

PROJECT REPORT ON

Disease Detection in Rice Leaves

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CERTIFICATE

This is to certify that the project report entitled “ Disease Detection in Rice Leaves ” has been prepared by the following students of the Department of Computer Science & Engineering in partial fulfillment for the degree of Bachelor of Technology(B.Tech.) in Computer Science & Engineering which is affiliated to Maulana Abul Kalam Azad University of Technology, West Bengal (Formerly known as West Bengal University of Technology) in the academic year 2021-2022

It is to be understood that by this approval, the undersigned does not necessarily endorse or approve any statement made, opinion expressed or conclusion drawn thereof, but approves the report only for the purpose for which it has been submitted.

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ABSTRACT

In India the economic, political and social stability rely directly yet as indirectly on the annual production of rice. 37% of the rice illness is because of disease as per the review and Analysis of IRRI (International Rice Research Institute), during this consequence, the farmer watches out of crop on-time with completely opposite treatments against disease. The diseases detection and identification in massive field through automatic technique is the helpful because it reduces the work of peoples or farmers, conjointly time and value for observation and analysis of un-wellness symptoms. This report contains approach for identification detection and of rice leaf diseases by multiclass SVM. The diseases classification is done by SVM classifier and therefore the detection accuracy is improved by optimizing the info exploitation. In this proposed system, we are using image processing techniques to classify diseases & quickly diagnosis can be carried out as per disease. This approach will enhance productivity of crops. It includes several steps viz. image acquisition, image preprocessing, segmentation, features extraction.

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1. Introduction

India is that the country wherever the most supply of financial gain is obtaining from agriculture. Farmers grow a spread of crops supported their demand. Since the plants suffer from the illness, the assembly of crop decreases thanks to infections caused by many styles of diseases on its leaf, fruit, and stem. Leaf diseases square measure principally caused by microorganism, fungi, virus etc. Diseases square measure typically tough to manage. Designation of the illness ought to be done accurately and correct actions ought to be taken at the acceptable time. Image process is that the trending technique in classification detection and of plant's leaves disease. Detection of these diseases requires people to expert in addition to a set of equipment and it is expensive in terms of time and money Therefore, computer based system which help to detection the diseases of plants is very helpful for farmers As well as to specialists in the field of plant protection. The proposed plant disease detection system consists of two phases, Image Processing and SVM Classifier in a series of Image processing that include pre-processing techniques such cropping, resizing, fuzzy histogram equalization, feature extraction where set of color and texture feature and used to great the knowledge base that used as training data for support vector machine classifier. We use the classifier trained using the knowledge base for detection and diagnosis of plant leaf diseases. To create the knowledge base we used sample images and divided it by 80% training and 20% testing. Lastly, classification technique is applied in detection the sort of plant disease.

2. Problem Definition

In this project, we have focused on the identification of three rice leaf disease detection (bacterial blight, brown spot and leaf smut).

These three different diseases have their characteristic patterns and shapes. The features of the diseases are described below.

- **Leaf smut:** small black linear lesions on leaf blades, leaf tips may turn grey and dry.
- **Bacterial blight:** elongated lesions near the leaf tips and margins, and turns white to yellow and then grey due to fungal attack.
- **Brown spot:** dark brown colored and round to oval shaped lesions on rice leaves.

Monitoring the diseases, their occurrences and frequencies are very important for early detection of the affected plants, their timely treatment, and most importantly, for planning future strategies to prevent the diseases to minimize the losses. Traditionally, crop disease management in India is carried out by manual detection of any irregularity in plants, then classification of that irregularity as disease by experts and finally recommending appropriate treatment. This series of tasks becomes very challenging while considering large farms. It causes additional time and labour as well.

On the contrary, taking the images of the affected area of the plants and testing with a pre-trained model gives a way better detection and classification of diseases.

This project proposes such an approach that makes disease prediction and classification of the three mentioned rice diseases. The novelty of the project lies in the detection of rice leaf diseases using machine learning approaches with high accuracy.

