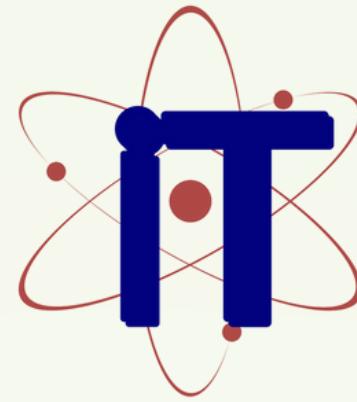




ACROPOLIS
Enlightening wisdom

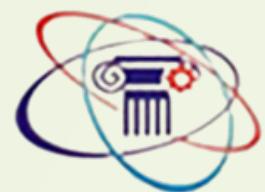


Synopsis Presentation on **Design Optimizer For Higher Yield Sustainable Fertilizer Using Random Forest Algorithm**



Guided By:
Dr. Prof. Prashant Lakkadwala

Presented By:
Akrati Nigam
Aashi Garg
Jyotirjay Narayan Gupta
Jatin Saini



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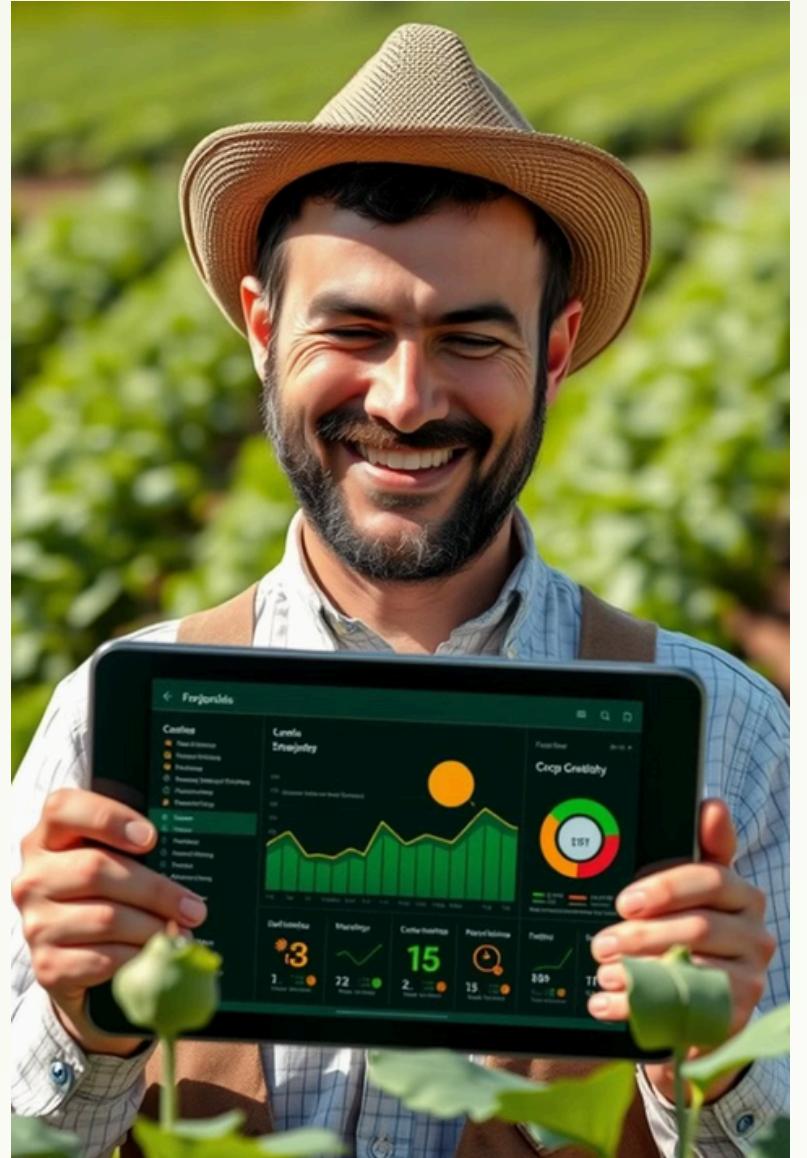
1. Introduction

