

REAL TIME AUTOMATION OF AGRICULTURE FOR DETECTING PLANT DISEASES

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Abstract : In agricultural land, there are lot of plants affected by number of diseases. Just like we can get sick, plants can get sick too and sometimes, the same type of things that make us sick can affect our green companions. A sick plant can even look under the weather. Its leaves may wilt or have holes in it. Early data on leaf well-being and sickness discovery can encourage the control of illnesses through legitimate administration techniques. If not treated, these plants may succumb to the disease and perish. Pathogens are any organism that makes plants ill, whether it be another animal such as an insect, or smaller organisms such as bacteria and viruses. Normally we have to check each and every plant to identify the plant disease. And we treat disease by various methods like MILK SPRAY, ELDER LEAF SPRAY, HORSERADISHSPRAY, BAKING SODA ...etc. This proposed system solves these problems so that we can automatically detect plant diseases and can apply self-treatment. This paper presents a method for early detection of leaf diseases in plants based on some important features extracted from its leaf images. Here we use BEAGLE BONE BLACK DEVICE which stores healthy leaf images and compare it with current images which is called IMAGE PROCESSING. so after image processing, if the disease leaves are found, then it enables auto medicining. Medicine supply is enabled through Sprinkler or Drip irrigation method, climatic conditions. To avoid spreading the diseases, Temperature sensors and moisture sensors are used. These sensors control spreading diseases.

IndexTerms - Beagle Bone, GSM, Auto-Medicining, Disease

I. INTRODUCTION

Plant disease, an impairment of the normal state of a plant that interrupts or modifies its vital functions. All species of plants, wild and cultivated alike, are subject to disease. Although each species is susceptible to characteristic diseases, these are, in each case, relatively few in number. The occurrence and of plant diseases vary from season to season, depending on the presence of the pathogen, environmental conditions, and the crops and varieties grown. Some plant varieties are particularly subject to outbreaks of diseases while others are more resistant to them. Monitoring and disease detection on plant is very difficult for sustainable agriculture.

The main objective of this program is to automatically detect plant diseases and to supply auto medicining. The beagle bone device is used in this treatment. The healthy images are prestored in the beaglebone black device. And using the webcam, we get the current leaf images. The camera which is interfaced to the Beagle bone black captures the leaf images continuously and compares it with the leaf's database. If there are any changes then auto-medicining is employed depending upon the conditions. Embedded system for automatic medicining to an agriculture field offers a potential solution to support site specific irrigation

The healthy leaf images are compared with the current leaf images which is called image processing. If the diseases are detected, then the user enables auto-medicine. If he clicks auto-medicine on, then the medicine is supplied to the plants through the sprinkler. GSM technology is used to get the information of plant diseases to the user.

II. SCOPE OF THE PROJECT

The main objective of this project is to monitor the plant health and detect the plant leaf diseases based on the texture of the leaf at the early stage in order to reduce spreading of diseases by enabling Auto-medicine to the plants through Beagle bone Black.

The camera which is interfaced to the Beagle bone black captures the leaf images continuously and compares it with the leaf's database. If there are any changes then auto-medicining is employed depending upon the conditions.

III. NECESSITY OF THE PROJECT

As smart technologies make headway across industries, the agriculture sector is not to be left behind. A considerably rising demand for the same is noted especially across the agriculture sector in developed economies. Latest technologies such as micro controller, cloud- or web-based platform, cameras, sensors, and smart devices, sensors, and cameras are implemented to help farmers understand their land condition better.

Plant diseases cause periodic outbreak of diseases which leads to large scale death and famine.

It is estimated that the outbreak of Helminthosporiose of rights in North east India in 1943 caused a heavy loss of food grains and death of million people.

The proposed system is a software solution for automatic detection and computation of texture statistics for plant leave diseases.

IV. LITERATURE SURVEY

Table 1 survey about the proposed work.

The above tabular column shows the detailed survey about the Real Time Automation of Agriculture for Detecting Plant Disease. Even though more number of research works was carried out in the past for Real time automation Agriculture for detecting plant Disease but the quantification of the system is very less. Only limited numbers of research works were carried out related to the clustering.

