

# Decoding Joliet, IL's Weather Puzzle

Predicting Conditions for 2024

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# Table of Contents



- 1 Introduction
- 2 Data Exploration
- 3 Model Building
- 4 Conclusion and Recommendation

# INTRODUCTION

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We will explore the weather prediction process for Joliet, IL in 2024. Join us for an exciting glimpse into weather prediction. Discover insights from our analysis and forecasting. Experience the importance of weather predictions in your daily life. Don't miss out!

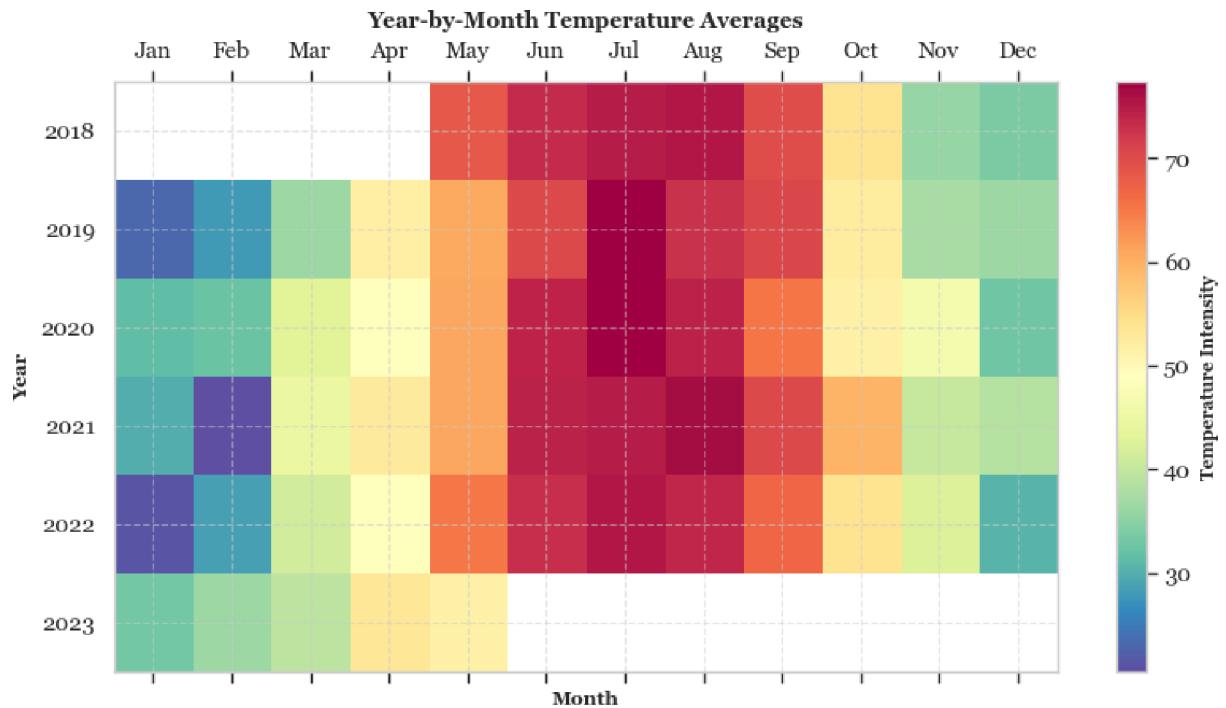
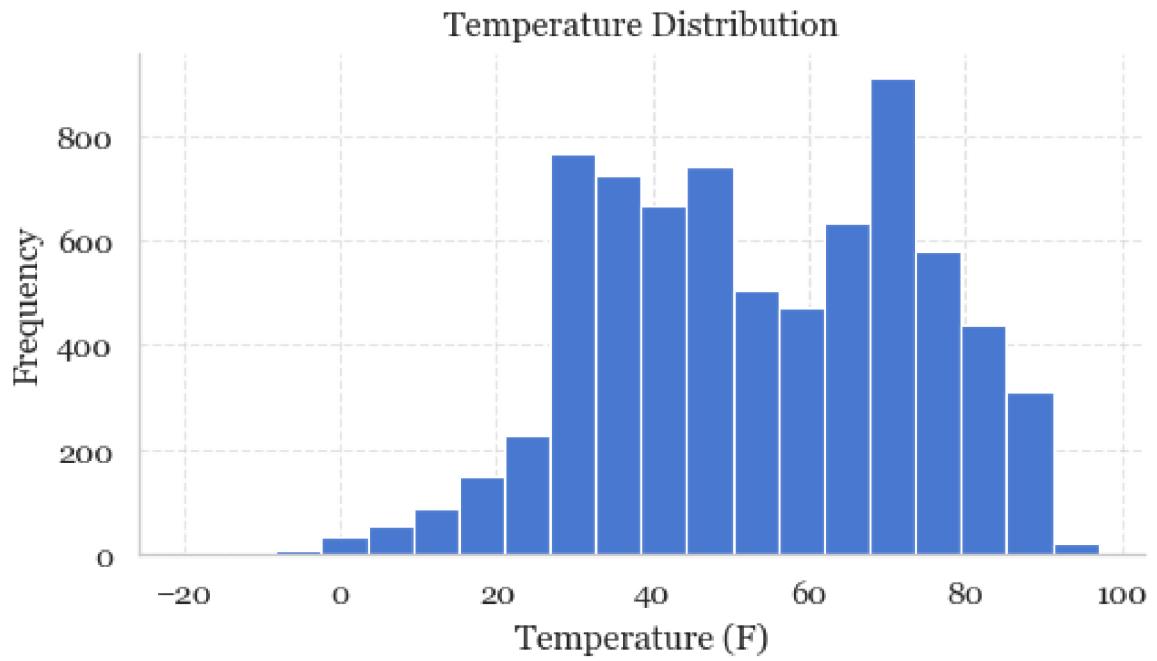


