Using Moon Phases and Weather Data to Predict Temperature

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INTRODUCTION

This project aims to **investigate the relationship between the moon phases and fluctuations in weather patterns** specifically focusing on temperature anomalies. By using historical weather data from varying weather stations, this project will explore whether moon phases can predict temperature anomalies.

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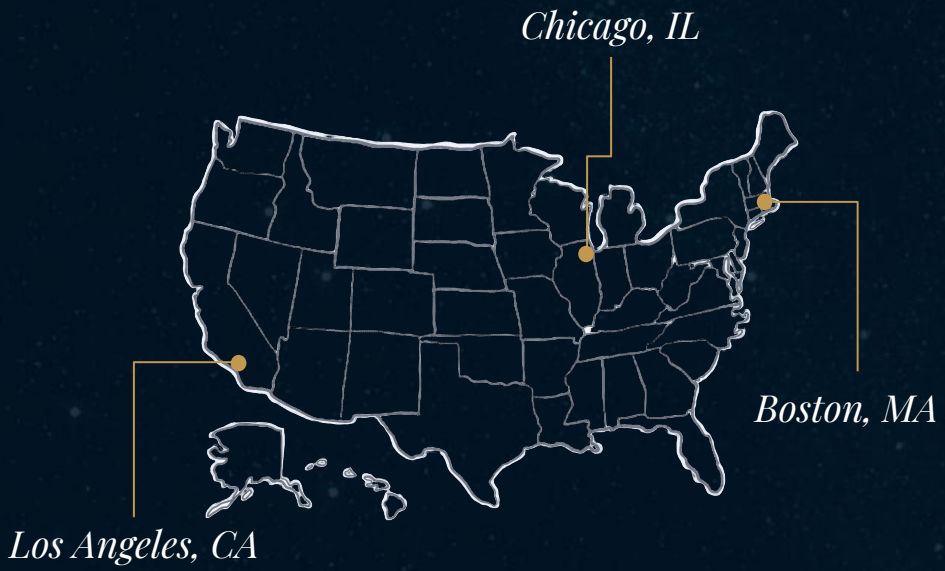
01.

Data Aggregation and Cleaning

DATA COLLECTION/SOURCES

WEATHER DATA

Source from Open-Meteo API. Data gathered from 10/29/2019-10/29/2024. Contains daily minimum temperatures (in °F), maximum temperatures (in °F), precipitation sum (in mm), and maximum wind speed (in mph) for Los Angeles, Chicago, and Boston.



DATA COLLECTION/SOURCES

MOON PHASES DATA

Source from API from USNO Astronomical Application. Data gathered from 10/2019-10/2024. Contains moon phases (New Moon, First Quarter, Full Moon, Last Quarter), date, and time (UT)

COMBINING DATA

Joined moon data to weather data for each city based on date. Added additional columns range and mean for weather (°F)

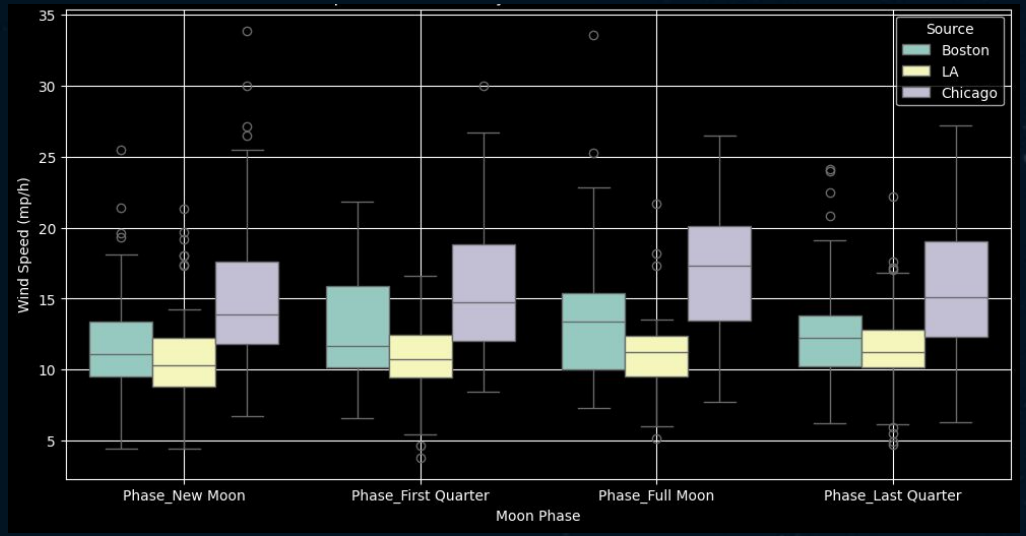
02.

Preliminary Analysis

Mean Temperature by Moon Phase and City

This box plot illustrates the distribution of mean temperatures across different moon phases for cities across the United States. In this plot, Los Angeles displays a smaller range as compared to Boston and Chicago. Based on moon phases alone, there isn't a large difference between the temperatures.

