IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 6, June 2020

Spray-Robo: Detection of Infected Plant and Auto-Spraying of Pesticides

Santosh E[1], Ashwini P[2], Devika R[3], Dhanush H S[4], Priyanka K Nayik[5]

Assistant Professor, Department of CS&E, Maharaja Institute of Technology Mysore, Mandya, India[1]

Student, Department of CS&E, Maharaja Institute of Technology Mysore, College, Mandya, India[2,3,4,5]

Abstract: Agriculture is one of the major sources of income in India. Agriculture faces lots of challenges, farmer needs to handle all the challenges. For example, farm maintenance, different diseases on crop and infelicitous management of pesticides. Diseases in plants results in reducing of yield in the plant. Hence detection and identification of diseased plant are important task with continuous monitoring of the crop and apply appropriate pesticides for the better yield of the crop. Generally, whenever a plant(s) is infected with mosaic virus, its symptoms are usually seen on leaves like dark spots, black traces, etc. The amount of infection affected to the plant can be approximated by analyzing the infection symptoms on leaves. To address this problem, there is a need to develop a system which continuously monitors the crop and detects the diseased plants and take appropriate action automatically. Hence, we proposed an automated system called "Spray-Robo" which detects and reacts for the diseased plants using image processing technique and robotic mechanism. Spray-Robo will be able to spray pesticides for the diseased plants with appropriate quantities.

Keywords: Spary-Robo, Image Processing, Identification of Diseased Plant, Spray Pesticide.

I. INTRODUCTION

India is a agricultural country and depends on agriculture for about 80 percent of the population. Plant disease leads to a convincing reduction of both agricultural product quality and productivity. The plant disease studies apply to research on the plants with visually recognizable patterns. Leaf health of plant and disease on plant leaf play the main role in productive crop production at the field. In olden days, only the farmer conducted manual analyses of plant diseases. It requires tremendous amount of effort and considerable processing time, too. Symptoms of the disease are found on the different parts of plant.

Processing of image is thrown center examination region inside designing and software engineering guideline as well. We mostly center around picture handling methods. This incorporates a progression of steps from catching the picture of leaves to distinguish plant is tainted or not. The caught pictures are dissected by different advances like securing, pre-handling, division, grouping. Here the primary element is that the yields in the field are consistently observed. This thusly diminishes the requirement for work in huge homestead lands. Likewise the expense and endeavours are decreased while the efficiency is expanded.

Objectives:

- Loading of the image and preprocessing it.
- Feature extracting and using it for comparison.
- Classification of leaf disease.
- Based on the disease, spraying of approximate amount of pesticides.
- The infection rate is communicated with Spray-Robo to control the spraying of pesticide.

This paper is formalized as follows, Section I contains the introduction of proposed approach, Section II contain the literature survey of our project, Section III contain the proposed system architecture, Section IV contain the methodology used in our system, section V describes results and discussion, Section VI concludes our work with future extensions.

II. LITERATURE SURVEY

Detection and classification of plant leaf diseases using image processing techniques

Perhaps the most simple of all algorithms to predict the test class example is the k-nearest-neighbour method. The time-complexity of making predictions is obvious drawback of the k-nearest-neighbour method. Neural networks are tolerant of noisy inputs, in addition. But hard to follow the structure of algorithm in neural network.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 6, June 2020

Agricultural plant leaf disease detection using image processing
The application of texture statistics to detect plant leaf disease was clarified in this paper, firstly by translating the transformation of color structure RGB into HSV space as HSV is a solid color descriptor Green pixel masking and removal at pre-computed threshold. Then segmentation using 32X32 patch size is performed in the next stage, and useful segments are obtained. Such segments are used by matrix of color occurrence for texture analysis. Ultimately parameters of texture are contrasted with parameters of texture of natural leaf.

An application of K-means clustering and artificial intelligence in pattern recognition for crop diseases
This paper presents the technique for classifying and identifying the various diseases which affect plants through. The approach given here for extraction of a feature set is the method of color occurrence. Neural networks are used for the automated detection of diseases in leaves. The proposed method would greatly promote correct identification of leaves, and appears to be an important approach.

