Plant Health Monitoring System through Image Processing and Defects Overcoming Through Embedded System

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Abstract: Agriculture is the back bone of the world Economy, 75% of countries depends on agriculture. Farmers have different type of multiformity for selecting various suitable crops and finding the relevant pesticides for plant. Affected plants drive to the heavy decrement in both the quality and quantity of agricultural profits. Monitoring the condition of the plant plays an important role in successful cultivation of crops in farming. In ancient days, the observation and analysis process of plant growth and diseases detection were done through manually by the expertise person. But it needs tremendous amount of manual work and also requires huge processing time. With the help of modern technology image processing methods can be involved in the plant disease detection. In large number of cases affected symptoms were detected on the leaves, stem and fruits of the plant. In this paper we are proposing an algorithm for detecting the dieses and depending upon the types of the diseases, the respective medicine can be given to the crops through an automated prototype.

Key words: cultivation, soil analysis, growth, health and disease

I. INTRODUCTION

Monitoring the farm of plants requires a lot of attention regarding seeding, plant growth and maintaining the soil moisture etc. This requires a lot of human effects. Especially due to the time of plant growth tracking the health of the plants is the most important thing. Plant disease management is the most essential work in farming. The research about the plant disease refers to the studies of visually observable patterns on the plants.

Plant disease types are varied based on so many factors like climatic changes, ground soil and insects disturbance. In today's agriculture indentifying the plant disease nature is the very hard and challenging task. Generally plant dieses identification was done manually.

Human visual system can detect the external disturbances of the plant but most of the diseases are caused by virus and bacteria. This can be identified by image processing.

II. LITERATURE SURVEY

Multiple numbers of methods are used by researchers and analysed the dieses of the plants. Raghottam Ramesh proposed a method "Plant Leaf Disease Management System" to detect all possible lemon leaf diseases. The concept of this project is to identify the disease of the plant leaves and obtain solution to that disease. Image processing techniques are used to identify and arrange the plant leaf diseases. With the help of these methods, the plant diseases can be indentified in the beginning stage itself. The techniques used for identification are K-Means cluster, GLCM, and Neural Network Classifiers. These methods are helped to detect the growth and heath level of the leaves. Vijai Singh proposed an algorithm based on image segmentation "Detection of unhealthy region of plant leaves using Image Processing and Genetic Algorithm" used for automatic identification and classification of plant leaf disease. Image segmentation, is a significant method for disease identification in plants and it's done by using genetic algorithm.

III. FRAMEWORK

A) Image acquisition:

It is a digital encoding process of a visual object. Images play an important role in day today life of a human. Based on our requirements the images can be obtained by using different kind of device like cameras and sensors, and then it can be processed by various techniques like sampling and quantisation for digital encoded representation

B) Image segmentation:

Segmentation is the method of splitting the pictures in terms of various parts based on different type's image analysis techniques, like edge and texture regional thresholding. The segmentation process of the plant is carried out by splitting the colour pixel of the plant and compared the affected part of the plant with encoded image based on the size and leaf colour texture. Depends on the outcome of the analysis the dieses range will be identified.

C) Image analysis:

Images of the plant and roots can be analysis by various techniques. Image analysis requires extraction of particular features that aid in the identification of the object. The Images obtained might be of different forms and of various dimensions, hence the images are pre processed and brought to same dimension, removes noise, background and reduces unwanted distortions.

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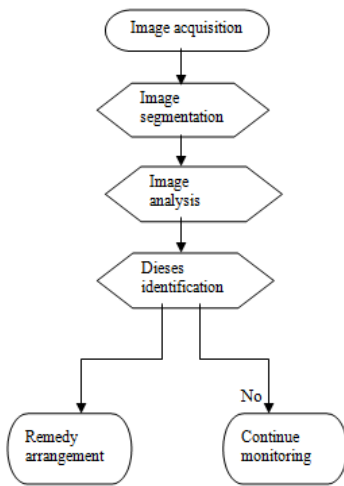*& Sciences Publication*

