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[ijirset@gmail.com](mailto:ijirset@gmail.com)

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# Plant Disease Detection Using MATLAB

Mayuri Vilasrao Vaidya<sup>1</sup>, Dr. R.M. Autee<sup>2</sup>

PG Student, Department of Electronics & Communication Engineering, Deogiri Institute of Engineering & Management Studies, Aurangabad, Maharashtra, India<sup>1</sup>

Asst. Prof., Department of Electronics & Communication Engineering, Deogiri Institute of Engineering & Management Studies, Aurangabad, Maharashtra, India<sup>2</sup>

**ABSTRACT:** Agricultural productivity is something on which economy highly depends. This is the one of the reasons that disease detection in plants plays an important role in agriculture field, as having disease in plants are quite natural. If proper care is not taken in this area then it causes serious effects on plants and due to which respective product quality, quantity or productivity is affected. The disease causing agents in plants will be majorly defined as pathogens of any agent. The symptoms diseased leaf image & then compared with normal leaf image. After feature extraction is done, the learning database images are classified by using neural network. These feature vectors are considered as neurons in ANN. The output of the neuron is the function of weighted sum of the inputs. After extraction of features, the diseases are identified with SVM classifier. Here Multiclass Support vector machines can be used for classification of features extracted leaf images.

**KEYWORDS:** Agricultural, Disease Detection, SVM classifier, ANN.

## I. INTRODUCTION

AGRICULTURE is a backbone of our country. Farmers have good selection of crops for his or her farm. Anyway, the crops cultivation for maximum profit and standard manufacture is usually scientific [1]. The huge population of the world depends on their large economy. As well as the economy growth plays an important role in the development of any country and their GDP. The impact of this economy depends entirely on agriculture. But, different factors of cultivation affect the quality and quantity of grains and vegetables. These grains and vegetables come in contact with different diseases due to different climates and conditions in different places. As a result, cultivators in any country face severe losses because of these diseases. For leaf disease, the amount of crop production is decreasing day by day. The main challenge is to identify the leaf disease in the agricultural field and to increase the quality and quantity of the production rate. First of all it is necessary to consider two crops leaf to identify disease [2].

It is very difficult to monitor the plant diseases manually. It requires tremendous amount of work, expertise in the plant diseases, and also require the excessive processing time. In most of the cases disease symptoms are seen on the leaves, stem and fruit. The plant leaf for the detection of disease is considered which shows the disease symptoms. The disease causing agents in plants will be majorly defined as pathogens of any agent. The symptoms diseased leaf image & then compared with normal leaf image. After feature extraction is done, the learning database images are classified by using neural network. These feature vectors are considered as neurons in ANN. The output of the neuron is the function of weighted sum of the inputs. After extraction of features, the diseases are identified with SVM classifier. Here Multiclass Support vector machines can be used for classification of features extracted leaf images. In this Approach we have evident one of the promising approach for the disease identification has been done using image processing technique and remedy for the identified disease has been implemented.

## II. LITERATURE SURVEY

Agriculture sectors also help the country to make them stronger in term of relation with other nations [3]. In the recent years researchers developed the plant disease detection using different image processing techniques, some of the developed systems are discussed in this section. Color, edge detection, and histogram matching are used by Shital Bankar et al [4] to diagnose plant disease. The most important aspect of plant disease research is to identify illness using CBIR (content-based image retrieval), which is primarily concerned with accurate detection of infected plants. An improved histogram segmentation approach is proposed for picture segmentation, which can determine threshold automatically and accurately Guiling Sun et al. [5]. Histogram Equalization is used to improve image contrast. K means



clustering is used to segment the images. Using Grey Level Occurrence Matrices, image feature extraction is used to extract the features of leaf disease symptoms. Plant leaf diseases are detected and classified using image processing approaches, according to Iqbaldeep Kaur et al. [6].

