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# Plant Monitoring System using Image Processing

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**ABSTRACT:** The automatic plant monitoring system has recently attracted tremendous interest due to the potential application in emerging technology. More importantly, this technique is used to enhance the performance of existing techniques or to develop and design new techniques for the growth of plants.

The plant monitoring system is helpful for watering the plants and to monitor few parameters for growth of plants. This system is very useful in few areas like nursery farms and in agriculture.

In this system a mechanism is established to obtain data by capturing the images of the plant by using camera and processing the image by using image processing to analyze intensity of sunlight, estimates the type of crops by creating the feature database and retrieval of images from database similar to query image. Determines the diseased part by colour identification methods.

**KEYWORDS:** Monitoring, intensity, mechanism.

## I. INTRODUCTION

Plants become an important source of energy and only a primary source to the problem of global warming. The damage caused by emerging, re-emerging and endemic pathogens, is important in plant systems and leads to potential loss economically. In addition, Leaf diseases contribute directly and indirectly to the spread of human infectious diseases and environmental damage. As these diseases are spreading worldwide causing damage to the normal functioning of the plant and also damaging the financial condition by significantly reducing the quantity of Leafs grown. The Leaf production losses its quality due to much type diseases and sometimes they occur but are even not visible with naked eyes.

Farmers estimate the diseases by their experience but this is not proper way. Generally, the plant is affected by diseases, pests, unfavorable conditions and nutrition deficiency. The symptoms and the losses caused by these diseases and pests are different and their life cycles are also different hence the adopted control measure are also completely different. Plant diseases are mainly originated by parasitic and non-parasitic causes. The main approach adopted in practice for detection and identification of plant diseases is naked eye observation of experts. The decision making capability of an expert also depends on his/her physical condition, such as fatigue and eyesight, work pressure, working conditions such as improper lighting, climate etc. That's why this is not a proper way and also time consuming. It might be expensive as continuous monitoring of experts in large farms.

So, we need a fast way and remote sensing form to protect the Leaf from disease. The leaf area monitoring is an important tool in studying physiological features related to the plant growth, photosynthetic & transpiration process. The classification and recognition of Leaf diseases are of the major technical and economic importance in the agricultural Industry.

Automatic detection of plant diseases is an essential research topic as it may prove benefits in monitoring large fields of Leafs and thus automatically detect the symptoms of diseases as soon as they appear on plant leaves. Therefore looking for fast, automatic, less expensive and accurate method to detect disease by calculating leaf area through pixel number statistics. Automatic detection of plant diseases is an important research topic these days as it may prove benefits as automatically detect the diseases from the symptoms that appear on the plant leaves.

## II. PLANT MONITORING SYSTEM

The plant monitoring system is helpful for watering the plants and to monitor few parameters for growth of plants. This system is very used in few areas like nursery farms and in agriculture. This helps in providing the appropriate amount of water for plants so reduces some situations like mud cracks, water logging.



OpenCV library in Python and few data structures are used to fulfill the requirements of our project. OpenCV is a library of programming functions mainly aimed at real time computer vision. In simple language it is a library used for image processing.

