Green Leaf Disease detection and Alertness using IoT (Internet of Things)

[1]S.Prakash, [2]K.Sabarinathan

[1]Assistant Professor, [2]Assistant Professor
Department of ECE
CK College of engineering and technology

***Abstract*: This paper talked about a framework utilizing raspberry PI to detect and prevent plant disease from spreading. The k means clustering algorithm was used for image analysis. It has numerous focal points for use in vast harvest ranches and in this way distinguishes indications of sickness naturally at whatever point they show up on plant leaves. In pharmaceutical research, the recognition of leaf ailment is essential and a critical theme for research, because it has the advantages of monitoring crops in the field in the form and thus automatically detects symptoms of disease by image processing using an algorithm clustering k - means. The term disease refers to the type of plant damage. This paper gives the best strategy to recognizing plant infections utilizing picture preparing and alarming the ailment brought about by IoT using Adafruit Cloud and showing the malady name on the framework proprietor's screen display. Automatic detection of symptoms of disease is useful for upgrading agricultural products. Completely automatic design and implementation of these technologies will make a significant contribution to the chemical application. The cost of pesticides and other products will be reduced. This will lead to an increase in farm productivity.**

***Index Terms*: Image processing, Raspberry Pi, Python, IoT.**

I. INTRODUCTION

India is notable for its generation of horticulture. The majority of the masses depends upon horticulture Farmers have a variety of cultivation options in the field. These crops are still cultivated in a technical manner for the best harvest and the highest quality of production. Thus, the yield can be increased and the use of technology can improve quality. Generally speaking, when a plant has disease, we can say that leaves are the fundamental marker of the plant's disease. We can generally observe the spots on her leaves due to illness. However, when the plant has a lot of infection, the whole leaf is secured by the sickness spots. India is quick creating nation and farming is the spine for the nation's advancement in the beginning times. Because of industrialization and globalization ideas the field is confronting obstacles. Over that the mindfulness and the need of the development should be imparted in the brains of the more youthful age. Presently multiday's innovation assumes essential job in every one of the fields yet till today we are utilizing some old procedures in horticulture. Recognizing plant ailment wrongly prompts colossal loss of yield, time, cash and nature of item. Recognizing the state of plant assumes a vital job for fruitful development. In former times ID is done physically by the accomplished individuals yet due to the such a significant number of natural changes the forecast is getting to be extreme. So we can utilize picture handling procedures for recognizable proof of plant malady. By and large we can watch the side effects of ailment on leafs, stems, blossoms and so forth so here we use leafs for distinguishing proof of sickness influenced plants.

II. LITERATURE SURVEY

Image acquisition, pre processing of images, extraction of features, recognition and order of plant infection are the essential strides for ailment discovery utilizing image Processing. High quality and clarity of enhanced images compared to the original image the created handling plan comprises of four primary stages as in the accompanying two stages are included progressively after the division stage. In the initial step we recognize the mostly green hued pixels. Next, these pixels are conceal dependent on explicit limit esteems that are processed utilizing Otsu's technique, at that point those for the most part green pixels are veiled. The other extra advance is that the pixels with zeros red, green and blue qualities and the pixels on the limits of the tainted group (object) were totally expelled. The trial results exhibit that the proposed strategy is a powerful procedure for the location of plant leaves infections. The created algorithms proficiency can effectively recognize and arrange the inspected illnesses [1].

The primary colors of the color image are red, green and blue. Because of its range, it is hard to implement the application using RGB. They therefore convert RGB to gray pictures. Detection of plant disease by some automatic technique is beneficial as it reduces extensive monitoring work in large crop farms and distinguishes the side effects of the illness itself at very early stages They presented a survey on different techniques of classification [2]. Abdul bari et al used MATLAB in their paper to extract and recover images. Digital camera is used to capture images here [3].

III. DISEASES

Leaf miners are the larval stage insect family. They feed between the top and bottom of the leaf.

Fig 1. Leaf minor disease

Because of the huge measure of bug in the plant, it is truly harmed. The quantity of slimy parasites can be six on one leaf. It can thusly genuinely harm the plant leaf. It can restrain plant development, inciting lower yields.

Fig 2: Yellow Spot Diseases

We can build up a picture handling system to recognize and arrange the sickness. This counteracts human impedance and consequently prompts an exact, fair choice. When all is said in done, whatever our observation on the ailment is used only for the sickness decision. A plant disease sign is a conspicuous effect on the plant. Signs can change the shading, change the shape or change the plant's ability as demonstrated by its response to pathogens, bugs, etc. The contracting of the leaf is a feature. Verticilium wither symptom. It is realized by V. dahliae and Verticillium alboatrum infectious plant pathogens. Generally fundamental signs of bacterial contamination are dull shaded, necrotic wounds included by a magnificent light yellow brilliance on the edge of the plant leaf or inside the leaf on the bean plants. You don't see the pathogen of the illness, yet a reaction achieved by the pathogen.

