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Paddy Leaf Disease Detection and Pesticides Recommendation

Mrs. G. Jeyasri[1], Praveena. T[2], Rashmika. S[3], Sakthipriya. S[4]
Assistant Professor, Information Technology, Anjalai Ammal Mahalingam Engineering College, Thiruvarur, India [1]
B.TECH, Information Technology, Anjalai Ammal Mahalingam Engineering College, Thiruvarur, India[2,3,4]

Abstract: *This study proposes a novel approach for detecting diseases in paddy leaves using machine learning algorithms. The proposed system utilizes an image processing technique to extract features from the leaf images, and then trains a classifier model to detect the diseases.Additionally, the system recommends suitable pesticides based on the detected diseases. The proposed system achieves high accuracy in disease detection and pesticide recommendation, indicating its potential for use in precision agriculture.*

Keywords: Image processing, Classifier model, Detect disease, Pesticides Recommendation

I. INTRODUCTION

Machine learning has emerged as a powerful tool in various fields, including agriculture, for detecting and predicting disease outbreaks. In recent years, there has been growing interest in developing machine learning-based approaches for the detection of paddy leaf diseases. These approaches typically involve the use of image processing techniques to extract features from leaf images, followed by training a classifier model to identify the disease.Moreover, after disease detection, it is equally important to recommend appropriate pesticides for treating the disease. Pesticides are often used in agriculture to control pests and diseases, but the selection of suitable pesticides is crucial to ensure effective treatment and prevent the development of pesticide resistance.Therefore, this project aims to develop an automated system for the detection of paddy leaf diseases and the recommendation of suitable pesticides using machine learning algorithms. The proposed system will use image processing techniques to extract features from leaf images, followed by training a classifier model to identify the disease. The system will also recommend appropriate pesticides based on the detected disease, enabling timely and effective treatment. The proposed system has the potential to improve the efficiency and accuracy of disease detection and treatment in paddy fields, contributing to increased yield and improved food security.

II. BENEFITS OF MACHINE LEARNING

Machine learning has numerous benefits, including:

1. Efficiency: Machine learning algorithms can analyze vast amounts of data much more quickly and accurately than humans, making it an efficient tool for automating tasks and processes.
2. Accuracy: Machine learning algorithms can improve accuracy by identifying patterns in data that humans might miss. This can help to reduce errors and improve decision-making.
3. Personalization: Machine learning can be used to create personalized experiences for users, such as personalized recommendations or customized products.
4. Scalability: Machine learning algorithms can be easily scaled to handle large amounts of data, making it an ideal tool for businesses that need to process and analyze vast amounts of data.
5. Cost-effectiveness: Machine learning can help reduce costs by automating tasks that would otherwise require human intervention.
6. Predictive insights: Machine learning algorithms can be used to predict future trends and behaviors based on historical data, allowing businesses to make informed decisions.

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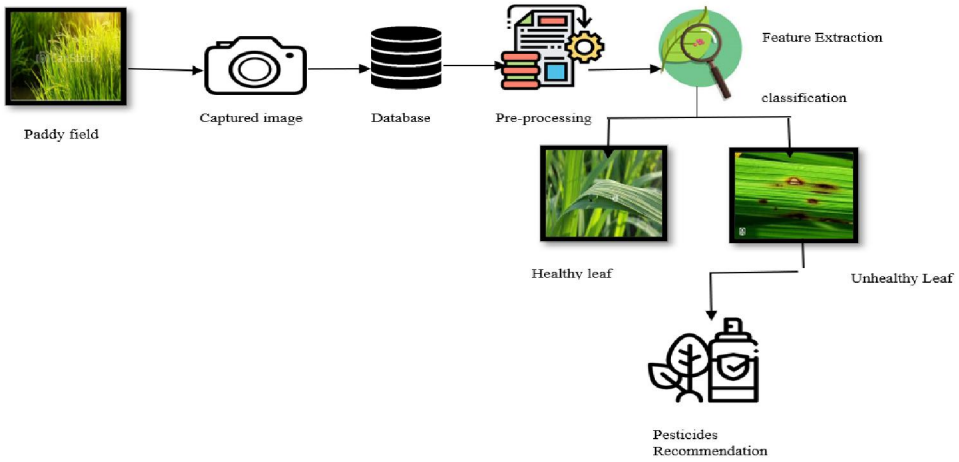
III. SYSTEM ARCHITECTURE



IV. LIST OF MODULES

Image Processing

Image preprocessing is an essential step in paddy leaf disease detection, which involves preparing the images for analysis. This step includes a series of techniques to enhance the image quality, such as image filtering, normalization, and image segmentation. These techniques aim to remove noise and artifacts from the images and improve their contrast and resolution.

Feature Extraction

The process of identifying the relevant characteristics of the paddy leaf disease images that can be used to distinguish between healthy and diseased leaves. This step involves several techniques such as texture analysis, coloranalysis, and shape analysis. The extracted features are then used as input for the disease classification step.

Disease Classification

Disease classification is the process of assigning a disease label to a paddy leaf image based on the extracted features. This step involves building a classification model that can accurately distinguish between healthy leaves and leaves infected with one or more diseases.

Performance Evaluation

Performance evaluation is the process of assessing the accuracy of the disease classification method. This step is crucial to determine the effectiveness of the disease detection model. Various metrics can be used in performance evaluation, such as accuracy, precision.

Pesticides Recommendation

The final step in paddy leaf disease detection, involves recommending the most suitable pesticide based on the classification result. To achieve this, the classification result is matched with a database containing information about the effectiveness of different pesticides against the identified diseases. The recommended pesticide should only be used after considering several factors such as environmental impact, cost, and safety.

V. CONCLUSION

In conclusion, paddy leaf disease detection and pesticides recommendation using machine learning is a promising approach to improve crop yield and reduce the use of harmful pesticides. Machine learning techniques can be used to

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accurately identify and classify different types of diseases affecting paddy leaves, and recommend suitable pesticides to control the spread of the disease. This can significantly reduce the cost of crop management and help farmers make informed decisions about crop protection. Moreover, this approach has the potential to be applied to other crops and plants, providing a scalable solution to improve agricultural productivity and sustainability. However, there is still a need for further research to improve the accuracy and robustness of machine learning algorithms for crop disease detection and pesticide recommendation. Overall, this field holds great potential to revolutionize the way we manage crop health and protect our food supply.

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BIOGRAPHY

- Mrs.G.Jeyasri, M.E, Assistant Professor, Anjalai Ammal Mahalingam Engineering College, Thiruvarur.
- Praveena.T,B.Tech/ Information Technology, Anjalai Ammal Mahalingam Engineering College,Thiruvarur.
- Rashmika.S, B.Tech/ Information Technology, Anjalai Ammal Mahalingam Engineering College,Thiruvarur.
- Sakthipriya.S, B.Tech/ Information Technology, Anjalai Ammal Mahalingam Engineering College,Thiruvarur.