

Weather Prediction Classification using Machine Learning

Objective

The main goal of this project is to predict the category of weather (Cold, Moderate, Hot) using past weather data. This project demonstrates the use of classification algorithms in data analytics.

Dataset

- Source: dataprjct.csv
- Features Used:
 - Precipitation
 - Temp_min
 - Wind
- Target Variable:
 - Temperature Label (Cold $\leq 20^{\circ}\text{C}$, Moderate $21-30^{\circ}\text{C}$, Hot $> 30^{\circ}\text{C}$)

Methodology

1. Data Preprocessing
 - Handled missing values by replacing with mean.
 - Converted numerical temp_max into categorical labels (Cold/Moderate/Hot).
 - Standardized feature values using StandardScaler.
2. Model Training
 - Logistic Regression (baseline classifier).
 - Random Forest Classifier (advanced ensemble method).
3. Evaluation
 - Accuracy Score
 - Confusion Matrix
 - Classification Report (Precision, Recall, F1-score).
4. Visualization
 - Heatmap of Confusion Matrix for better understanding of classification results.

Results

- Logistic Regression: Basic classification with limited accuracy.
- Random Forest: Better performance with higher accuracy.

- Model can take new unseen weather data (precipitation, temp_min, wind) and predict category as Cold/Moderate/Hot.

Conclusion

This project successfully demonstrates how machine learning classification can be applied to weather prediction. While it is a simplified model (not a full weather forecast system), it highlights skills in:

- Data cleaning & preprocessing
- Feature engineering
- Machine learning classification
- Model evaluation & visualization

This project is useful for data analytics practice and showcases the end-to-end workflow of building a predictive model.