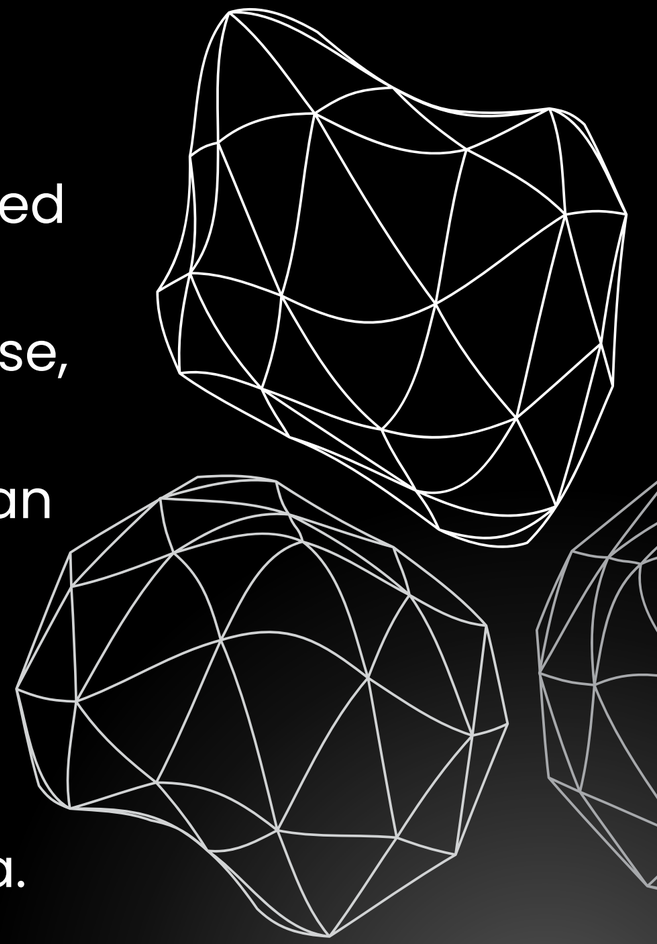
PS - 5

AI - POWERED PRECISION FARMING ASSISTANT

LIFEISWORSE

INTRODUCTION

- Farming, a cornerstone of the global economy, is increasingly challenged by resource constraints, climate variability, and outdated practices.
- Conventional methods often rely on guesswork rather than precise, data-driven decision-making.
- To address this gap, we propose a Precision Farming Assistant—an intelligent system that leverages machine learning to provide actionable insights.
- Our solution is designed to empower farmers by recommending the most suitable crop, optimal irrigation methods, and effective fertilizer strategies based on real-time environmental and soil data.



TECHSTACK

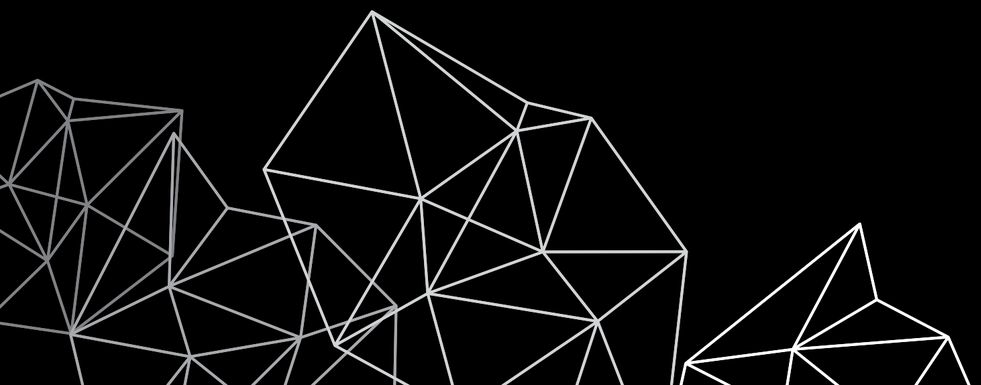
Python — core programming language

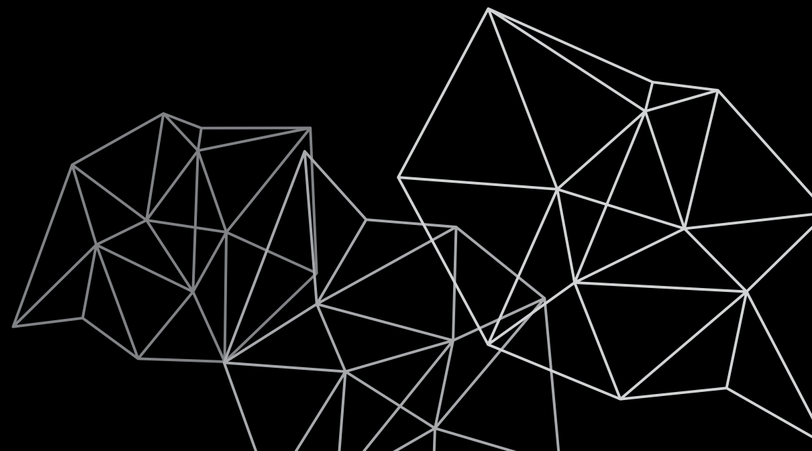
Flask — lightweight web framework for building APIs

scikit-learn — ML model training (RandomForest, DecisionTree, etc.)

