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Plant Disease Detection using Image Processing Techniques

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Abstract - *Diseases in plants cause major production and economic losses as well as reduction in both quality and quantity of agricultural products. Now a day's plant diseases detection has received increasing attention in monitoring large field of crops. Farmers experience great difficulties in switching from one disease control policy to another. The naked eye observation of experts is the traditional approach adopted in practice for detection and identification of plant diseases. On the other hand, mobile phone usage has increased exponentially among the population of India. People from all walks of life are using mobile phones and different associated applications for gaining economic and social benefits. However, very few mobile phone applications and World Wide Web applications benefit agricultural production and specifically aim farmers. In the proposed paper we review the need of simple plant leaves disease detection system through an world wide web application that would facilitate advancements in agriculture. The project is aimed at developing an world wide web and android application to generate an automated system to detect diseases through image processing of leaves. The purpose of such development is to assemble an application with a user friendly interface and implement some effective algorithms considering the problems. This will improve productivity of crops.*

Key Words: Image processing, leaf disease detection, binary image comparison, binary images.

1. INTRODUCTION

India is agriculture based country that has many people working in the agriculture industry. The agricultural sector plays an important role in economic development by providing rural employment. Paddy is one of the nation's most important products as it is considered to be one of India's staple food and cereal crops and because of that, many efforts have taken to ensure its safety, one of them is crop management of paddy plants. Paddy plants are affected by various fungal and bacterial diseases. This work focuses on recognizing three paddy plant diseases namely Brown Spot Disease (BSD), Leaf Blast Disease (LBD), Bacterial Blight Disease (BBD). The proper detection and recognition of disease is very important in applying required fertilizer. BSD is one of the most common fungal disease and most damaging paddy plant disease. They are at first little, roundabout and dim chestnut to purple cocoa. Completely created sores are round to oval with a light cocoa to dark focus, encompassed by a rosy chestnut edge brought on by the poison delivered by the organisms. Some take after jewel shape, wide in the middle and indicated either end. The main objective of this work is to develop a system for classifying the paddy plant diseases using image processing technique.

The existing method for plant disease detection is simply naked eye observation by experts through which identification and detection of plant diseases is done. For doing so, a large team of experts as well as continuous monitoring of plant is required, which costs very high when we do with large farms. At the same time, in some countries, farmers do not have proper facilities or even idea that they can con- tact to experts. Due to which consulting experts even cost high as well as time consuming too. There are currently many different ways of performing image segmentation, ranging from the simple thresholding method to advanced color image segmentation methods. These parts normally correspond to something that humans can easily separate and view as individual objects. Computers have no means of intelligently recognizing objects, and so many different methods have been developed in order to segment images. The segmentation process is based on various features found in the image. This might be color information, boundaries or segment of an image. We use Genetic algorithm for color image segmentation. Evolutionary computing was first introduced in the 1960s by I. Rechenberg. His idea was then taken forward by other researchers. Sometimes evolutionary changes are small and appear in significant at first glance, but they play apart in natural selection and the survival of the species. Paddy is one of the nation's most important products as it is considered to be one of India's staple food and cereal crops and because of that, many efforts have taken to ensure its safety, one of them is crop management of paddy plants. Paddy plants are affected by various fungal and bacterial diseases. This work focuses on recognizing three paddy plant diseases namely Brown Spot Disease (BSD), Leaf Blast Disease (LBD), Bacterial Blight Disease (BBD). The proper detection and recognition of disease is very important in applying required fertilizer.BSD is one of the most common fungal disease and most damaging paddy plant disease.

The methodology analysis of diagnosis the leaf diseases. This process include various tasks, such as image acquisition, image pre-processing, image segmentation, shape feature extraction and soybean disease classification based on lesion type of two most serious disease of soya plant. In this project there are two modules that is admin module and user module. Both modules have their classified responsibility. Admin can stores the data about leaf disease, can modify the database according to user requirements. If a farmer wants to assess a disease-affected stem and need to be assured if

the plant is affected by a certain disease or not, then he just has to use our mobile or website and take a picture of the disease-affected stem. Then he will be given the option to send this image to our dedicated system server.

2. RELATED WORK

In the farm, various sensors are deployed like soil moisture sensor, Temperature - Humidity sensor and camera for detecting diseases on a leaf. Data collected from sensors and send it to Raspberry PI through wired or wireless devices. In server-side data is verified and matched with ideal values of data like temperature value, humidity value, and soil moisture value. If difference occurred with respect to predefined threshold value then notification send to the farmer on his mobile or website. Output of sensors are generated in the webpage and farmer.

- Image Capturing: Spotted leaves are taken for this, study. Images are taken in controlled environment and are stored in the JPEG format.
- Leaf Image Segmentation: Image segmentation is the important step to separate the different regions with special significance in the image.
- Actual Leaf region Segmentation: Input image is first converted into gray scale image. Since image is taken in controlled environment placing diseased leaf on the white background, it makes large difference in gray values of two groups, object and background.
- Leaf Disease region segmentation: Segmentation of region with spots is done here. For success of experiment it is necessary to segment the disease region accurately. Disease management is a challenging task. Mostly diseases are seen on the leaves or stems of the plant. Precise quantification of these visually observed diseases, pests, traits has not studied yet because of the complexity of visual patterns. Hence there has been increasing demand for more specific and sophisticated image pattern understanding. We propose an image-processing-based solution for the automatic leaf diseases detection and classification according to the environmental factors.

