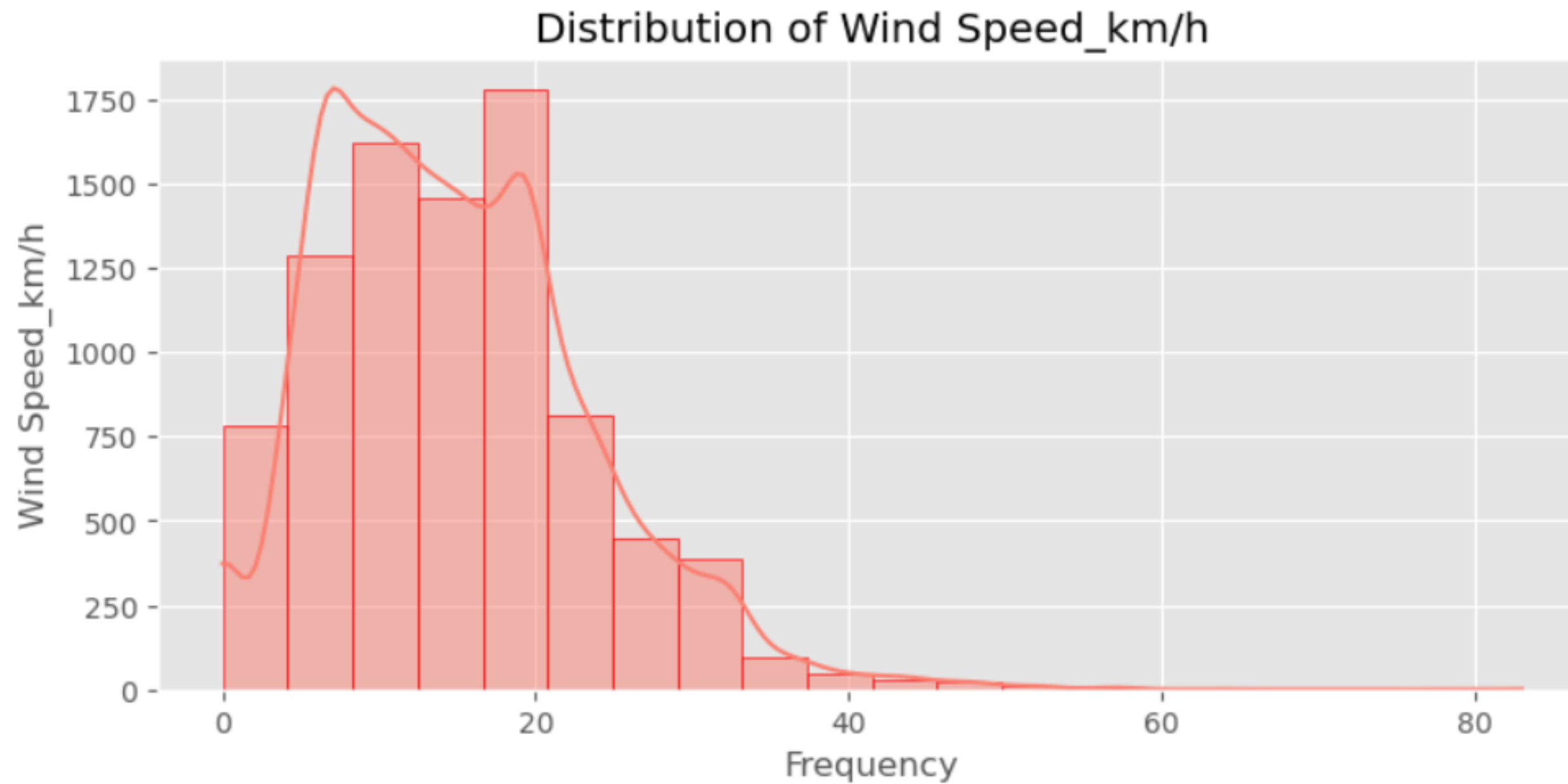
## Distribution of Wind Speed km/h



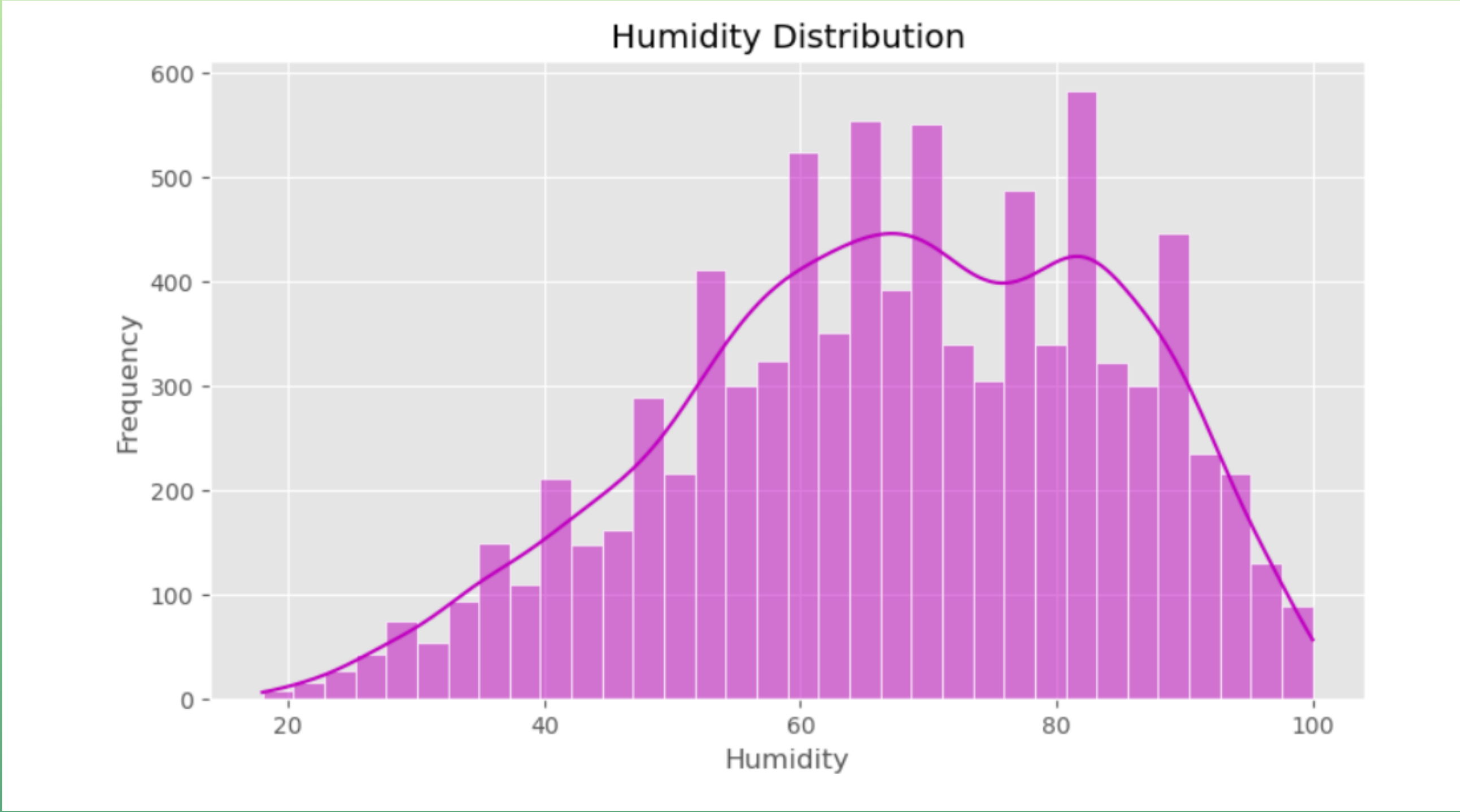
## Average Temp and Humidity by Month



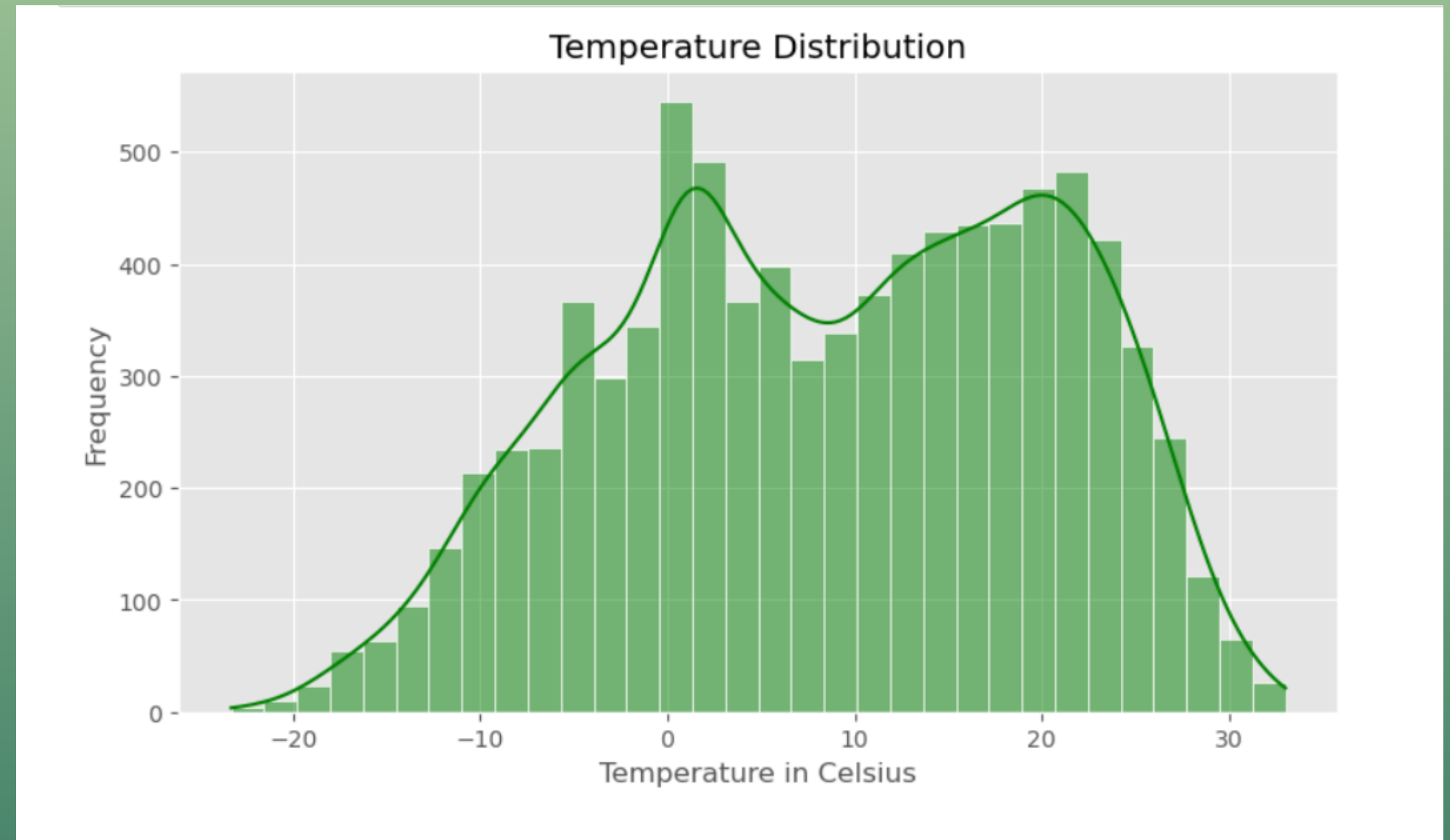
**The wind speed histogram illustrates that 20km/h is the prevailing