

# Detection of Pest from Paddy Crop Leaf Using Image Processing Techniques

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**Abstract:** - Agriculture plays a crucial role in Indian economy. To increase the productivity and cultivation, farmers were using chemical pesticides. Now a days uses of pesticides become more dangerous, it's not only kills the pests in plants but also the health of the human, birds, animals, etc. To overcome this problem, it is necessary to control the use of pesticide. Pest detection is the most important process for an effective cultivation. Using digital image processing techniques pest can be detected as early as possible. Here the image of paddy crop leaves is captured through a digital camera and processed using image processing techniques. The final process in those techniques is image segmentation in which the image is segmented using clustering methods. clustering algorithms detects affected part of the leaves and also calculates the percentage of affected area.

**Keywords:** *Image processing, Feature extraction, Clustering algorithm.*

## I INTRODUCTION

Now a days early pest detection of the pests in a crops is a major challenging task for the farmers. Most of the people mainly depends upon agriculture. Now the important matter is to increase the productivity of the crops. But the problem exists here is pest infection on plants. There are different approaches have been used to deal with this problem. There are different crops are cultivated in the field. This paper mainly focuses on paddy crops. The most common pest diseases occur in the paddy crops are green leafhopper, paddy stem borer. To overcome these problem image processing can be a good result, image processing techniques help farmers to detect pest shape, affected area of pest in leave, color variation due to pest infected region, change of shape and size of each leaf can identify separately and easily. Automatic detection is the best way for the detection of pests from the crops and classification algorithms are used to classify them on the basis of the different properties of the images. In this paper, the images of leaves from the crop fields were taken and then various processing techniques were applied on them. For pest detection, different clusters were used to separate background from the pests on images of leaves. This technique is very simple and accurate in detection of the pests from the images.

## II PROPOSED METHODOLOGY

Different samples of images are collected through pan tilt camera with high quality. Here the unmanned aerial vehicle (drone) are used i.e., the camera is placed in the drone and

capture the images continuously in the field. Then the captured images are sent to the computer system by using Wi-Fi in the camera and then different processing techniques will take place for pest detection.

**Image capturing:**

The first step in the every image processing application is image capturing the images of the paddy crop leaves are captured through camera and sent to the system through the Wi-Fi routers. Then the captured images are stored in any one of the formats like jpg, jpeg, tiff etc.

**Image pre-processing:**

Image pre-processing consists of three steps the very first step in every image processing techniques is conversion of RGB to gray scale image. The captured images is of RGB type so the images are converted into grayscale because the RGB image requires large space to store and more time taken for processing.

Formula to convert RGB to gray scale is

$$I(x, y) = 0.2989 \times R + 0.5870 \times G + 0.1140 \times B$$

And the next step is compressing the image. Compressing or resizing of an image is an important step for every image processing tools. Compression is nothing but changing the dimensions of an image. There are different methods are used for compressing the images. Here the acquired image is compressed by using discrete cosine transform algorithm (dct).

And the last step is filtering the images.to remove the unwanted portion of the images different filters were used. To detect the pest affected area clustering algorithms are used which differentiates the similar and dissimilar portion of the leaves.

**Feature extraction:**

Feature extraction is the most important part. Here some properties of the images are considered to differentiate the affected and without affected leaves. Region properties gray covariance properties are included. The properties are standard deviation, entropy, smoothness, contrast, affected area, energy, rms, mean, skewness, etc...,these properties are extracted from the image and are trained to svm as a dataset for svm classication. A relatively new learning method used for binary classification is support vector machines(svm).