Detection of unhealthy region of plant leaves and classification of plant leaf diseases using texture features
Malady recognizable proof procedure incorporates a few stages from which four fundamental advances are as per the following: initially, a shading structure transition is taken for the RGB image info, and afterward a typical edge esteem is utilized to veil and dispose of green pixels, which is trailed by division process, and the surface insights are resolved for valuable segments. At last, classifier is utilized to distinguish the ailment for the attributes that are expelled. The heartiness of the proposed calculation is demonstrated by the utilization of a database of trial after effects of around 500 plant leaves.

Applying image processing technique to detect plant diseases
A classifier dependent on ANN is embraced which utilizes the blend of shading and surface highlights to perceive and distinguish different diseases of plants. The results are urging and guarantee to create machine vision framework in the zone of plant infection acknowledgment and grouping. The proposed approach can substantially support recognition of both normal and affected products.

III. SYSTEM ARCHITECTURE

Our system first capture the image of leaf through web camera to identify the leaf health. Using image processing and SVM Algorithm, system differentiate the leaf into diseases or non diseased leaf. If the leaf is healthy then using OLED screen we display it as healthy and neglect it. System here trained is for mosaic virus, if disease is found in the leaf, System display mosaic virus on the OLED screen then further process is carried out to know the percentage of disease infected. After identification of disease our system automatically sprays the pesticides to the infected leaf.