Name of the author	Title of the paper	Publications/ year	Concept	Advantages	Disadvantages
Channamallikarjuna Mattihalli	Real time Automation of Agriculture Land, by Automaticall y Detecting Plant Leaf Diseases and Auto Medicine	2018	Sicknesses in plants cause real creation and financial misfortunes and in addition diminishment in both quality and amount of agrarian items. Early data on leaf well being and sickness discovery can encourage the control of illnesses through legitimate administration techniques. This paper presents a method for early detection of leaf diseases in plants based on some important features extracted from its leaf images.	Plant diseases can be detected at early stage. And Spreading of diseases can be avoided. Information about the plants and system will be intimated to the user through GSM interfacing. Automatic enabling of medicine supply to the infected plants.	Human immune mechanism is complex
Siddharth Singh Chouhan	Bacterial Foraging Optimization Based Radial Basis Function Neural Network (BRBFNN) for Identification and Classification of Plant Leaf Diseases: An Automatic Approach Towards Plant Pathology	2018	The contribution of a plant is highly important for both human life and environment. Plants do suffer from diseases, like human beings and animals. There is the number of plant diseases that occur and affects the normal growth of a plant. These diseases affect complete plant including leaf, stem, fruit, root, and _ower.	The plant serves as the basic need for any living organisms. They are the most important and integral part of our surroundings. Just like a human or other living organism does plant do suffer from different kind of diseases.	More Complex and Time consuming

Reza Malekian	IoT solutions for precision agriculture	2018	In this paper, precision agriculture is set to provide higher productivity and a better use of resources when compared to traditional methods and this will result in lower costs with higher yields.	The sensor network systems presented here all share the same basic features: a wireless sensor/actuator network connected to a server and database.	It has Detection Rate of only 53.34% and a False Positive Rate of 0.20%.
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V. PROPOSED SYSTEM

This proposed system consists of a device called Beagle bone black; it is interfaced with a digital camera or web camera which is used to detect the diseases in leaves.

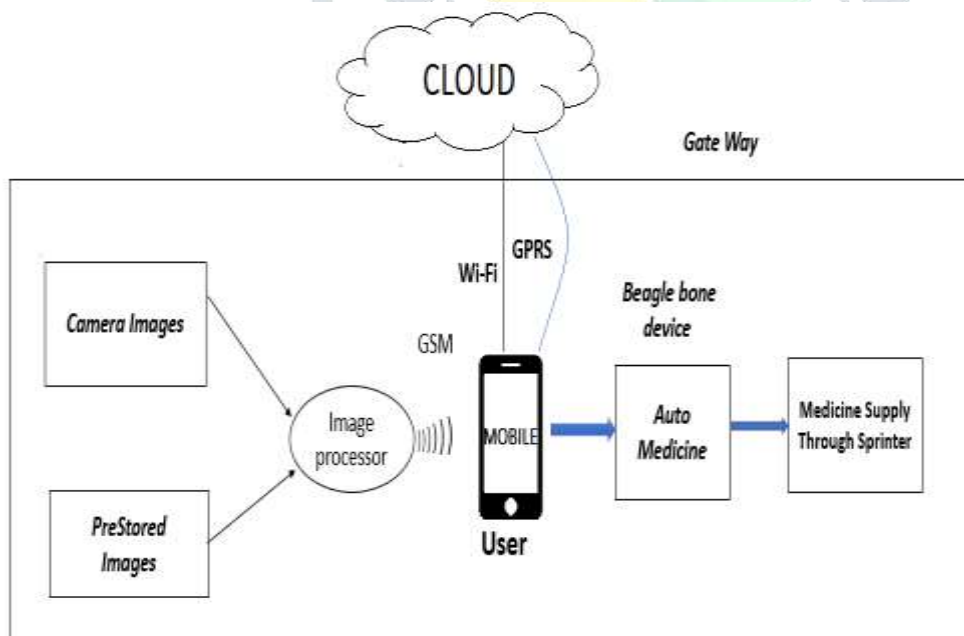
In the proposed system, images of leaves are captured and compared with image healthy leaves images which are in database that are pre-stored in the device.

After image processing, if the plants are found infected, this device automatically turns on the valves, through which medicine supply is enabled or disabled automatically to the plant area through a sprinkler or drip irrigation

VI. ADVANTAGES

This proposed system provides the smart solution for plant diseases treatment. so this reduces human effort and time. Plant diseases can be treated effectively. This system is effective, low cost and user friendly.

VII. ARCHITECTURE



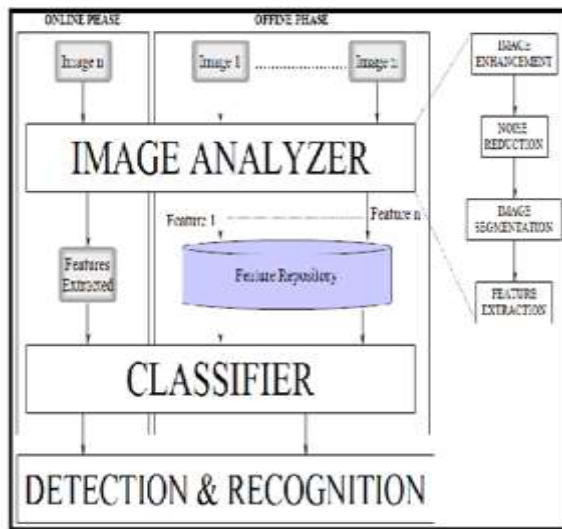
The camera images and the prestored images which are there in beagle bone device are compared and processing is done through the image processor.