# DATA EXPLORATION

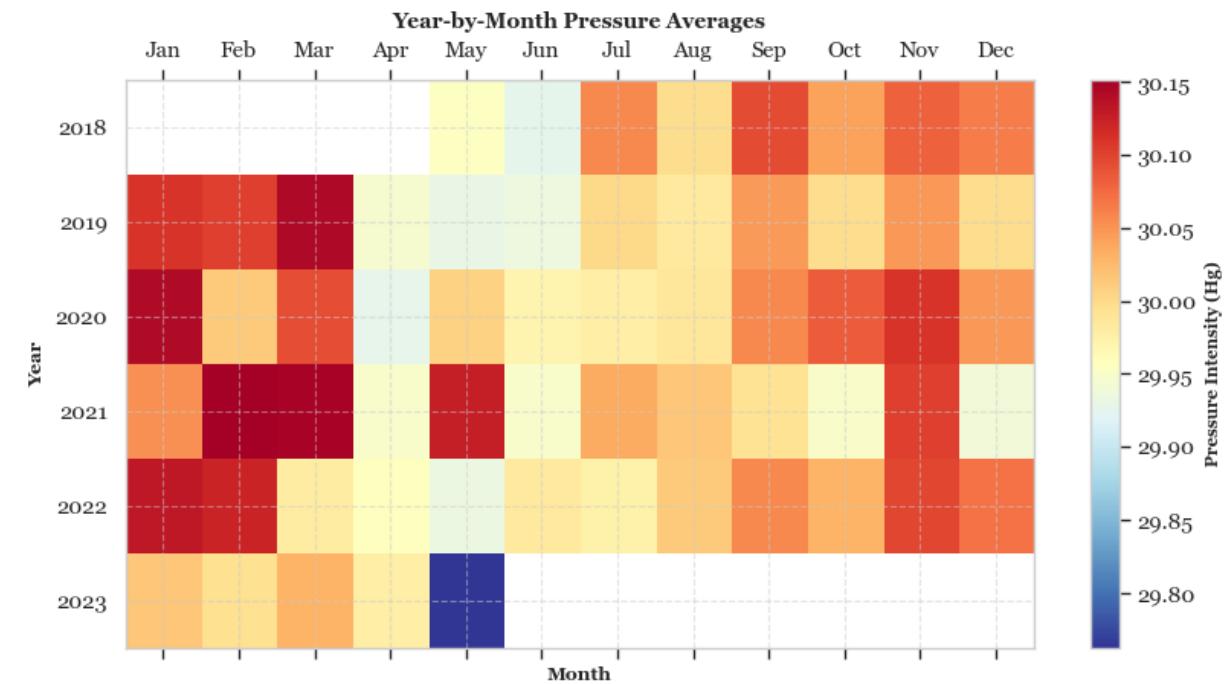
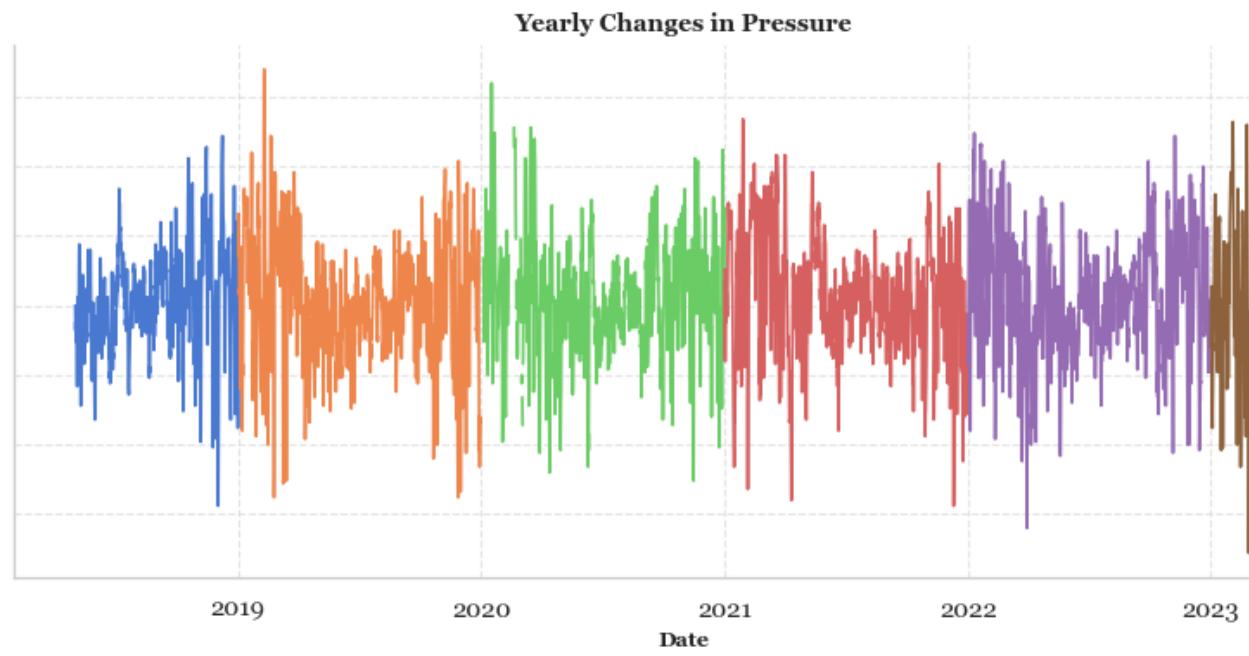
Our dataset of 7324 rows and 27 columns holds valuable weather information, carefully cleaned and refined for accuracy. Discover the hidden insights and forecasts within this data, unveiling the future weather patterns of Joliet, IL.