Fig1. Flow chart

IV. PROPOSED SYSTEM

In this project we are focusing to identifying the plant dieses and trying to produce the solution for the infected area of the plant through some medicine supplements. The Affected crops are identified through image processing. Depending upon the severity, the medicine amount is given to the crops. Everything here is automated through a microcontroller, no role to be played by human. For identifying the dieses we collected some plant data bases and by comparing the infected plant with the various data bases we can identify the dieses and we can monitor the process of the growth level of the plants
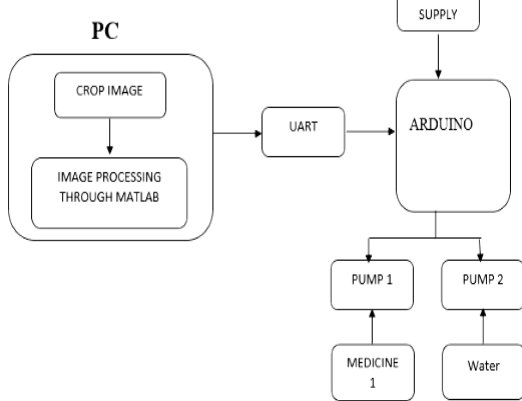

Fig.2 Block Diagram

V. EXPERIMENTAL SET UP AND PROTOCOL

For identifying the dieses so many image processing techniques also used and by using Adriano software we can analyse the level of the infection of the plant and from that we can decide what kind of medicine we can provide to clear the infection.

The dieses can be identified based on measurement of soil moisture, leaf analysis, ph level, and plant root based analysis. The infected parts can be identified based on RGB colour coordination and size of the images.
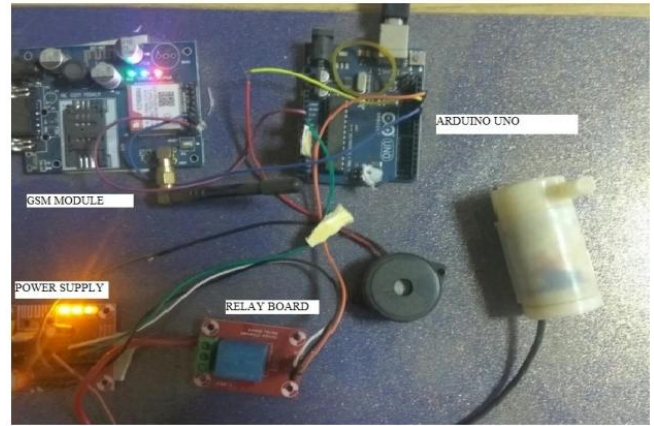

Fig 3: Plant Health monitor

```
clc;clear all;
close all;
workspace;
[Path,U_C]=imgetfile;
IMA=imread(Path);
IMA = imresize(IMA,[500 500]);
figure('name','Test Image','numbertitle','off');
imshow(IMA);impixelinfo
Ibright = Igreen + g;
Ibright = Ibright + (Imorph);
figure('name','Morphed
image','numbertitle','off');imshow(Ibright);impixelinfo;
for i=1:size(Ibright,1)
for j=1:size(Ibright,2)
if Igreen(i,j)=0.98
Ib(i,j)=1;
else
Ib(i,j)=0;
End
g = graycomatrix(G);
stats = graycoprops(g,'Contrast Correlation Energy
Homogeneity');
Contrast = stats.Contrast;
Correlation = stats.Correlation;
Homogeneity = stats.Homogeneity;
Mean = mean2(G);
Standard_Deviation = std2(G);
Entropy = entropy(G);
RMS = mean2(rms(G));
%Skewness = skewness(img)
Variance = mean2(var(double(G)));
a = sum(double(G(:)));
Smoothness = 1-(1/(1+a));
```

