

Rainfall Prediction using Machine Learning

1. Introduction

Project Title: Exploratory Analysis of Rain Fall Data in India for Agriculture

Team Members:

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2. Project Overview

Purpose: This project develops a Machine Learning-based system that predicts whether it will rain tomorrow based on weather parameters.

Features:

- User enters weather parameters
- Predict rainfall automatically using ML model
- Display prediction result (Rain / No Rain)
- Fast and accurate prediction
- User-friendly web interface

3. Architecture

Frontend:

- HTML
- CSS

Backend:

- Flask
- Python

Machine Learning Model:

- Random Forest Classifier
- Scikit-learn
- StandardScaler

Storage:

- Local storage
- rainfall.pkl
- scale.pkl

4. Setup Instructions

Prerequisites:

- Python 3.x
- Flask
- Scikit-learn
- Pandas
- NumPy

Installation Commands:

1. pip install flask
2. pip install scikit-learn
3. pip install pandas
4. pip install numpy

5. Folder Structure

```
RAINFALL_PREDICTION/
|
├── templates/
|   ├── index.html
|   ├── chance.html
|   └── nochance.html
|
├── app.py
├── rainfall.pkl
├── scale.pkl
└── WeatherAUS.csv
```

6. Running the Application

Run the Flask application using:

5. python app.py

7. API Documentation

Endpoint: POST /predict

Input: Weather parameters (MinTemp, MaxTemp, Rainfall, Humidity9am, Humidity3pm)

Output: Rain or No Rain

8. Authentication

Currently, authentication is not required.

9. User Interface

- Input form for weather parameters
- Prediction result display page
- Rain background image for rain prediction
- Sunshine background image for no rain prediction

10. Testing

- Input validation test
- Model prediction test
- Integration test

Accuracy achieved: Approximately 85%

11. Screenshots of Output



12. Known Issues

- Prediction accuracy depends on data quality
- Model can improve with additional features

13. Future Enhancements

- Cloud deployment
- Mobile application version
- Add more weather parameters
- Real-time weather API integration