

Detection of Unhealthy Region of Plant Leaves using Image Processing and Genetic Algorithm

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Abstract:- *This is the fundamental issues in today's world. Mobile or Smart phones (Android based) is becoming an essential device for all types of people irrespective of the age group and literacy (literate or illiterate). In India, mobile technology has shift in the communication medium to reach out to the masses .plants need regular physical and scientific handling for proper growth. Expert advices to the farmers is a possibility in India, i.e., information was available earlier for electronic processing, and now, communication is merged with Information Technology to create ICT impacts as a whole. ICT enabled environment is becoming a day-to-day reality everywhere in India. Tele-health allows health care professionals to diagnose and treat patients in remote locations using ICT. This paper presents a method for identify plant disease based on color, edge detection and histogram matching. It has significant perspective in field of agriculture. Some techniques are there for identifying plant disease. The method used in this research is divided into two major phases. First phase concerns with training of healthy sample and diseased sample. Second phase concerns with the training of test sample and generates result based on the edge detection and histogram matching.*

Keywords: *Edge detection, Image processing, CBIR, Color histogram, Android Mobile Application, Remote area, Real time Assistance, Telehealth.*

I. INTRODUCTION

The agriculture sector is changing the socio-economic environments of the population due to liberalization and globalization. About 75% people are living in rural India and still depend on agriculture. About 43% of India's geographical area is used for agricultural activity. Agriculture is crucial to India's economy. However, most of India's poorest people are s farmers who have little or no access to technology for their proper solution of the damaged crops. Farmers lack knowledge on medicine. Every year, significant amounts of agricultural products are lost in India due to some critical diseases and improper maintenance.

In remote areas, very often, the farmers do not get any suggestion regarding the correct scientific procedure to be followed for a particular cultivation. In India, problems are faced by common people in rural areas in the health sector, too. In urban areas, people get better facility in health care.

However, the qualified doctors are not always willing to go to serve in remote rural areas. Many patients in remote villages die without proper treatment . The population is increasing day by day, but the number of physicians, doctors, nurses or government hospitals serving rural population is not increasing proportionately. Therefore, the health care needs of rural population are not being addressed properly. The significant increase of capabilities in modern telecommunication and data processing enables advanced tele-service solutions to assist medical treatment at remote locations.

II. RELATED WORKS

In recent days, there has been an attempt to assist the farmer by telephony service but, this service is not 24X7 hours service. Sometimes, the farmers are not able to connect with experts due to communication failures. Another important problem is that in a critical situation, if the farmers are not able to explain or if the disease is a new one, then farmers

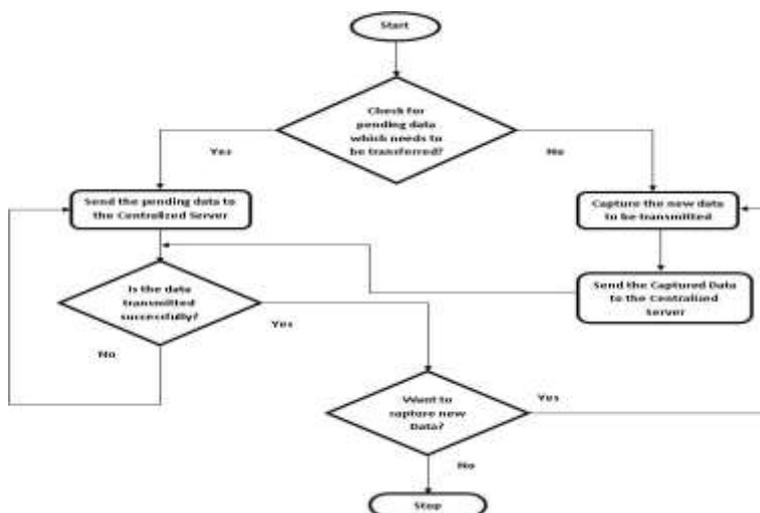
would not be able to identify the diseases of the crops. Captured images from crop surfaces can provide a better solution where the remote scientist can see instantly the image for disease diagnosis. Similarly, captured skin, face, or other images through the developed application may be sent to expert doctors to extend health advice to remote areas.

Our research focuses on the detection of plants diseases based on color, edge detection and matching histogram technique. Based on the color space, histogram, and edge detection techniques, we can able to find the disease of plant. Our research works on two phases. First phase includes all the healthy and disease leaves are given as input to the .Net. Second phase is mainly concern the test the testing samples that are given as input to the .Net.

