Dr Crop Android App

Final Year Project Report

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This project **Dr Crop Android App** is presented by **Muhammad Ibrahim, Zeeshan Ali and Wali Muhammad** under the supervision of their project advisor and approved by the project examination committee, and acknowledged by the Hamdard Institute of Engineering and Technology, in the fulfillment of the requirements for the Bachelor degree of BS Software Engineering

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Authors' Declaration

We declare that this project report was carried out in accordance with the rules and regulations of Hamdard University. The work is original except where indicated by special references in the text and no part of the report has been submitted for any other degree. The report has not been presented to any other University for examination.

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Plagiarism Undertaking

We, Muhammad Ibrahim, Zeeshan Ali and Wali Muhammad , solemnly declare that the work presented in the Final Year Project Report titled <**Dr.Crop Android Application**> has been carried out solely by ourselves with no significant help from any other person except few of those which are duly acknowledged. We confirm that no portion of our report has been plagiarized and any material used in the report from other sources is properly referenced.

Dated: 02-07-2025

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Definition of Terms, Acronyms, and Abbreviations

Table 2: Definition of Terms, Acronyms, and Abbreviations

Term	Description
Actor	An entity that interacts with the system, e.g., user, external systems.
CNN	Convolutional Neural Network, a type of deep learning algorithm used for image recognition.
API	Application Programming Interface, a set of routines and tools for building software applications.
GUI	Graphical User Interface, a system that allows users to interact with software through graphical elements.
Camera Input	Input method where visual data is captured using a camera for processing.

Abstract

Agriculture plays a pivotal role in sustaining global food security, with cotton and wheat being key staple crops. However, the threat of plant diseases looms large, jeopardizing crop yields and food production. In response to this challenge, this thesis presents an innovative Android application leveraging the power of machine learning for the early detection and identification of diseases in cotton and wheat plants. The primary objective of this research is to develop a user-friendly, accessible, and accurate tool that empowers farmers and agricultural practitioners to diagnose plant diseases swiftly and accurately. The app harnesses the capabilities of deep learning algorithms and computer vision techniques to analyze images of plant leaves, stems, and other relevant parts. Through an extensive review of existing literature and the creation of a robust dataset, our research explores and implements state-of-the-art machine learning models to classify and detect diseases.

The results of this study showcase the effectiveness of our Android app, achieving high accuracy rates in disease identification across diverse environmental conditions and stages of plant growth. These findings not only underscore the app's practical utility but also lay the foundation for more efficient and sustainable agricultural practices. This research contributes to the field by bridging the gap between technology and agriculture, presenting an accessible solution for timely disease management, and ultimately enhancing crop productivity. The implications of this work extend to improved food security and sustainable agricultural practices on a global scale. Furthermore, this study identifies avenues for future research, including the expansion of the app's capabilities and the exploration of additional crops and diseases.

In conclusion, the Android app presented in this thesis represents a significant step towards mitigating the impact of plant diseases on cotton and wheat crops. It demonstrates the potential of machine learning in revolutionizing agriculture, equipping farmers with a valuable tool to protect their livelihoods and contribute to a more resilient and food-secure future.

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CHAPTER 1

INTRODUCTION

1.1 Motivation

Agriculture is the backbone of many economies, and crop health directly affects food security and farmer livelihood. Diseases in wheat crops are often diagnosed late, leading to huge losses in yield. By integrating machine learning with mobile technology, we can empower farmers with a practical, real-time, and offline solution to identify diseases early, take preventive measures, and improve agricultural outcomes.

1.2 Problem Statement

Farmers often struggle to identify wheat diseases in a timely manner, leading to reduced crop yield and increased pesticide misuse. There is a need for a mobile-based, automated detection system that works offline and helps farmers detect diseases accurately through image processing.

1.3 Goals and Objective

- Develop a prototype mobile app for wheat disease detection.
- Utilize a CNN model for accurate image classification.
- Ensure offline compatibility via TensorFlow Lite.
- Design a user-friendly GUI for non-technical users.
- Lay groundwork for adding other crops like cotton in the future.

1.4 Project Scope

The current scope is limited to wheat disease detection using a trained CNN model. It supports image input via camera or gallery, and provides instant predictions offline. Future versions may include other crops such as cotton.

CHAPTER 2

RELEVANT BACKGROUND & DEFINITIONS

Background

In agriculture, early detection of plant diseases is critical. Manual inspection is time-consuming and error-prone. Recent advances in AI, particularly CNNs, have made it possible to automate disease identification from images with high accuracy.

Definitions

• **CNN (Convolutional Neural Network):** A deep learning model used for image classification.

• **TensorFlow Lite:** A lightweight version of TensorFlow optimized for mobile devices.

• **GUI:** Graphical interface for user interaction.

• **Image Preprocessing:** Techniques used to normalize and resize images before model input.

Key Features

• Offline wheat disease prediction using mobile camera.

• Simple GUI tailored for farmers.

• Use of lightweight CNN with TFLite.

• Expandable to other crops.

CHAPTER 3

LITERATURE REVIEW & RELATED WORK

Literature Review

Several studies have explored the application of CNNs in plant disease detection. Research shows that CNNs can achieve accuracy above 90% when trained with sufficient image data. Papers such as 'PlantVillage' have demonstrated the effectiveness of deep learning models in agricultural settings.

Related Work

Many mobile applications exist, such as Plantix and Leaf Doctor, but they require internet access and are not crop-specific. Our project differentiates by providing an offline, wheat-specific prototype for disease detection.

Gap Analysis

• Most existing systems are online-only.

• General-purpose apps lack crop-specific optimization.

• No local language or farmer-friendly offline GUI in many tools.

• Lack of lightweight inference on mobile devices.

This project addresses these issues through a dedicated wheat disease detection prototype.

References

• TensorFlow Lite Documentation

• CNN-based Plant Disease Detection Research Papers

• Kaggle Wheat Disease Dataset

• Android App Development Resources