# A Web Based Solution to Detect Rice Leaf Blast Disease Using Convolution Neural Network

## Abhishek H.K., Dr. Indiramma M.

Abstract-In the time of advancement, different enterprises are moving from manual to automated courses of action of various issues in the hand. While these frameworks have not simply extended the capability, they moreover have condensed the cost, time andwork hours required to get an ensured excellence.In agriculture, paddy is one of the real harvests packaging substantial measure of fields moreover, serving the sustenance necessities. One of the crucial infections of paddy is leafblast. The thought behind the work isto assemble a Convolutional Neural Network model and train itutilizing a collection of leaf blast pictures and group into various dimensions of infection so as to recommend appropriate solution to the farmers. A web based application is the proposed product of the work and the farmers can input the pictures ofleaf blast and get seriousness of the malady and the solution forit..

**IndexTerms**— automate; framework; paddy; rice disease; Convolutional Neural Network model;

#### I. INTRODUCTION

Rice is a critical agricultural yield. The majority of the world's populace devour rice as staple sustenance. In excess of 90 percent of world's rice is delivered and expended in Asia. In any case farmers lose an expected normal of 37 percent of their rice edit to nuisances and maladies consistently. Illness discovery and acknowledgment is a requesting undertaking. By and large, illnesses are recognized physically which is extremely troublesome furthermore, tedious. The bare eye perception of specialists is the fundamental methodology received by and by which is costly on expansive homesteads. A large portion of the farmers in rustic territories decide illness physically that occasionally makes a mistake recognize the sorts of sickness. They don't do mindful of legitimate administration to fix paddy leaf sicknesses. Along these lines, the creation of rice is being hampered quickly in consistently. Thus, a quick and precise paddy leaf sickness acknowledgment framework and legitimate care as per the seriousness of sickness wind up fundamental undertakings.

This work primarily centers around one of the three most regular rice diseases, Leaf Blast. The other two major diseases are Brown spot and Bacterial blight. Leaf Blast is

Manuscript revised May 13, 2019 and published on June 5, 2019 ABHISHEK H.K., Department of CSE, BMS College of Engineering, Bengaluru, Karnataka - 560019

**DR. INDIRAMMA M.**, Professor, Department of CSE, BMS College of Engineering, Bengaluru, Karnataka - 560019

moreover a contagious malady and lesions are an axle or curved formed furthermore, whitish to dim focuses with red to the caramel outskirt. The idea is to empower agriculturists to discover the seriousness of the rice leaf blast malady all alone utilizing this framework.

The eagerness for the work is lack of end-to-end product for the agriculturalists to detect and solve rice diseases and abstain from making manual forecasts which diminishes the yield. Despite the fact that looks into have taken a shot at similar issues it was constrained to their examination reason. It has not turned out as an item which truly adds to the growth of the farmers. The enthusiasm for doing this work was basically an enthusiasm for undertaking a challenging task in a fascinating territory of research. The chance to learn and contribute to such a vital field is gigantic..

#### **II.** LITERATURE SURVEY

While examining the different methodologies utilized till date in the current issue, it ends up perfect that a great deal of scientists have been working in the region. Anyway enhancement is searched for and is being done as the time slips. Preprocessing of the images can be done using several ways. One of the ways to do it is to use color slicing. Using color slicing, RGB color components are extracted [6] and utilize the region defined by the specific colors as a mask for further processing. From this preprocessing of RGB coloring space, it can be converted to HSI (Hue, Saturation and Intensity) color space using ColorCube component method Contrary to this type of preprocessing, image can be preprocessed using the steps like Image re sizing, Image Contrast enhancement and finally image filtering, segmentation using K-means clustering [5]. Using spectral characters of the rice leaf blast, features can be extracted. Like proposed in [7], spectral measurements for individual leaves were made using a spectroradiometer. These spectral characters were divided into different levels to differentiate the severity levels. As explained in [4] Simple Linear Iterative Clustering (SLIC) algorithm is a widely used super pixel algorithm in image oversegmentation. In order to separate lesion from an image with complex background, the image is over segmented by SLIC super pixel algorithm as preliminary segmentation. The image will be divided into super pixels. Within each super pixel, pixels have similar color. This is also a way to preprocess an image.