wind speed, indicating its frequent occurrence in the data distribution.**



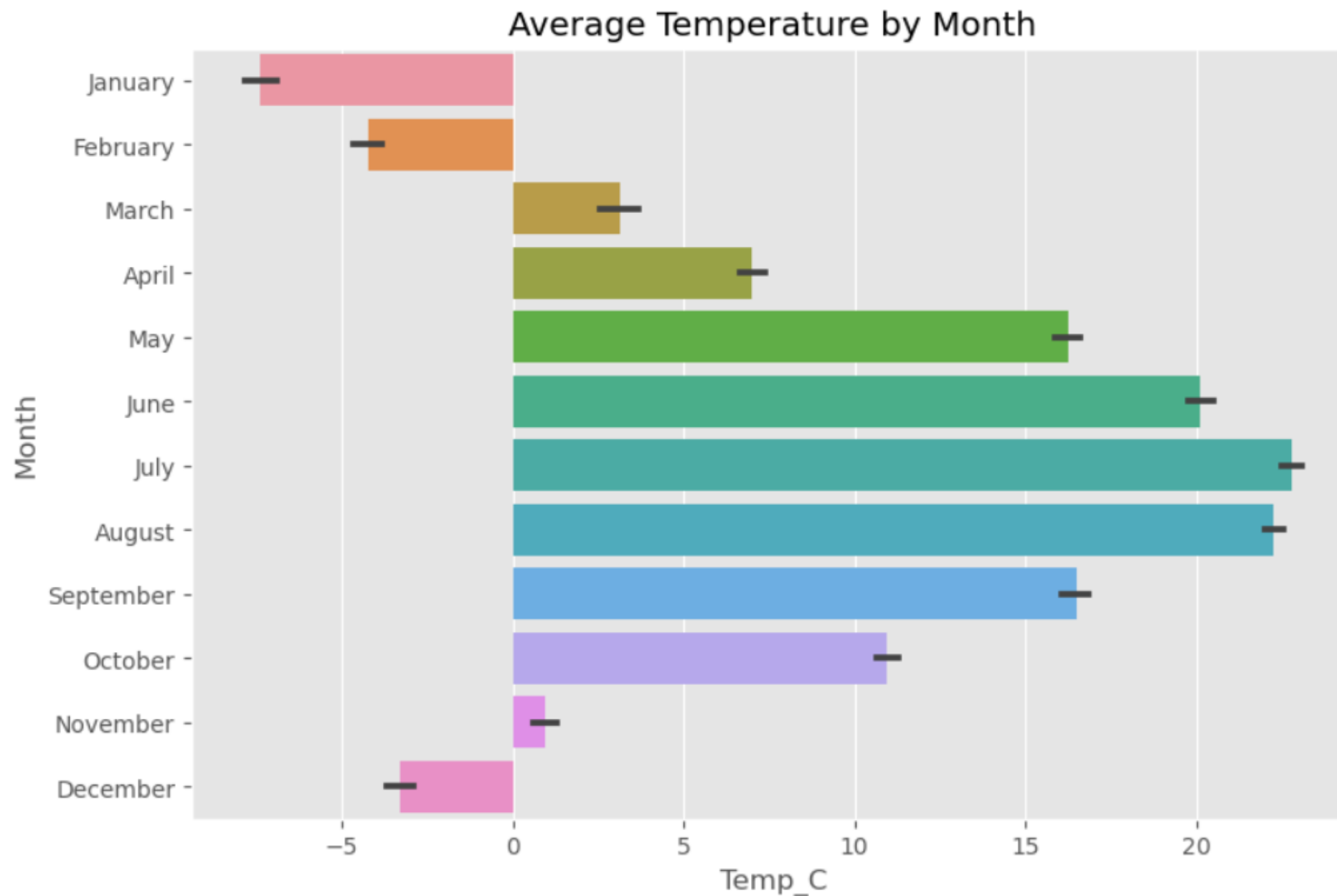
High humidity readings typically range between 60% and 80%, indicating elevated moisture levels in the atmosphere during the recorded period