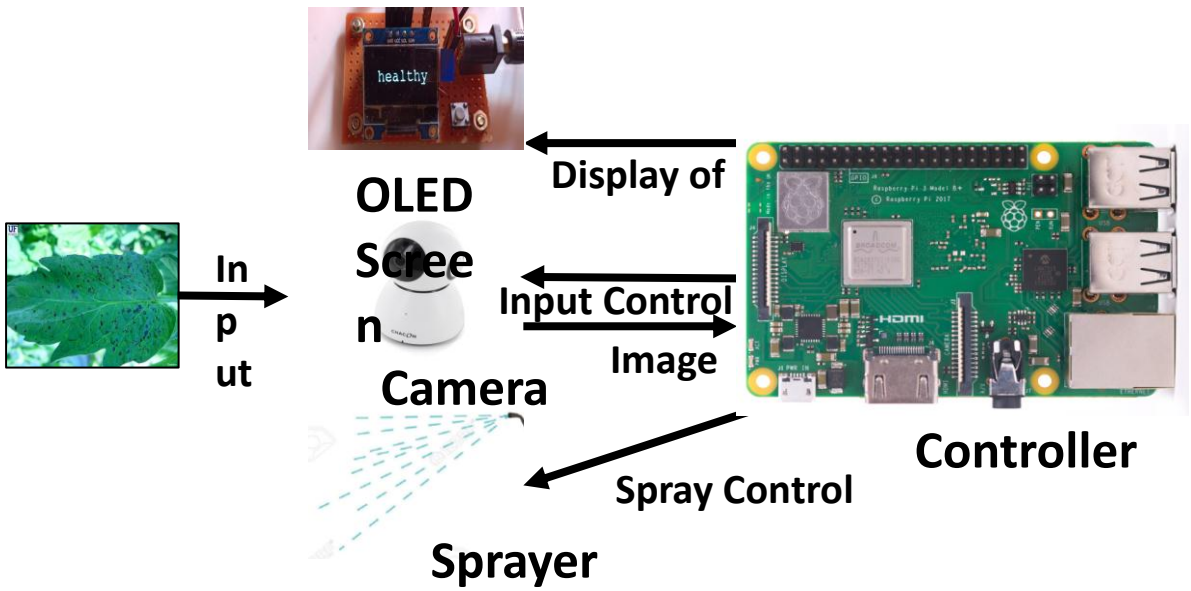

Fig. 1: The Architecture diagram of our proposed system

IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 9, Issue 6, June 2020

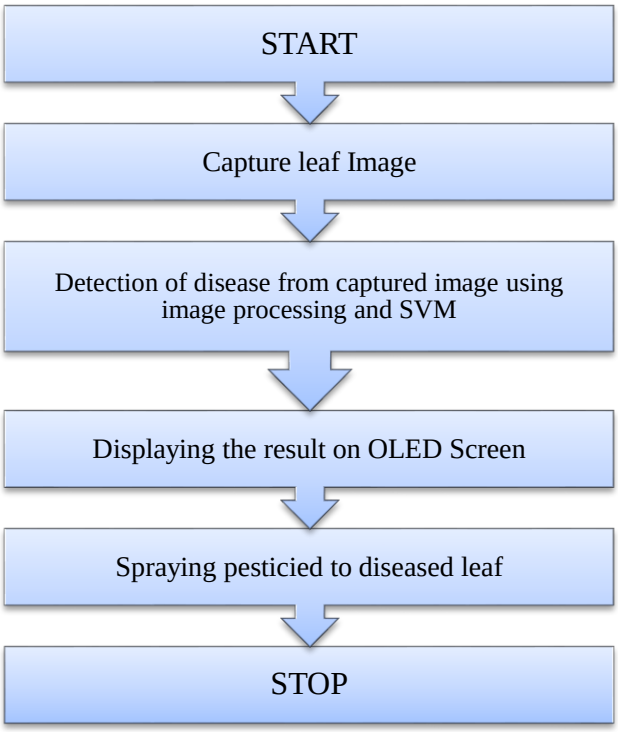

Fig. 2: Overview of the system

Image Processing

1) Image-acquisition:
This stage shows the feedback in the conceptual approach. The pictures are taken from camera. The image of the leaf is extracted and is stored for further phase in the database. The photos are feeded to the machine in real time. White background is generated for further study, proper visibility and easy analysis of images, most leaves differ in color from red to green for accurate segmentation.

2) Pre-processing Image
Preprocessing of the image is required to resize the captured image from high to low resolution. The resizing of the image may be achieved via the interpolation process.

• Noise removal and data standardization are used in this stage as a preprocessing model in which all features are norma lized from vector to unit space.
• We use Gaussian filter for filtering the noise in the image.
• The picture we place for the grayscale process. The captured input image is transformed to a gray image using the equ ation to transform colors
• = 0.3R + 0.59 G + 0.11B
• The image taken in white background results in broad variations between target and background gray values.

3) Image Analysis
Image Review during this step, segmentation of image is done to locate the region of interest. Segmenting the disorder is important step in making it more concrete and easier to evaluate. The segmentation purpose is to improve or adjust the portrayal of a image for further analysis into multiple segments. The technique used in segmentation is region based segmentation which distinguishes healthy and diseased area of the leaf by using leaf color. The database is divided into two sets of images with the specified features to train and check.

4) Effective Extraction
Representation of feature reduction is useful when the image size is large and necessary to complete tasks such as matc hing and retrieval of images quickly

5) Comparison
Trained images are compared with extracted feature of captured image.

6) Disease Identification in Leaf
SVM Algorithm is used to compare captured image with trained image and detect the disease in the leaf.

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 6, June 2020

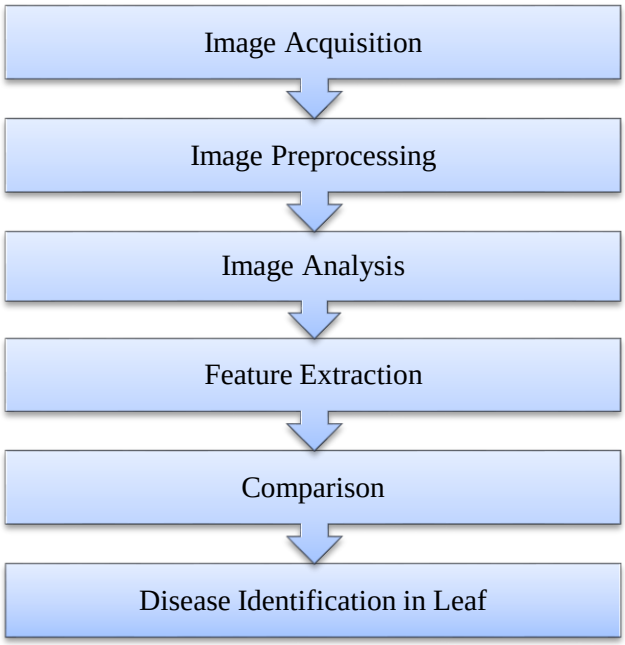

Fig. 3: Flow chart of image processing

IV. METHODOLOGY

Our system "Spray-Robo" use SVM for classification. Firstly, image is captured through web camera. The captured image is segmented and each image divided into five cross five Matrix here image is classified into pixels then the same pixels is classified into three cross three filter in which complete detailed feature are extracted, after extracting a feature each and every extracted feature is loaded into numpy array. The disease trained is for mosaic virus. (Its features are moltted light and dark green on leaves, leaves may be curved, spots of dead leaf tissue become apparent and size of a leaf is reduced.) Loaded pixels are then compared with a trained data set. If the leaf is diseased then system will display as a mosaic virus on OLED Screen, if it is healthy it will display healthy.