While extracting the features of an image color features, texture features and shape features can be extracted separately [5]. Color features can be extracted using mean, RMS, Standard deviation, Variance. Texture extraction can be done using Contrast, energy and entropy. Paper [3], explains how Back Propagation Neural Network model can

# International Journal of Research in Advent Technology, Vol.7, No.6S, June 2019 E-ISSN: 2321-9637 Available online at www.ijrat.org

be used to extract the features of a rice leaf disease, though it is for brown spot detection. The error is back propagated and then weights are adjusted, the training repeats until the model is ready to accurately distinguish the brown spot in the test images. Paper [2] explains, how a CNN model can be used for image classification. Here, the authors of [2], took MNIST data set, which is a collection of handwritten digits from 0 to 9, for training and classification. It consisted of convolutional layer (obtained by overlapping a feature matrix), a pooling layer and a fully connected layer for preprocessing. In the CNN, it consisted of 2 hidden layers in between the input and output layers. However, due to the simplicity to the model constructed, the accuracy was comparatively less. Paper [1] shows that a TensorFlow model, enabled by Google, gave nearly 99.99 percent accuracy after 5000 iterations of training the model, with a data set of 20,000 training images and 5,000 test images of cats and dogs. These are the different methods for image preprocessing and feature extractions methods available as proved by different researchers.

## **III. PROPOSED SYSTEM**

The proposed system aims to address the problems left out by the previous systems, that is, detection of the leaf blast disease followed by the solution prediction action. The proposed work uses the most advanced tools available for image classification problems such as Convolution Neural Network.

Preprocessing: The work progresses to achieve high accuracy by building a Convolutional Neural Network by taking the input image data set. The images are applied a feature map or activation map to obtain the convolutional layer. The convolutional layer is a series of image (in pixels) in a smaller size than the original one. The reason to apply this feature map is to obtain a smaller image without losing the data so that processing can be faster. The obtained convolutional layer is pooled by applying another matrix to obtain the pooling layer. This pooling layer is done to remove spacial invariance. For example, the face a cat need not be in the same pixel location in each training image or it may be titled compared to the other images. This can be handled by removing the spacial invariance using pooling layer. These pooling layer are converted to the feature vectors which are given to the input layer of the convolutional neural network model.

**Full connection:** A model has to be built with an input layer, hidden layer (with softmax layer) and an output layer. The feature vector obtained from the preprocessing stage will be fed to the input layer which randomly assigns the wait and starts to learn. From the output layer it checks if its prediction is correct. Then it backpropogates the weights assigned and train with the next set of images. The backpropogation of weights is done by calculating the cost function using gradient descent. At the end of numerous epochs of training, the model learns to predict with highest accuracy. This model is used to test the input images and then retrieves the solution from the database and sends to the end user through the web page.



## **IV. SYSTEM ARCHITECTURE**

Figure 1: System architecture of the proposed system

#### V. RESULTS AND DISCUSSION

The proposed system was implemented with a dataset of nearly 250 images of leaf blast rice disease of different levels. The accuracy obtained was nearly 72 percent accurate. However as the size of the dataset increases, the accuracy is bound to increase due to highly capable Convolutional Neural Network along with the SVM classifier.

In the created framework the pictures of the rice ailments are taken preprocessed, highlights or features are extricated from the pictures. The extricated highlights are utilized for preparing the framework utilizing Convolutional Neural Network calculation. The prepared component information and the test highlight information are put away in the SVM classifier to make the prediction and classify into several levels of severity.

The created work makes it simple for the farmers, scientists and agribusiness understudies to distinguish the rice sickness, characterize the rice malady and know the seriousness of the rice illness and answer for it.

# VI. FUTURE SCOPE

- The size of the dataset has to be increased to obtained the highest accuracy.
- The picture information to be gathered in regards to the product infections is to be taken and transmitted continuously from the field in real time

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# International Journal of Research in Advent Technology, Vol.7, No.6S, June 2019 E-ISSN: 2321-9637 Available online at www.ijrat.org

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