Chapter 8
Plant Disease Identification and Pesticides Suggestion Using Deep Learning

B. Swapna
https://orcid.org/0000-0002-7186-2842
Dr. MGR Educational and Research Institute, India

G. Chaitanya Gowd
Dr. MGR Educational and Research Institute, India

G. Chiranjeevi
Dr. MGR Educational and Research Institute, India

S. Deepa
Velammal Engineering College, India

D. Senthil Kumar
RMK College of Engineering and Technology, India

S. Anandhi
Dr. MGR Educational and Research Institute, India

ABSTRACT

Plant health management is vital for maximizing crop yields. However, traditional methods of identifying plant diseases and suggesting appropriate Pesticides are often labour-intensive, time-consuming, and prone to human error. It proposes an automated system that utilizes drones equipped with advanced imaging sensors and recommend suitable Pesticides based on real-time data. The drone captures high-resolution images of crops and analyses them using image processing techniques to identify symptoms of various plant diseases. By employing deep learning models trained on large datasets of diseased and healthy plant images, the system can classify the type and severity of the disease. Simultaneously, soil health data

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and environmental conditions are considered to suggest an optimal fertilizer plan for the affected area. This system provides several benefits, including faster disease detection, precise identification, reduced labor costs, and increased efficiency in Pesticides usage. It enables farmers to take timely and accurate actions, resulting in improved crop health and productivity

INTRODUCTION

Supporting food production and livelihoods faces challenges like pest attacks, plant diseases, and unsustainable fertilizer use, putting pressure on farmers. Early detection of plant diseases and appropriate fertilizer application are essential for improving yields and reducing environmental harm. Traditional visual inspections are slow and subjective, while indiscriminate fertilizer use harms crops and the environment. Modern technology, like drones and AI, can overcome these issues by automating disease identification and providing real-time data. This project proposes a drone-based system that uses image processing to detect plant diseases and recommend fertilizers, promoting sustainable farming.

The IoT and big data technologies to enhance crop production through smart farming. It proposes the IoT-SFF (Internet of Things Smart Farming Framework) with GIS (Geographic Information System) analysis to boost crop yields and optimize fertilizer use in inland smart agriculture. Drones can monitor irrigation and crop health while providing information on soil moisture through remote sensing. This data is crucial for understanding the crops grown in the area. Farmers can use this information to assess their soil's moisture levels and water it needs by comparing it to other soils.

LITERATURE SURVEY

Shahi et al. (2023) proposed the existing research covered by our review questions. First, the different UAV platforms, sensors, used in the studies we reviewed also examine how these platforms affect the performance of methods for estimating crop diseases and highlight the most effective vegetation indices and their success in detecting specific crop diseases. Additionally, the performance of advanced data-driven methods, and the various features used, including vegetation indices.

Yamamoto et al. (2023) done the changes in red crown rot (RCR) damage in fields over time, drones were used to capture multispectral images of the same field. Field investigations confirmed that RCR reduced soybean yields in both years. Using supervised classification of the images, researchers were able to visualize the spread of