Temperature analysis reveals predominant readings between 0-20°C, with fluctuations evident in the histogram, indicating dynamic weather conditions for analysis.



# Temperature by Month

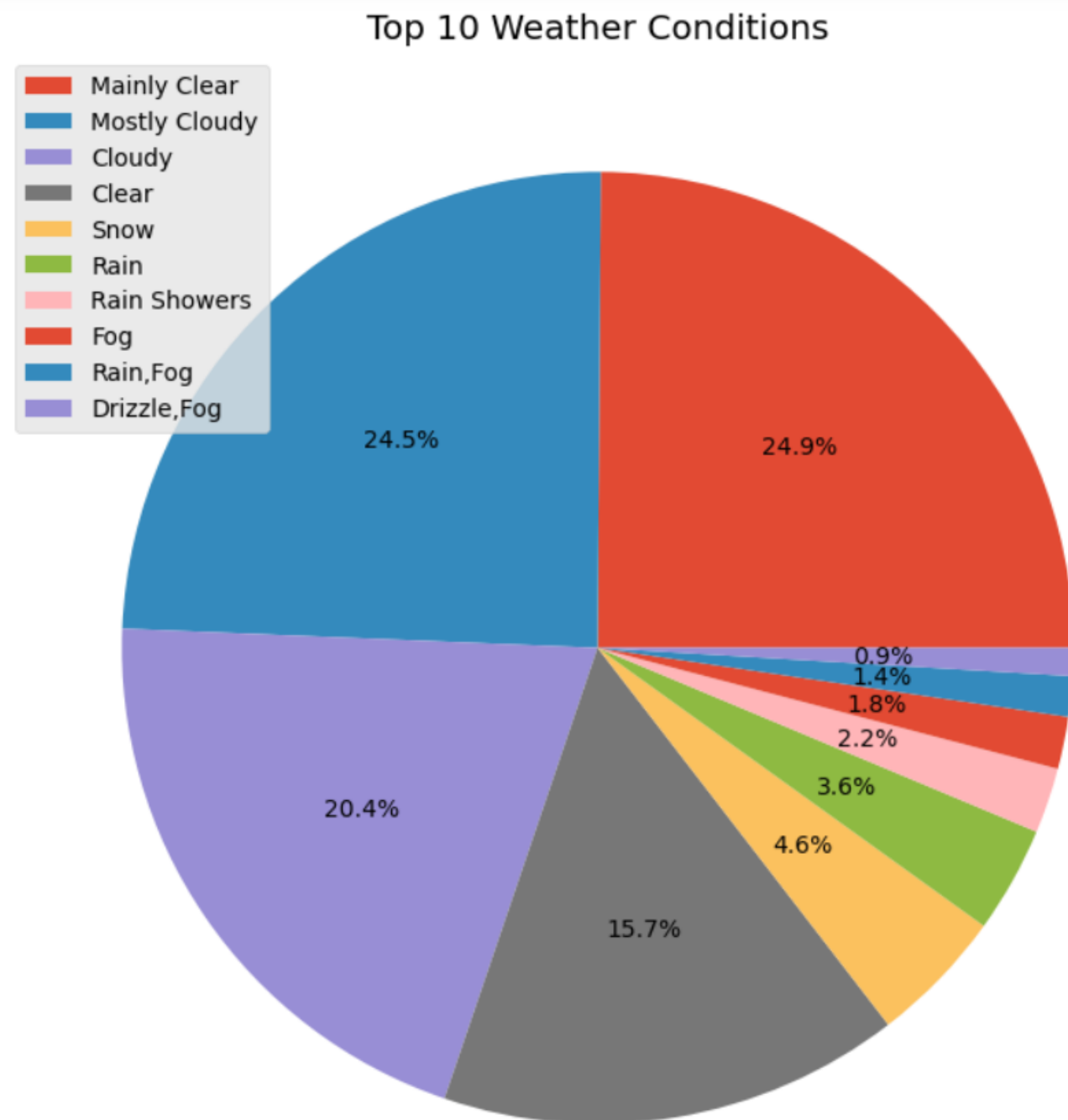


**This Graph can provide insights into the Seasonal temperature variations reveal extreme conditions: frigid winters with negative temperatures contrast July's sweltering heat, defining diverse weather patterns for analysis.**



