IMAGE-BASED POTATO LEAF DISEASE DETECTION USING DEEP CONVOLUTIONAL NEURAL NETWORKS

A PROJECT REPORT
Submitted by

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Under the guidance of,

Dr. MADHUSUDHAN MV

in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND TECHNOLOGY
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

At

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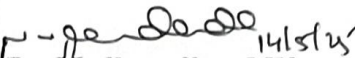## PRESIDENCY UNIVERSITY

BENGALURU

MAY 2025

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CERTIFICATE

This is to certify that the Project report **"Image-Based Potato Leaf Disease Detection using Deep Convolution Neural Networks"** being submitted by "Dinakar S, Diwakar S, Rahul Ashok, Adarsha SG" bearing roll number "20211CST0083, 20211CST0084, 20211CST0075, 20211CST0061" in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Technology is a bonafide work carried out under my supervision.

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DECLARATION

I hereby declare that the work, which is being presented in the report entitled "**Image-Based Potato Leaf Disease Detection using Deep Convolution Neural Network**" in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Technology**, is a record of my own investigations carried under the guidance of **Dr.Madhusudhan MV, Associate Professor, Presidency School of Computer Science and Engineering, Presidency University, Bengaluru**.

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

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ABSTRACT

Potato plant diseases have a huge effect on crop yield and quality, and they threaten global food security. Conventional disease detection methods include manual inspection by experts, which may be time consuming, labor intensive, and susceptible to human error. This work introduces a machine learning approach to the automated prediction of potato plant diseases based on image classification. High resolution images of potato leaves were gathered and preprocessed for improved feature extraction. Different models, such as convolutional neural networks (CNN), were trained on labeled datasets of healthy and diseased leaf images. The model developed was highly accurate in identifying prevalent potato diseases like Late Blight, Early Blight, and Potato Leaf Roll Virus. The system is capable of quick and precise disease diagnosis, allowing for timely intervention and efficient management practices. The incorporation of this predictive model into agricultural systems can minimize crop losses, enhance productivity, and facilitate sustainable farming practices.

Potato plants are susceptible to numerous foliar diseases affecting yield and quality, with associated challenges for sustainable agriculture and global food security. Conventional approaches to disease diagnosis are dependent upon skilled visual assessment, which may be ineffective, subjective, and error-prone. In view of these inadequacies, this paper offers an automatic detection framework of the disease based on deep CNN. The framework utilizes a dataset of high-quality images of healthy and infected potato leaves, including prevalent diseases like Late Blight, Early Blight, and Potato Leaf Roll Virus. By using a well-crafted preprocessing pipeline and optimized CNN structure, the model can well extract informative visual features for precise classification. Experimental results show good detection accuracy and robustness over different image conditions. The incorporation of this smart detection system into farming processes can facilitate quick, uniform disease monitoring, lower reliance on skilled labor, and facilitate well-informed decision-making for crop protection and yield optimization.

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