**National University of Computer & Emerging Sciences**

**Karachi Campus**



Potato Disease Classification

**Deep Learning for Perception**

**Section: A**

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**Project Proposal**

**Introduction**

The Potato Disease Classification project aims to develop a cutting-edge system utilizing Artificial Intelligence (AI) techniques to accurately identify and classify diseases affecting potato crops. By integrating advanced neural networks and image processing algorithms, the system will empower farmers with a powerful tool for early disease detection and management, ultimately enhancing crop productivity and sustainability.

**Existing System**

Currently, farmers rely on manual inspection and traditional methods for disease diagnosis, which can be time-consuming and prone to errors. While some automated systems exist, they may lack the accuracy and efficiency required for practical applications in the field. Our project seeks to overcome these limitations by introducing a state-of-the-art AI-based solution for potato disease classification.

**Problem Statement**

Existing systems may suffer from limited accuracy, scalability issues, and a lack of real-time capabilities, hindering their widespread adoption. Additionally, there may be a need for advanced features such as disease localization and optimization for deployment on devices with limited resources. Our goal is to address these challenges by developing a robust and efficient disease classification system tailored to the needs of farmers.

**Proposed Solution**

We propose developing a deep learning model based on Convolutional Neural Networks (CNNs) to accurately classify potato crop diseases from images. The model will be trained on a diverse dataset of potato crop images, encompassing various disease types and severity levels. Additionally, we will integrate TensorFlow Serving and FastAPI for seamless deployment of model, enabling real-time inference and scalability. To optimize the model for deployment on resource-constrained devices, we will explore techniques such as quantization and TensorFlow Lite.

**Algorithm**

The core algorithm employed in our solution is the Convolutional Neural Network (CNN), a deep learning architecture widely used for image classification tasks. CNNs have demonstrated remarkable performance in various computer vision applications, including disease diagnosis, by effectively extracting features from input images.

**Salient Features**

* Accurate disease classification using state-of-the-art AI techniques.
* Real-time inference and deployment capabilities for timely disease detection.
* User-friendly interface for easy interaction and interpretation of results.

**Tools & Technologies**

* Programming Language: Python
* Frameworks: TensorFlow, FastAPI, ReactJS/React Native
* Operating System: Windows (Platform independent for deployment)

**Results**

* High accuracy in disease classification, validated through comprehensive testing and evaluation.
* Real-time inference capabilities demonstrated via a user-friendly frontend interface.
* Potential improvements in crop yield and reduced losses due to early disease detection with Optimized models.

**Conclusion**

The Potato Disease Classification project represents a significant step towards leveraging AI for enhancing agricultural practices and crop management. By harnessing the power of deep learning and advanced image processing techniques, we aim to provide farmers with a reliable and efficient tool for combating potato crop diseases. While the results may vary based on external factors, we remain committed to delivering a robust and impactful solution tailored to the needs of the agricultural community.