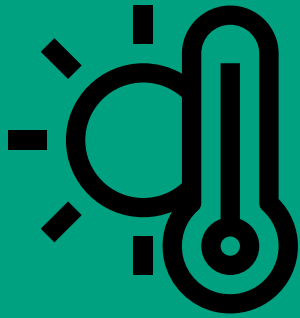


# Top 10 Weather Conditions

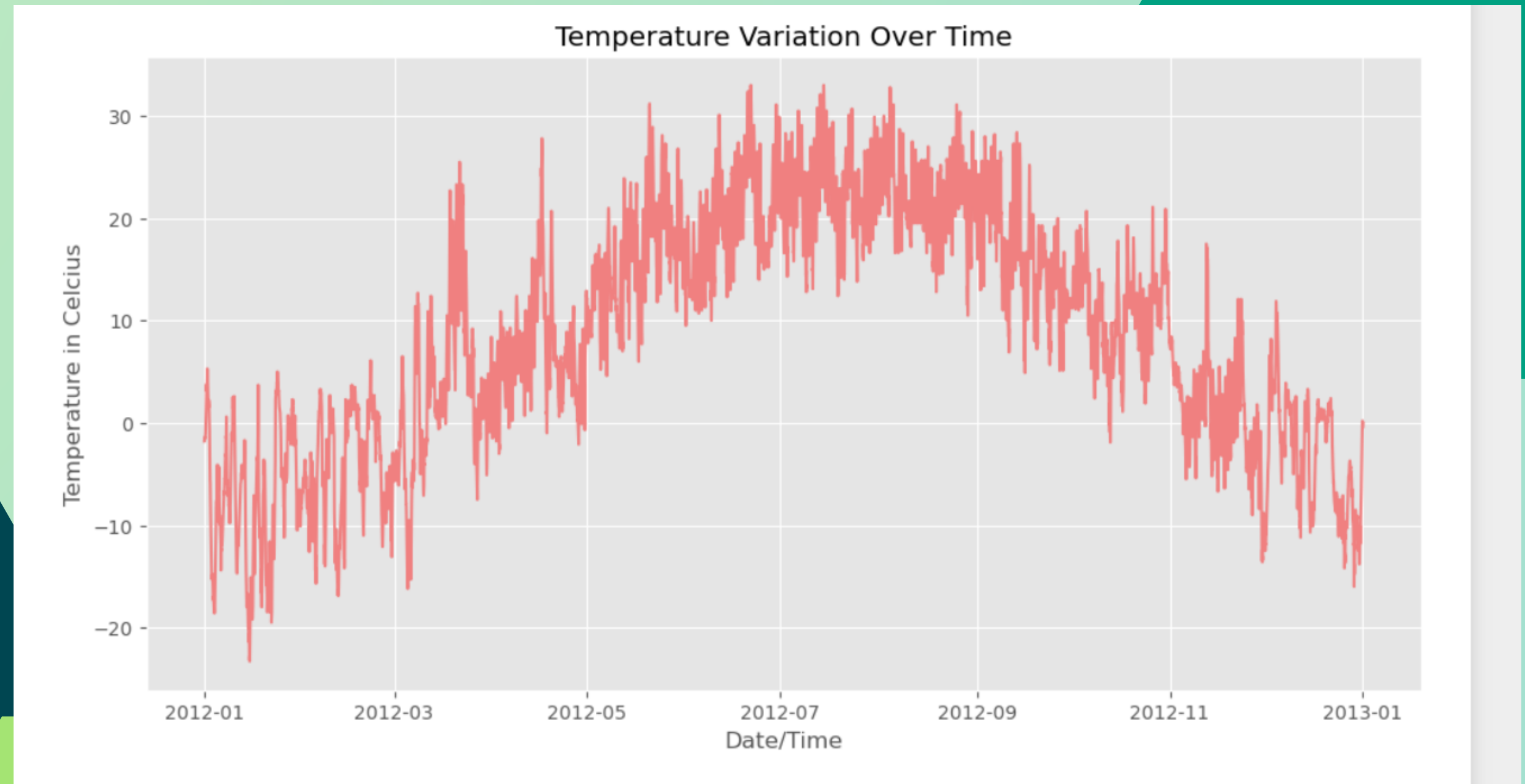


**Weather data predominantly indicates clear conditions 25% of the time, occasional clouds 24%, and intermittent occurrences of snow and rain for analysis.**

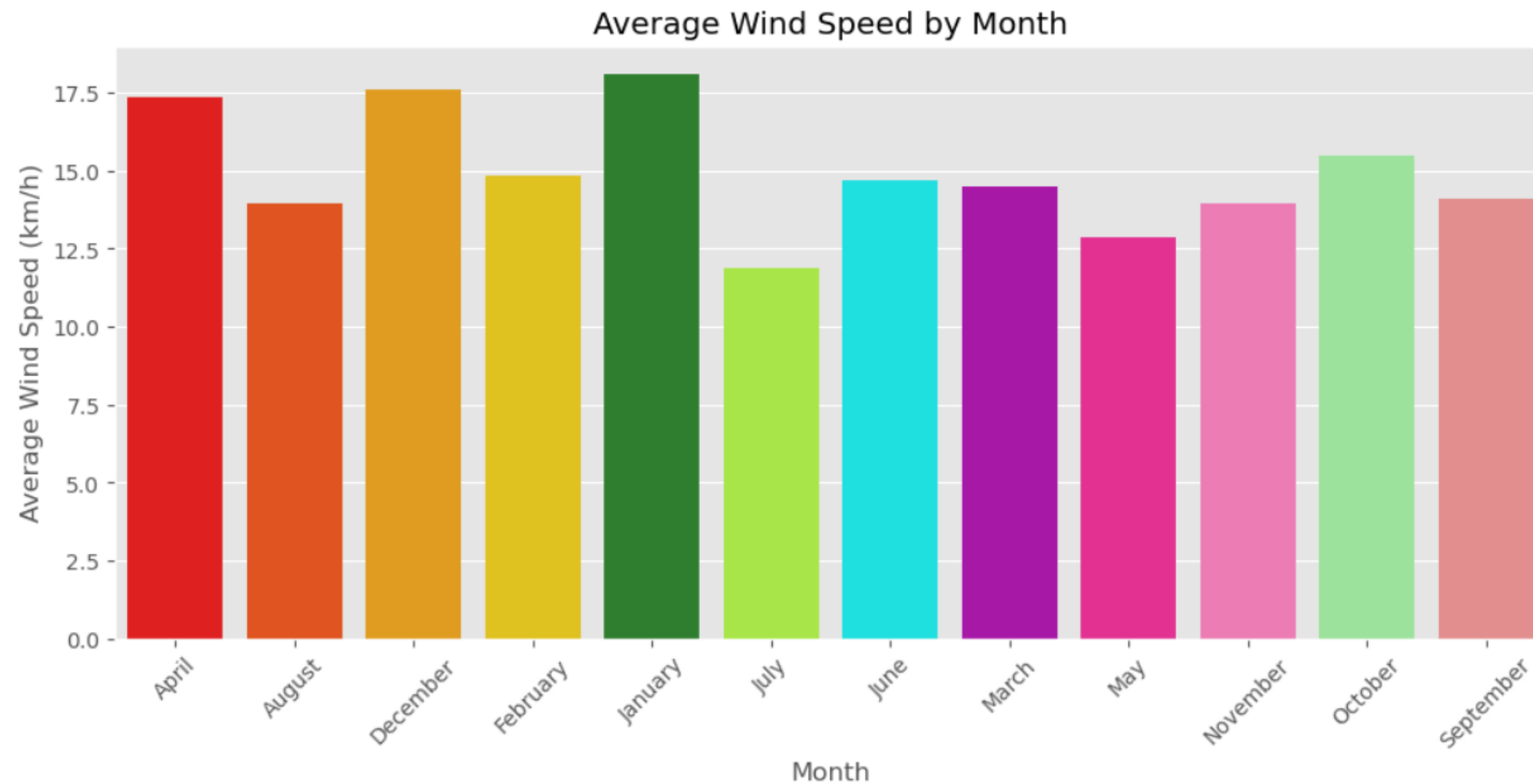
# Temperature variation over time



Temperature trends show a gradual increase in January, peaking in July and August, followed by a decline. High temperatures persist in summer months, contrasting with cooler conditions afterward.

