Crop Care AI: The Smart Farming Revolution

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INTRODUCTION

A sophisticated agricultural system utilizing IoT devices gathers live data on soil and weather conditions. Through machine learning algorithms, a mobile app offers tailored insights and suggestions for improved inputs, boosting efficiency and productivity in paddy farming.

MOTIVATION

- Make people practice agriculture.
- To help the food shortage in the upcoming years.
- Practicing agriculture in a healthy way that enhances soil structure and reduces soil erosion.

PROBLEM STATEMENT

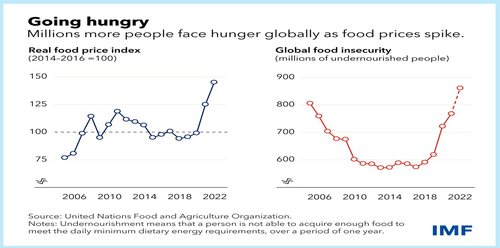

Fig 1. Stats of Real food prices and Food insecurity

Issue:

- Millions of people are dying every year due to lack of food.
- The price of food has been increasing because the "demand is greater than supply".

Solution:

- Our project enables every individual to practice agriculture and aims to make them self-sufficient.

METHODOLOGY

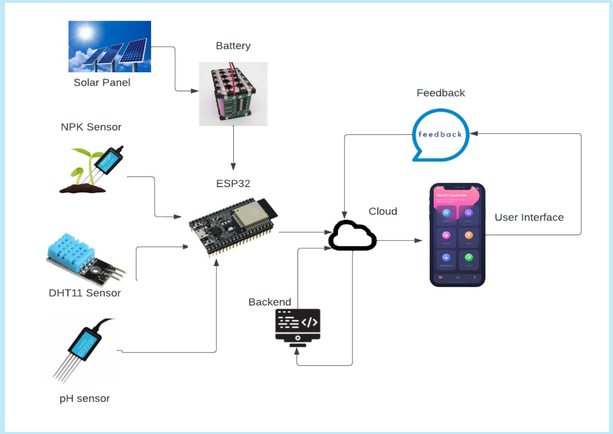

Fig 2. Block Diagram

1. The user first creates an account. During this process, the user specifies their desired crop and the area of cultivation.
2. Once the user account is created, the system collects data related to soil and weather conditions.
3. This data, along with the user's preferences, are used to predict a suitable crop.
4. If a suitable crop is identified, the user is presented with this information.
5. The system also provides the user with daily reports on Nitrogen, Phosphorous, Potassium (NPK) levels, weather conditions, and fertilizer values.
6. If no suitable crop is identified, the system prompts the user to consider alternative crops grown in the area.
7. The reports of fertilizer, NPK and weather values will be sent daily

REALISTIC CONSTRAINTS

- Device and infrastructure costs: The costs of sensors, hardware, software, and infrastructure deployment need to be balanced with potential sensors, hardware, software, and infrastructure deployment need to be balanced with potential cost savings from improved care and reduced errors.
- Scalability and maintenance: The system should be scalable to accommodate different regions and crops while considering ongoing maintenance costs.

ENGINEERING STANDARDS

- IEEE 2700-2014: IEEE Standard Definitions for Sensor-Based Occupancy Detection Systems
- ANSI/ISA-100: Wireless Systems for Industrial Automation
- ASABE S522: Soil Strength Measurement

RESULTS & INFERENCE

Integration of IoT sensors and machine learning optimizes farming, enhancing global food security through diverse crop cultivation. Random forest achieves 99% precision, showcasing its effectiveness.

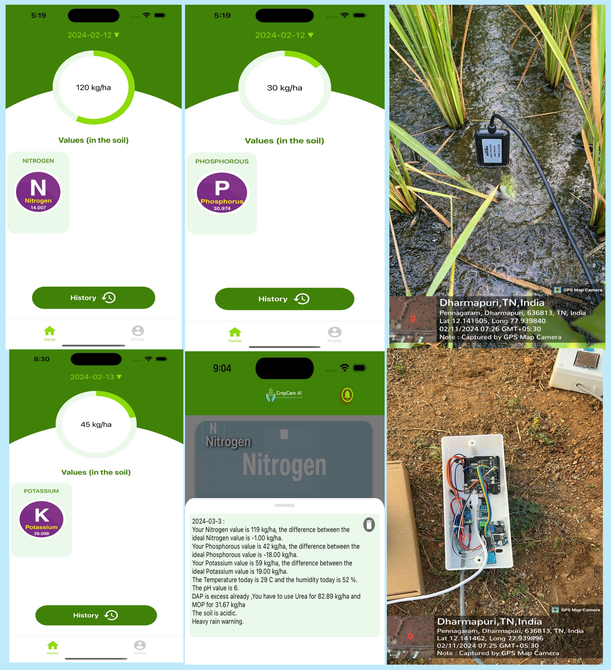

Fig 3. Software and Hardware Results

CONCLUSION

In conclusion, the integration of IoT sensors and machine learning in agriculture offers global solutions. Embracing diverse crops and leveraging precise predictive models empower farmers to optimize resources efficiently. This innovation not only enhances food security but also ensures sustainable practices, addressing the challenges of shrinking agricultural land and increasing food demand worldwide.

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CONFERENCE /JOURNAL PUBLICATION

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