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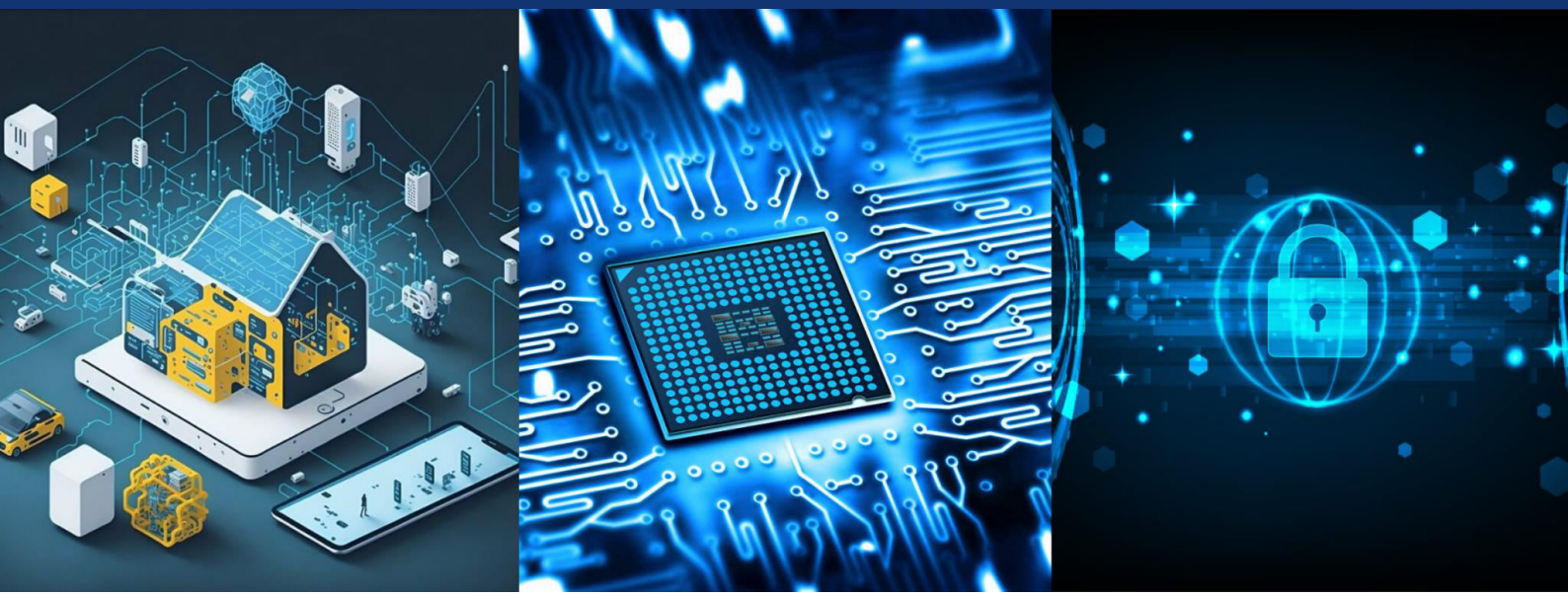