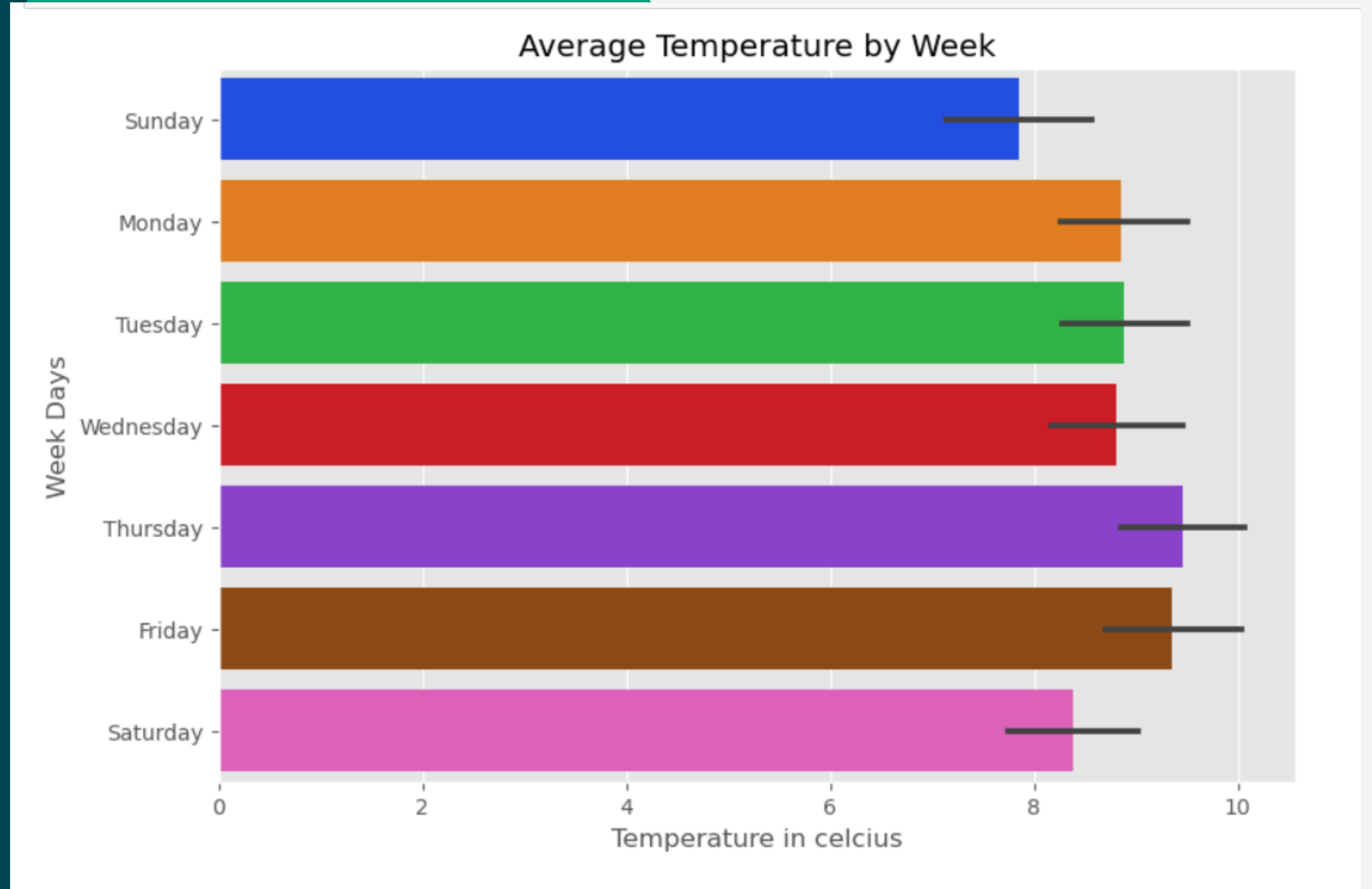



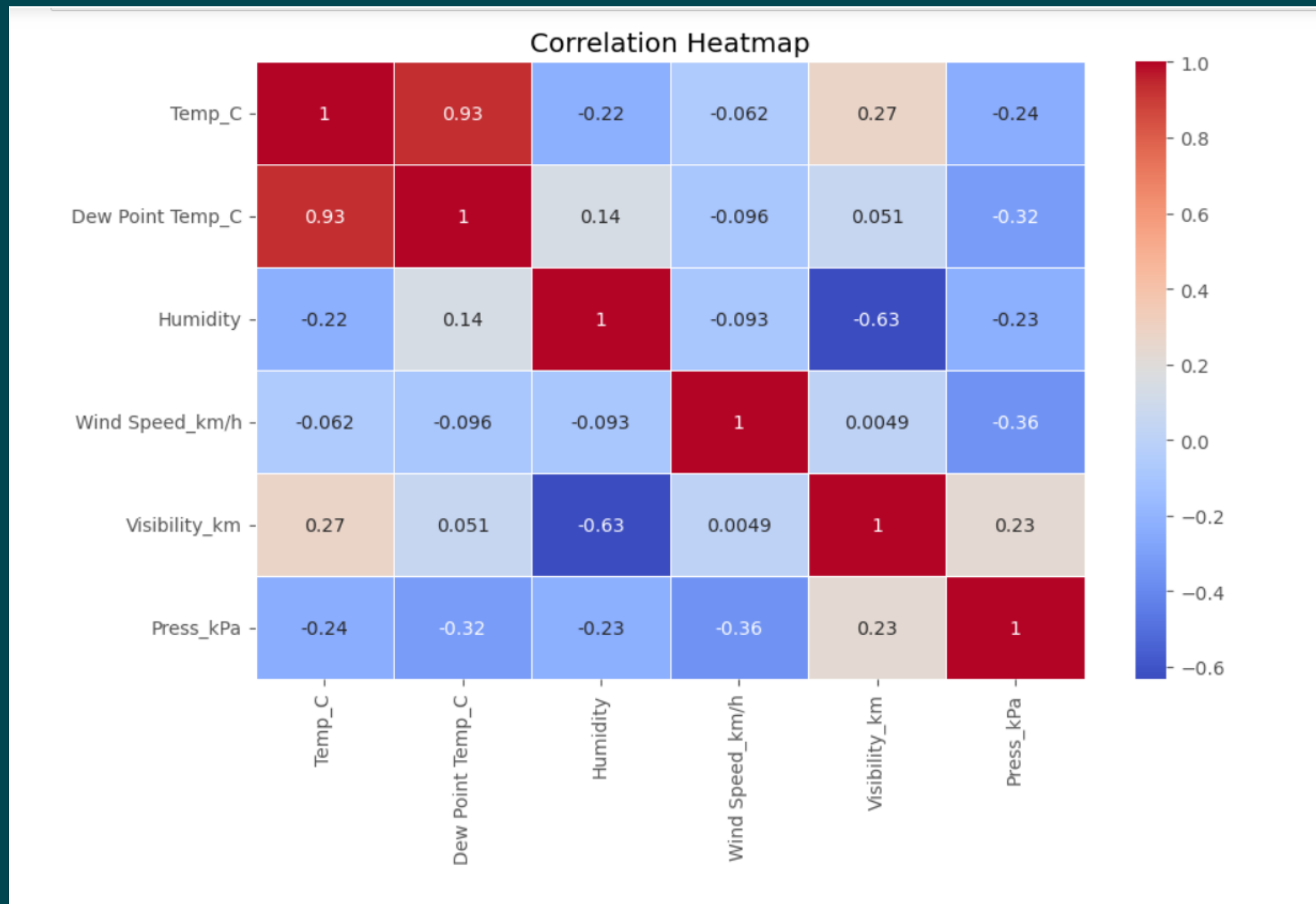
# Wind Speed by Month



*January* typically exhibits higher wind speeds (km/h) compared to July, indicating a seasonal variation in atmospheric conditions between these months.