Wind Speed Distribution by Moon Phase and City



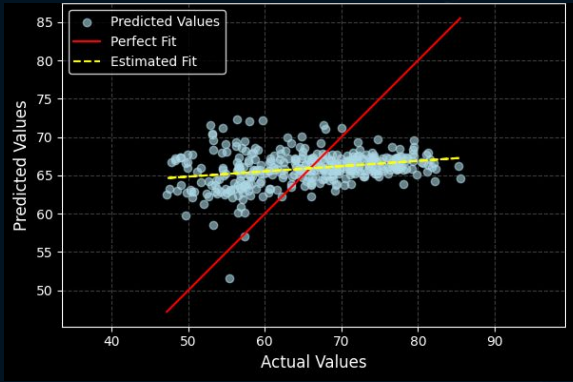
This plot displays the wind speed distribution by moon phase and city. Chicago has the widest range of wind speeds for each moon phase while LA has the shortest range of wind speeds in comparison. There is also not too much of a difference between the wind speed distribution and the moon phases.

03.

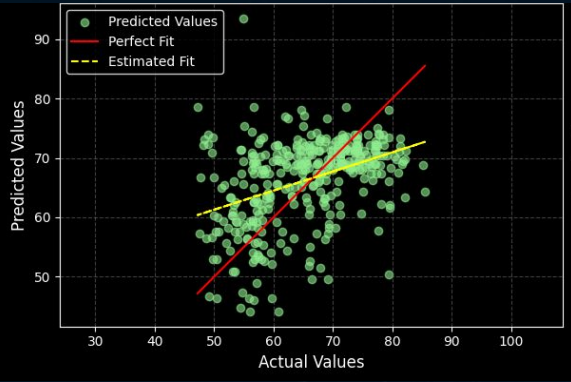
Model Selection and Testing

MODEL PREDICTION VS ACTUAL VALUES

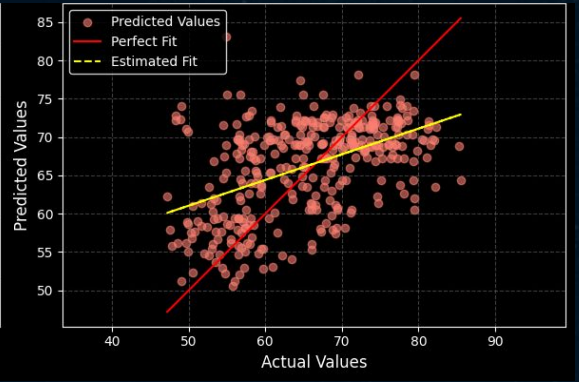
Linear Regression



Decision Tree

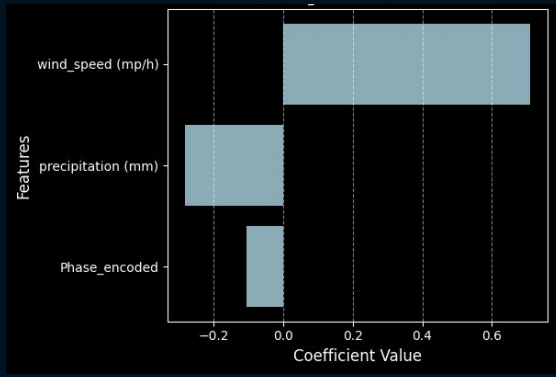


Random Forest

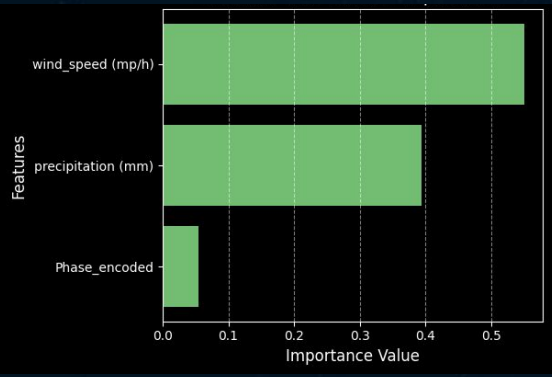


FEATURE IMPORTANCE

Linear Regression



Decision Tree



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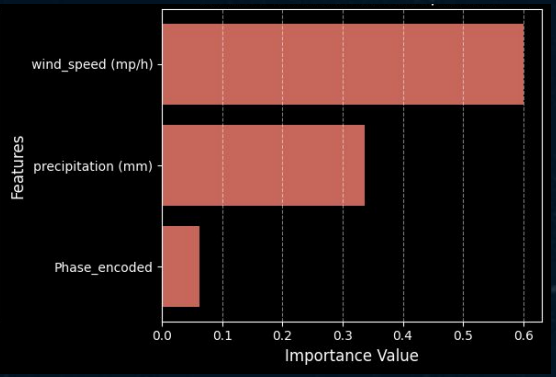

04.

Future Steps

Going forward...

Tasks to Try

Combine Models

Try ensemble methods or additional models to increase both accuracy and the moon phases feature importance

Additional Features

Find additional information around weather data that might help our model without taking away from the moon phases

Hyperparameters

Test different hyperparameters to improve our final model either via Grid Search or manually

THANKS!

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