

# Weather Data Analysis using MATLAB

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## Abstract

This project focuses on the analysis of weather data using MATLAB. The dataset includes temperature, rainfall, and humidity values. The main objective of this project is to identify weather patterns, visualize the data, and forecast future temperature trends. The results show clear seasonal variations and allow simple prediction using regression.

## 1. Introduction

Weather analysis is a critical area of research that helps in climate monitoring, agriculture planning, and disaster management. In this project, MATLAB is used to analyze weather data of Pune city. The dataset contains daily records of temperature (°C), rainfall (mm), and humidity (%).

## 2. Methodology

1. Data Collection: A synthetic dataset of 30 days was generated with attributes - Date, Temperature, Rainfall, and Humidity. 2. Data Preprocessing: The dataset was loaded into MATLAB using `readtable()`. 3. Analysis: Graphs were plotted for temperature, rainfall, and humidity trends. 4. Forecasting: A simple regression model was used to predict temperature values for the next 30 days.

## 3. Results & Discussion

The following results were obtained from the MATLAB analysis:

- Daily temperature variation plotted across 30 days.
- Rainfall distribution visualized using bar graphs.
- Humidity trends clearly identified.
- Future temperature prediction done using regression analysis.

Graphs generated:

1. Temperature Trend 2. Rainfall Plot 3. Humidity Trend 4. Forecasted Temperature

## 4. Conclusion

The project successfully demonstrates how MATLAB can be used for weather data analysis. The dataset was visualized effectively, and forecasting provided useful insights into future temperature trends. This approach can be extended with real-world datasets for climate studies.

## References

- MATLAB Documentation: <https://www.mathworks.com/help/> - Climate Data Sources: IMD, NOAA, OpenWeather