### III. PROPOSED WORK

#### A. Detecting the moisture content in the soil

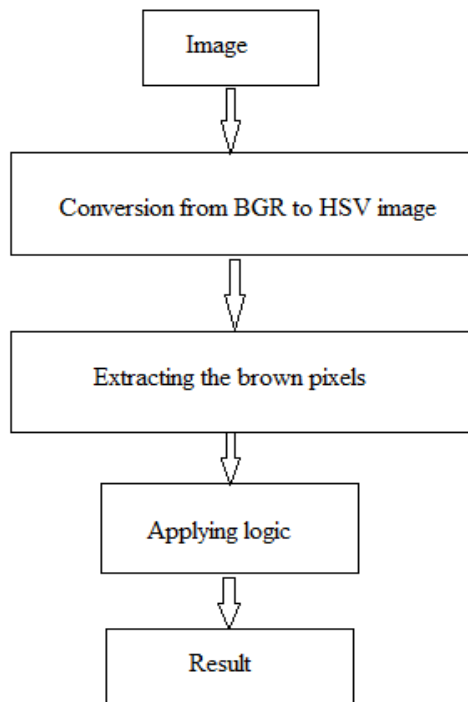


Fig.3.1: Block diagram for detecting the moisture content in the soil

B. Determining the type of soil

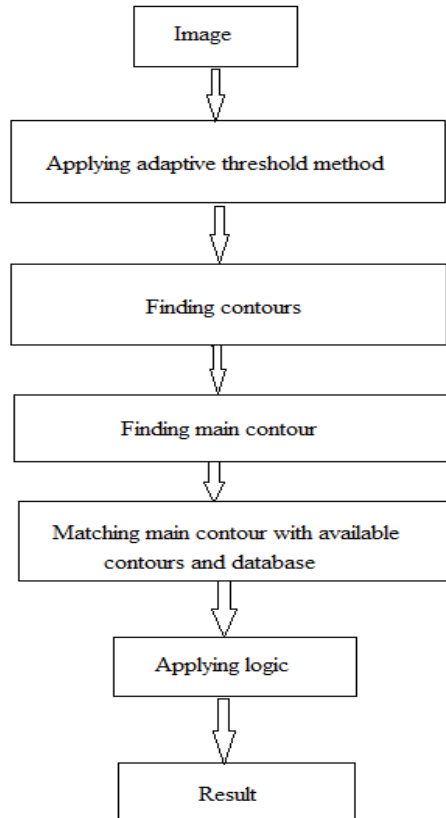


Fig.3.2: Block diagram for detecting the type of soil

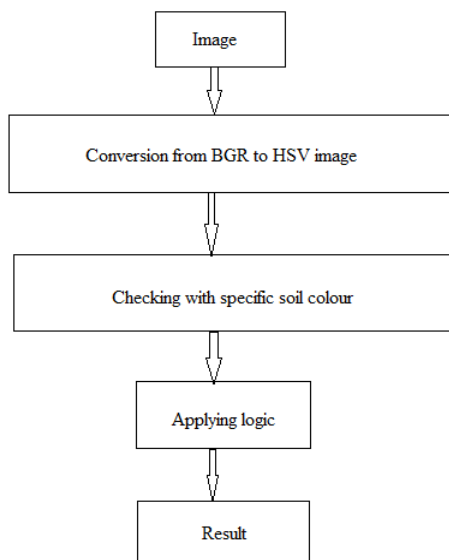


Fig.3.3: Block diagram for estimating the damaged part of the leaf

C. Estimating the damaged part of the leaf

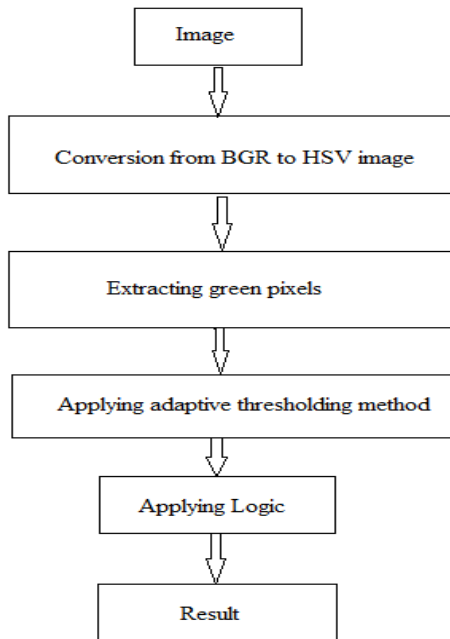


Fig.3.4: Block diagram for detecting the type of plant

#### IV. RESULTS

A. Moisture content in the soil



Fig. 4.1: Image of the water in soil



Fig.4.2: Resultant image with brown and black pixels



Fig.4.3 : Output of the soil from website

B. Type of soil



Fig.4.4: Black soil



Fig.4.5 : Website output for type of soil

C. Damaged part of the leaf

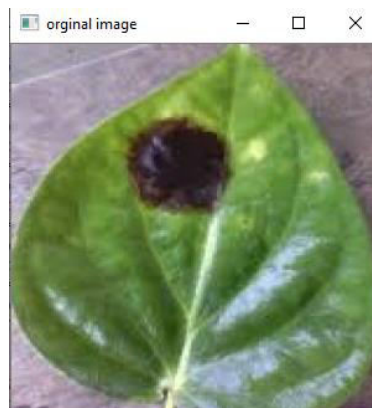


Fig.4.6 : Damaged part of the leaf



Fig.4.7 : Damage percentage of the leaf from website

D. Type of plant



Fig.4.8 : Original banana leaf for testing

```
===== RESTART: C:\Users\Dell\Desktop\practice2.py =
matching with banana leaf  98.56746313856306  percentage
matching with mango leaf  58.332309523417166  percentage
matching with cotton leaf  43.10022733801979  percentage
seems like a banana leaf..
```

