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IDENTIFICATION AND PESTICIDE SUGGESTION OF DISEASES IN RICE PLANT (Oryza sativa) USING IMAGE PROCESSING & DEEP LEARNING ALGORITHM

Arfath Bin Absar[*1], Rafid Abdullah[2], Nure Alam Ridoy[3] & MD Tarikul Islam[4]
[*1,2,3&4]Faculty of Engineering, American International University – Bangladesh (AIUB)

ABSTRACT

Rice is the staple food of about 135 million people of Bangladesh. Several diseases such as leaf blast, neck blast, leaf scald etc. of rice and rice plant leafs are major constraints and matter of concerns for the production of rice. Therefore, it is an advantageous to investigate the potential outcomes of abusing Information Technology based methods and practices to create rice development in the nation. Primary target of this thesis is to build up an application to analyze rice diseases through their visual side effects so appropriate diseases control techniques can be adjusted keeping in mind the end goal to procure a decent collect in rice plantation. This thesis paper develops the way toward recognizing rice plant diseases through visual symptoms of the contaminated region of a plant. The system applies images processing techniques to group unhealthy rice plant leaves and distinguish the infection. The system distinguishes the name of the diseases and suggests the appropriate solution for control it.

INTRODUCTION

The main objective of this thesis is to develop a software by using image processing and deep learning algorithm which can identify any affected rice plant image and then give the pesticide suggestions for the affected rice plant. For this thesis a feature named "Haar-Feature Selection" from "Viola Jones Algorithm" [1] is used. Basically by using this feature any objects can be detected. By giving the samples of the affected images in "Training Image Labeler" which is an app of MATLAB the Region of Interest (ROI) were selected. Then after using the MATLAB code an xml file was generated. This xml file is necessary for developing the main software. This software compares between the affected image and unaffected image and then gave the result. By giving input of any affected image of rice plant this software can immediately detect the disease. In this thesis three of the diseases of rice plant were discussed. Now a day these three diseases are major constraints and matter of concerns for the production of rice [2][3]. So this software can be very helpful for detecting those three diseases.

PROPOSED DESIGN

A. Block Diagram of proposed diseases detection system part

In this part, how does the disease will be detected and pesticides will be suggested are shown in a block diagram. A classifier file is generated by using image processing and deep learning trainer. Then compare with this classifier file by user's input the diseases can be detected.

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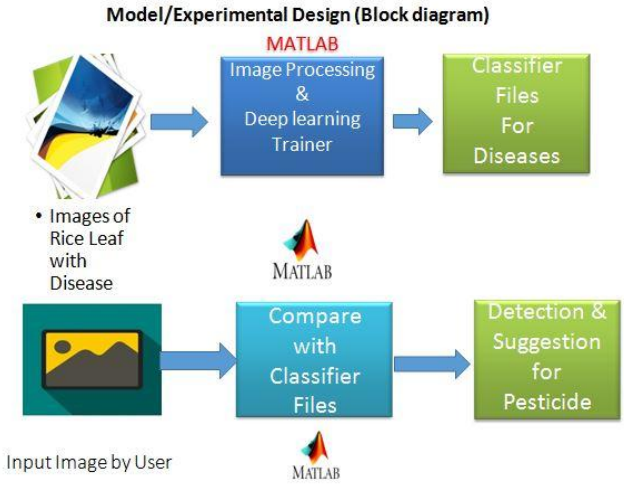

Figure-1: Block Diagram of proposed diseases detection system

B. Block Diagram ROI selection and xml file generate

First of all some affected and non-affected images are collected. Then by using "training image labeler" the app has to select ROI (Region of Interest). Affected images are used positive images and non-affected images are negative images. By using MATLAB coding a XML file is generated to detect the affected image from the image library given. The xml file is merged with an App built by MATLAB application feature.

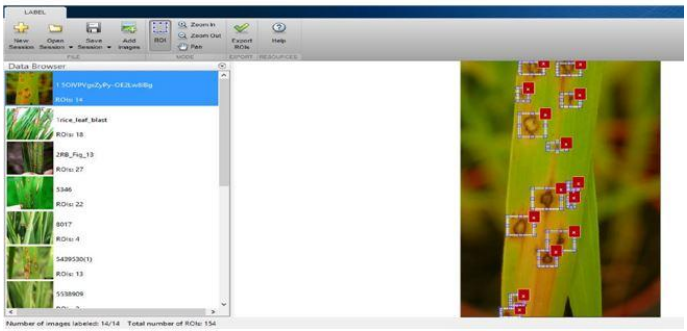

Figure-2: Block Diagram of ROI Selection

SIMULATED RESULT

An app is created to make the disease detection system more user friendly. The app is also created by MATLAB.

The app some basic criteria like browsing images, detecting diseases that were already selected by the programmer, one crop can have multiple diseases, the app will detect the percentages of specific disease, and for detected disease the app will suggest pesticide suggestion for improvising the crop.

