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Agrosense Ai-Powered Smart Plant Health Advisor.

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ABSTRACT
Agriculture plays a critical role in food security and economic development. However, plant diseases, improper growth conditions, and lack of timely guidance significantly affect crop productivity. Early identification of plant health issues can reduce losses and improve yield quality. This paper presents AgroSense AI, an intelligent plant health advisory system that utilizes image-based analysis and environmental data to assist users in monitoring plant health. The proposed system identifies plants using images captured through a camera or uploaded by the user, provides growth and nutrient recommendations, simulates plant growth through an educational interface, and offers weather-based advisory support. The system is implemented using Python and Streamlit, integrating image processing techniques and external APIs. The proposed solution is cost-effective, user-friendly, and suitable for academic and educational agricultural applications..
Keywords: AgroSense AI, Plant Disease Detection, Image Processing, Smart Agriculture, Machine Learning,weather advisory.
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1. INTRODUCTION:

Agriculture remains the backbone of many developing economies, where crop productivity is directly linked to plant health. Diseases caused by fungi, bacteria, and environmental stress factors can significantly reduce agricultural output. Traditional disease identification methods require expert knowledge and physical inspection, which may not be readily available to farmers and students.

Recent advancements in artificial intelligence, image processing, and web technologies have enabled automated plant monitoring systems. Image-based plant identification and disease analysis provide a scalable and affordable alternative to manual inspection. This paper proposes AgroSense AI, a smart plant health advisory system designed for academic use that identifies plants, provides growth guidance, and delivers environmental advice without the need for physical sensors.

Environmental factors such as temperature and humidity play a significant role in plant growth and health. Weather conditions influence disease occurrence, water requirements, and nutrient absorption. Integrating weather-based advisory features into plant health monitoring systems enhances practical usefulness by helping users understand climate impacts on plant development.

In recent years, the adoption of smart agriculture technologies has increased due to the growing demand for sustainable farming practices. Farmers and agricultural students often face challenges such as lack of expert guidance, delayed disease identification, and limited access to advanced diagnostic tools. These challenges are more prominent in rural and resource-limited areas, where traditional laboratory-based testing and expert consultation are not always feasible. As a result, there is a strong need for intelligent, low-cost, and easily accessible systems that can assist in plant health monitoring.

The proposed AgroSense AI system addresses these challenges by combining plant identification, growth advisory, weather-based

guidance, and educational simulation into a single web-based platform. Unlike sensor-dependent agricultural systems, AgroSense AI operates without physical hardware, making it affordable and suitable for academic environments. The system aims to support learning, awareness, and basic decision-making related to plant care, thereby contributing to the advancement of smart and sustainable agriculture practices.

2. RELATED WORK

Several studies have explored the application of machine learning and deep learning techniques for plant disease detection. Convolutional Neural Networks (CNNs) have been widely used to classify leaf diseases using image datasets. Existing research primarily focuses on disease classification accuracy, often neglecting user interaction, growth advisory, and environmental awareness.

Unlike existing approaches, AgroSense AI integrates plant identification, advisory services, weather-based guidance, and an educational plant growth simulation into a single system. This holistic approach makes the system more suitable for academic demonstration and learning purposes.

3. SYSTEM ARCHITECTURE

The overall architecture of AgroSense AI consists of multiple functional modules working together to deliver plant health insights. The system operates as a web-based application accessible through a browser.

System Modules:

1. Image Input Module – Captures plant images via IP camera or file upload.

2. Plant Identification Module – Identifies plant species using image-based analysis.

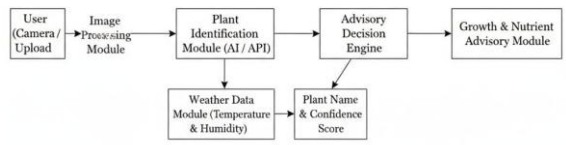
3. Growth Advisory Module – Provides plant care and nutrient recommendations.