SVM Classifiers were used by Kowju Gayatri et al. [7] for the analysis of morbid leaves and morbid leaves collected to detect the diseases type and classification for various plant leaves were collected and tested for the identification of the illness inflicting bacterium, virus, fungi, and pathogens, among other things. For the identification and classification of many leaf diseases, Rekha C. Halli et al. [8] use image analysis & classification form approaches. The segmentation is done by K-Means. The texture features of the GLCM are then extracted, and SVM is used to classify the data. V. Singh and A.K. Misra [9] offer an image segmentation technique that may be used to detect and classify plant leaf diseases automatically. The genetic algorithm is used to do image segmentation, which is an important part of disease detection in plant leaf disease. Artificial Neural Networks, Bayes classifiers, Fuzzy Logic, and hybrid algorithms can all be utilized to increase recognition rates in the classification process. V Pooja, Rahul Das and V Kanchana [10] proposes a disease detection and classification technique with the help of machine learning mechanisms and image processing tools. Finally the obtained results are sent through SVM Classifiers to get the results. The Support Vector Machines outperforms the task of classification of diseases.

### III. SYSTEM DEVELOPMENT

There are many diseases that affect crops and lead to significant production losses, which threaten the issue of food security. Human visual examination with the naked eye is the way most widely used and common. This method gives a large room for error depending on where the farmers trying to detect the disease through visual inspection as a big chance of error in some cases resorting to experts, this latter needs a lot of time, effort and money. Figure 1 shows proposed plant disease detection System Architecture. The binary classifier that makes use of the hyper-plane that is additionally referred to as the choice boundary between 2 of the categories is named a Support Vector Machine (SVM). A number of the issues of pattern recognition like texture classification build the use of SVM. Mapping of nonlinear {input information| input file| computer file} to the linear data provides sensible classification in high dimensional area in SVM. In this study, the images were collected from multiple sources, including the field visit to Wasit governorate in Al-Nu'maniyah district, Due to the difficulty of conducting field visits as well because of seasonal conditions, the researcher was forced to take part of the pictures from websites, mostly to a group of international universities. In this study, images were collected for three crops, wheat, tomatoes and cucumbers, three different diseases for each crop, as well as the health status of each of these crops.

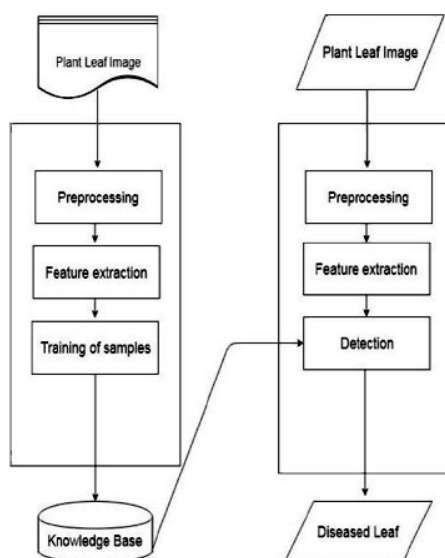


Figure 3.1: Proposed plant disease detection System Architecture.



The image that is captured by a digital camera containing about 30% of the infected plant leaf information and the remaining 70% of the rest of the information is not important because it represents the background. The implementation phase involves the actual materialization of the ideas, which are expressed in the analysis document and developed in the design phase. Implementation should be perfect mapping of the design documenting suitable programming language in order to achieve the necessary final product. Often the product is ruined due to incorrect programming.

#### IV. RESULT

The studies of the plant diseases mean the studies of visually observable patterns seen on the plant. Health monitoring and disease detection on plant is very critical for sustainable agriculture. It is very difficult to monitor the plant diseases manually. It requires tremendous amount of work, expertise in the plant diseases, and also require the excessive processing time. In most of the cases disease symptoms are seen on the leaves, stem and fruit. The plant leaf for the detection of disease is considered which shows the disease symptoms. The disease causing agents in plants will be majorly defined as pathogens of any agent. The symptoms diseased leaf image & then compared with normal leaf image. Figure 2 shows the home screen of the proposed system and figure 3 shows the accuracy of the system.

