Smart Activity Planner Using Live Weather Data Analyst

1.Introductions :

The **Smart Weather Activity Planner** is a web-based application that fetches **real-time weather data** using the **OpenWeatherMap API**, predicts the **probability of rain** using a **Machine Learning model**, and recommends suitable **daily activities** based on:

- Temperature
- Humidity
- Rain prediction
- Wind conditions

The application provides a **user-friendly interface** with dynamic weather visuals and personalized activity suggestions.

2.Objectives :

- To fetch real-time weather information using a city name
- To predict rain using a Machine Learning model
- To recommend suitable activities based on weather conditions
- To provide an interactive and visually appealing user interface
- To integrate frontend, backend, API, and ML into a single project

3.Technologies Used :

Frontend:

- HTML
- CSS
- JavaScript
-

Backend:

- Python
- Flask Framework
- Requests(API calls)

Machine Learning:

- Scikit-learn
- Random Forest Classifier
- Pandas
- Numpy
- RandomForestRegressor

API:

- OpenWeatherMap API

TOOLS:

- VS Code
- Browser Developer Tools

4.System Architecture :

- User enters a city name
- Frontend sends request to Flask backend
- Backend:
  - Fetches real-time weather data
  - Loads historical weather data
  - Trains ML model
  - Predicts rain
  - Recommends activity
- Backend returns JSON response
- Frontend displays:
  - Temperature
  - Humidity
  - Wind
  - Rain status
  - Activity recommendation
- Background video changes based on rain condition

5.Advantages :

- Real-time weather updates
- Intelligent activity suggestions
- Interactive and modern UI
- Easy to use and user-friendly

6.Limitations :

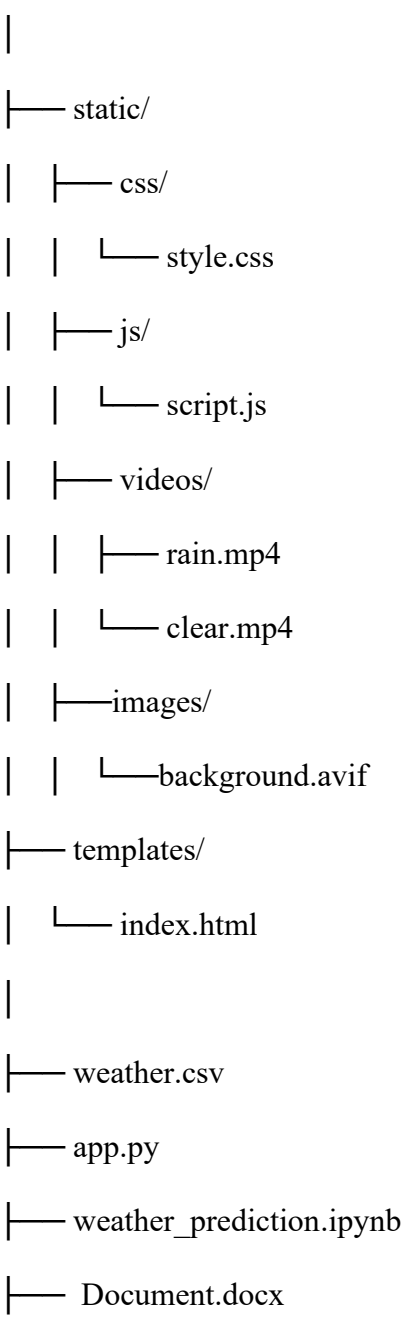
- ML model retrains on every request
- Internet connection required
- Limited weather parameters used

7.Why This Project Is Useful

- Helps users plan daily activities smartly
- Uses **real-time data**, not static values
- Combines **web development + machine learning + API integration**

