





# Crop and Fertilizer Recommendation System using Machine Learning

Name: Dipanshu Dhage Email Id:dipanshu9131@gmail.com



## **Learning Objectives**

- •Understand the challenges in modern agriculture related to crop and fertilizer selection.
- •Learn how machine learning can solve real-world agricultural problems.
- •Gain practical experience in:
  - Data preprocessing and analysis
  - Training and evaluating ML models
  - Building a user interface using Streamlit
  - Deploying a complete AI application
- •Apply OCR techniques to extract data from documents.
- •Learn how to manage projects using GitHub.





## **Tools And Technology Used**

- Python: Main programming language for the project.
- •Streamlit: Framework for building the interactive web interface.
- •pandas: For data manipulation and analysis.
- •scikit-learn: Used to train machine learning models (Random Forest).
- •pytesseract: Extracts text from image-based soil reports (OCR).
- PyMuPDF (fitz): Extracts text from PDF soil reports.
- •GitHub: For version control and project management.

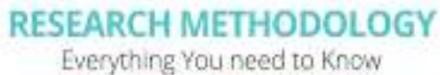




### **Methodology**

- Data Collection: Gather and preprocess datasets for crops and fertilizers.
- Model Training: Train Random Forest models to predict crops and fertilizers.
- •OCR Extraction: Use pytesseract to extract soil data from uploaded images or PDFs.
- •Streamlit Integration: Create an interactive app for users to upload reports and get recommendations.
- •Model Deployment: Save models as .pkl files for real-time predictions.

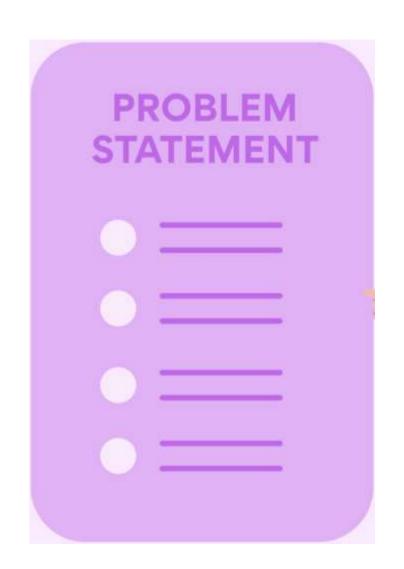






#### **Problem Statement:**

- •Farmers often face challenges in selecting the right crop and fertilizer due to varying soil conditions, climate, and other factors.
- •Traditional methods of crop and fertilizer selection are timeconsuming and lack accuracy.
- •There is a need for a solution that:
  - Provides tailored crop and fertilizer recommendations based on real-time soil data.
  - Helps farmers optimize their agricultural practices, increasing crop yield and sustainability.





#### **Solution:**

- •AI-Powered Recommendation System:
- •Leverages machine learning to provide real-time crop and fertilizer recommendations.
- •Uses soil test reports (extracted via OCR from images/PDFs) as input data.
- Features:
- •Interactive web app built with **Streamlit** for ease of use.
- Machine learning models trained on crop and fertilizer datasets.
- •Personalized suggestions based on soil nutrients (NPK), irrigation type, and crop preferences.

#### •Impact:

- Helps farmers make informed decisions for higher crop yields.
- •Saves time and resources by suggesting optimal crop-fertilizer combinations.

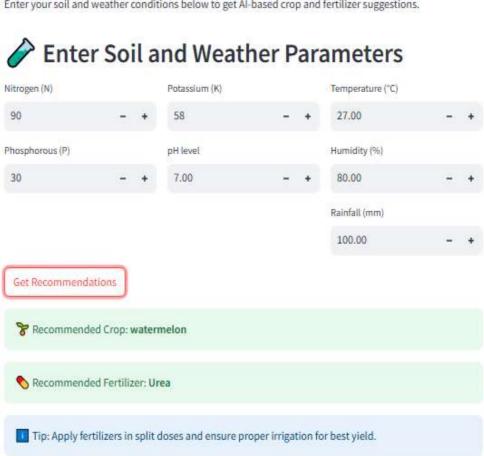




### **Screenshot of Output:**



Enter your soil and weather conditions below to get Al-based crop and fertilizer suggestions.





#### **Conclusion:**

- •The Al-powered Smart Crop and Fertilizer Recommendation System simplifies and optimizes agricultural decision-making for farmers.
- •By integrating machine learning with real-time soil data, the system ensures accurate and personalized crop and fertilizer recommendations.
- •This solution:
- Enhances farm productivity.
- •Saves time and resources.
- Contributes to sustainable agricultural practices.





# Thank You!

**Contact Information:** 

•GitHub: https://github.com/dipanshudhage/Skill4Future