Detection of Rice Planthopper by Image Processing

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Abstract - *Rice Planthopper is the most devasting insect pest in rice growing areas, RPHs are among the most important pests of rice. Finding RPHs on image processing is an important thing. We use a region of interest method (ROI) to detect RPHs Thresholding is used to convert gray scale image into binary ,by using decision tree algorithm ,classify data to get binary image of RPHs After binarization edge detection is performed which represents the layout of the object within the image. Edge detection will change of levels of low intensity to high intensity of grey. Then it will create the edge and extract the planthopper from background Extraction of planthopper is based on its features like its shape,area.In this proposed method we remove a lot of area where we did not follow with the interest. The results are useful to reduce executing time, labor wasting and obtain image of RPHs in every stage of its growth.*

***Key Words*: Region Of Interest (ROI), Rice Planthopper (RPH).**

1. INTRODUCTION

Rice Planthopper in a paddy field is very disaster situation every year. Planthopper can be a problem in rained and in irrigated wetland environment. It also occurs in area with continuous submerged conditions in the field, high shade, and humidity. Closed canopy of the Rice Plants, densely seeded crops, excessive use of nitrogen, and early season insecticide spraying also favors insect development. The feeding damage caused by plant hoppers results in the yellowing of the plants. At high population density hopper burn or complete drying of the plants is observed. At this level, crop loss may be 100%.The farmers sprinkle the pesticides but every time its difficult and waste of using the pestisides.So use of Image processing technology will help to detect the RPHs so before growing the RPHs we should detect and remove that RPHs.

Since checking RPHs is very difficult and time consuming we use a Image processing technique. Image processing technology have good application in agriculture field and it is increasing rapidly in the field There are many method in detecting the RPHs by image processing, we input RGB image to convert to gray scale using the Gaussian blur function[2],that is not accurate method. Then extract the feature. Then support vector machine (SVM) are used for RPHs classification [5]To find ROI setting the threshold is must in this case. Detection of object is done using contour detection. Based on features the detected objects are classified using k-mean clustery. For classification we can also use SVM classifier but it would spend too much time by depending on supervised learning so we prefer k-mean clustery. Feature extraction is done by training the model to classify among RPHs and other objects. Generally feature extraction are based on based on like RPHs ,edge or small areas, shape.

As shown in fig1 The proposed method provide image processing to get ROI of the field

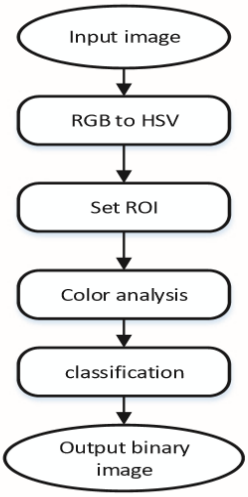

Figure 1:Flow chart

Figure 2:Rice planthopper

2 Image Preprocessing and Set ROI

A .Collection of image and preprocessing*:*

High definition image of Rice plant is captured using camera as shown in the fig1.2 .The resolution of captured image is 4608 x 3456 pixels under full high definition it is helpful to found out RPHs easily. Frames of the captured image representation is in the form of RGB.since RGB takes 8bit each. hence, totally 24bits so it is difficult to process the

image in 24bit format therefore the image is converted from RGB to Gray scale. Gray scale helps in removing the noise in the image.

B. Set ROI:

The main aim of setting ROI is to reduce captured image area. For setting new ROI we set a threshold of 105. New ROI leaves the stem and removes unimportant borders. According to thickness of the stem the width of ROI will be set. Since different rice plant had different width of ROI,it avoided to cut over or leave too large width that was not an ideal situation .ROI image are effective to distinguish different objects in the image.

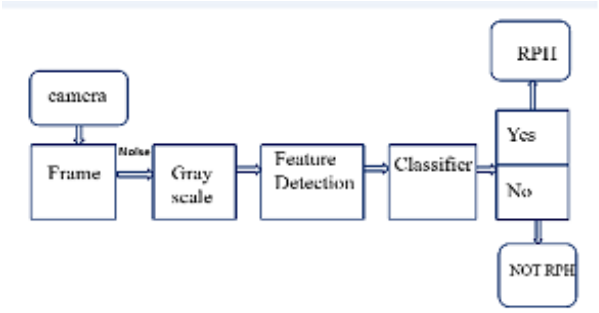

Figure 3:Module Description

C. Object Detection

a .Edge Detection*:*

Edge is the portion of data which represents the layout of the object within the images, can be used to identify the size of objects in the image or identifying objects within the images. Edge detection changes the level from low intensity to high intensity afterword's it will create the edge and extract the planthopper.then it fills the inner edge and indicate the shape of planthopper.Edge detection is based on contour detection that is nothing but the closed loop.