Let's explore the captivating world of weather prediction together!





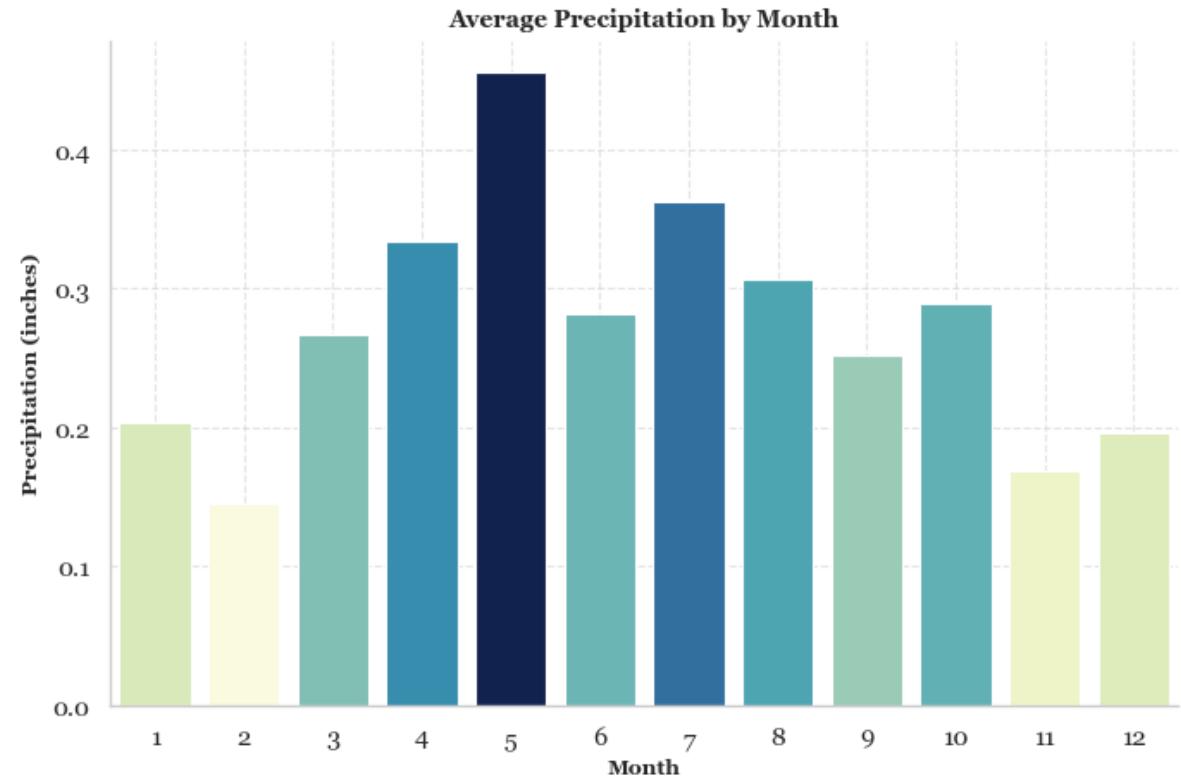
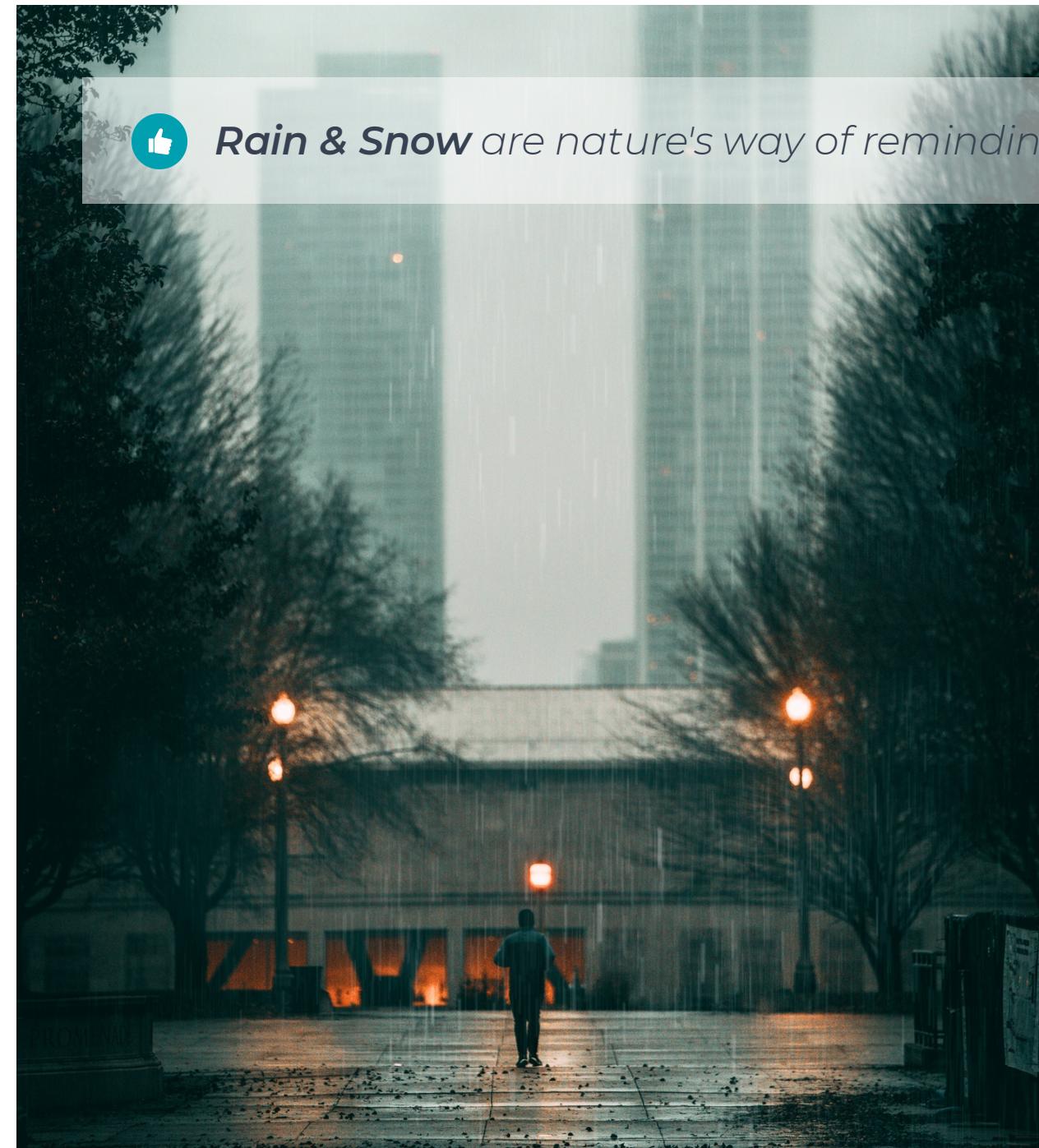
**Temperature** a universal language spoken by the **Earth**.