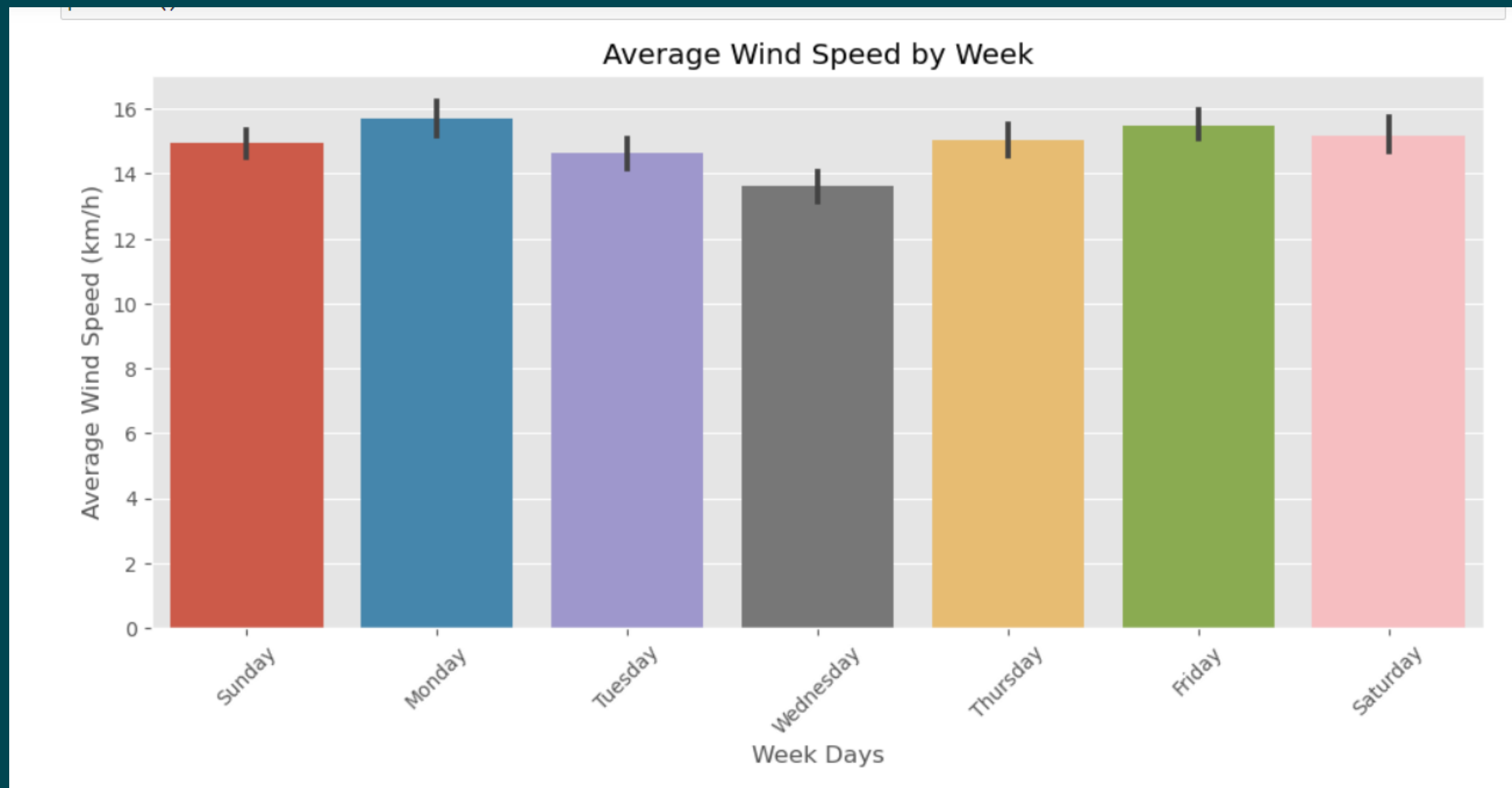
# Temperature by Week





The heatmap illustrates correlations between numeric variables. Strong positive correlations are indicated by warmer colors, while negative correlations are shown by cooler colors, aiding in identifying relationships among variables.