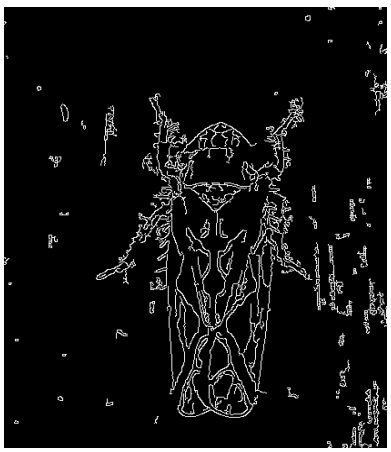

Figure 4:Edge Detection

b .Mathematical Morphology:

Mathematical morphology is also known as adaptive threshold. Once threshold have been set and edge detected mathematical morphologies are applied. Some of the mathematical morphologies are erosion, dilation, opening and closing.

Erosion:

A pixel in the original image considered one only if all the pixels under the kernel is one, otherwise it is made to zero. All pixels near boundary will be discarded depending upon the size of kernel so thickness or size of foreground object decreases or simply white region decreases in the image.it is useful to remove small white noises,detatch two connected objects. After erosion the image will become thin.

Figure 5:Erosion

Dilation:

It is just opposite of erosion. Here pixel element is one if at least one pixel under the kernel is one .it adds pixels to the boundaries and increases the white region in the image after dilation image will became thick.

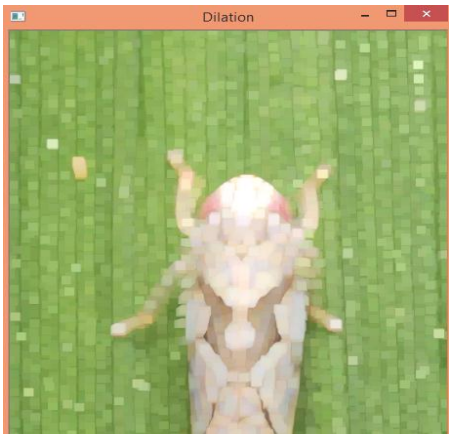

Figure 6:Dialation

Opening:

Opening is another name of erosion followed by dialation.It is useful in removing noise. We should always use open followed by close.

Closing:

Closing is the reverse of opening, dilation followed by erosion.it is useful in closing small holes inside the foreground objects or small black point on the object.

c. Classification*:*

After object detection features are detected to classify the RPH.The feature are edge, shape or area .RPHs classification is done by using of k-mean clustering algorithm's-mean is one of the simplest unsupervised learning algorithms that solve the well know clustering problem .The procedure follows a simple and easy way to classify a given data set through certain number of clusters fixed. The main idea is to define k centroids one for each cluster. These centroids should be placed in a cunning way because of different location causes the different far results. Better choice is to place to centroids away from each other now take each point belonging to a data set and associate with nearest centroid. Finally this algorithm aims at minimizing an objective function.

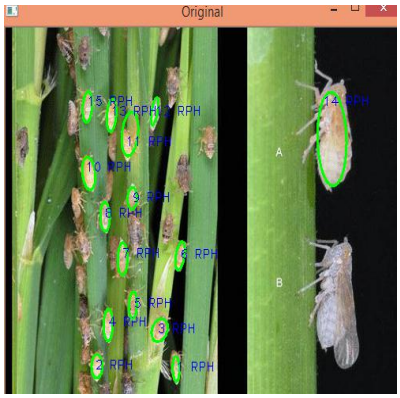

Figure 7:Detection of RPHs

Figure 8: Detection of RPHs in Thresholding

3. CONCLUSION

The goal of this paper is to find out the RPHs based on image process technique. The results of edge detection, erosion and dilation are shown in the fig 4,5,6 respectively. Compared to original image in erosion it decreases the white region in the image and in dilation it increases the white region in the image. So finally detection of the RPHs is given in fig 7,8. In this paper, we presented a image processing of RPHs. It is helpful to detect the every stages of RPHs. This research is helpful for farmer to detect the RPHs. Reduce input cost and benefits the environment. This not only reduced labor wasting and time consuming, but also provided a well ROI for even more extended application.

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