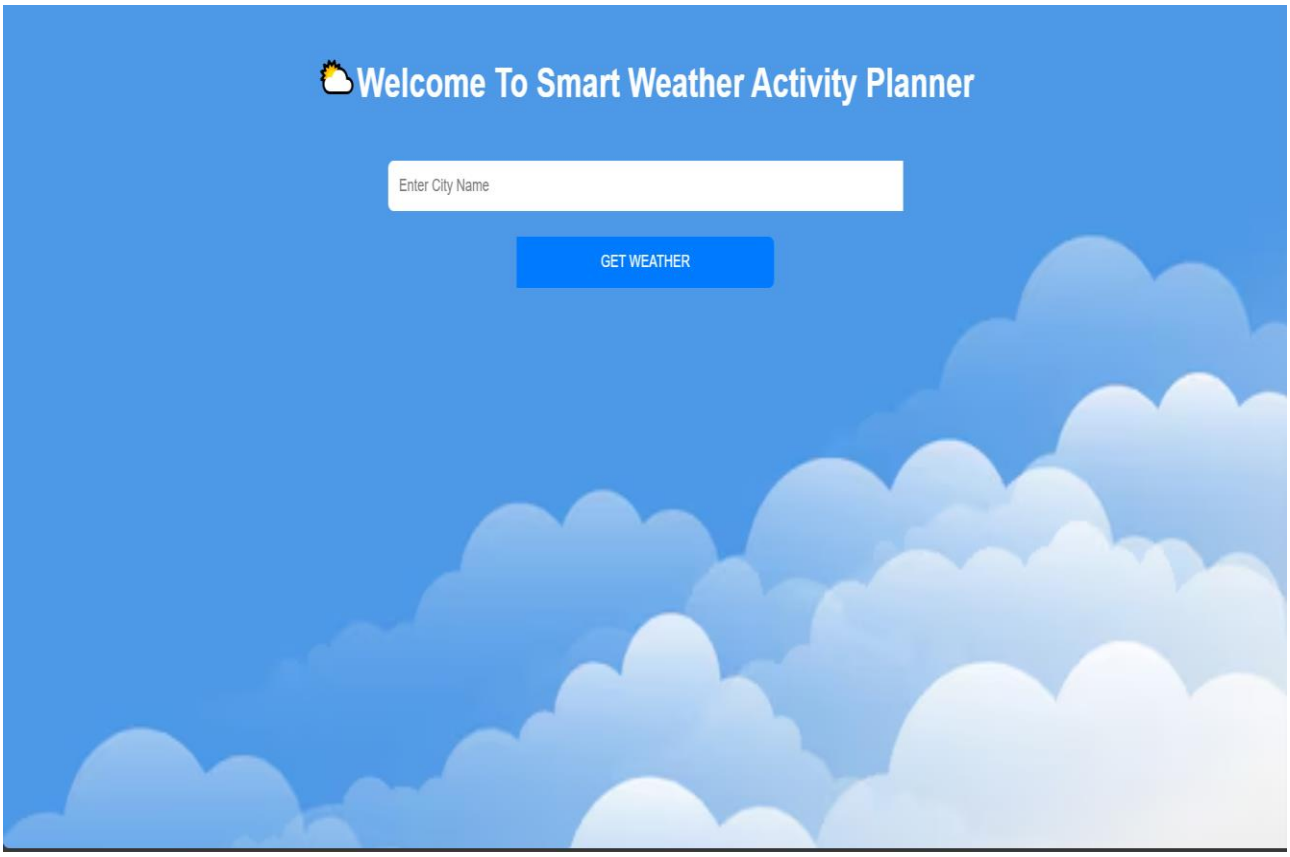
8.Project Folder Structure :