3. Architecture & Detailed Working

3.1 System Architecture:

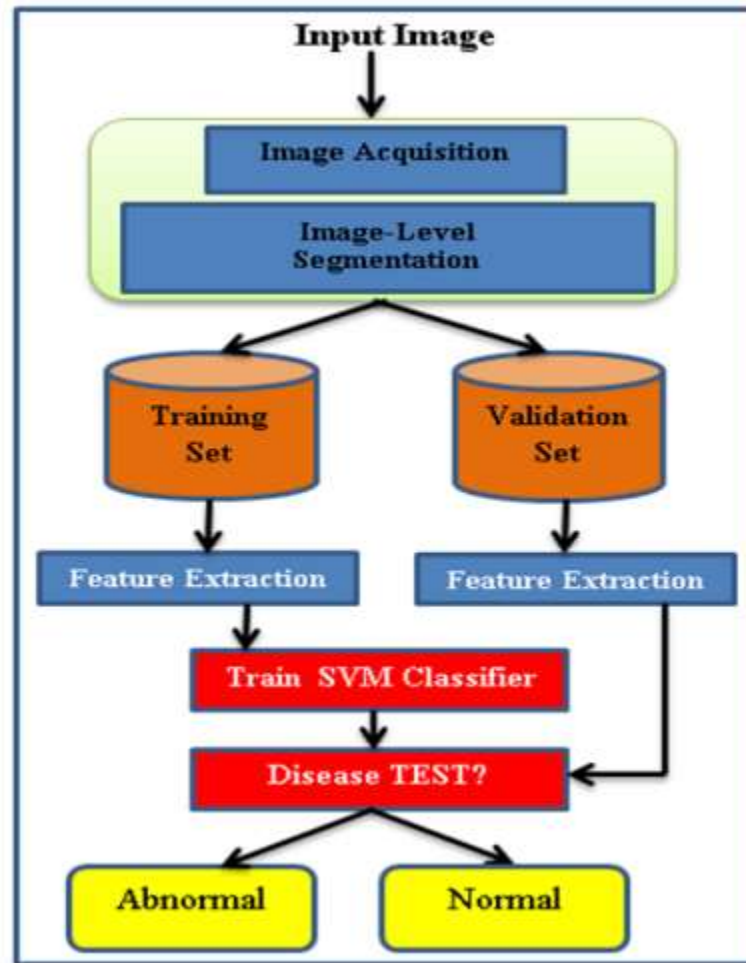


Fig-1: System Overview

The system model includes two parties: the user and the system server. In this module, images of the plant leaf are taken from the system. After Image taking Image Processing is done in first phase as Pre-processing, Image Segmentation, feature efficient communication, the server system is to seek and utilize Extraction, classification and treatment the image. Here, user uploads image then this analysis image and

processing image is done through Image Processing. This proposed system that is plant disease detection system consists of two phases: in the first phase we establish the knowledge base and this by introducing a set of training samples in a series of processing that include first pre-processing of the image techniques such cropping, resizing, fuzzy histogram equalization and next is the extract a set of color and texture feature and used to great the knowledge base that used as training data for SVM (support vector machine) classifier. In the second phase of the work we use the SVM classifier that is trained using the knowledge base for detection and diagnosis of plant leaf diseases. To create the knowledge base we used sample images and divided it by 80% training and 20% testing. We have used each yield three diseases in addition to the proper state of each crop of leaf the accuracy of disease detection is done efficiently. Then system server is check the User upload image is disease oriented or not disease and its classification using SVM that shows the disease with name.