VI. SIMULATION RESULTS

1. Reference images

Image.1 Rice field green grass

Image.2 Infected grass images
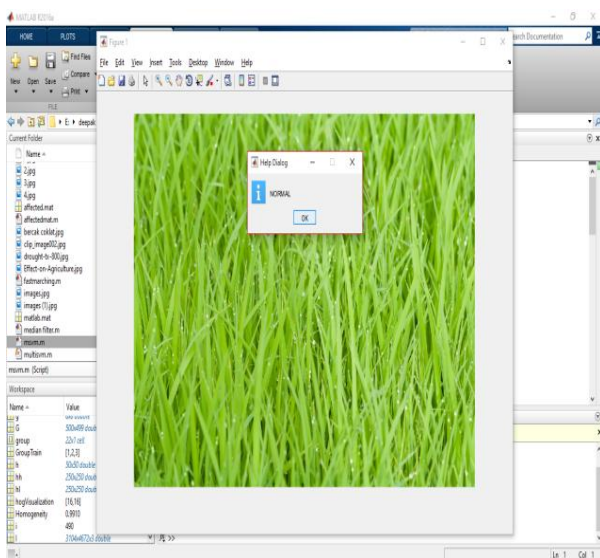
2. Output images
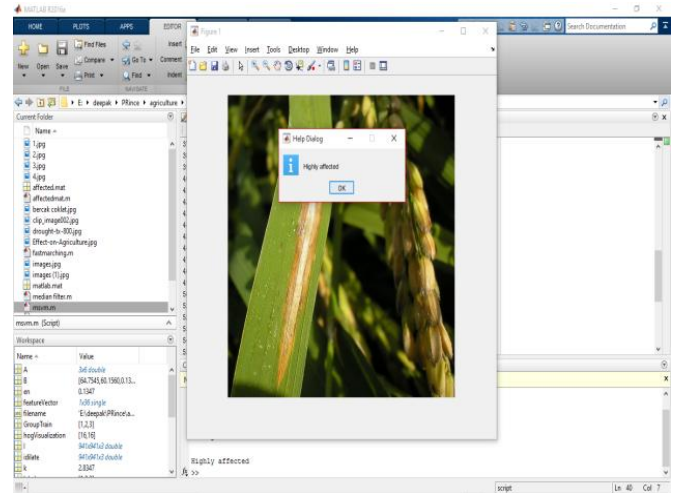

Image.3.Normal grass field output image

Image.4.Highly infected grass field output image

VII. CONCLUSION

The main focus of this project is to identify the dieses of the plant and provide some necessary help to make the unhealthy plant in to healthy one. An image processing algorithm was developed to identify the dieses and a prototype was created with full automated techniques to provide the medical supplements to the affected plant .This will helps the farmers to identify and rectify the dieses in the initial stage itself and it will improves the cultivation with healthy plants

REFERENCES

1. Sanjeev S Sannakki, Vijay S Rajpurohit, V B Nargund, Pallavi Kulkarni,"Diagnosis and Classification of Grape Leaf Diseases using NeuralNetworks",IEEE proceedings of 4ICCCNT, 2013
2. S. Arivazhagan, R. NewlinShebiah, S. Ananthi, S. Vishnu Varthini, "Detectionof unhealthy region of plant leaves and classification of plant leaf diseases usingtexture features", CIGR Journal ,Vol. 15, No.1, 2013.
3. Arti N. Rathod, BhaveshTanawal, Vatsal Shah, "Image Processing Techniquesfor Detection of Leaf Disease", Vol 3, Issue 11, 2013.
4. Jayamala K. PatilBharti, "Advances in image processing for detection of plantdiseases", Journal of Advanced Bioinformatics Applications and Research, Vol 2,Issue 2, pp 135-141, 2011.
5. Camargoa, J.S. Smith, "An image-processing based algorithm to automaticallyidentify plant disease visual symptoms", Biosyst Eng., Vol 102:9–21, 2009.
6. SindhujaSankarana, AshishMishraa, Reza Ehsania, Cristina Davisb, "A reviewof advanced techniques for detecting plant diseases", Computers and Electronicsin Agriculture, Vol 72, pp. 1–13, 2010.
7. Niketamoda, Bharat jadhav, Smeetanaikwadi, "Detection and classification ofplantdiseases by image processing", International Journal of Innovative Science,Engineering & Technology, Vol. 1 Issue 2, 2014.
8. P.Revathi, M.Hemalatha, "Classification of Cotton Leaf Spot DiseasesUsing Image Processing Edge Detection Techniques" IEEE proceedings ofINCOSET, pp 169-173, 2012.
9. Raghottam Ramesh. Kulkarni, Dr. A. V. Sutagundar "Plant Leaf Disease Management System" Proceedings of the IEEE 2017 International Conference on Computing Methodologies and Communication(ICCMC)
10. Revathi, M. Hemalatha, "Cotton Leaf Spot Diseases Detection UtilizingFeature Selection with Skew Divergence Method", International Journal ofScientific Engineering and Technology (ISSN: 2277-1581), Vol. (3), IssueNo.1, pg.no. 22-30, 1 Jan 2014.

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