Project1/

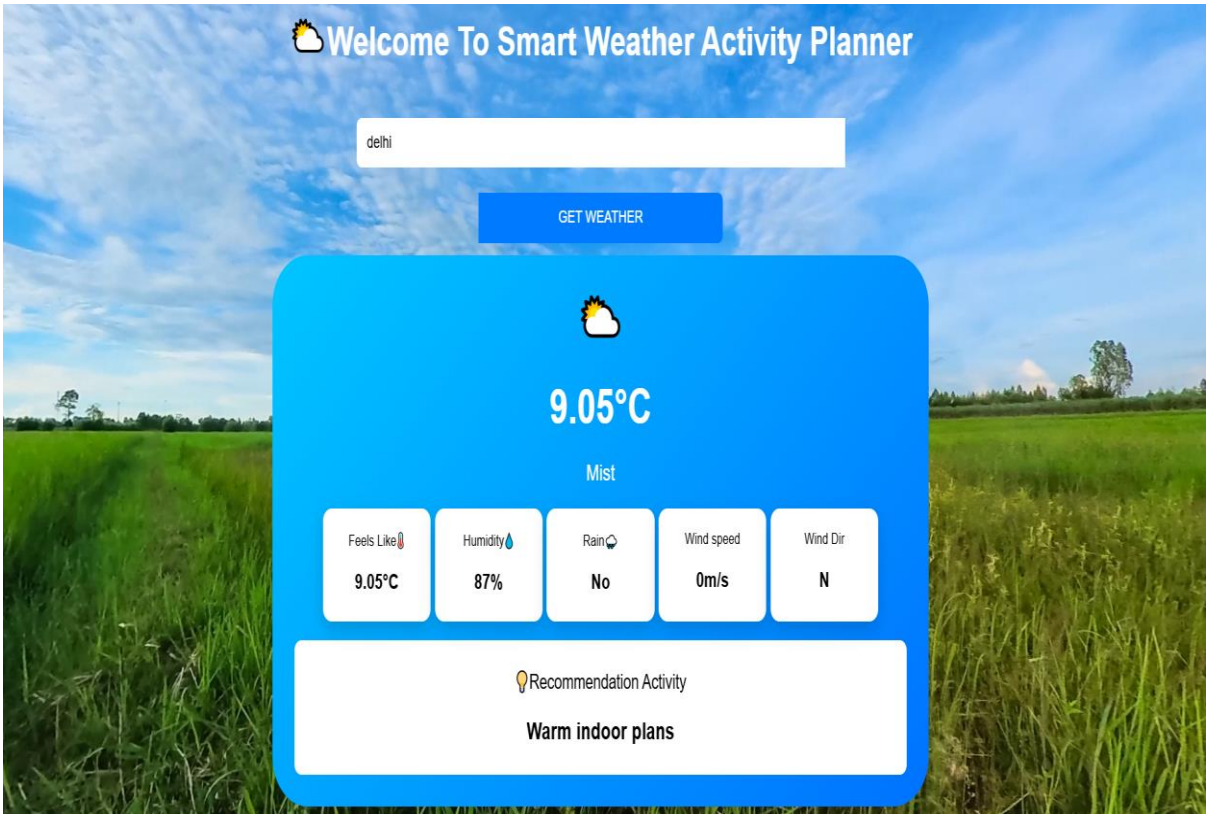


9.Output Screen :

