

Plant Disease Detection using Deep Learning

DISSERTATION

*Submitted in partial fulfillment of the
Requirements for the award of the degree*

of

Bachelor of Technology

in

Computer Science & Engineering

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Year 2022-2023**

Introduction

The health and productivity of agricultural crops play a crucial role in ensuring food security and sustainable development. However, plant diseases pose significant threats to crop yields and can lead to substantial economic losses for farmers worldwide. Timely and accurate detection of plant diseases is essential for effective disease management and minimizing crop damage. This project aims to contribute to the field of plant pathology by developing a “Plant Disease Detection” system that can efficiently identify diseases affecting various crops. By using Convolutional Neural Networks (CNNs) techniques, the system will analyze images of plant leaves or other affected parts, and accurately identify the presence of diseases or abnormalities. In this project, we are using dataset which contain 39 different classes of plant leaf and background images. The project will focus on the detection of common and economically significant plant diseases, such as powdery mildew, leaf spot, blight, and rust. By harnessing the power of machine learning techniques, this project seeks to provide an efficient and accurate solution to detect and diagnose plant diseases, leading to improved crop management, increased agricultural productivity, and ultimately, a more sustainable future for the farming community.

Objective

The main implication of this project to benefit farmers and the agricultural community as a whole, leading to improved crop management and sustainable agriculture.

1. Enable the system to provide real-time detection of plant diseases, allowing for immediate intervention and preventive measures.
2. Improve the efficiency of disease detection by reducing reliance on manual inspection, thus saving time and resources for farmers and agricultural experts.
3. Enable farmers to proactively manage crop health by providing early detection and identification of diseases, facilitating timely treatment and prevention strategies.
4. Minimize the impact of plant diseases on crop yield and quality by enabling early intervention, leading to increased productivity and reduced economic losses.

Scope

The scope of this project is as follows:

1. This can benefit farmers by providing early and accurate detection of diseases, enabling timely intervention and effective crop management practices.
2. It will provide valuable insights into disease patterns, epidemiology, and factors influencing disease spread, leading to a deeper understanding of plant diseases and their management.
3. We can integrate this technology with Remote sensing technologies to enable the monitoring of large agricultural areas, providing a broader perspective on disease occurrence, spread, and severity.

Software & Tech Stack

1. Python 3.0+
2. Pytorch
3. Jupyter Notebook
4. ReactJS
5. Fast API
6. Visual Studio Code
7. Dataset : Identification of Plant Leaf Diseases Using a 9-layer Deep Convolutional Neural Network

References

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