# Wind Speed by Week

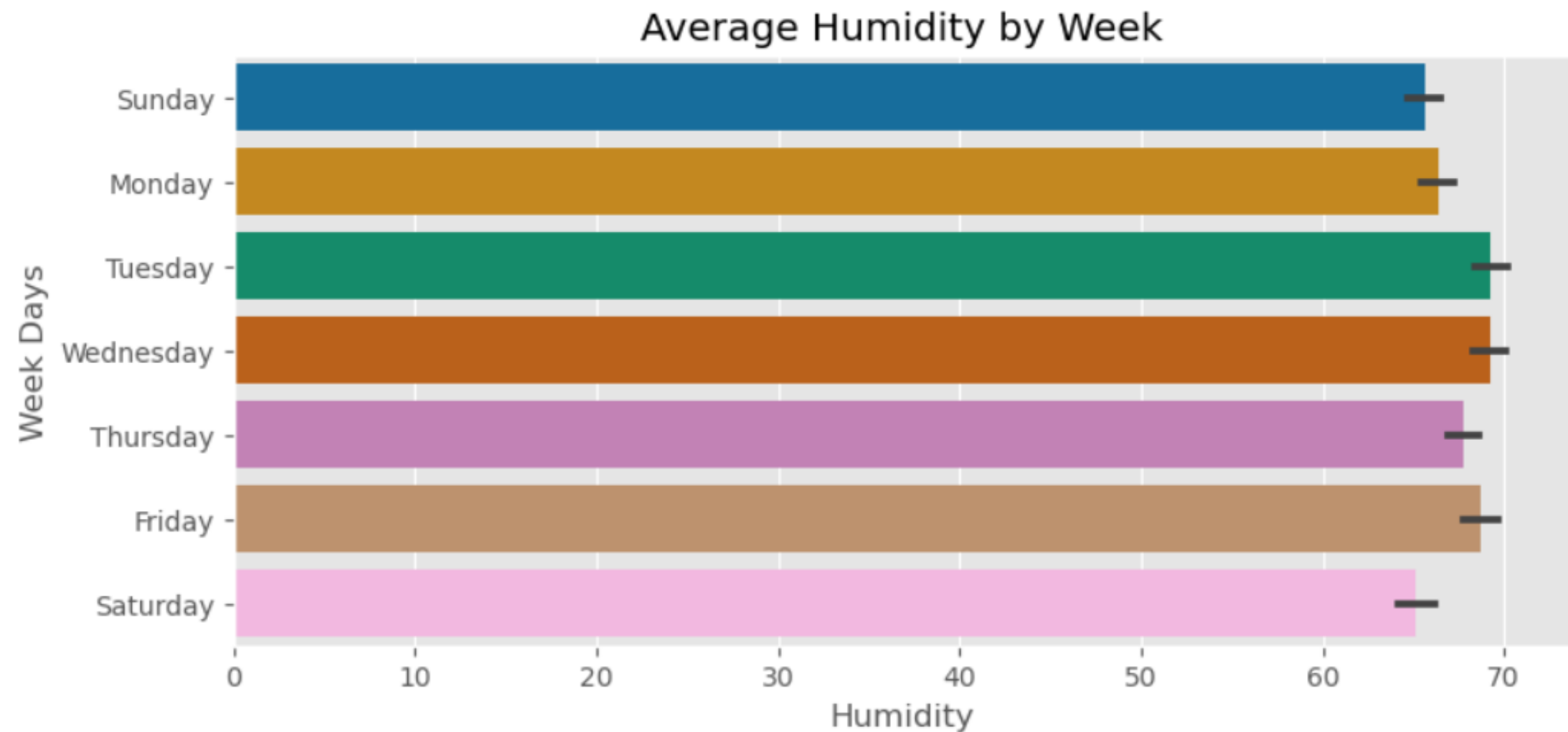


Monday registers elevated wind speeds (km/h), suggesting potential weather patterns or conditions that contribute to higher wind velocities on this specific day.

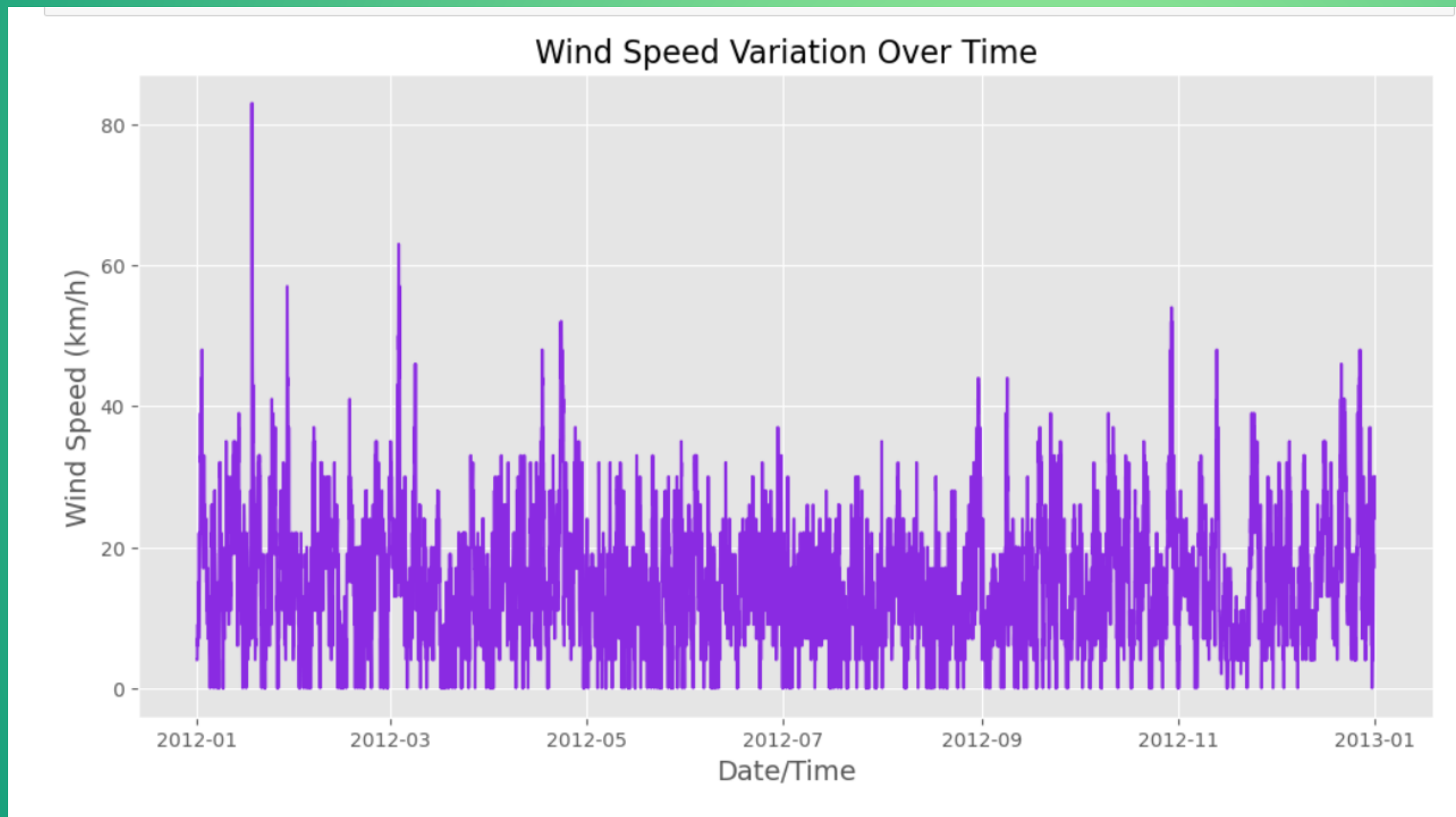
# Humidity by Week



The graph predominantly depicts humidity levels on Tuesdays and Wednesdays, indicating a focus on these specific days for humidity analysis.