IV. Stream Diagram of the System

IV. (I) Block Diagram

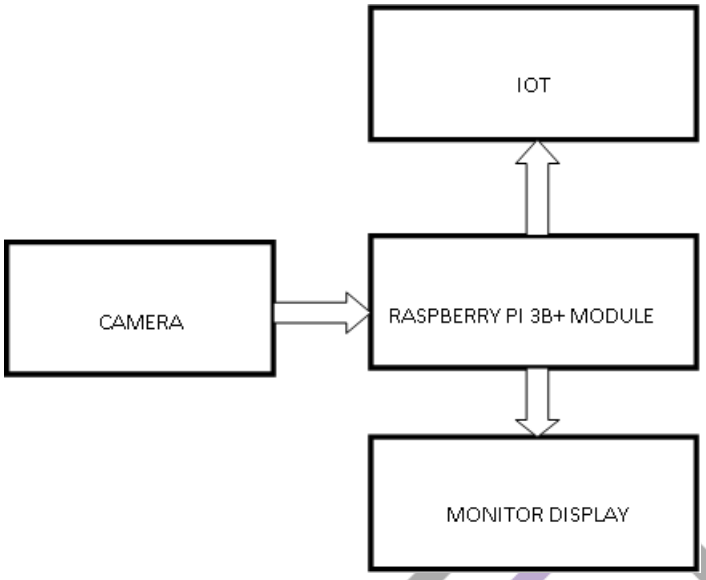

Fig 3: block diagram of plant disease detection.

A. Block Diagram Description

1. Power Supply
A 5V, 1A control supply is required for this framework. The exceptional association is accommodated the raspberry pi demonstrate B. The power supply can be given by utilizing that USB association.

2. Camera
Used to catch a yield picture, it is legitimately associated with the Pi 3 Model B raspberry. There are two different ways to associate the camera to the Pi 3 display B raspberry. The first is by means of USB port and the second is a 15pin header for raspberry Pi3 camera interface.

3. Raspberry PI
Raspberry Pi is a little PC like module. The camera caught picture will be sent to the Raspberry Pi. Using Open CV library; Raspberry Pi forms the picture and recognizes it.

4. WiFi
Used to send the information to the framework proprietor through cloud, this information is the name of the infection the processor identifies.

5. Screen as presentation
The screen shows the name of the infection identified and the name of the pesticide.

IV. (II) Flow Diagram:

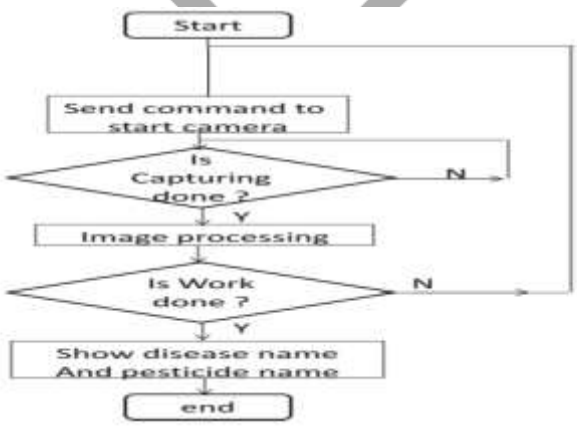

Fig 4: flow diagram of disease detection

V. Algorithm

1. Capture the RGB format image.
2. Produce structure of shading change.

3. Convert RGB shading regards to the predefined space in that structure.
4. Apply K means image segmentation Grouping.
5. Green pixel masking (green channel masking).
6. Eliminate the masked cells within the infected cluster edges.
7. Convert the RGB to HIS infected cluster.
8. SGDM matrix generation for H and S.
9. To calculate its features, call GLCM function.
10. Texture statistics computing
11. Recognition configures k - m (classifier).

Disease detection using the method of K Means Clustering [2]. The algorithm provides the vital strides to recognize the plant leaf Image. In the underlying advance, the RGB pictures of all leaves are for the most part caught by camera. In stage 2 a shading change structure is framed and afterward shading space change is connected in stage 3. So as to perform stage 4, these two stages are to be expected. In stage 2 a shading change structure is shaped and afterward shading space change is connected in stage 3. So as to perform stage 4, these two stages are to be expected. In stage 2 a shading change structure is shaped and after that shading space change is connected in stage 3. So as to perform stage 4, these two stages are not out of the ordinary. These four stages are in stage one, identified and controlled by the infected objects. The green pixels will be recognized in step 5.Then green pixel covering is done as pursues: if the pixel's green shading esteem is not exactly the limit esteem that we have officially determined, at that point the pixel's red, green and blue part esteems are made zero.