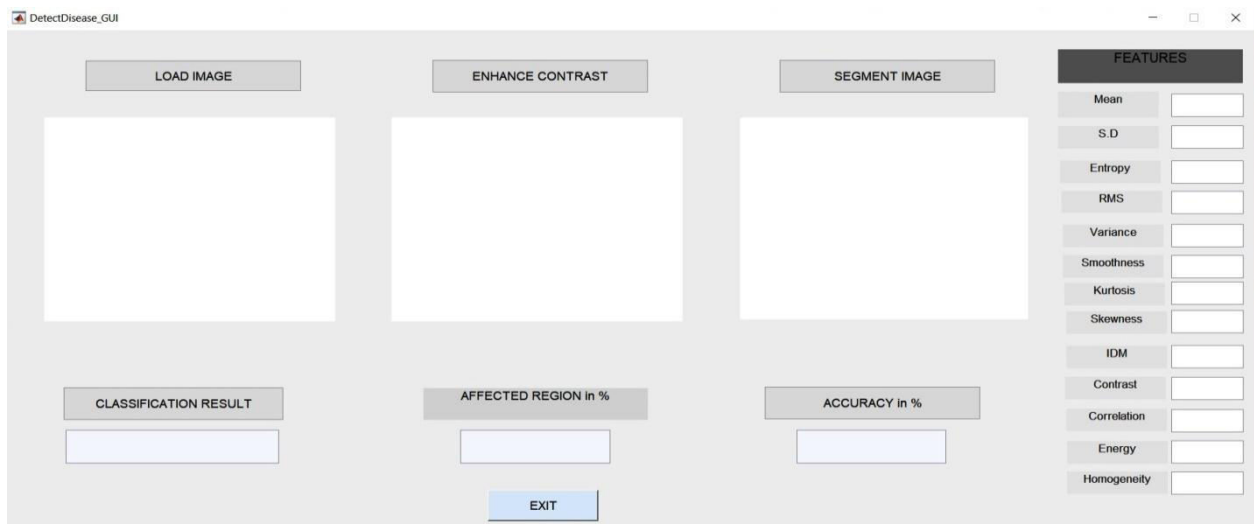


Figure 2 Home Page of the System.

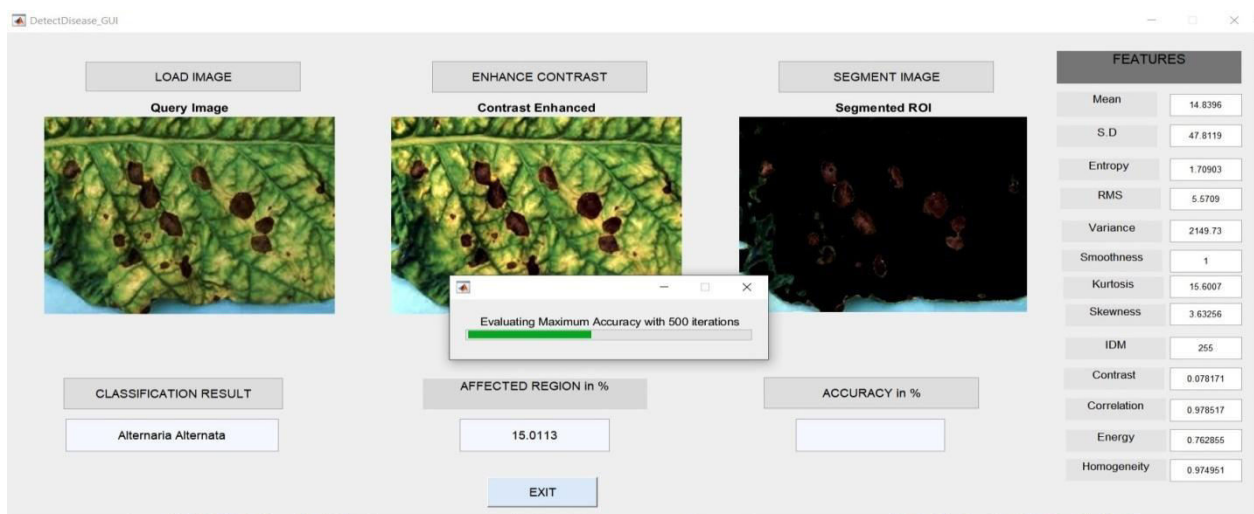


Figure 3 Result of the System.





## V. CONCLUSION

The agriculture department has taken initiative in the prevention of plants from different types of diseases in all seasons. The automation can overcome the manual observation of disease in plants by applying image processing practices plays a role in the computers era. Over decades many researchers have experimented lot of research on plant leaves to detect and recognize a type of diseases, this automation can find early disease that helps to prevent damages for plants and list of some diseases and techniques are specified above in the literature review, which actually bring to a close the importance of continuing the research for the next level of competency.

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