

# A SURVEY ON BEST SUITED IMAGE PROCESSING METHOD IN AGRICULTURE TO DETECT PLANT DISEASES

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**Abstract-** The future of India lives in its villages and smaller towns. The principal source of income is from agriculture. About 75% people in India are living in rural areas and are completely dependent on Agriculture. India's 43% of geographical area is still used for agricultural activity. Agricultural Image Processing is one of the main applications of Image processing. This is one of the most fast growing research fields that are having its involvement in various areas. Agricultural industry is one such application area. In this area, image processing is been utilizing in different ways to identify the crop, plant, leaves, flower, fruits etc. and to identify the disease related with it. Digital image processing is a technique used for enhancement of the image. Many methods are already been used in image processing for agriculture field. The purpose of this paper is to come up with a best suited method for improving the productivity of products along with the quality.

**Keywords:** Plant diseases, Digital image processing, Image processing phases, Artificial Neural Network, Support Vector Machine, Clustering method, HSV clustering.

## I. INTRODUCTION

Agriculture is the main occupation and the source of earning in India. As land is limited and the population is increasing, the usage of land is decreasing due to housing, industries and wastage due to salinity. The growth in agriculture production increases the Indian Economy. But the life style of Indian farmers and farming is varying rapidly due to increase in non-agricultural opportunities. India is developing as well as a cultivated country, so most of the population is directly dependent on agriculture. Farmers produce yield from the agricultural field. But while farming, farmers face environmental problems as well as man-made problems and limited resources. These problems affect directly the productivity of crop. To detect the plant diseases they are still using manual power. This made image processing come into the limelight. The purpose of this paper is to survey about various methods used for agricultural image processing problem solving.

The rest of the paper is organized as follows Literature survey II, Algorithm III and followed by Conclusion IV.

## II. LITERATURE SURVEY

Image processing is one of the computing algorithms that perform image processing on digital images. An image is a two-dimensional function  $f(x, y)$ , where  $x$  and  $y$  are the coordinates. The coordinates  $x$  and  $y$  are the intensity level of the image at that point. An image is called digital when  $x$ ,  $y$  and the intensity values of 'f' are all finite and are in discrete quantities. Elements are also known as pixels or image elements or picture elements. The input is a digital image and it processes that image using algorithms. This results in an image. The process of digital image processing is shown in the form of phases in the following Figure.1[1].

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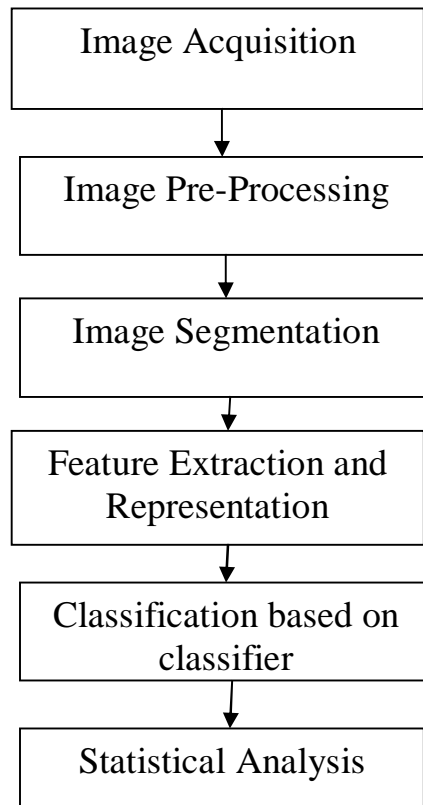


Figure.1 Process of Digital Image Processing

*Image Acquisition-*

The first phase is the image acquisition phase. After the image is obtained; various processing methods can be applied to that image to perform different vision tasks. Before processing, the image must be converted to numerical form. This process is known as digitization. There are various types of devices that can be used to acquire digital images

*Image Pre-processing-*

Pre-processing is done after the first phase after the image is obtained. The main focus of preprocessing is to improve the order of the image for better results. This method is used for enhancing contrast, isolating regions and removing noise. The methods used are image compression, image enhancement and image measurement[2].

*Image Segmentation-*

The first phase in analysis of image is to divide the image. Segmentation subdivides an image into its constituent components or objects [3]. This process of segmentation should be stopped when the objects of interest have been isolated. It is a way of grouping together the pixels with the similar attributes.

*Feature Extraction and Representation-*

The extraction is the process in which certain features of interest regarding an image are detected and they are represented for processing of the next phase. The common goal is to convert the segmented objects to representation that describe their main features in a better way [4]. The attributes used are the type of images, the level of granularity and the context of the application that uses the result.

*Classification Based on Classifier-*

In classification the images are classified based on the extracted features of the image into predefined categories by using best suitable methods that compare the image pattern with images. The different methods which can be used are Support Vector Machine, Artificial Neural Network and Decision Tree [5].

*Statistical Analysis-*

It is a process of extracting reliable and useful information from the images. The aim is to provide statistical methods for image analysis. Different methods can be like artificial neural networks, support vector machine etc.

**III. ALGORITHM**

*Algorithm Steps-*

First, the images of leaves are acquired in RGB color mode. These images are then transformed into Hue Saturation Value (HSV) using color space representation. According to HSV clustering value 0 refers to red, 2/3 is blue and 1/3 is green. The green colored pixels are then associated and masked [6]. Then the infected portion of the leaf is extracted. The infected region is then divided into equal number of patches which are sized equally. The infected region will show the result in a textual format which in turn will recognize the disease as shown in Figure.2 below.

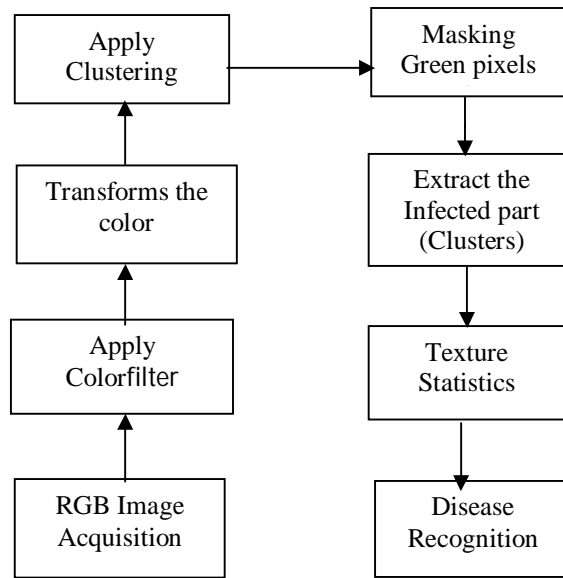


Figure.2 Detection System Architecture for plant disease

Table.1 Comparison of different detection algorithms:

Authors	Detection Algorithm	Parameters
Dheeb Al Bashish & et al.	K-means	93% of accuracy
Ging Yao & et al.	SVM method	97.2 % of accuracy on rice disease plant
S. Phadikar & et al.[7]	Bayer's and SVM classifier , mean filtering and Otsu's algorithm	Bayer's – 68.1 % SVM – 79.5% accuracy

The above Table.1 shows the comparison of different detection algorithms used to detect leaf disease in plants. The generated results are accurate and the best technique is chosen on this basis.

**VI. CONCLUSION**

Disease detection system identifies the infected part of the leaf by using image processing technique. For clustering and classification of diseases texture examinations are formulated. The paper proposed is an effort which can considerably support a precise detection of leaf diseases in plants. The proposed future work is to enhance the previous work on agriculture image processing algorithm by using clustering methods so that classification process will be done faster with more accuracy. To detect amount of disease present on leaf.

## REFERENCES

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