3.2 Image Processing:

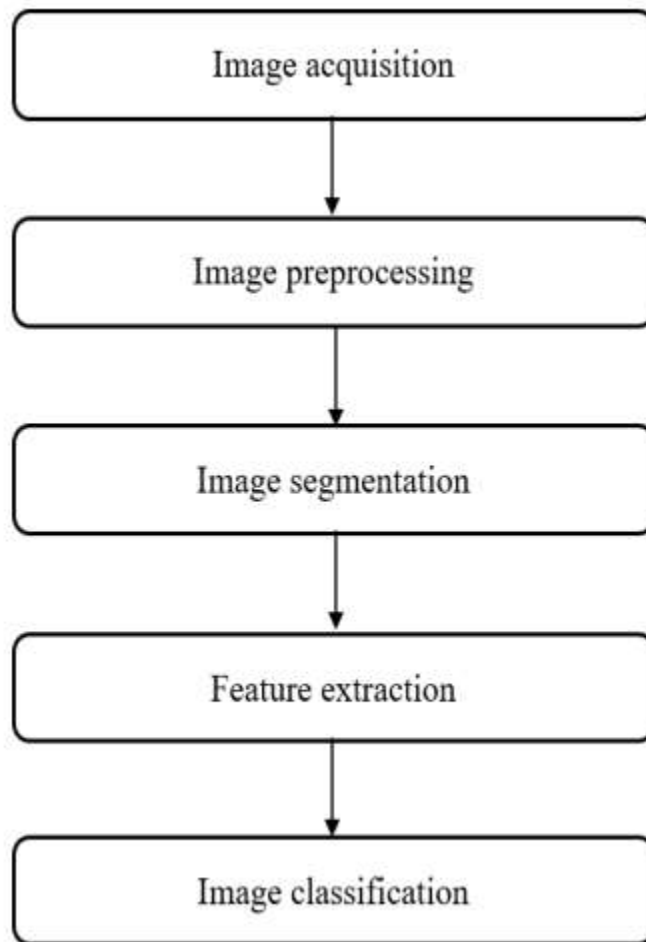


Fig 2: Image Processing

- **Image Acquisition:** Image acquisition stage is the first stage of any vision system. Sample images are obtained or collected of the leaves using different mobile cameras with different resolutions, which are used to train the system for processing. These sample images are stored in standard format. All sample images are in Red, Green, and Blue (RGB) color form.
- **Pre-processing:** An input image has some unwanted noise as well as redundancy present in it. So pre-processing uses

technique for noise removal, contrast enhancement and illumination equalization. To remove the background noise as well as to suppress the undesired distortion, this is present in it. These types of variations are occurred due to many reasons such as camera settings, variation in light etc.

- **Segmentation:** The main goal of the segmentation is to be extract meaningful and useful information from the image with respect to certain feature. In present work histogram based method and thresholding is used for segmenting an image as per category. In this stage, a histogram is computed from all of the pixels in the image, Color or intensity can be used by measure. To determine the most frequent color for pixel location the histogram can also be applied on an every pixel basis where the resulting information is used.
- **Feature extraction:** Extracting the relevant information from the input image is called process of feature extraction. Also transforming the input data into the set of features data is called feature extraction. There are various types of attributes of leaves images such as color, texture, shape and edges etc. Leaves in context color and texture features are extracted to get good result and accuracy.
- **Classification:** The classification technique is used for both training and testing process. This is the last stage of the system. The features extracted from training leaves are compared with features extracted from testing leaves. Then the images are classified based on the matched features. So the Support Vector Machine technique is used for classification of leaf disease.

3.3 Multiclass SVM (Support Vector Machine):

In machine learning concept, SVM (support-vector machines) is supervised learning method with associated learning algorithms that will help to analyze data used for clustering, classification and regression analysis. In which, given a set of training data set to SVM, each marked as belonging to one or the other of two categories, SVM training algorithm builds a model that assigns new data examples to one category or the other called clustering by category, making it a non-probabilistic binary. An SVM model is a representation of the examples as points in space mapped so that the examples of the separate categories are divided by a clear or more gaps that is as wide as possible. A support vector machine is a type of model used to analyze the data and discover patterns of analysis in regression classification. When your data has exactly two classes Support vector machine (SVM) is used. SVM performs well on data sets that have many attributes. SVM Classifies data points into two classes as per their same attributes, color or size and shape of the object or data points. In this developed system we use SVM for segment leaf image to identify affected region of the from non-affected region of the leaf.

3.4 Result:



Fig 3: Leaf Image Upload

Above figure shows display after running the project in which we have to upload an image of the plant leaf to identify disease or not in leaf by clicking on Upload image button from our system. After uploading image it shows the leaf image contains diseases or not in output. Initially it processes the image by Images processing is done where pre-process, resizing, color extracting is done. After processing image it goes to the SVM. SVM segment this image as per same features, color and shape of the image region affected. Enhance contrast box shows the clearer image than real image. In which we can see that the affected region area of leaf image. Therefore it shows the predicted disease by clicking the predict disease button from our system.