**Pressure** the unseen force that shapes our atmospheric world.



**Rain & Snow** are nature's way of reminding us that change is beautiful and necessary.



**clear Skies**

Light Drizzle / Overcast Sky  
Light Drizzle / Scattered / Overcast Sky  
In The Vicinity, Thunderstorms / Broken Sky  
Rain / Scattered / Broken Sky

Light Snow / Overcast Sky  
Drizzle / Overcast Sky  
Strong Rain / Scattered / Broken Sky / Overcast Sky

**Light Rain / Overcast Sky**

Light Rain / Scattered / Overcast Sky

Mist / Broken Sky  
Fog / Broken Sky  
In The Vicinity, Vertical Visibility

**Broken Sky**

Scattered / Broken Sky / Overcast Sky  
Brilliant / Scattered / Broken Sky / Overcast Sky

**Mist / Overcast Sky**

Light Snow / Scattered / Overcast Sky

**Broken Sky / Overcast Sky**

Mist / Broken Sky / Overcast Sky  
Light Rain / Scattered / Broken Sky / Overcast Sky

**Mist / Clear Skies**

Strong Rain / Broken Sky / Overcast Sky  
Light Rain / Broken Sky / Overcast Sky

**Scattered / Broken Sky**

Rain / Scattered / Broken Sky / Overcast Sky

**Scattered / Overcast Sky**

Rain / Overcast Sky  
Light Rain / Scattered / Broken Sky  
Light Drizzle / Scattered / Broken Sky / Overcast Sky

Light Snow / Broken Sky / Overcast Sky  
Haze / Overcast Sky  
Sun / Clear Skies  
Rain / Broken Sky

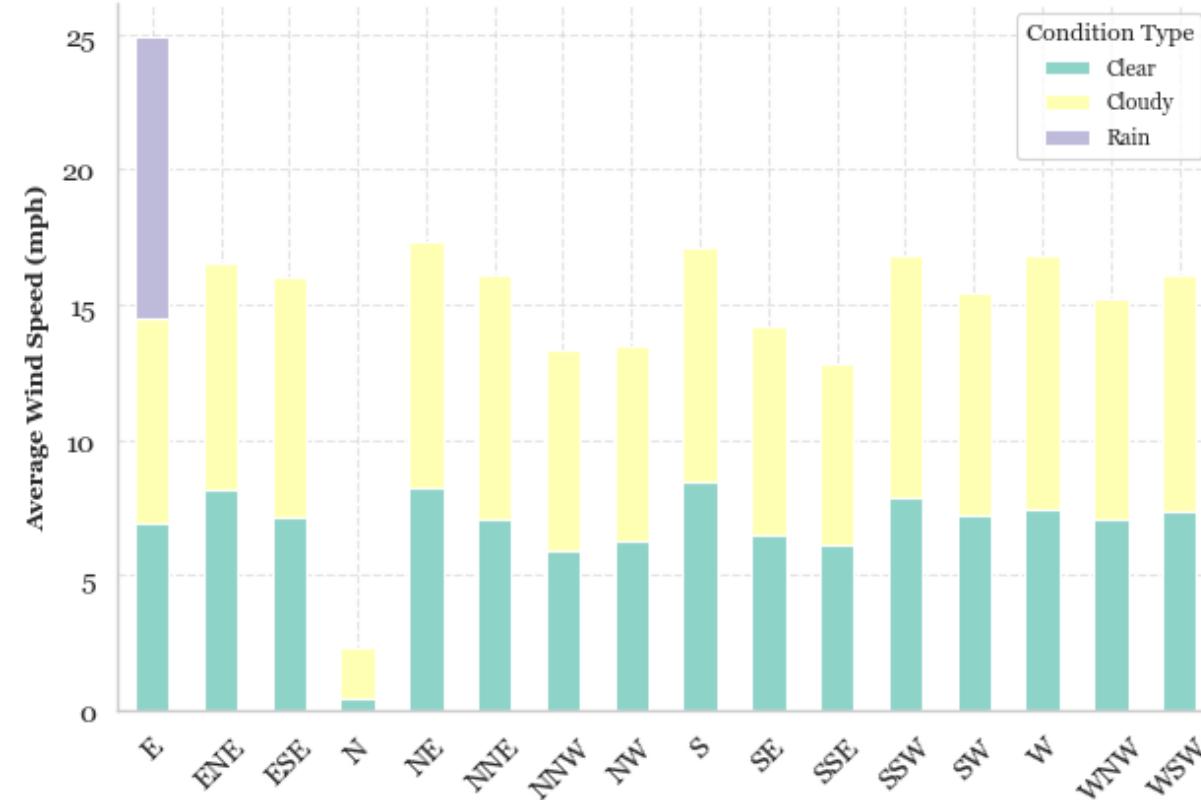
Fog / Overcast Sky  
Drizzle / Broken Sky / Overcast Sky  
Freezing, Fog / Overcast Sky