V. RESULT ANALYSIS

The aim of our work is to develop an Robot which automatically detects the infected leaves and spray the appropriate about of pesticides which is robust and work in any environment in order to maintain quality and quantity of plant and maintain soil fertility. Here we discuss about the output of our proposed system by showing some figures, which helps in better understanding of our proposed system

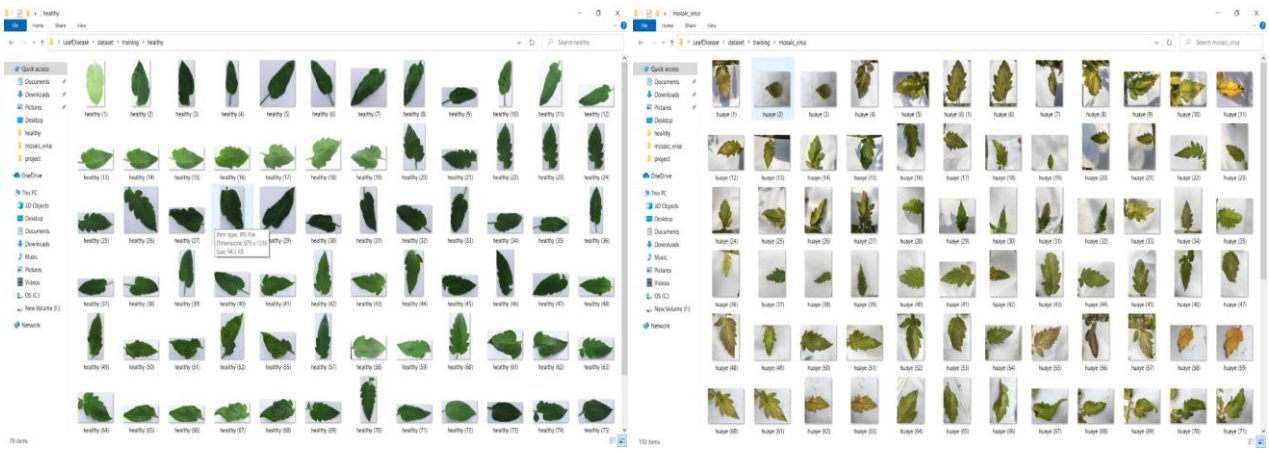

Fig. 4: The dataset of healthy leaves and diseased leaves

IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 9, Issue 6, June 2020

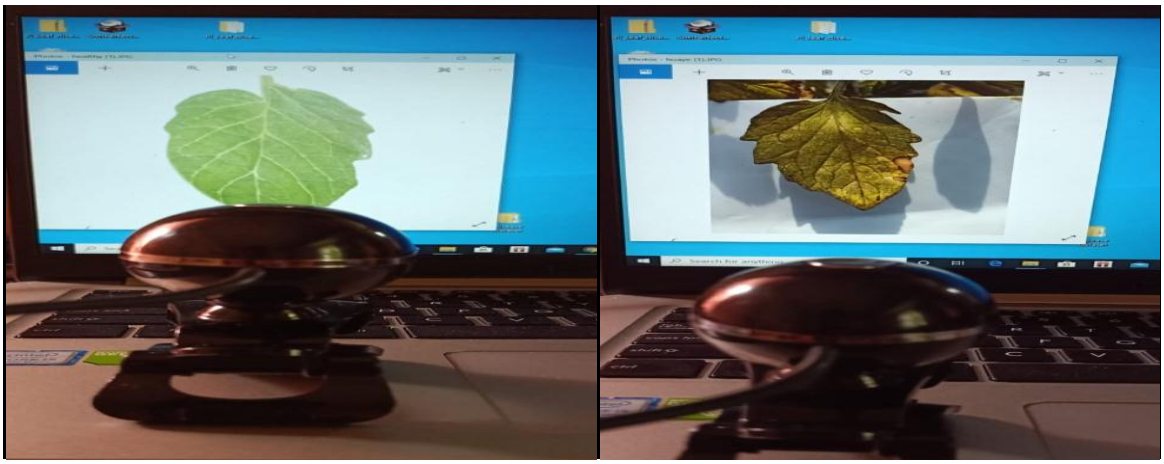

Fig. 5: The figures shows the image acquisition of different leaves

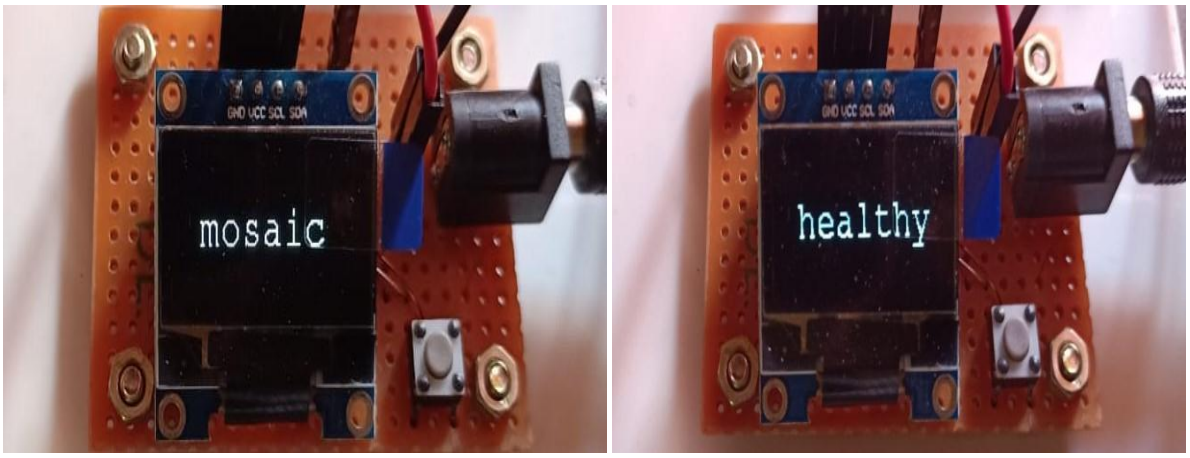

Fig. 6: The figure shows the display of result on OLED Screen.

VI. CONCLUSION

In our system we identify the leaf health using image processing. Here first we differentiated into diseased or non-diseased. If the leaf is said to be non-diseased then it is neglected by displaying it as healthy on OLED Screen. If the disease is found in leaves then further process is carried out to know the percentage of disease infected. When the disease is identified the robot automatically sprays the pesticides based on percentage of infection in the diseased leaf. This research includes a study of the different leaf disease detection techniques. Pace and precision are key characteristics of disease detection. Therefore, there is search on