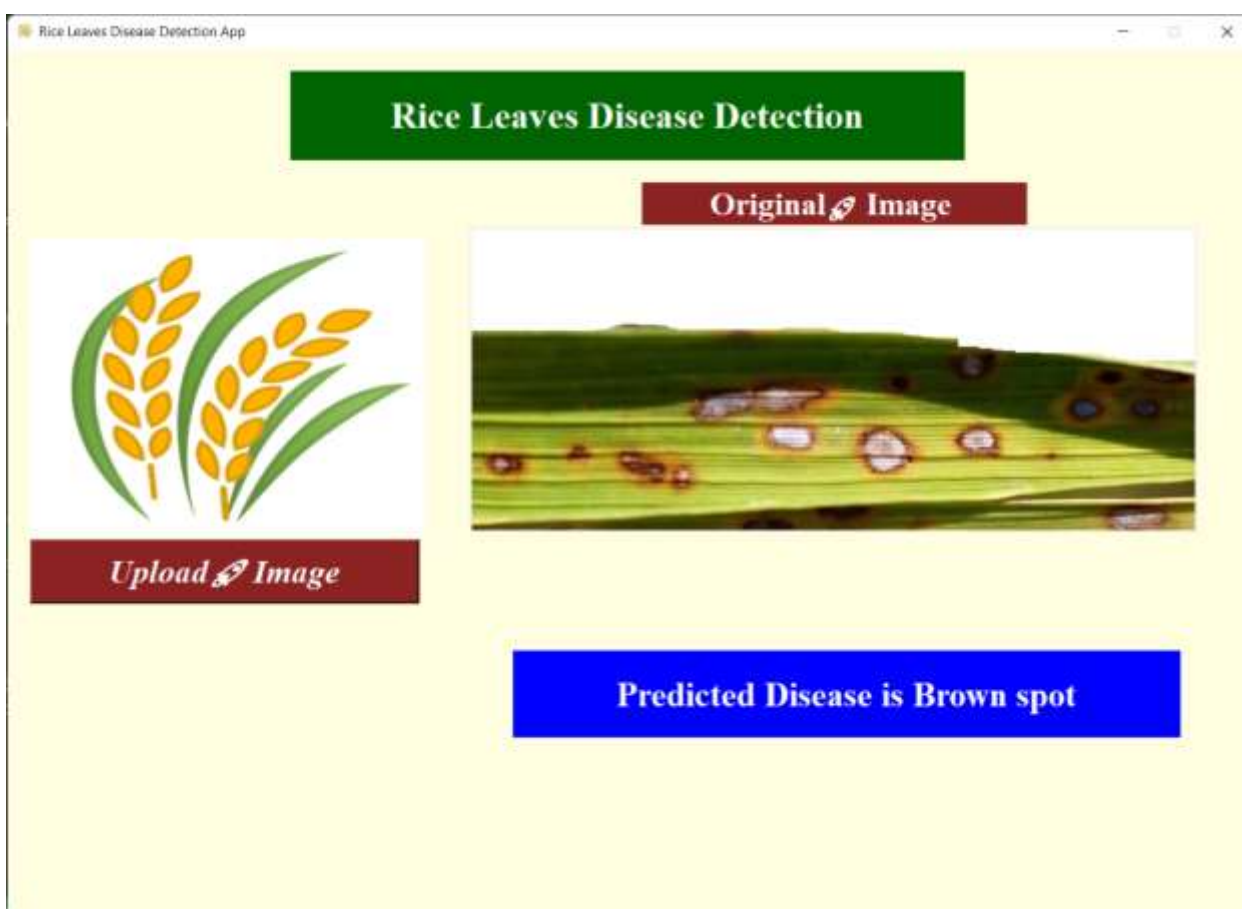


Fig 4: Disease detected

4. Future Scope

SVM (Support Vector Machine) is very helpful to identify and detect the diseases in plant's leaf. In present system does detect and identify diseases in particular leaf. Identify Rice Leaf diseases are already developed. This developed system is able to identify and detect any plant's leaf diseases with maximum accuracy. The Detection and identification of plant leaf diseases using SVM very useful in future due to the system shows diseases name as well as affected region with features fields.

5. Conclusions

The main purpose of this approach is to detect and identify the diseases in Leaves using SVM. Detection & Identification of Leaves Diseases using Multiclass SVM plays very important role in agriculture solutions to their problems. This methodology is automatically detecting leaf diseases with the name of disease and features. From the execution point of view, this methodology used with various kinds of Plant's leaves like bacterial leaf blight, brown spot and leaf smut successfully. Therefore, by using SVM with Image processing technique to optimize the feature as diseases of the leaves, SVM is proved to be the promising technique for the differentiation and categorization of the rice leaf diseases with normal precision with affected region of the leaf having more accuracy in result.

6. Bibliography

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