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To design and analysis of plant disease diagnostic using machine learning

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Abstract:

In pharmaceutical research, leaf disease detection is necessary and an important topic for research because it has advantages in monitoring crops in the form and thus it automatically detects symptoms of disease by image processing by k-means clustering algorithm. The term disease means the type of damage to the plants. This Paper provides the best method for detection of plant diseases using image processing and alerting about the disease caused by sending email, SMS and displaying the name of the disease on the monitor display of the owner of the system.

To upgrade agricultural products, automatic detection of disease symptoms is useful. The design and analysis of these technologies is totally automatic and it will significantly help in the machine learning application. It will reduce the cost required for the pesticides and other products. This will lead to an increase in productivity of the farming.

Keywords:

CNN, KNN, ML, Disease, yield.

1. Introduction:

Agriculture is the backbone of India and about 70% of the population depends on agriculture. Farmers have large range of diversity for selecting various suitable crops and finding the suitable pesticides for plant. Disease on plant leads to the significant reduction in both the quality and quantity of agricultural product. The studies of plant disease refer to the studies of visually observable patterns on the plants. Monitoring of health and disease on plant plays an important role in successful cultivation of crops in the farm. In early days the monitoring and analysis of plant diseases were done manually by an expert person in the field. This requires tremendous amount of work and also requires excessive processing time. Our system uses ML Model to detect healthy and unhealthy leaves by training images and finding accurate results.

2. Methodology:

2.1. ML Model:

Machine learning trained and tested models which detect crop leaf disease are stored on operating device. You can check if a leaf is diseased or not on a locally hosted website by uploading an image on it. 2.2 Operating Device The operating device serves as the central processing unit for the system. It stores the machine learning (ML) model, which was trained to detect plant leaf diseases.

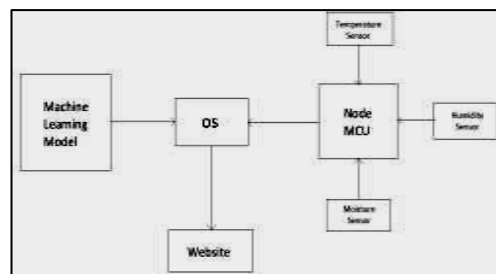


Figure. 1: Block Diagram of crop disease detection

The operating device can be a personal computer (PC) or a similar device with sufficient computational power. It runs the necessary software, such as a Python IDE, to handle ML model inference and data processing.

3. Modeling and Analysis:

This fig.2 shows how different components work together to make the whole system function properly.

A Convolutional Neural Network (CNN) is a deep learning algorithm primarily used for image recognition and computer vision tasks. It consists of several interconnected layers that learn to extract meaningful features from input images.

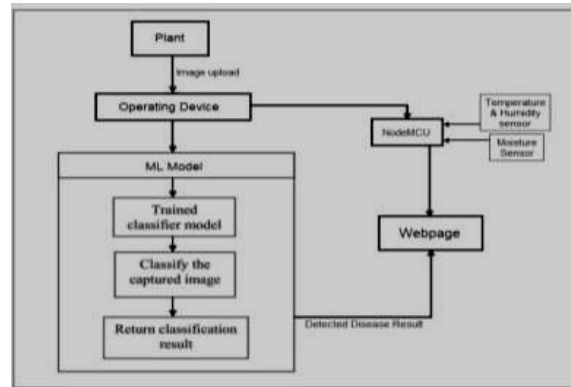


Figure. 2: System architecture of crop disease detection

4. Results and Discussion:

In this research, we developed a crop disease detection system to identify common diseases in different types of plantlike potato, wheat, corn etc.

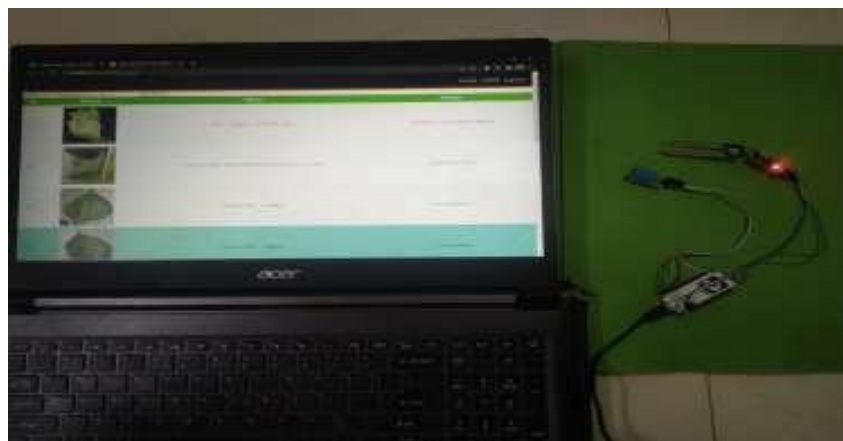


Figure. 4: Crop disease detection setup

5. Conclusion:

In conclusion, the crop leaf disease detection project utilizes advanced technologies and machine learning algorithms to accurately identify and classify diseases affecting crop leaves. By leveraging computer vision techniques and a comprehensive dataset of leaf images, the project aims to improve disease detection and provide timely interventions for farmers. The implementation of this project has the potential to significantly enhance crop management practices, reduce yield losses, and ultimately contribute to food security and sustainable agriculture.

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