automated, effective, quick and accurate production which is used on unhealthy leaf for the detection of disease Research to build hybrid algorithms & neural networks can be expanded to improve the Rate of recognition for final process of classification. In addition to the measurement of the sum of disease present on the crop.

REFERENCES

[1] Savita N. Ghaiwat, "Detection and classification of plant leaf diseases using image processing techniques" 2015
[2] Prof. Sanjay B, "Agricultural plant leaf disease detection using image processing" 2013
[3] Mrunalini, "An application of K-means clustering and artificial intelligence in pattern recognition for crop diseases" (2011)
[4] S. Arivazhagan, "Detection of unhealthy region of plant leaves and classification of plant leaf diseases using texture features" (2013)
[5] Anand H Kulkarni "Applying image processing technique to detect plant diseases" (2012)
[6] Mr.N.P.Kumbhar, Dr.Mrs.S.B.Patil, "A Review For Agricultural Plant Diseases Detection Using Different Techniques" International journal of Electrical and Electronics Engineering(IJEEE) vol no.9, Issue no.1, January-june 2017.
[7] Mr.Khushal Khairnar, Mr.Rahul Dagade, "Disease Detection And Diagnosis On Plant Using Image Processing". Vol 108 – No. 13, Dec 2014.
[8] Santanu Phadikar And Jaya Sil, "Rice Disease Identification Using Pattern Recognition, Proceedings" 11th International Conference On Computer And Information Technology (ICCIT 2008) 25-27 December, 2008, Khulna, Bangladesh.