RIPHAH INTERNATIONAL UNIVERSITY

Faculty of Computing
FINAL YEAR PROJECT INITIAL PROPOSAL

Wheat Rust Guard

Project Team

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Project Proposal

Project Title: Wheat Rust Guard

Project Overview:

The yellow (stripe) rust and brown (leaf) rust are two of the most devastating diseases affecting wheat crops worldwide. In Pakistan, 68 out of 228 fields reported leaf rust, which represents 30% of the total. The majority of fields in Tando Allahyar, Sindh were affected by leaf rust, whereas Chakwal, Punjab was mostly impacted by yellow rust. They significantly reduce crop yields and quality, affecting global food security. Early detection and correct diagnosis are critical for effective disease management and control. The project aims to develop a mobile application that can detect yellow and brown rust diseases in wheat crops using machine learning techniques.

Objectives:

The major goal of this project is to create a machine learning model capable of properly identifying and classifying wheat yellow and brown rust illnesses using field pictures. The system will attempt to:

- High accuracy in detecting and distinguishing between yellow and brown rust and healthy.
- Provide real-time or near-real-time disease detection to help farmers.
- To create a user-friendly mobile application that enables farmers and agricultural specialists diagnose yellow and brown rust diseases in wheat crops.

Scope:

Development of Machine Learning Model:

- **Data Collection:** Acquire a comprehensive dataset of images of wheat depicting variable yellow and brown rust intensities.
- **Model Training:** Building and training a machine learning model on the detection of yellow and brown rust diseases.

Application Development:

- **Platform:** Development of an android application for disease diagnosis that will be very user-friendly.

- **Integration:** Integrate machine learning model into the application for identifying yellow and brown rust diseases through images in real time.

Field Testing: Perform the validation of an application with real users in the field and enhance it based on the feedback provided.

Contribution to Society:

Giving farmers access to timely information enables them to apply fungicides more effectively and selectively, cutting down on needless chemical applications and encouraging sustainable farming methods. Stable wheat supply and production can be achieved by preventing large-scale crop losses by early and accurate detection of wheat rust infections. By stopping the spread of illness and lowering crop yield losses, early detection helps to minimize the financial burden on farmers.

Expected Outcomes:

A functional app that is easy to use and effectively detects yellow and brown rust diseases in wheat crops. Development of machine learning model that correctly differentiates healthy, yellow and brown rust.

Limitations:

Data Quality and Amount: The accuracy of the machine learning model depends on the quality and amount of training data. Not enough data or biased information can hurt how well the model works.

Image Variability: Changes in image quality, lighting, and angles can affect how well the model spots diseases in workflows.

Model generalization: The model may not be able to properly classify new, unseen data if such data haven't already been presented in a wide variety of datasets in had been trained on.

Device Limitations: The app's responses and performance will also depend on the user's camera and the processing power of the device.

User Adoption: The user problems can also involve farmers or agricultural experts not willing to adopt and incorporate new technology into their practices.