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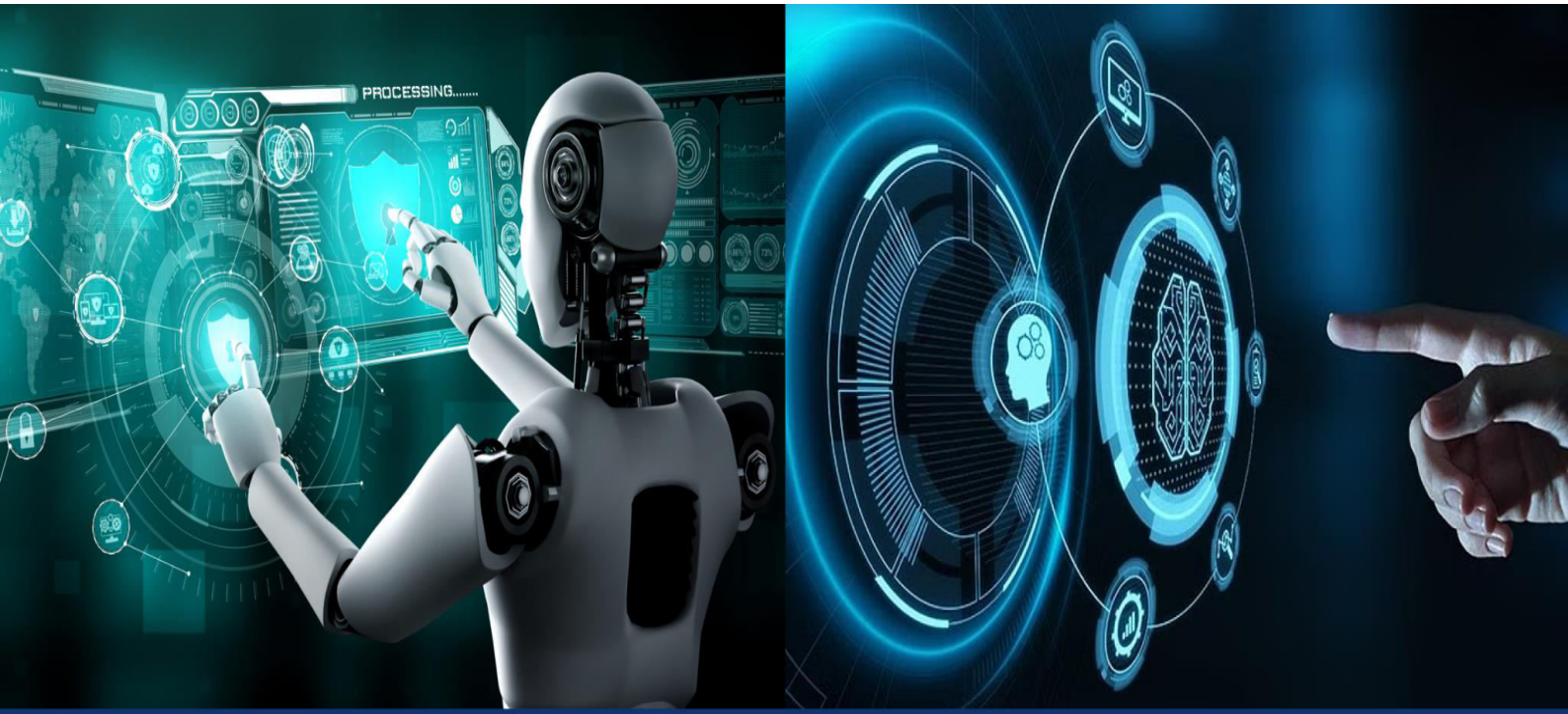

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Plant Disease Detection – A Machine Learning-Based Approach

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ABSTRACT: Agriculture is a critical sector that sustains human life, yet plant diseases remain a major challenge, leading to significant crop losses. The Plant Disease Detection system is a machine-learning-based approach designed to diagnose plant diseases efficiently. By leveraging deep learning techniques, the system analyzes plant leaf images to identify diseases with high accuracy. It provides users with disease information and recommended treatments, bridging the gap between expert knowledge and everyday farming practices. The system is built using Python, TensorFlow, and OpenCV, and deployed with a Flask API for real-time predictions. The goal is to offer an accessible solution for farmers and agricultural professionals to enhance productivity and reduce economic losses.

KEYWORDS: Plant disease detection, deep learning, machine learning, image processing, TensorFlow, Python.

I. INTRODUCTION

Plants are essential to human survival, contributing to food security and environmental balance. However, they are prone to various diseases that can severely impact agricultural output. Traditional plant disease diagnosis methods require expert knowledge and manual inspection, which can be time-consuming and inaccessible to many farmers. The Plant Disease Detection project aims to develop an intelligent system that utilizes machine learning to automate plant disease diagnosis. The system allows users to upload images of plant leaves, which are then analysed by a deep learning model trained on a large dataset of plant diseases. The model identifies the disease and suggests possible treatments, enabling farmers to take timely preventive measures.