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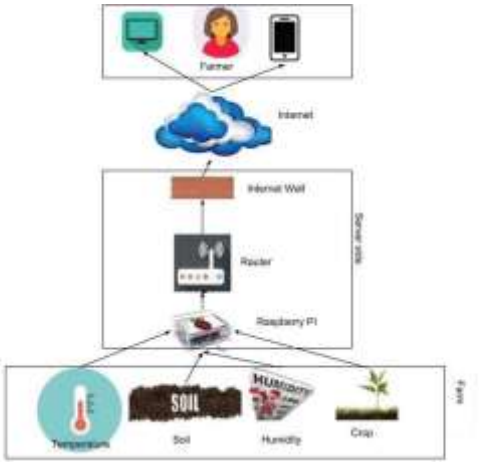

Fig. 2.1: Architecture of Prototype

Get detailed information about his crop and atmosphere of his farm from anywhere. Crop disease detection is done by using Image Processing. The camera is placed near crop so that image of a leaf is taken by the camera. Captured image is sent to the server and using Image processing techniques leaf disease is detected, Status of a leaf is sent back to the farmer on the web page & mobile phone on the app.

3. WORKING PRINCIPLE

The methodology analysis of diagnosis the leaf diseases. This process include various tasks, such as image acquisition, image pre-processing, image segmentation, shape feature extraction and soybean disease classification based on lesion type of two most serious disease of soya plant. In this project there are two modules that is admin module and user module. Both modules have their classified responsibility. Admin can stores the data about leaf disease, can modify the database according to user requirements.

If a farmer wants to assess a disease-affected stem and need to be assured if the plant is affected by a certain disease or not, then he just has to use our mobile or website and take a picture of the disease-affected stem. Then he will be given the option to send this image to our dedicated system server.

3.1.1 Admin Module:

In this system the admin plays a very important role in the system in which all the data stored by the admin. Admin can modify the information; also he can update the system. He gives authorities to user. There is need to login to the admin. The admin uploads the original image of the plant, its required moisture and temperature in degree Celsius, symptoms of the disease and the affected image of the plant by disease because of environmental changes. The admin uploads the details of the plant and gives solution on it with remedies.

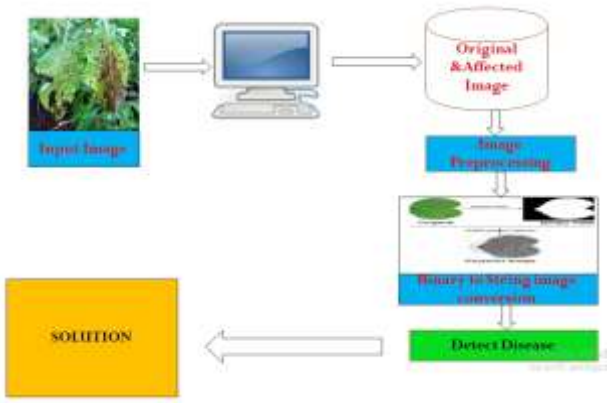

Fig.3.1: Working of System

3.1.2 User module:

This system is helpful to the farmers for reducing the loss of farmers because of environmental changes. The user must be registered himself into the system. He will get his unique user id and password. By uploading affected image he can view the details of the leaf and also get solution on it. Another option for the user is that he can upload symptoms of the disease, if the user doesn't having appropriate information but he can only enter near about details. It is possible to get information. All the mathematical equations should be numbered as shown above.

4. CONCLUSIONS

From this method we can identify the disease present in monocot. List of references is also added to this article for more detailed description .This paper deals with the accuracy and fast approach of disease detection. This project is used in agriculture sector to overcome the diseases of plants. Leaf disease detection is successfully done by using Image processing techniques. All observations and tests are completed and this proves that this is the solution for smart agriculture. This system definitely improves the yield of the crops increases the overall income of the farmer.

REFERENCES

[1] Snigdha Sen, and Madhu B, "Smart Agriculture: A Bliss to Farmers", 6(4): April, 2017.

[2] Chetan Dwarkani M, Ganesh Ram R, Jagannathan S, R. Priyatharshini, "Smart Farming System Using Sensors for Agricultural Task Automation", 2015 IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2015).

[3] Nikesh Gondchawar, R. S. Kawitkar, "IoT based Smart Agriculture", International Journal of Advanced Research in Computer and communication Engineering Vol. 5, Issue 6, June 2016.

[4] N. Suma, Sandra Rhea Samson, S. Saranya, G. Shanmugapriya, and R. Subhashri, "IOT Based Smart Agriculture Monitoring System", International Journal on Recent and Innovation Trends in Computing and Communication, vol. 5 no. 2, 2017.

[5] Tuli, N. Hasteer, M. Sharma and A. Bansal, "Framework to leverage cloud for the modernization of the Indian agriculture system," IEEE International Conference on Electro/Information Technology, Milwaukee, WI, 2014, pp. 109-115.

[6] D. Yan-e, "Design of Intelligent Agriculture Management Information System Based on IoT, "Fourth International Conference on Intelligent Computation Technology and Automation", Shenzhen, Guangdong, 2011, pp. 1045-1049.

[7] G. S. Matharu, P. Upadhyay and L. Chaudhary, "The Internet of Things: Challenges & security issues," 2014 International Conference on Emerging Technologies (ICET), Islamabad, 2014, pp. 54-59.

[8] J. Ye, B. Chen, Q. Liu and Y. Fang, "A precision agriculture management system based on Internet of Things and WebGIS," 21st International Conference on Geoinformatics, Kaifeng, 2013, pp. 1-5.