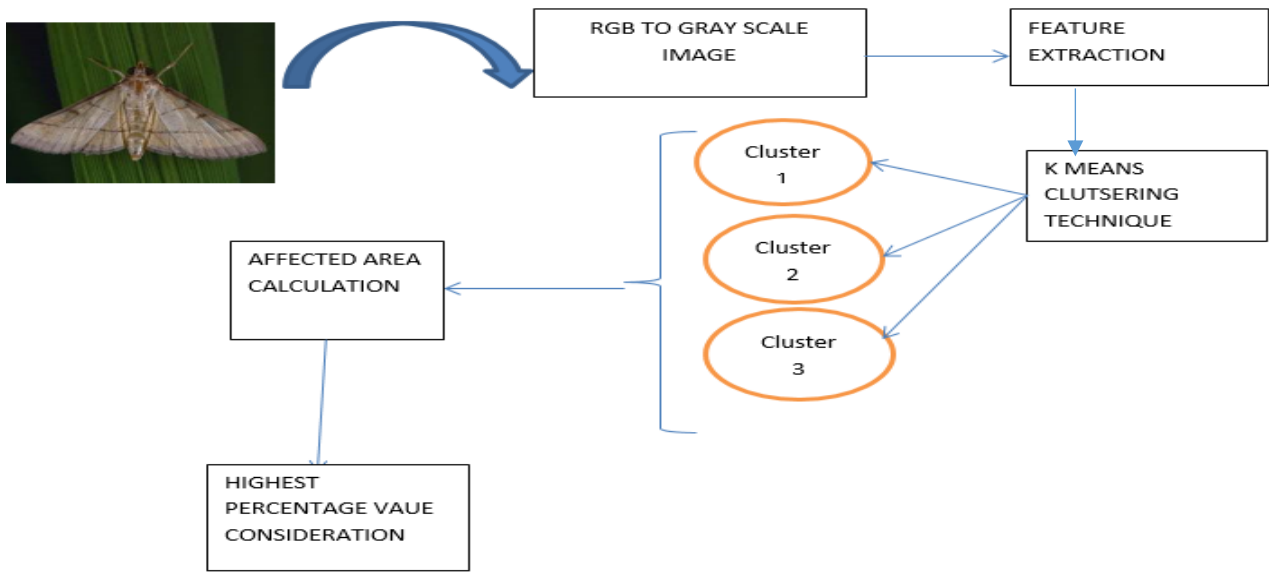


Fig1 block diagram of proposed methodology

**Clustering technique:**

k means clustering algorithm is a data portioning algorithm that assigns n observations to exactly one of k clusters defined by centroids. Where k is chosen before the algorithm starts. Here in this edge detection method three different clusters that are portioned by means clustering techniques are of three different segmented images. The below equation shows the clusters partition with respect to the distance among the affected region are:

$$\text{cluster\_idx, cluster\_center} = \text{k means}(\text{ab, colors, distance, sqEuclidean, Replicate, 3})$$

$$\text{affected area} = A1/A2$$

where A1 is the affected portion of the leaf and A2 is the entire desired leaf region. K means observation are classified into three different clusters. Cluster1 shows only the similar

data consists of only green portion of the paddy crop leaf. cluster2 shows both the green region and affected region of the leaf with maximum color variation. cluster3 represents only the pest affected portion of the paddy crop leaf. By selecting one of the clusters affected area percentage of the leaf can be calculated. The clusters which shows the highest value are taken into consideration for decision making for further usage of pesticides by the farmers and also from the proposed work the extracted output results are more accurate.

**III RESULTS**

There are three different types of pests which are affected by the paddy crop leaves such as insect ,bacteria, fungi. different feature values are extracted from the feature extraction technique. Below figures show the different types of pest affected leaves in the paddy crop leaves.