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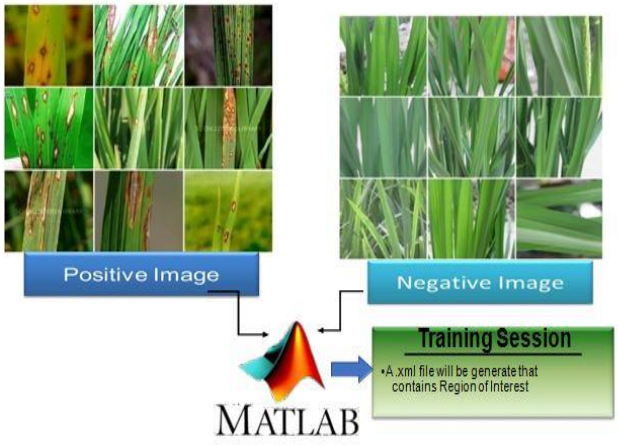

Figure-3: Generating process of xml file

Let's test BLAST loading the following image

Figure-4: Selected image

After pressing Detect button

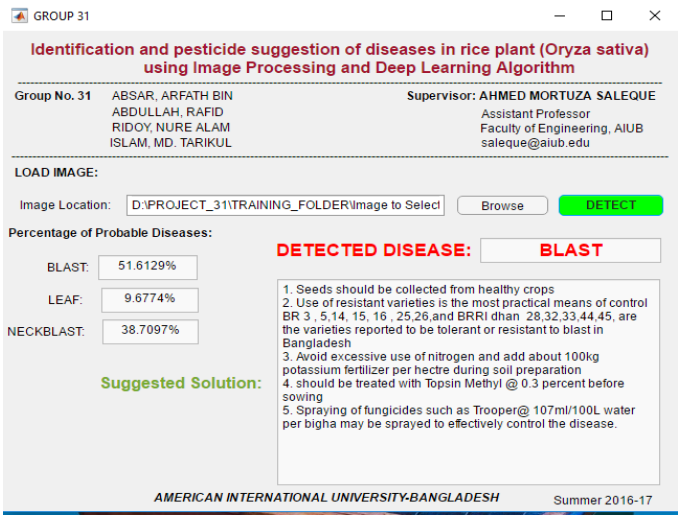

Figure-5: Detecting disease

ISSN 2349-6193
Impact Factor: 3.866

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Figure-6: Detected image

By using this process we can also easily detect the neck blast and leaf scald.

Let's test LEAF

Figure-7: Selected image

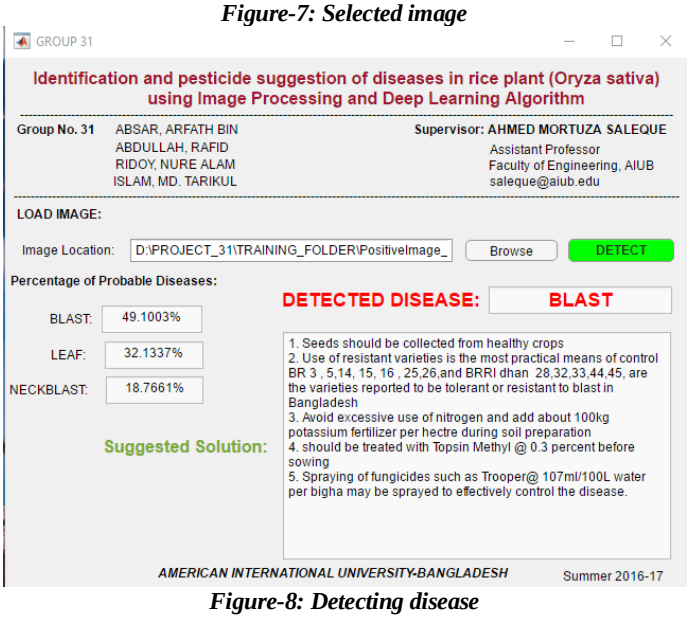

Figure-8: Detecting disease

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Impact Factor: 3.866

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Figure-9: Detected image

There is an error for LEAF. Possibility of Blast is 49% and possibility of LEAF is 32% As only 23 images was used to train LEAF whereas 60 images to train BLAST.As blast and leaf is almost similar to look, hence there is an error. Due to time limitation, it want possible to use more images to train the leaf.

FUTURE WORKS

- More positive images will be added, thus the accuracy of result will be increased.
- If time permits Voice generation system will be added to the system. Thus a farmer can listen to the system and get pesticide suggestion from it easily.

DISCUSSIONS

A system has been proposed and simulated in this thesis for identification and pesticide suggestion of diseases in rice plant (*Oryza Sativa*) using image processing and deep learning algorithm. The proposed site for this thesis work is for the rural area of Bangladesh where rice is cultivated. First of all disease affected pictures has been collected for simulating to identify the disease using MATLAB. An algorithm named Viola-Jones algorithm is used to get the main output. There are four stages of this algorithm but for this thesis only one stage is used which name is a Haar-like feature. In MATLAB software an application training image labeler has been used for selecting the ROI from the disease affected pictures which are taken to do the thesis. The analysis of the obtained results depicts that if a disease affected image is given as input in the software it can easily identify which disease it is.

CONCLUSION

This application will increase the production of rice plants by controlling rice diseases. It will be an easier way to find out the diseases of rice plant and providing pesticide suggestions. Also reduce the hassle of suffering farmers. By using this application one can contribute in his economy and lead the agriculture of his country one step ahead.

While doing the research work there were some problems because of the limitations of the environment. At that time it was not the rice harvesting season. So it was not possible to collect the real images of disease affected plants. At that case, have to take images from different website. It was insufficient for training purpose. That is the only reason for less accuracy.

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