**Fog / Vertical Visibility**

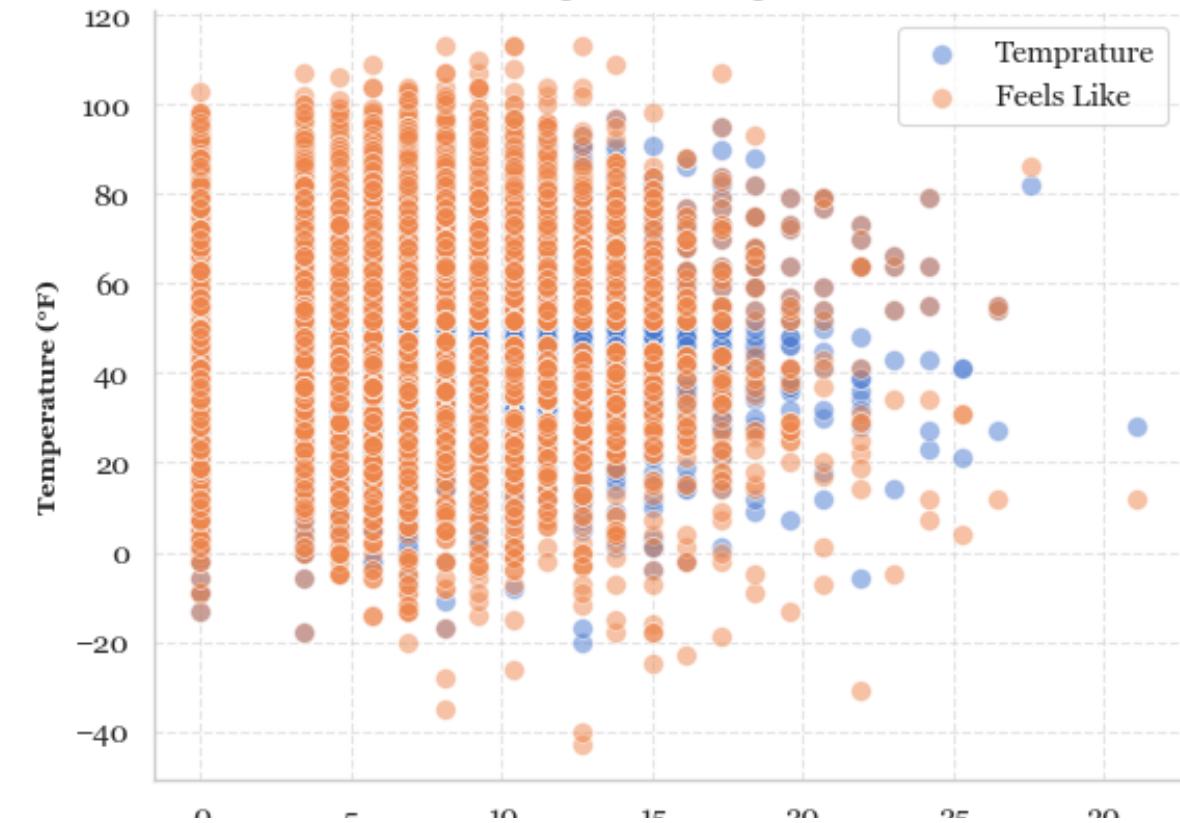


*Clouds are nature's poetry, painting the sky with beauty and mystery.*

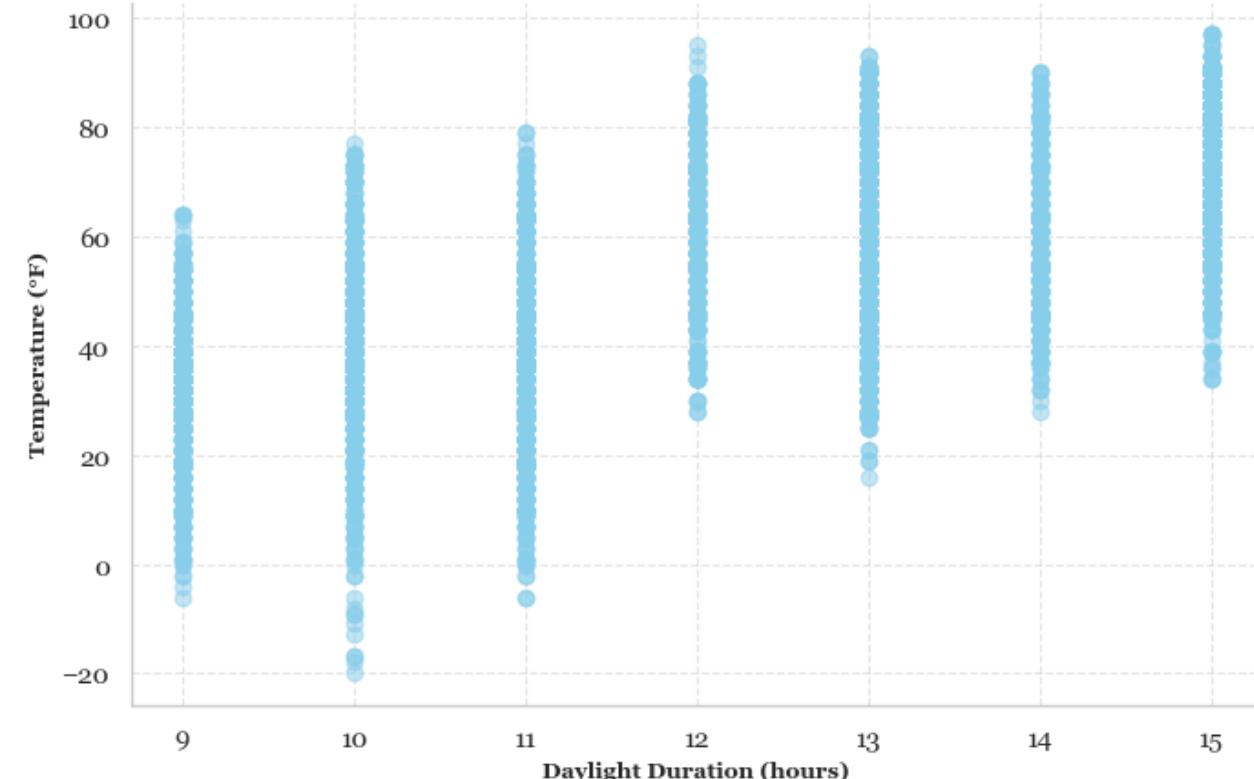
### Average Wind Speed by Wind Direction & Condition Type