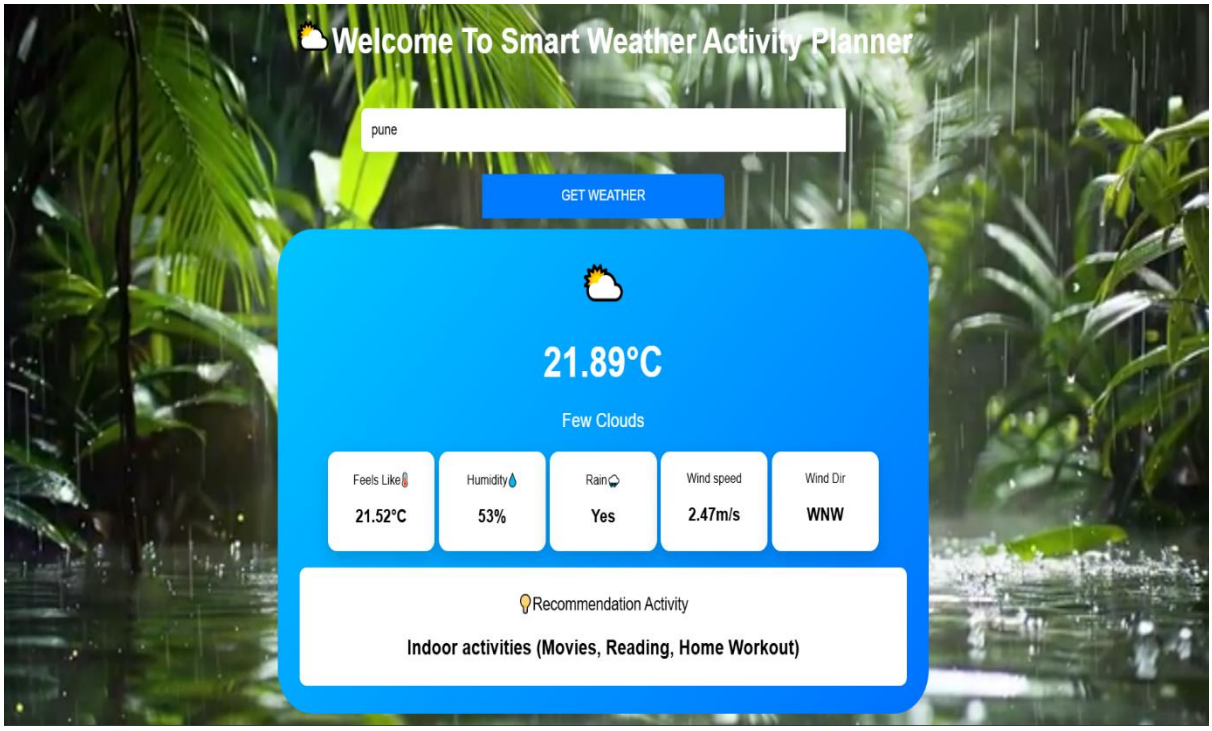
- **Input Window**



- **Clear Weather (No Rain)**

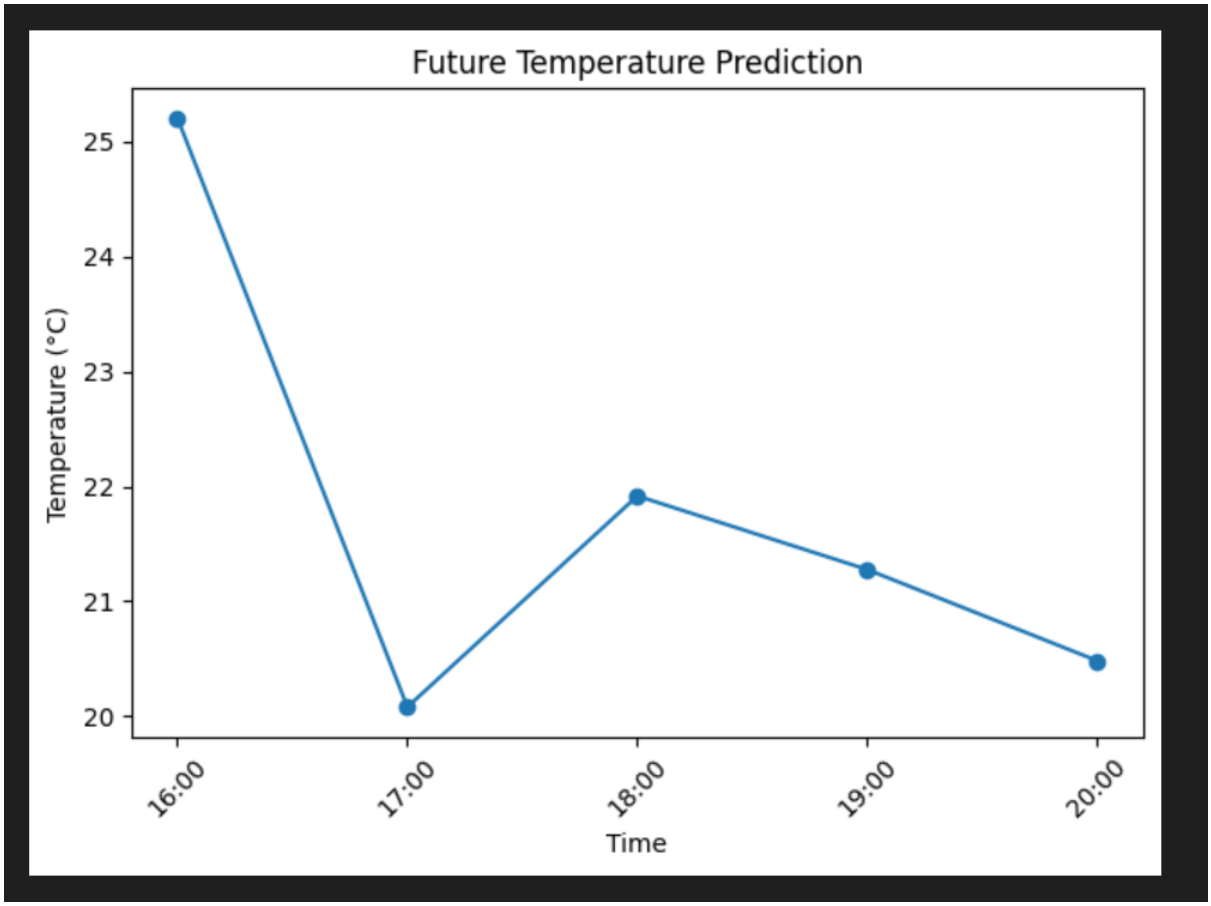


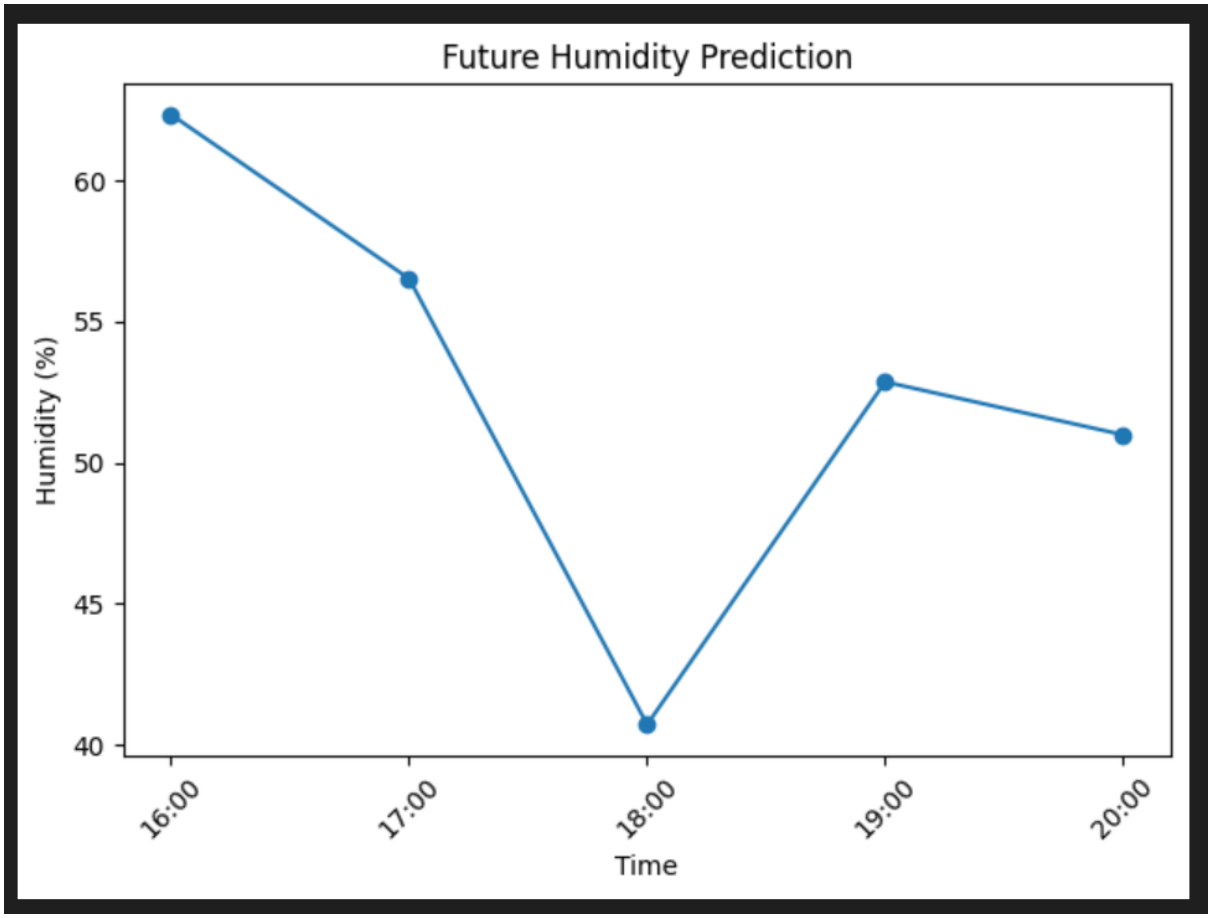
- **Rain Weather :**



10. Weather Predication Output (Using ML):

```
rain predication model performance
Accuracy : 0.85
precision : 0.86
Recall : 0.38

Temperature

Regression model performance
MAE : 2
RMSE : 2

Humidity

Regression model performance
MAE : 10
RMSE : 13
```


Future Temperature Prediction
Temperature (°C)
25
24
23
22
21
20
16:00
17:00
18:00
19:00
20:00
Time


Future Humidity Prediction
Humidity (%)
60
55
50
45
40
16:00
17:00
18:00
19:00
20:00
Time

```
--- Interpretation & Insights (Model Understanding) ---
