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**Certificate of Examination**

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Title of the Project: **AGRIGROW: A TECHNIQUE FOR CROP DISEASE DETECTION AND RECOMMEDATION**

This is to certify that the project report entitled “**AGRIGROW: A TECHNIQUE FOR CROP DISEASE DETECTION AND RECOMMEDATION**” submitted by **Prerit Kumar Jain** Regd.no. **2102040011** of Computer Science and Engineering under the Department of Computer Science and Engineering, Veer Surendra Sai University of Technology, Odisha has been examined by us. We are satisfied with the volume, quality and correctness of the work.

External Examiners HOD, Dept. Of CSE

VSSUT, BURLA

**Department of Computer Science and Engineering**

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**Supervisor’s Certificate**

This is to certify that the Project work entitled “**AGRIGROW: A TECHNIQUE FOR CROP DISEASE DETECTION AND RECOMMEDATION**” is being submitted by **Prerit Kumar Jain** Regd.no. **2102040011**, to the Department of Computer Science and Engineering, Veer Surendra Sai University of Technology, Burla, in partial fulfilment of the requirement for the degree of Bachelor of Technology in Computer Science and Engineering during the academic year 2024-2025. It is an original report carried out by him under my supervision.

Dr. Santi Kumari Behera

(Supervisor)

**Declaration**

I hereby declare that the project titled “**AGRIGROW: A TECHNIQUE FOR CROP DISEASE DETECTION AND RECOMMEDATION**” submitted to Veer Surendra Sai University of Technology for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a result of original work carried out in this report. I also declare that the work has not been submitted, in whole or in part, to any other university as an exercise for a degree or any other qualification.

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**Abstract**

Global agriculture is confronted by the dual pressures of a burgeoning population demanding increased food production and the escalating impacts of climate change, which threaten crop yields and resource availability. To navigate these complexities, a shift towards precision agriculture, leveraging data-driven insights, is imperative. This major report details the design, development, and initial evaluation of an integrated digital decision support system aimed at empowering farmers and agronomists with actionable intelligence for enhanced crop management.

The first component is an **AI-powered crop disease detection module**. This module utilizes the capabilities of deep learning, specifically employing a pre-trained Convolutional Neural Network (CNN) based on the MobileNetV2 architecture. This lightweight yet powerful model is fine-tuned to analyse digital images of crop leaves and rapidly identify common diseases such as Cercospora Leaf Spot, Common Rust, and Northern Leaf Blight, or classify the plant as healthy. Early and accurate visual diagnosis through this automated system can significantly reduce reliance on manual inspection and facilitate timely intervention.

Secondly, the system incorporates an **intelligent crop recommendation engine**. This engine leverages machine learning models trained on datasets encompassing crucial soil parameters (Nitrogen, Phosphorus, Potassium levels, pH) and climatic factors (temperature, humidity, rainfall). By inputting site-specific data, users receive recommendations for the most suitable and potentially profitable crops, thereby optimizing land use and minimizing risks associated with planting ill-suited varieties.

The third component is a **tailored fertilizer recommendation system**. This system provides precise nutrient management advice by considering both the specific nutrient requirements of the selected or detected crop and the existing nutrient profile of the soil, as inputted by the user. The underlying machine learning model aims to suggest optimal quantities and types of fertilizers, promoting healthy plant growth while minimizing nutrient wastage, economic costs for the farmer, and potential environmental pollution from over-fertilization.

The entire system is implemented as an accessible web application. The backend services, including model inference and data processing logic, are developed using Python with the Flask microframework. The user interface, designed for intuitive interaction, is built using standard web technologies: HTML for structure, CSS for styling, and JavaScript for client-side dynamism. To ensure portability, ease of deployment, and environmental consistency, the application is containerized using Docker. Preliminary evaluations of each component indicate promising potential for enhancing agricultural decision-making, with the overarching goal of contributing towards increased crop yields, more efficient resource utilization, and the promotion of sustainable farming practices in a challenging global landscape.

**Keywords: Crop Disease Detection, Crop Recommendation, Fertilizer Recommendation, Deep Learning, MobileNetV2**

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**List of Abbreviations**

AI – Artificial Intelligence

ML – Machine Learning

DL – Deep Learning

CNN – Convolutional Neural Network

R-CNN – Region based Convolutional Neural Network

GDPR – General Data Protection Regulation

ANN – Artificial Neural Network

ReLU – Rectified Linear Unit

HTML – HyperText Markup Language

CSS – Cascading Style Sheet

JS – Java Script

JSON – JavaScript Object Notation

URL – Uniform Resource Locator