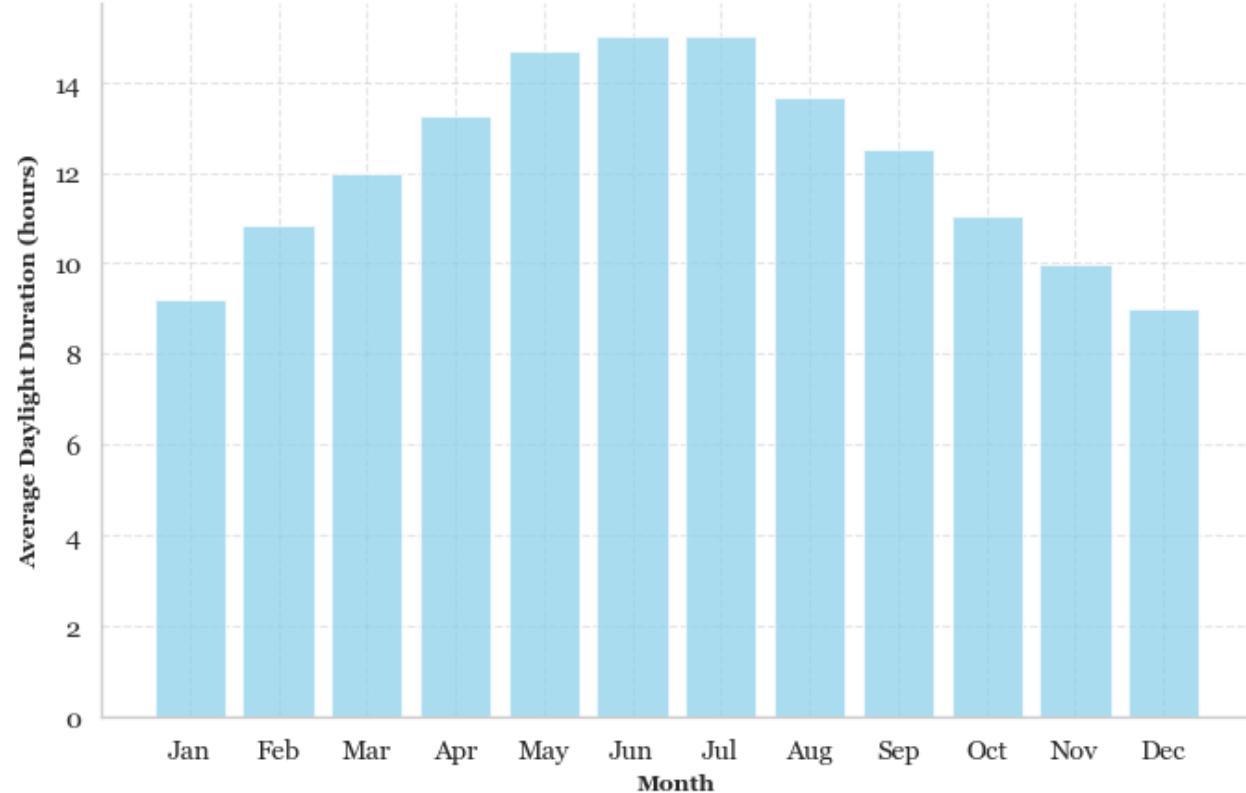
### Wind Speed vs. Temperature



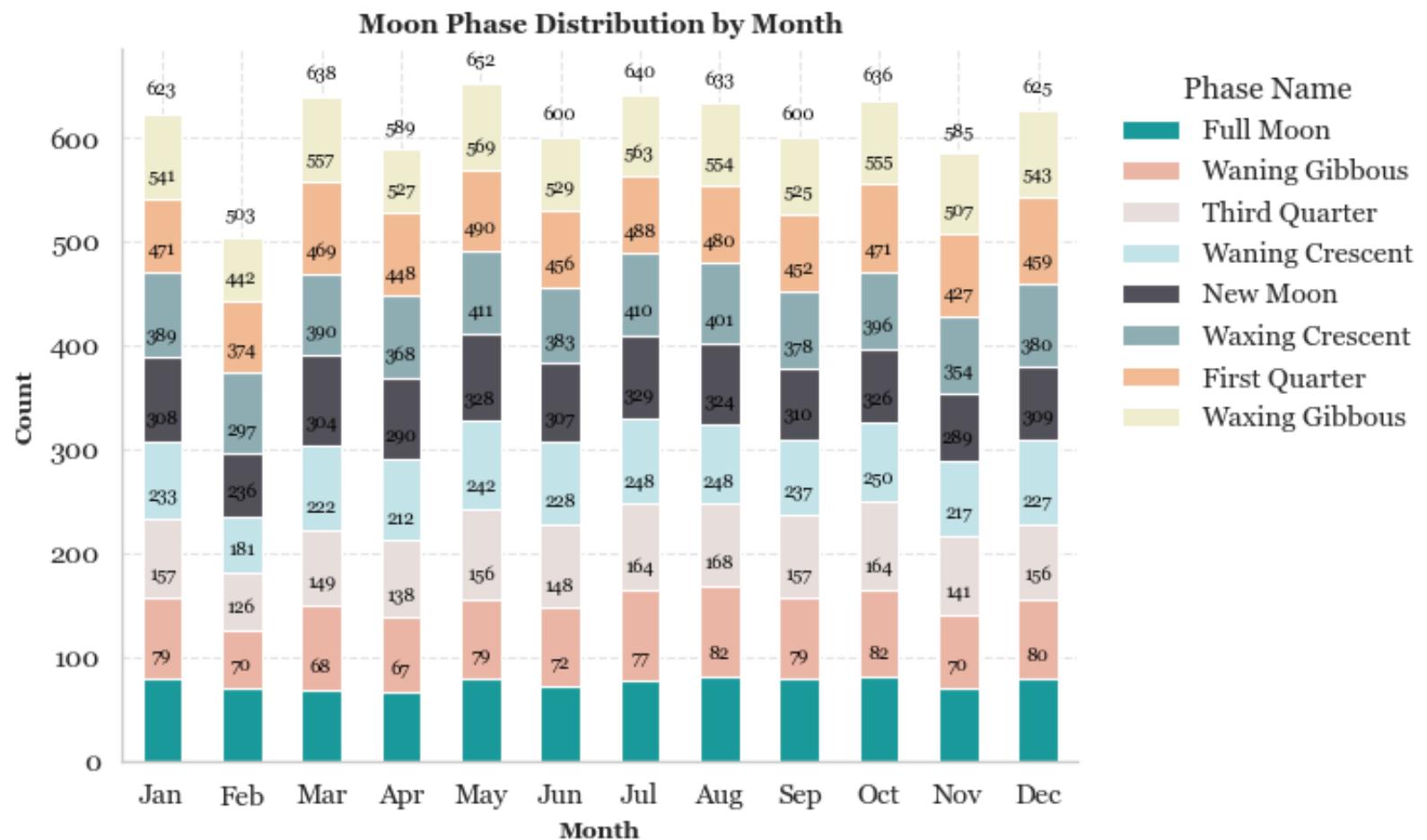
### Daylight Duration vs. Temperature



### Average Daylight Duration by Month



The **sun** is a daily reminder that we have the power to renew ourselves and start afresh.



 The **moon** is a reminder that even in the darkest times, there is always a sliver of hope.

## #1. Model Building

### Data Preparation

Extracted input features (day and month) and target variable (temperature) from the dataset.

Data Splitting: Divided the data into training and testing sets.