pandas — data processing & preprocessing

OUTPUT MODULES





MODULE 1

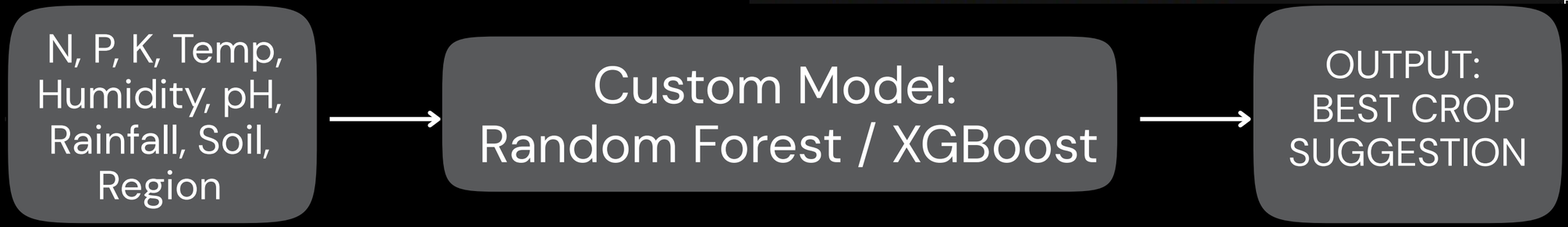
- 🎯 **Objective:**
  Identify the most suitable crop for the given conditions.
- 📌 **Inputs:**
  N, P, K, Temp, Humidity, pH, Rainfall, Soil, Region
- ⚙️ **Model:**
  Random Forest / XGBoost
- 🎯 **Output:**
  Best crop suggestion

OUTPUT

```
🌱 Crop Recommendation Analysis:

1. ✅ Recommended Crop:
   - muskmelon

2. 🚿 Predicted Irrigation Method: Flood
3. 💧 Estimated Water Requirement (per square meter): 6.99 mm/day
4. 🌾 Predicted Yield: 2.99 tons
```



MODULE 2

- 🎯 **Objective:**
  Recommend optimal fertilizer(s) based on crop and soil needs.
- 📌 **Inputs:**
  NPK, Crop, Soil Type, Growth Stage
- ⚙️ **Model:**
  Decision Tree / Rule-Based
- 🎯 **Output:**
  Suitable fertilizer(s)

OUTPUT

```
🌿 Fertilizer Recommendation:
Add Urea: 15 kg/acre; Add DAP: 39 kg/acre; Add MOP: 90 kg/acre
```

MODULE 3

- 🎯 **Objective**:
  Provide timely alerts to optimize fertilizer usage
- 📥 **Input**:
  Region (city name), Date
- ⚙️ **Logic/Model:**
  → If rain expected within 48h → Alert: Delay fertilizer application.
  → If heatwave forecasted → Alert: Plan indoor activities.
- 📤 **Output**:
  Weather-specific actionable alerts shown with time

OUTPUT

```
Weather Alert System
Enter city name: Coimbatore

Current Weather in Coimbatore:
Temperature: 31.66°C
Conditions: broken clouds
Wind Speed: 2.64 m/s

Weather Alerts:
- 🌧️Rain expected in 0h. Delay fertilizer application.
- 🌧️Rain expected in 3h. Delay fertilizer application.
- 🌧️Rain expected in 6h. Delay fertilizer application.
- 🌧️Rain expected in 9h. Delay fertilizer application.
- 🌧️Rain expected in 12h. Delay fertilizer application.
- 🌧️Rain expected in 24h. Delay fertilizer application.
- 🌧️Rain expected in 27h. Delay fertilizer application.
- 🌧️Rain expected in 30h. Delay fertilizer application.
- 🌧️Rain expected in 33h. Delay fertilizer application.
- 🌧️Rain expected in 36h. Delay fertilizer application.
- 🌞Heatwave expected in 45h. Plan indoor activities.

Last updated: 2025-04-05 17:29:31
```

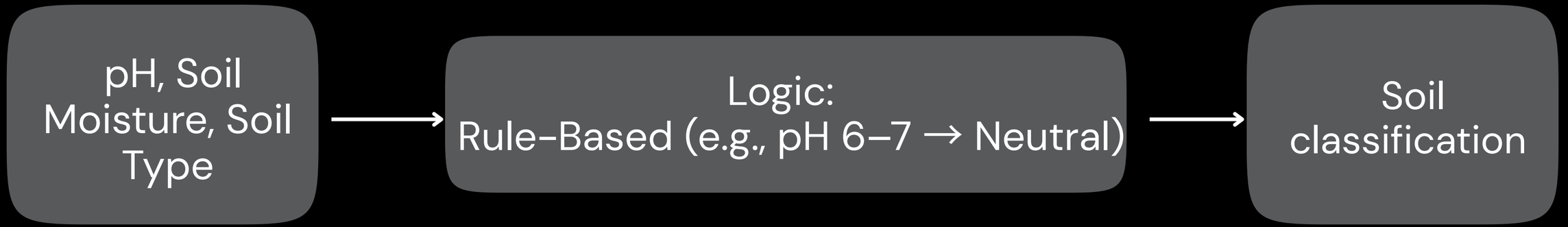
Soil Moisture, Water Need, Area, Irrigation Type → Model: Linear Regression / Threshold Rules → Irrigation timing

MODULE 4

- 🎯 **Objective:**
  Evaluate soil condition for better crop planning.
- 📌 **Inputs:**
  pH, Soil Moisture, Soil Type
- ⚙️ **Logic:**
  Rule-Based (e.g., pH 6–7 → Neutral)
- 🎯 **Output:**
  Soil classification

OUTPUT

```
🌱 Crop Condition Assessment:
Suboptimal
```



THANK YOU

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