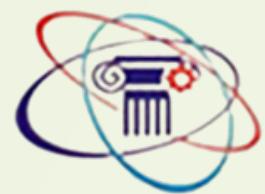
1.1 Overview

- The overuse and misuse of fertilizers in agriculture has been a significant cause of reduced agricultural yields, degraded soil, and adverse environmental effects.
- Farmers often lack precise knowledge about fertilizer amounts and types, resulting in reduced returns on agricultural investments.
- The project aims to create a data-driven solution that offers farmers optimal fertilizer usage recommendations based on soil health, crop type, and weather conditions.
- By analyzing various factors affecting soil and crop growth, this solution will promote sustainable farming practices, increase crop yields, and boost farmer incomes.

1.2 Purpose

- This project's main goal is to provide farmers with an easy-to-use tool that provides customized fertilizer recommendations, encouraging the use of sustainable farming techniques
- This targeted approach ensures that nutrients are distributed efficiently, fostering optimal crop growth.
- This project stands at the intersection of technology and tradition, empowering farmers to meet the demands of a growing population while preserving the earth for future generations.
- It aims to enhance agricultural productivity, protect the environment, and improve the economic well-being of farmers.





2. Literature Review

Sr. No.	Name of Solution/System	Features	Limitations/Drawbacks
1	Soil Testing Kits	Provides basic soil nutrient levels	Limited accuracy, no real-time data integration
2	Fertilizer Recommendation	Offers general guidelines based on crop type	Lacks real-time weather and soil health data
3	Precision Agriculture Tool	Uses GPS and IoT sensors for precise application	High cost, requires technical expertise
4	Government Extension Services	Provides expert advice and training	Limited reach, not personalized
5	Satellite Imagery Analysis	Monitors crop health and soil conditions	Expensive, requires specialized software

3. Problem Statement

- Farmers frequently apply fertilizer incorrectly or excessively because they rely on conventional wisdom or broad recommendations.
- Degradation of the soil and poor crop performance are the outcomes of this practice. The inability of current systems to integrate real-time data
- Like weather patterns and comprehensive information on soil health
- Limits their ability to make precise suggestions regarding fertilizer use.

4. Proposed Solution

- The proposed solution is a robust software application designed to integrate soil health data, crop requirements, and weather forecasts.
- It aims to recommend the most suitable fertilizer type and dosage.
- By leveraging data analytics and machine learning models, the system can predict the fertilizer needs of various crops, helping farmers make well-informed decisions.
- Additionally, the application promotes environmentally friendly practices by encouraging the minimal and precise use of fertilizers.