• The model detected weather patterns similar to rainy conditions.
• Current temperature (22.61°C) influences comfort level.
• Humidity level (52%) affects how hot or cold it feels.
• Temperature trend shows an increasing pattern in upcoming hours.
• Humidity is expected to rise, which may increase discomfort.
• These insights help understand model behavior beyond raw predictions.

city :pune,IN

current Temperature :22.61
feels like:22.28
minimum Temperature:22.61°C
maximum Temperature:22.61°C

humidity :52

wind speed :2.88m/s
Wind direction:W
Weather Predication :few clouds

Rain Predication:Yes
```

```
Recommended Activity : Indoor activities (Reading, Movies, Home workout)

Future Temperautre Predications :
 22:00: 21.5°C
 23:00: 25.5°C
 00:00: 24.8°C
 01:00: 24.9°C
 02:00: 26.5°C

Future humidity Predications :
 22:00:43.4%
 23:00:46.8%
 00:00:47.2%
 01:00:47.2%
 02:00:47.2%
```

11.Future Enhancements

- Cache ML model instead of retraining
- Add 7-day forecast
- Add night/day background videos
- Mobile optimization
- Deploy on cloud platform

12.References

- OpenWeatherMap API Documentation
- Flask Official Documentation
- Scikit-learn Documentation

13.Conclusion

- The Smart Activity Planner is an intelligent, user-friendly system that demonstrates practical use of **data science and web technologies**. It helps users make better daily decisions by analyzing weather conditions and predicting rain using machine learning, while also offering an engaging visual interface.