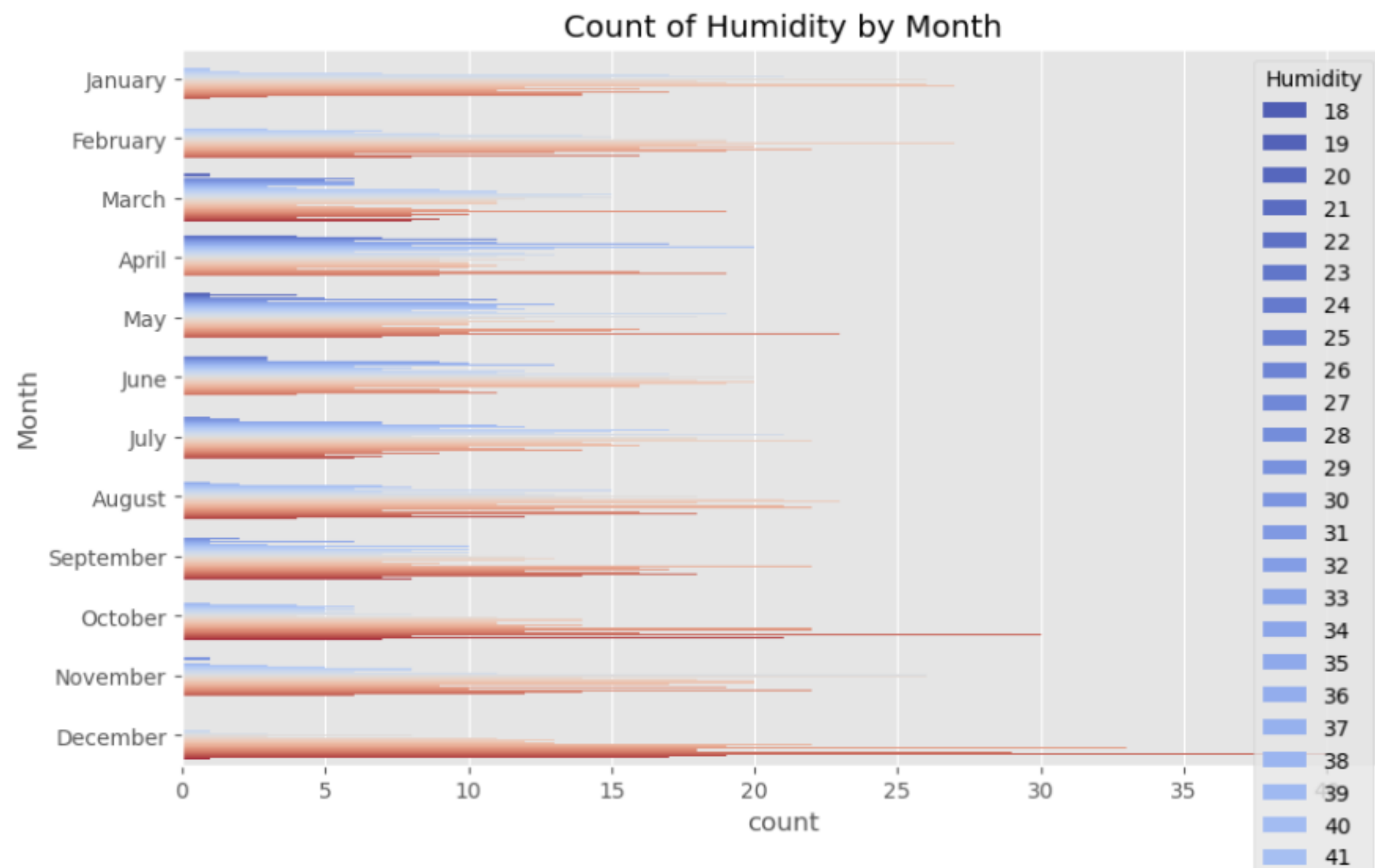


A time-series plot of wind speed unveils trends or patterns in wind behavior. Abrupt spikes signal storms or turbulent weather conditions.



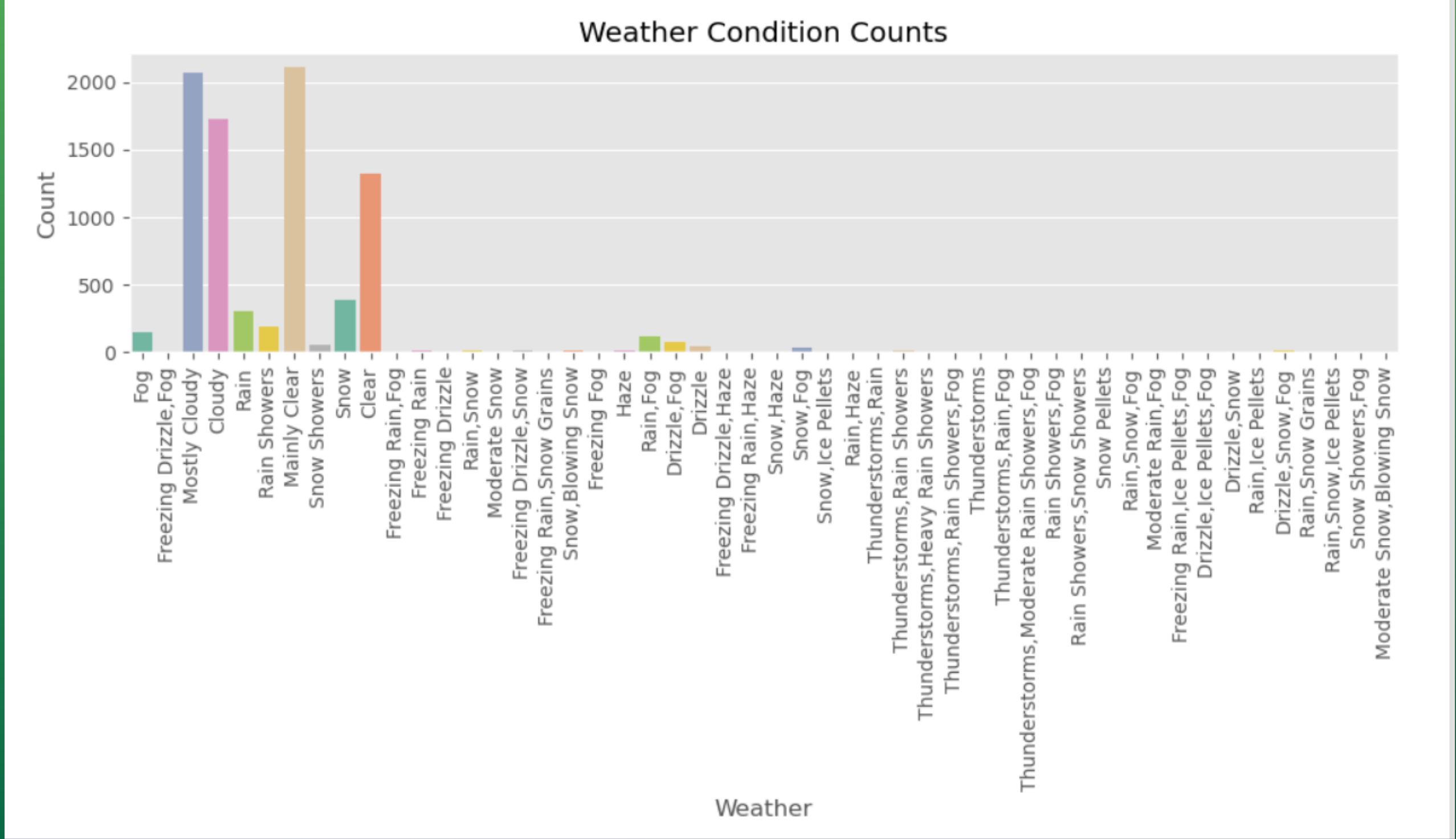


# Humidity by Month



**Humidity exhibits an upward trend at month-end, with notable increases observed in March, August, and September, suggesting seasonal variations for analysis.**

Weather analysis highlights prevalent conditions of mostly cloudy skies with frequent clear intervals, shaping predominant atmospheric patterns for examination.





# Conclusion

In conclusion, this weather data analysis revealed intriguing patterns and trends over time. Seasonal variations in temperature, wind speed, and humidity were evident, with visualizations effectively illustrating key insights. The correlation analysis provided valuable relationships between different weather variables. This analysis contributes to a better understanding of the recorded weather conditions, offering insights for further exploration and applications in various domains.

