A REPORT
ON

AI-Driven Crop Disease Prediction and Management System

Submitted by,

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Under the guidance of,

Dr. Kuppala Saritha

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

At

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY

BENGALURU

MAY 2025

PRESIDENCY UNIVERSITY

PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Project report **"AI-Driven Crop Disease Prediction and Management System"** being submitted by "Sumanth R, Nithin Gowda M and Girish G R" bearing roll number(s) "20211CSE0452, 20211CSE0415 and 20211CSE0412" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out under my supervision.

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DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **"AI-Driven Crop Disease Prediction and Management System"** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Dr. Kuppala Saritha, Professor, School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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ABSTRACT

The agricultural sector continues to face major challenges due to the prevalence of plant diseases, which significantly reduce crop yields, farmer income, and food availability. Traditional methods of disease identification rely heavily on expert knowledge and manual inspection, which are often time-consuming, inconsistent, and inaccessible to farmers in remote or resource-limited regions. As agriculture moves toward digital transformation, there is a growing need for intelligent systems that can provide accurate, real-time plant disease diagnosis with minimal human intervention.

This project introduces an AI-powered crop disease prediction and management system that leverages deep learning techniques for image-based classification. A Convolutional Neural Network (CNN) based on the ResNet50 architecture was trained on a large, well-curated dataset of plant leaf images. Through data augmentation and fine-tuning, the model achieved a high validation accuracy of 99.23%, enabling it to effectively recognize multiple diseases across different crop types. The system's ability to analyze visual patterns and detect early symptoms ensures precise and timely disease identification.

To enhance usability, the model is integrated into a Flask-based web application, providing a simple and responsive interface for farmers and agricultural professionals. Users can upload images of infected leaves and receive instant feedback that includes the disease name and recommended preventive or corrective measures. The real-time nature of the system allows for rapid decision-making, reducing delays in treatment and minimizing crop damage. The architecture is modular and scalable, allowing for future extensions like mobile deployment, voice assistance, and integration with IoT sensors.

By automating the plant disease detection process, this system significantly reduces dependence on agricultural experts and supports informed decision-making in crop management. It promotes sustainable farming practices by encouraging early intervention and optimized pesticide usage, ultimately contributing to increased agricultural productivity. As a practical implementation of AI in precision agriculture, the proposed system exemplifies the potential of deep learning to revolutionize disease management and strengthen food security in farming communities.

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