If the images are found infected, then user enables auto medicine from the software from his gsm mobile the auto medicine is enabled then the medicine is supplied through the sprinkler of that particular plant.

The devices and sensors used here are connected to the cloud through the gateway using WI-FI.

VIII. MODULES

1. IMAGE ANALYSER



2. BEAGLE BONE

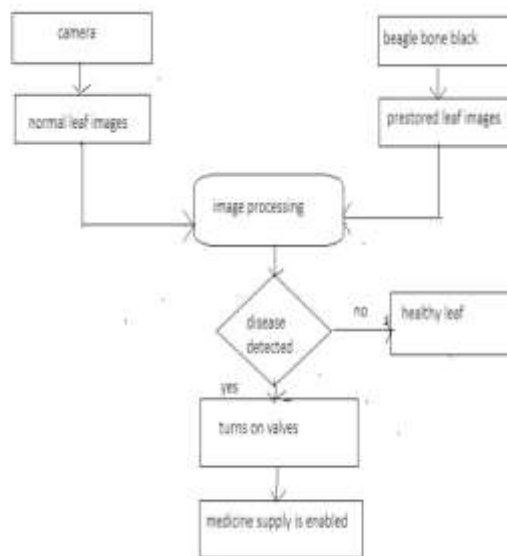
BeagleBone Black is a low-cost, community-supported development platform for developers and hobbyists, featuring the Sitara AM3358BZCZ100 ARM Cortex-A8 32-Bit RISC microprocessor from Texas Instruments. It is similar to the BeagleBone but with some previous features removed to make way for the excellent new features. The Beagleboard.org platform has a proven track record of facilitating innovation from concept to market and BeagleBone Black's enhanced feature set enables developers to turn ideas into prototypes more easily than ever. Whether operating standalone or in conjunction with another computer, this new BeagleBone will provide developers easy access to industry standard interfaces and a well-developed ecosystem of software and tools. The original BeagleBone's cape plug-in boards are also compatible with the BeagleBone Black, making easy integration with previous projects yet another advantage.

3. THE IMAGE IDENTIFICATION FORM SOFTWARE

Computers can use machine vision technologies in combination with a camera and artificial intelligence software to achieve image recognition. While human and animal brains recognize objects with ease, computers have difficulty with the task. Software for image recognition requires deep machine learning. Performance is best on convolutional neural net processors as the specific task otherwise requires massive amounts of power for its compute-intensive nature. Image recognition algorithms can function by use of comparative 3D models, appearances from different angles using edge detection or by components. Image recognition algorithms are often trained on millions of pre-labeled pictures with guided computer learning.

IX. FLOW DIAGRAM

From this flow chart, here from the web cam we get the current leaf images and from the beagle bone we get the original leaf images which are prestored in that device. These both image are compared and processed which is called image processing. From the image processing, if the images are found diseased then the valves will be turned on automatically. If there is no disease found, then the process will be stopped.



IX. ALGORITHM

1. The ImageProcess will compare the images from web camera and prestored images from BeagleBone black device
2. It determines if the leaf is diseased or not and return the result.

ImageProcess(normal_leaf_images, prestored_leaf_images)

Input:

Camera device->normal_leaf_images

BeagleBone_black device->prestored_leaf_images

Output: bool diseased_or_not

```

{
diseased_or_not=false
if(normal_leaf_images!=prestored_leaf_images):
    diseased_or_not=true
else:
    diseased_or_not=false
return diseased_or_not
}
  
```

1. Disease_detect takes the result from previous module as input to determine if the leave is diseased or not.
2. If the leave is diseased then the check is made for turn_on_values and the particular disease is detected.
3. The cure and the medicine supply for the detected disease is implemented through sprinklers system using BeagleBone black device.

Disease_detect(diseased_or_not)

Input: diseased_or_not

Output: (result)decision taken for either cases

```

{
    if(diseased_or_not=false):
        result=healthy_leaf
    else:
        {
            result=diseased_leaf
            check(turn_on_values):
                disease=detect_disease
            BeagleBone_black device -> disease_cure(disease)
                medicine_supply=enable
        }
}
  
```

X. CONCLUSION

This proposed system helps to identify diseases in plants. And self-treatment is enabled by turning the valves and medicine is supplied through the sprinkler. The information of the operation of valves is sent to the user through GSM technology. And using the temperature sensors and moisture sensors, we can control the spreading the diseases. The entire project runs through the beagle bone black device.

XI. REFERENCES

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