Training set: All observations except the last 12 months.

Testing set: The last 12 months of observations.

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## #2. Model Building

### ARIMA Model Specification

ARIMA (2, 1, 2) Model

*AR (Autoregressive)*: Takes into account the two most recent temperature observations.

*I (Differencing)*: Adjusts the temperature series once to achieve stationarity.

*MA (Moving Average)*: Considers the two most recent prediction errors for forecasting temperature.

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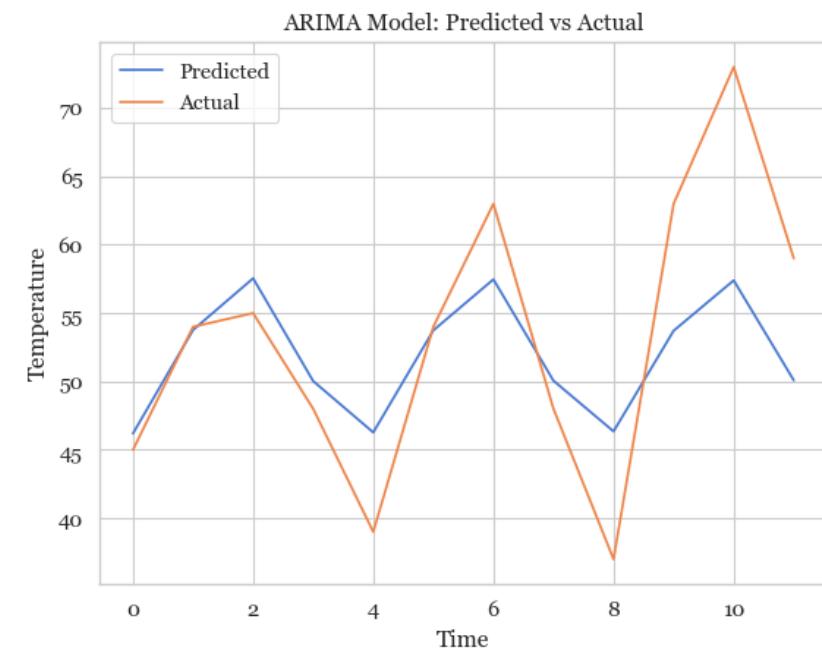
## #3. Model Building

