



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 12, December 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

 9940 572 462

 6381 907 438

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Survey on “Rice Leaf Disease Detection Using Hybrid Approach”

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ABSTRACT: Plant diseases have negative impact on the agricultural sector. This disease lowers the productivity of the yield and gives huge loss to the farmers. For precision agriculture it is very important to detect diseases in the plants to save agricultural crop yield and minimizing the use of pesticides. Detection of diseases at early stage can be done using Image processing domain. Detection of diseases in rice leaf can be done using Deep Learning and Machine Learning techniques. Convolution Neural Network (CNN) can be used for feature extraction, extracting features for the rice leaf images. Further for the classification of diseases various machine learning algorithms such as Random Forest.

KEYWORDS: Rice Leaf Disease Detection, Convolutional Neural Network, Neural Network, Deep Learning

I. INTRODUCTION

Agribusiness is India's chief type of revenue. 70% of Indian populace and around 58% of India's rustic populace rely upon agribusiness. Among different harvests, rice is the most fundamental. It gives energy and protein to the greater part of the total populace. It has been approximated that the number of inhabitants on the planet will ascend around 8.5 billion of every 2030, 9.7 billion out of 2050 and 10.9 billion out of 2100, separately. The interest and utilization of rice increments with the expansion in the populace. To address out this difficulty, it is assessed and expected that rice creation is to be expanded by 40% in 2030. A practical expansion in rice creation is prerequisite which will give worldwide food security. This expansion in the rice creation would be conceivable by transformation of high return assortments and assurance of illnesses and bugs in farming field. Organism, microbes and infection are the primary guilty parties for the rice plant illnesses. The flare-up of these infections brings about decrease of rice creation. This exploration principally centers around three most normal leaf infections named Brown spot, Leaf impact, typical and Hispa.

1.1 Motivation

Identification of the rice leaf diseases is the key to preventing to such diseases. The studies of the rice leaf diseases mean the studies of visually observable patterns seen on the images.

Disease detection on rice leaves is very critical for agriculture field. It is very difficult to monitor the diseases manually. So we are going to invent disease detection and prevention system over machine learning.

1.2 Need

To develop a system that detects rice diseases with maximum precision and with minimum processing time to help in the agriculture field.

II. LITERATURE SURVEY

S.Ramesh, D.Vydekiet al. [1] stated that, this paper proposes a machine learning algorithm to find the symptoms of the disease in the rice plant. Automatic detection of plant disease is carried out using machine learning algorithm. Images of healthy and blast disease affected leaves are taken for the proposed system. The features are extracted for the healthy and disease affected parts of the rice leaf. These images are processed with the proposed method and the leaf is categorized as either infected or healthy.

Minu Eliz Pothan, Dr. Maya L Pai [2] proposed that proposed method describes different strategies utilized for rice leaf disease classification purpose. Bacterial leaf blight, Leaf smut and Brown spot diseased images are segmented using Otsu's method. From the segmented area, various features are separated utilizing “Local Binary Patterns (LBP)” and “Histogram of Oriented Gradients (HOG)”. Then the features are classified with the assistance of Support Vector Machine.



PanuwatMekha, PanuwatMekha[3] proposed that experimented with image classification is used to classify the data set of rice leaf diseases, such as; Brown Spot Rice disease (BSR), Bacterial Leaf Blight disease (BLB), which is the rice leaf disease with severe outbreaks around Thailand. Moreover, image processing technology in the classification types of rice leaf disease, such as; Random forest classification algorithm, Decision tree classification algorithm.

Shreya Ghosal1 , Kamal Sarkar[4] stated that in this paper,Deep Learning show that Automatic Image Recognition systems using Convolutional Neural Network (CNN) models can be very beneficial in such problems. Transfer Learning to develop our deep learning model. The proposed CNN architecture is based on VGG-16 and is trained and tested on the dataset collected from rice fields.