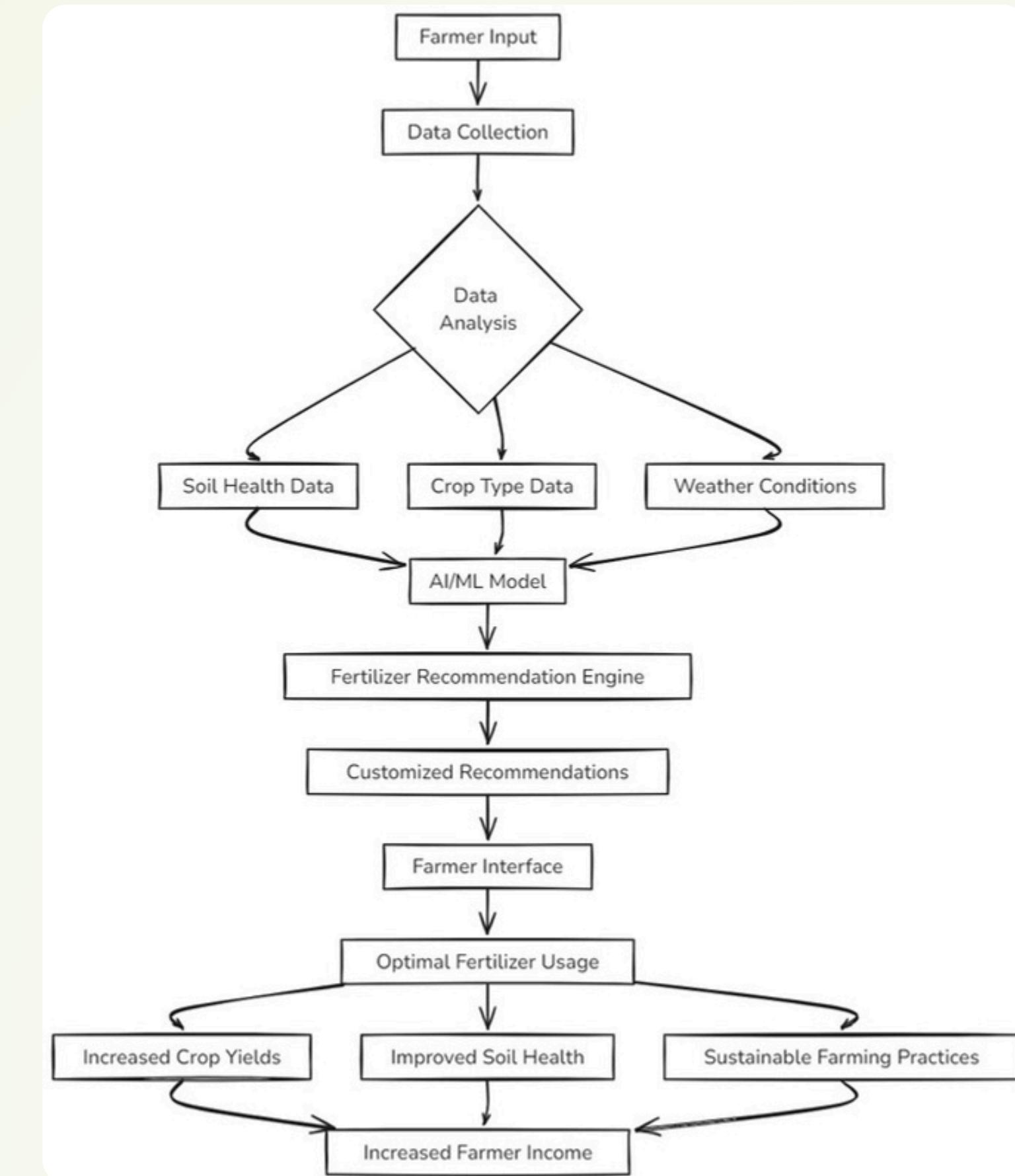
5. Objectives



- Its objectives are to:
 - Promote healthy soil by making recommendations on fertilizer use.
 - Increase agricultural productivity by fertilizing certain areas.
 - Minimize damage to the environment by avoiding excessive use of fertilizer.
 - Maximize farmers' profits by offering data-driven advice.

6. Theoretical Analysis

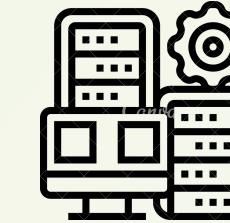
fig3.1.1 block diagram for fertilizer optimizer





6. Theoretical Analysis

6.2 Hardware Requirements



- Smartphones or computers for farmers to access the application.
- Soil testing kits.
- Storage Requirements : 8-16 GB RAM, 256 GB SSD

6.3 Software Requirements



- Programming Languages: like Python, R
- Data Analysis Tools like Pandas, NumPy, Scikit-learn.
- Weather API integration for real-time weather data.
- Database Management tools like SQL or NoSQL for managing soil and crop data.
- Cloud service: AWS (EC2) for hosting the backend, running ML models, and web application.



Applications

- **Small and Large-Scale Farming:** By recommending sustainable practices, it increases productivity in farms of all sizes.
- **Precision Agriculture:** The system supports precision agriculture by offering targeted fertilizer recommendations.
- **Government and Agricultural Agencies:** It can aid in developing policies and recommendations for fertilizer usage across different regions.
- **Research and Development:** Researchers can utilize the data generated by the application to study the long-term impacts on soil health.



GitHub Link

- <https://github.com/AkratiNigam/Fertilizer-optimizer>

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Thank You
Queries ?