Department of Information Technology
School of Studies in Engineering and Technology

B. Tech- VIII Semester (Session 2022-23)

Project Synopsis

Name of Project Members (With Roll Number):

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Project Title: **Crop Disease Detection System**

Abstract of Project

Crop Disease Detection System is a tool to help farmers quickly and accurately identify plant diseases in their crops. Using a combination of image recognition and machine learning algorithms, the system analysis images of plants and plant leaves and compares them to a database of unknown disease symptoms. The system then provides a disease name and after proper diagnosis suggests appropriate treatment options. With the help of this system, farmers can detect and treat diseases early on, preventing crop loss and increasing crop yields. This system can be easily integrated into a farm's operations and can be accessed through user-friendly interface.

Introduction

The agriculturist in provincial regions may think that it's hard to differentiate the malady which may be available in their harvests. It's not moderate for them to go to agribusiness office and discover what the infection may be. Our principle objective is to distinguish the illness introduce in a plant by watching its morphology by picture handling and machine learning.

Pests and Diseases results in the destruction of crops or part of the plant resulting in decreased food production leading to food insecurity. In recent times, server based and mobile based approach for disease identification has been employed for disease identification. Several factors of these

technologies being high resolution camera, high performance processing and extensive built in accessories are the added advantages resulting in automatic disease recognition.
Modern approaches such as machine learning and deep learning algorithm has been employed to increase the recognition rate and the accuracy of the results.

Literature Review

These are some related works:

1. S. S. Sannakki and V. S. Rajpurohit, proposed a "Classification of Pomegranate Diseases Based on Back Propagation Neural Network" which mainly works on the method of Segment the defected area and color and texture are used as the features. Here they used neural network classifier for the classification. The main advantage is it Converts to L*a*b to extract chromaticity layers of the image and Categorisation is found to be 97.30% accurate. The main disadvantage is that it is used only for the limited crops.
2. P. R. Rothe and R. V. Kshirsagar introduced a" Cotton Leaf Disease Identification using Pattern Recognition Techniques" which Uses snake segmentation, here Hu's moments are used as distinctive attribute. Active contour model used to limit the vitality inside the infection spot, BPNN classifier tackles the numerous class problems. The average classification is found to be 85.52%.
3. Aakanksha Rastogi, Ritika Arora and Shanu Sharma," Leaf Disease Detection and Grading using Computer Vision Technology &Fuzzy Logic". K-means clustering used to segment the defected area; GLCM is used for the extraction of texture features, Fuzzy logic is used for disease grading. They used artificial neural network (ANN) as a classifier which mainly helps to check the severity of the diseased leaf.
4. Godliver Owomugisha, John A. Quinn, Ernest Mwebaze and James Lwasa, proposed" Automated Vision-Based Diagnosis of Banana Bacterial Wilt Disease and Black Sigatoka Disease "Color histograms are extracted and transformed from RGB to HSV, RGB to L*a*b.Peak components are used to create max tree, five shape attributes are used and area under the curve analysis is used for classification. They used nearest neighbors, Decision tree, random forest, extremely randomized tree, Naïve bayes and SV classifier. In seven classifiers extremely, randomized trees yield a very high score, provide real time information provide flexibility to the application.

Objectives

The objective of this project is to develop a Crop Disease Detection system that uses image processing and machine learning techniques to accurately identify and diagnose diseases in crops. The system will analyse images of crop leaves and use algorithms to detect the type of disease and suggest a solution. The goal is to provide farmers with a quick and efficient tool for identifying and addressing crop diseases, which can help to improve crop yields and reduce spreading of the disease.

Proposed Methodology

The **prototyping model** is a systems development method in which prototype is build, tested, and then reworked as necessary until an acceptance outcome is achieved from which the complete system or product can be developed. We will follow the following methodology: -

- Requirement Analysis
- Feasibility Study
- Create a prototype
- Customer review and approval
- Design
- Coding
- Testing
- Installation and Maintenance

Expected Outcomes

First for any image we need to convert RGB image into gray scale image. This is done just because Hu moments shape descriptor and Haralick features can be calculated over single channel only. Therefore, it is necessary to convert RGB to gray scale before computing Hu moments and Haralick features. To calculate histogram the image first must be converted to HSV (hue, saturation and value), so we are converting RGB image to an HSV image.

Feasibility Study

The goal of the feasibility study is to get a feel of the problem's extent as well as to solve it. The goal is to find the project that will benefit the organization the greatest.

The feasibility study has three components:

- *Technical Feasibility:* A technical feasibility study is conducted to examine whether a project is possible in terms of software, hardware, manpower, and skills to complete. The system is platform neutral because it is written in Python. As a result, users of the system can run on any platform and have average processing capabilities. Because the technology is cutting-edge, the system is also technically possible.
- *Financial feasibility:* Financial feasibility refers to whether the predicted gain is equal to or greater than the estimated expenditures. It is also known as a cost-benefit analysis.
- *Operating Feasibility:* The operational feasibility of a given system is a measure of how successfully it handles user problems. Operational feasibility is determined by the project's human resources and entails predicting whether or not the system will be used when it is designed and installed

Hardware/ Software Requirement:

Software: VS code, GitHub, Kaggle, Figma, TensorFlow, CNN (Convolutional Neural Network).
Frontend Technology: HTML, CSS, JavaScript, ReactJS.
Backend Technology: Python, Deep Learning, Machine Learning, Natural Language Processing (NLP), Firebase.

Application of Project:

1. Early detection and identification of crop diseases.
2. Monitoring of crop health.
3. Optimization of crop health by detecting and preventing crop diseases.
4. By identifying the presence of pests, the system can help farmers to implement appropriate pest management strategies, reducing the need for harmful pesticides.

Future work (Scope of work):

1. Integration with precision farming technologies to enable targeted treatment and management of disease outbreaks.
2. Development of machine learning and AI-based algorithms for accurate and efficient disease detection.
3. Use of remote sensing and imagery analysis for early detection and monitoring of disease outbreaks.
4. Development of the system to cover a wider range of crops and diseases.
5. Development of an expert system to assist farmers and agronomists in disease diagnosis and management.
6. In collaboration with research institutions and government organisations for data sharing and validation of results.

Name of the Proposed Guides:

1. Dr. Santosh Soni **Signature …….**

2. Dr. Agnivesh Pandey **Signature…….**

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