4. Educational Simulation Module – Demonstrates plant growth stages interactively.

5. Weather Advisory Module – Generates advice based on real-time weather data.

6. User Interface Module – Displays outputs using a simple graphical interface.

Block Diagram



Block Diagram of AgroSense AI System

The methodology of the proposed system is illustrated through a sequential workflow.

A. Image Acquisition

Users provide plant images either through an IP camera connection or by uploading an image file. This flexibility enables the system to operate without specialized hardware.

B. Image Processing and Plant Identification

The captured image is processed using the Python Imaging Library (PIL) to ensure compatibility and quality. The image is then transmitted to a cloud-based plant identification API, which returns the plant's biological name, common name, and a confidence score.

C. Health and Growth Assessment

Based on the confidence score and plant name, the system determines whether the plant appears healthy or may require attention. A rule-based advisory system provides growth tips, watering guidance, and nutrient suggestions.

D. Educational Plant Growth Simulation

An interactive simulation demonstrates the effect of actions such as watering and fertilization on plant growth. This module is designed to improve user engagement and agricultural awareness, particularly for students.

E. Weather-Based Advisory

The system retrieves temperature and humidity data using a weather API. Based on environmental conditions, appropriate plant care recommendations are generated, such as increased watering during high temperatures or protection during cold conditions.

4. IMPLEMENTATION

The AgroSense AI system is implemented using Python with the Streamlit framework to create an interactive web interface. The application uses multiple libraries and APIs to achieve its functionality.

Technologies Used:

Programming Language: Python

Frontend Framework: Streamlit

Image Processing: PIL (Pillow)

APIs: Plant Identification API, OpenWeather API

Data Handling: Requests, JSON

The modular structure of the implementation allows easy scalability and future enhancements./yc r1

5. RESULTS AND DISCUSSION

The implemented system successfully identifies plant species from images with acceptable accuracy for academic applications. The advisory modules provide meaningful plant care recommendations based on both image analysis and environmental data. The educational simulation effectively demonstrates the importance of proper plant care practices.

The system does not require physical sensors, making it affordable and accessible. While the accuracy depends on image quality and API performance, the results demonstrate the feasibility of AI-based plant health advisory systems in educational environments.

6. CONCLUSION

This paper presented AgroSense AI, an intelligent plant health advisory system that combines image-based plant identification, growth guidance, weather-based recommendations, and educational simulation. The system is designed to be cost-effective, user-friendly, and suitable for academic projects. The results show that artificial intelligence and web technologies can effectively support plant health monitoring without complex hardware requirements.

7. PROTOTYPE MODULE

The prototype of AgroSense AI is developed as a web-based application to demonstrate feasibility and functionality. It integrates plant identification, growth advisory, weather-based guidance, and user interaction within a single interface. The modular design ensures simplicity, low cost, and suitability for academic evaluation.

REFERENCES

1.S. Sladojevic, M. Arsenovic, A. Anderla, D. Culibrk, and D. Stefanovic, “Deep Neural Networks for Plant Disease Recognition,” IEEE Transactions on Computational Intelligence, 2016.
2. S. P. Mohanty, D. P. Hughes, and M. Salathé, “Using Deep Learning for Image-Based Plant Disease Detection,” Frontiers in Plant Science, 2016.
3. IEEE Author Center, “IEEE Guidelines for Paper Preparation.”
4. A. Kamilaris and F. X. Prenafeta-Boldú, “Deep learning in agriculture: A survey,” Computers and Electronics in Agriculture, vol. 147, pp. 70–90, 2018.
5. P. Ferentinos, “Deep learning models for plant disease detection and diagnosis,” Computers and Electronics in Agriculture, vol. 145, pp. 311–318, 2018.
6. J. G. A. Barbedo, “Plant disease identification from individual lesions using deep learning,” Biosystems Engineering, vol. 180, pp. 96–107, 2019.
7. R. P. Singh, M. Sharma, and A. Singh, “Smart agriculture using IoT and machine learning techniques,” IEEE International Conference on Computing, Communication and Automation, pp. 145–150, 2017.

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