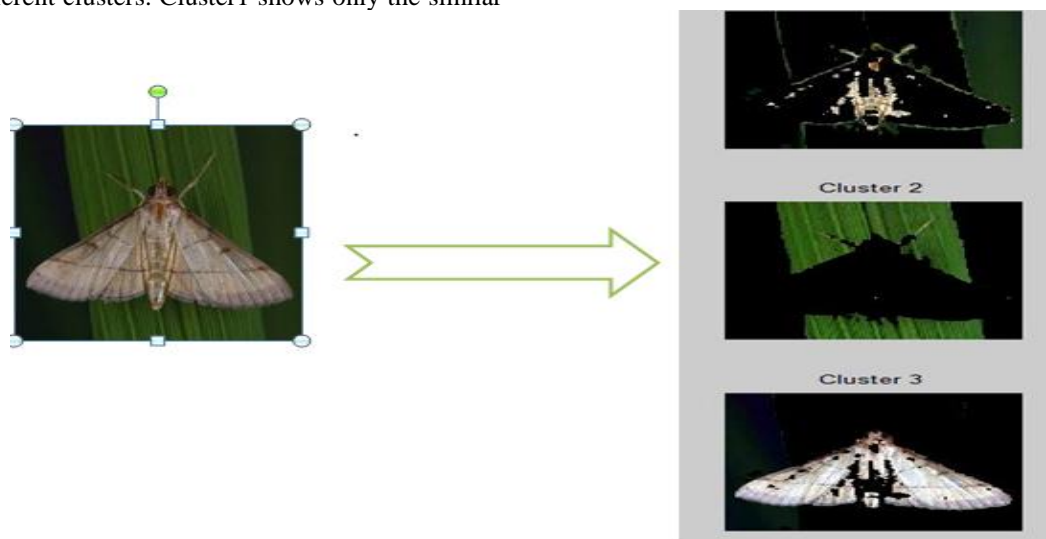


Fig2 insect affected leaf

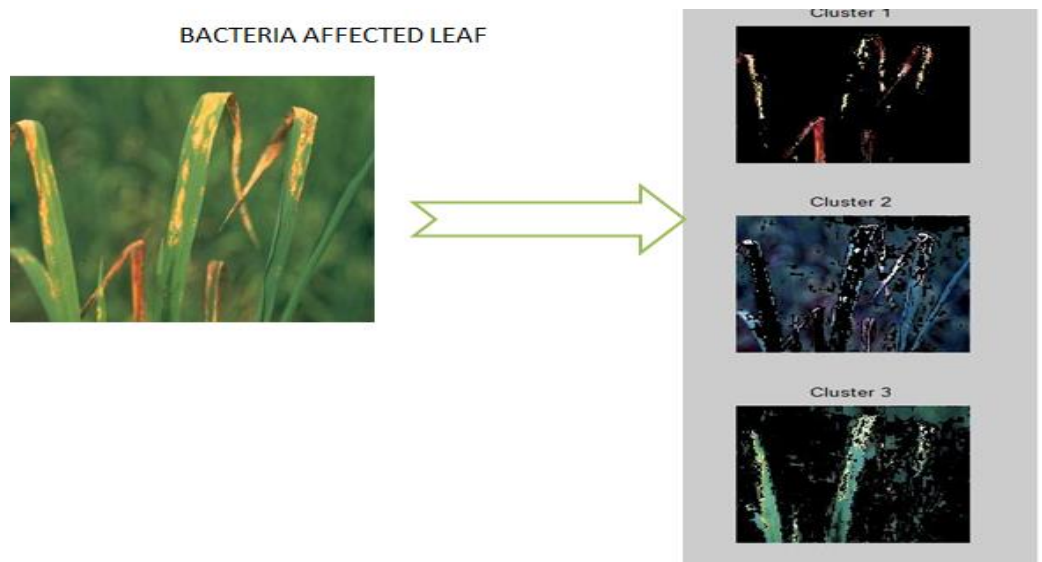


Fig 3 bacteria affected leaf

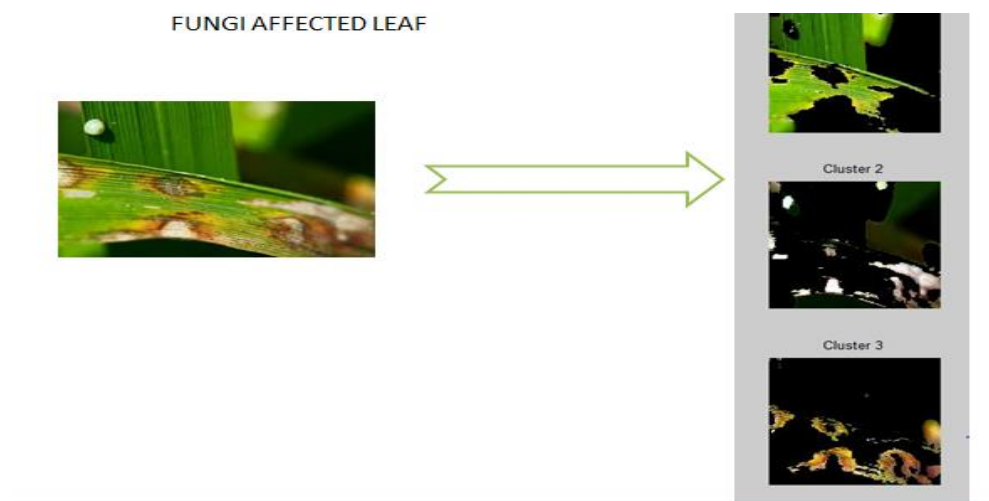


Fig 4 fungi affected leaf

#### IV CONCLUSION

Image processing plays an important role in the detection of pests. Here the first objective is to classify the pests whether the affected crop is affected or not. The main goal of this project is to detect the pest as early as possible. Here pan tilt camera is used for taking crop leaves without disturbing the other paddy crop leaves by using drone vehicle. This prototype system proved reliable for rapid detection of pests. It is rather simple to use and exhibits the better performance level.

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