This is done because this is the part that has not been affected that is the reason esteems are made zero which additionally prompts a decrease in counts. Also, the time eaten up by the raspberry pi3 to show the last yield will be phenomenally diminished.

The pixels with zero a motivating force for red, green and blue and the pixels at the edge of the debased bundles are completely ousted in step 6.Phase 2 consolidates stage 5 and stage 6, and this stage gives included clarity in the gathering of this infection. These outcomes with extraordinary acknowledgment and execution should be lessened to its base regard; similarly concerning the most part required figuring time.

The contaminated group will be changed over from RGB structure to HSI position in step number seven. Starting now and into the foreseeable future, the SGDM frameworks will be made for each pixel of the picture. In any case, this is cultivated for pictures of H and S and not I. Truly, the SGDM [1] measures the likelihood that a given pixel will happen at a particular dim measurement at a substitute partition and presentation edge from the other pixel, anyway pixel has a second explicit diminish level. For every single picture, surface measurements are produced from the SGDM frameworks. Inside the edge of the corrupted bit of the leaf, the features are resolved for the pixels present. That suggests uninvolved the part that isn't influenced inside the breaking point of sullied parts. Stages 7 to 10 under stage three.
In this phase the texture related characteristics are calculated for the segmented objects. Finally, the process of recognition was performed in the fourth phase. The ventures in the calculation are rehashed each time for each picture we captured. The result will be transferred to the IoT Module after this. The result will also be displayed on the monitor.

VI. TECHNOLOGIES

A.OPENCV

Open CV represents Computer Vision Open Source. It contains the library of programming capacities for is AI programming. Open CV is required for picture handling applications continuously. OpenCV is created generally in C, C++ and its guideline interface is in C++ language, yet regardless of all that it holds a less no matter how you look at it yet wide C language interface.

B.PYTHON

Is modest Python, simple to learn. It is required for raspberry Pi - related code programming. Python is a language that supports both as packages and modules. Besides the standard library, it also has a Python interpreter. They are available to all platforms free of charge in both source and binary form, and can be unreservedly disseminated to everyone. Python is a language scripting that empowers line - by - line execution of the code

C.Tomcat server

There are two server types
1. Server of applications
2. Web server

Apache Software Foundation is developing an open source web server. The database includes images of the infected and healthy leaves from different angles in our system. This is a large database. Some processes also require java based systems for image processing. So we are using this server from Tomcat.

VII. Expected Result

Leaves of illnesses are chosen for recognition as fine buildup, fleece mold, dark Dot. The server makes the database for solid leaves and sick leaves. To contrast the pictures and wiped out and solid leaves, this is essential.

The sort of illness is along these lines arranged by examination. Figure 6, Figure 7, Figure 8 demonstrates the normal yield, which incorporates for the most part portioned picture, grayscale picture, removed picture highlight of Fig 5.

Fig.5: Downy mildew

Fig. 6: segmented image

Fig 7: Grayscale image

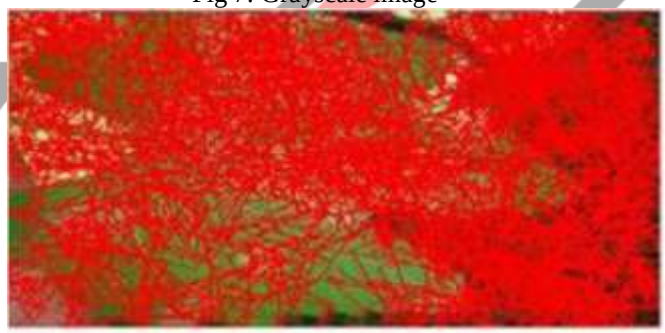

Fig. 8: Feature extracted image

VIII. Conclusion

There are essentially three fundamental kinds of Leaf ailment, Bacterial, Fungal and Viral. The precision of plant ailment recognition is essential in plant ailment location, however the procedure ought to be rapid in the meantime Work can be stretched out by utilizing quad copter at field level to catch pictures of the leaves of the different plants in the farm. For further handling, this framework can be associated with the server. The point of this work is to identify, group leaf ailments utilizing picture preparing instruments and send all data about the sickness through the IoT module to the farmer's mobile phone.

References

[1] M. Reyalat, Al Hiary, Braik, Bani Ahmad, and Z. Rahamneh, "Fast and accurate plant disease detection and classification."International journal of Computer Applications (0975-8887), Vol-17, No1, March 2017

[2] Smith J S., Camargo A., "An algorithm based on image processing to aut omatically identify visual symptoms of plant disease."

[3] S A Ali,Sulaiman, N., Mustapha,"K means accuracy clustering." Information technology journal 1256-1262, 2009, ISSN 1812-56322009 Asian network for scientific Information.[1]