Fig.4.9 : Output of the test leaf

V. CONCLUSION AND FUTURE SCOPE

Image processing is highly vulnerable to false outputs as there are many obstacles which are unknown to the processing unit. The estimated success rate for the code was to pass 4 out of 10 test cases but it overcomes its limits by passing 6 out of 10 cases. The efficiency of the project will keep on increasing by training the model with a lot of data and other different modification techniques.

Paper [1] presents classification and detection techniques that can be used for plant leaf disease classification.

In paper [2] there are four steps. Out of them the first one is gathering image from several part of the country for training and testing. Second part is applying Gaussian filter is used to remove all the noise and thresholding is done to get the all green color component. K-means clustering is used for segmentation. All RGB images are converted into HSV for extracting feature.

The paper [3] presents the technique of detecting jute plant disease using image processing.

According to paper [4] they have proposed for a technique that can be used for detecting paddy plant disease by comparing it with 100 healthy images and 100 sample of disease1 and another 100 sample of disease2. It's not sufficient enough to detect disease or classify it training data is not linearly separable.

In paper [5] detection of unhealthy plant leaves include some steps are RGB image acquisition.

Paper [6] includes tomato disease detection using computer vision.

The methodology for cucumber disease detection is presented in paper [7].

In paper [8] RGB images are converted into gray scale image using color conversion. Various enhancement techniques like histogram equalization and contrast adjustment are used for image quality enhancement.

In paper [9] popular methods have been utilizes machine learning, image processing and classification based approaches to identify and detect the disease of agricultural product.

In paper [10] image processing technique are used to detect the citrus leaf disease.



#### REFERENCES

- 1) Dhiman Mondal, Dipak Kumar Kole, Aruna Chakraborty, D. Dutta Majumder" Detection and Classification Technique of Yellow Vein Mosaic Virus Disease in Okra Leaf Images using Leaf Vein Extraction and Naive Bayesian Classifier., 2015, International Conference on Soft Computing Techniques and Implementations- (ICSCTI) Department of ECE, FET, MRIU, Faridabad, India, Oct 8-10, 2015.
- 2) Pranjali B. Padol, Prof. Anjil A. Yadav, "SVM Classifier Based Grape Leaf Disease Detection" 2016 Conference on Advances in Signal Processing (CAPS) Cummins college of Engineering for Women, Pune. June 9-11, 2016.
- 3) Detecting jute plant disease using image processing and machine learning 2016 3rd International Conference on Electrical Engineering and Information Communication Technology (ICEEICT)
- 4) Tejoindhi M.R, Nanjesh B.R, Jagadeesh Gujanuru Math, Ashwin Geet D'sa "Plant Disease Analysis Using Histogram Matching Based On Bhattacharya's Distance Calculation" International Conference on Electrical, Electronics and Optimization Techniques (ICEEOT)-2016
- 5) Detection of unhealthy plant leaves using image processing and genetic algorithm with Arduino 2018 International Conference on Power, Signals, Control and Computation (EPSCICON)
- 6) Tanvimehera, Vinay Kumar, Pragyagupta "Maturity and disease detection in tomato using computer vision" 2016 Fourth international conference on parallel, distributed and grid computing (PDGC)
- 7) Ms. Poojapawar, Dr. Varsha Tukar, Prof. Parvin Patil "Cucumber Disease detection using artificial neural network"
- 8) Detection and measurement of paddy leaf disease symptoms using image processing
- 9) Mukesh Kumar Tripathi, Dr. Dhananjay, D. Maktedar" Recent Machine Learning Based Approaches for Disease Detection and Classification of Agricultural Products" International Conference on Electrical, Electronics and Optimization Techniques (ICEEOT)-2016.
- 10) Detection of leaf diseases and classification using digital image processing International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS)-2017





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