By integrating image processing techniques with convolutional neural networks (CNNs), this system enhances disease identification accuracy. The ultimate objective is to minimize crop losses, optimize agricultural productivity, and support sustainable farming practices.

II. PROBLEM STATEMENT

Challenges in Agriculture

1. Farmers struggle to identify plant diseases accurately, leading to ineffective treatment.
2. Traditional disease detection methods are time-consuming and require expert intervention.
3. In remote areas, lack of access to agricultural experts results in untreated crop diseases.

Challenges for Farmers

1. Limited knowledge of disease symptoms and treatment methods.
2. High crop losses due to delayed or incorrect diagnosis.
3. Need for an automated, fast, and user-friendly disease detection system.

III. METHODOLOGY: PLANT DISEASE DETECTION SYSTEM

Features for Farmers

1. Image-Based Disease Detection – Users upload images of plant leaves, which are analysed for disease symptoms.
2. Machine Learning Model – A deep learning model trained on a dataset of plant diseases ensures high accuracy.

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3. Disease Information and Solutions – The system provides details on identified diseases and recommended treatments.
4. User-Friendly Interface – Accessible through a web-based or mobile application for easy usage by farmers.

System Architecture

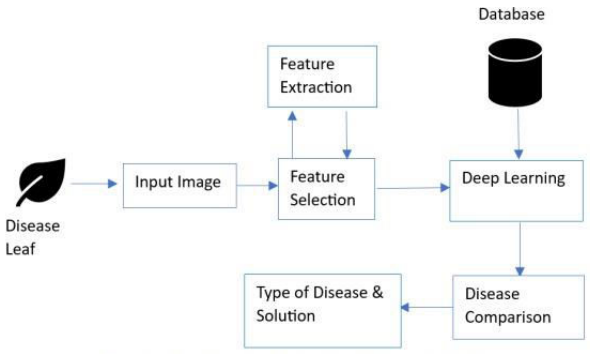


Figure 1: Architecture Diagram of Proposed System

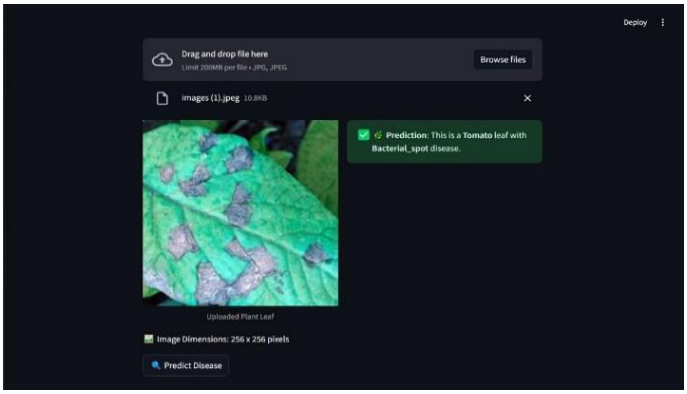
IV. RESULTS AND FINDINGS

The Plant Disease Detection system significantly improved the accuracy of disease identification using deep learning models. Farmers benefited from early disease detection, which helped reduce crop losses and improve overall yield. The system also enhanced user engagement by simplifying the diagnosis process, making it easier for farmers to identify plant diseases and take timely preventive measures without requiring expert intervention.

V. OUTPUT

Fig 1. Landing Page

Fig 2. Result Page



VI. CONCLUSION AND FUTURE WORK

The Plant Disease Detection system provides an AI-powered approach to diagnosing plant diseases, making expert-level knowledge accessible to farmers. By leveraging machine learning and image processing techniques, the system enhances agricultural productivity, reduces crop damage, and optimizes disease management strategies. Future enhancements include integrating real-time image analysis using smartphone cameras, expanding the dataset to include more plant species and disease types, and implementing multilingual support to make the system more accessible globally.

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REFERENCES

1.TensorFlow Documentation: https://www.tensorflow.org/
2.OpenCV Documentation: https://opencv.org/
3.Python Official Docs: https://docs.python.org/
4.Flask Documentation: https://flask.palletsprojects.com/

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