### Train/Test/Evaluate

1. Model has been trained to predict temperature using the training data. (*model fit*)
2. Trained model has been used to forecast temperature for the testing period (*generate predictions*)

The model's temperature predictions, on average, deviate from the actual temperatures by approximately **7.05 (RMSE)** units.

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## Conclusion:

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The simple ARIMA model used in this project has limitations in accurately predicting the weather for Joliet, IL in 2024. Further enhancements and refinements are necessary to improve the model's performance.



## Recommendations:

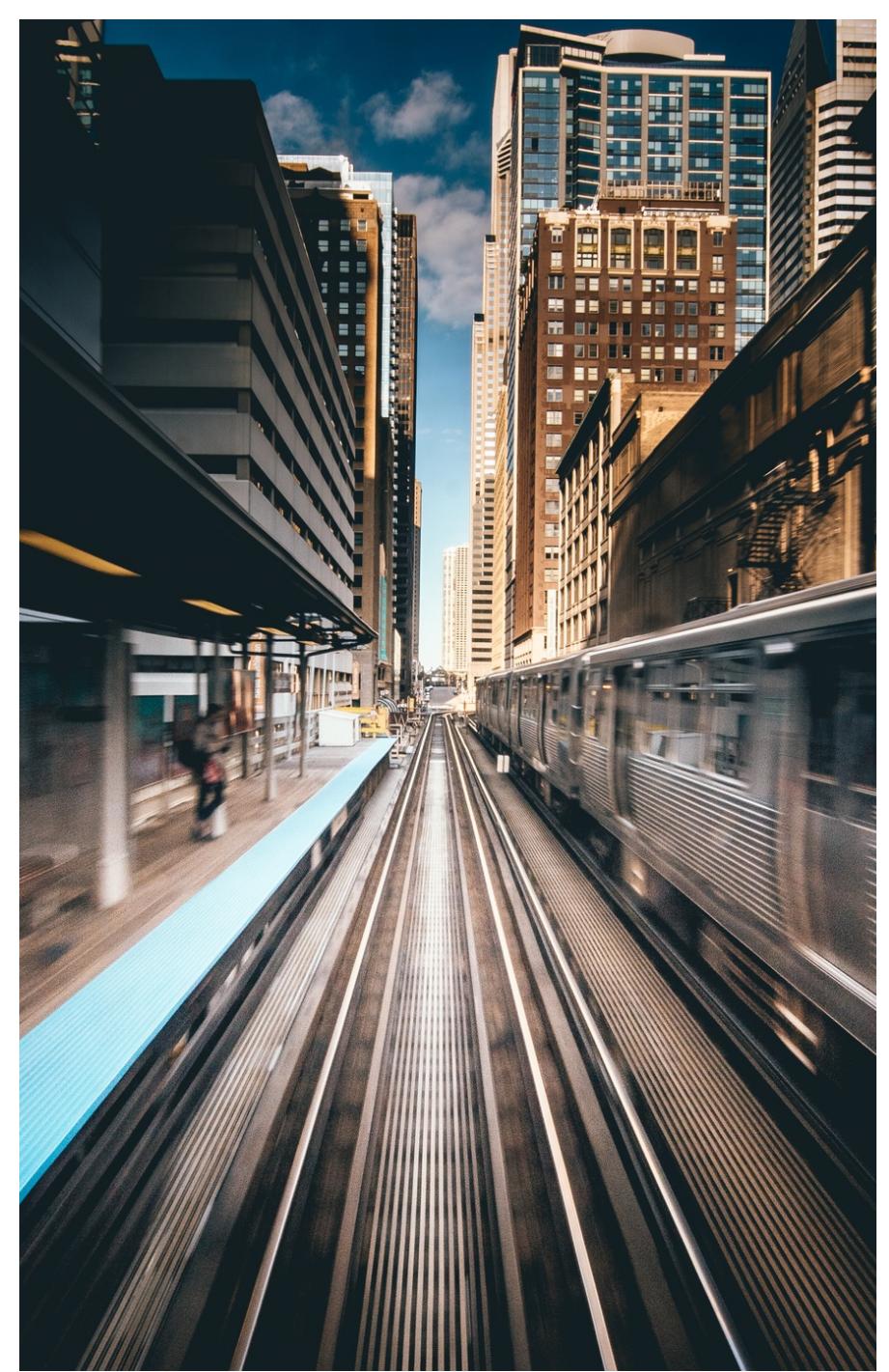
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Explore advanced machine learning techniques for time series forecasting.

Incorporate additional variables like humidity, wind speed, and neighboring region data.

Continuously refine and expand the model for more accurate predictions.





Empowering Weather Prediction.

**Thanks, Earthcam!**