III. PROPOSED METHOD AND ALGORITHM

A. Proposed Methodology:

In a proposed system, we are proposing experiment on rice leaf diseases like, Leaf Blast- It is a type of fungal disease caused by MagnoportheOryzae. It is affected all above ground part of rice plant. The initial symptoms of this disease are white to grey green spots, which ae oval shape with brownish border. It occurs in low soil moisture, frequent rain, cool temperature in day time.

Brown Spot-It is a fungal disease; infected leaves have big brown spot which can kill whole leaves.

Hispa– Hispa scrapes the upper surface of the leaf blades leaves only the lower epidermis. It is abundant in rainy season.

(leaf blast, brown spot, hispa) diseases with limited set of supervised data as shown in figure1.

We are proposing a Convolutional neural network for feature extractionand classification through random forest. We are going to solve accuracy issue in diagnosis of disease with accurate stage predictions.

B. Algorithms

1. CNN

In this proposed research paper Convolution Neural Network will be used for feature extraction. CNN is a type of Neural network is an advanced version of perceptron. In this type there is one or more than one convolution layers.CNN can fetch exact features from the image data, rather than taking the features one by one. Generated weights are extracted from the different layers of CNN such as convolution layers, pooling layers, activation layer and fully connected layers. Convolution layer is the key role of this network, which does the extraction of the features from the training image data.

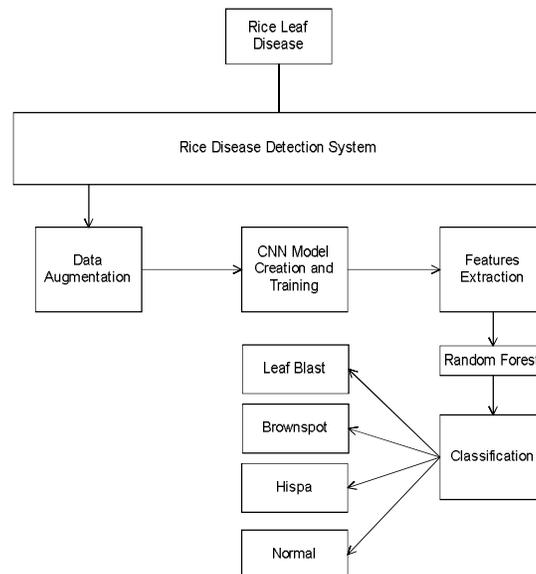


Fig1. Proposed Architecture

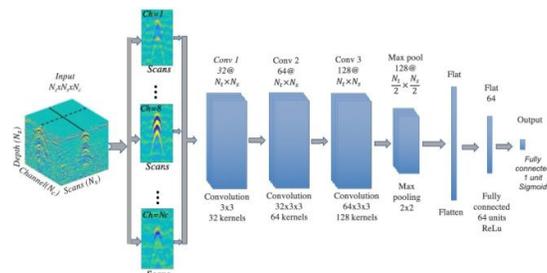


Fig2. CNN Architecture

2. Random Forest

A random forest is a machine learning technique that belongs to Supervised learning techniques. It is used to solve regression and classification problems. It utilizes ensemble learning, which is a technique that combines many classifiers to provide solutions to complex problems.

A random forest algorithm consists of many decision trees. The ‘forest’ generated by the random forest algorithm is trained through bagging or bootstrap aggregating. Bagging is an ensemble meta-algorithm that improves the accuracy of machine learning algorithms.

The (random forest) algorithm establishes the outcome based on the predictions of the decision trees. It predicts by taking the average or mean of the output from various trees. Increasing the number of trees increases the precision of the outcome.

IV. CONCLUSION

We are going to invent multi rice leaf disease detection system over machine learning and CNN techniques which solves existing accuracy problem as well as reduce death rates by rice type diseases like hispa, leaf blast, brown-spot. After detection of disease inform to farmer that how to prevent from a disease. For future work, we can implement this technique on some more diseases with rich dataset. Increasing the number of diseases and dataset used for the process can improve the accuracy.

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