III. PROPOSED SYSTEM

This approach starts with the digital images for both the samples such as healthy leaf images and diseased leaf images. The image is captured from the environment using the Kodak digital camera of 9 megapixels. Then set the resolution of image at 390x425 dimensions. Once the database is acquired of healthy and infected images of samples, the image processing techniques are used to extract the useful features that are useful for the analysis of next phases. After that, histogram comparisons are used to classify the image according to the specific problem at hand.

The overall architecture of the developed system includes Google Application Engine(GAE) and Google Web Toolkit(GWT) functioning as server. The real-time assistance ensures information flow to remote areas using internet (GPRS) or via SMS.



To determine the pH value of the soil the image processing techniques are used. For capturing the images the phone camera is used and after processing the captured image the pH value of the soil is determined and accordingly crops or plants are suggested that can be grown in that field.

- **Genetic Algorithm:**

Genetic algorithms belong to the evolutionary algorithms which generate solutions for optimization problems. Algorithm begins with a set of solutions called population. Solutions from one population are chosen and then used to form a new population. This is done with the anticipation, that the new population will be enhanced than the old one. Solutions which are selected to form new solutions (offspring) are chosen according to their fitness

Some advantages of genetic algorithm are

Genetic algorithm optimizes both variables efficiently, continuous or discrete. It searches from a large sampling of the cost surface. Large number of variables can be processed at the same time.

The basic steps of genetic algorithm are as follows:

- 1) Generate random population of n chromosomes (suitable solutions for the problem).
- 2) Evaluate the fitness $f(x)$ of each chromosome x in the population.
- 3) Create a new population by repeating following steps until the new population is complete.
- 4) Select two parent chromosomes from a population according to their fitness (the better fitness, the bigger chance to be selected).
- 5) With a crossover probability cross over the parents to form a new offspring (children). If no crossover was performed, offspring is an exact copy of parents.
- 6) With a mutation probability mutate new offspring at each locus (position in chromosome).
- 7) Place new offspring in a new population.
- 8) Use new generated population for a further run of algorithm.
- 9) If the end condition is satisfied, stop, and return the best solution in current population.
- 10) Go to step 2.

IV. PROJECT DESCRIPTION

It presents a method for identify plant disease based on color, edge detection and histogram matching. Sometimes plant's doctors are also unable to recognize the disease that results in lack of identification of right type of disease and this leads to crop spoil if not taken care of at right time. It has significant perspective in field of agriculture. sample technique for identify plant disease

CONTENT-BASED FILTERING

A) Content-Based Image Retrieval For Identifying Image Based Plant Disease:

Our research focuses on the detection of plants diseases based on color, edge detection and matching histogram technique. We need two very significance characteristic that is mainly concern with the accuracy of detection and speed to recognize the image diseases. Based on the color space, histogram, and edge detection techniques, we can able to find the disease of plant. Our research works on two phases. First phase includes all the healthy and disease leaves are given as input to the .Net. In the training process, the RGB color components are separated into three layers Red, Green and Blue i.e. grayscale image and then apply the CANNY's edge detecting technique. After the edge detection technique histogram is plot for each component of healthy and disease leaf image and stored in the systems. Second phase is mainly concern the test the testing samples that are given as input to the .Net.

- **Overview of Content Based Image retrieval (CBIR)**

Content based image retrieval (CBIR) offers efficient search and retrieval of images based on their content. With the abundance and increasing number of images in digital libraries and the Internet in the last decades, CBIR has become an active research area. The retrieval may involve the relatively simpler problem of finding images with low level characteristics (e.g. finding images of sunset) or high level concepts (e.g. finding pictures containing bicycles).With the development of the Internet, and the availability of image capturing devices such as digital cameras, image scanners, the size of digital image collection is increasing rapidly.

CONCLUSION

The most common benefit of mobile devices, as found by the survey is its penetration in rural India as the largest basic medium of basic communication. The mobile phone is the only convenient mode of communication to which farmers have access. So it would help the farmers and the rural people if used properly and would be beneficial to most of them. As far as infrastructure is concerned in India, the Mobile communications services reach to each and every remote place. The basic requirement for running the application is available easily which Indian rural people can afford. The training process includes the training of these samples by using layers separation technique which separate the layers of RGB image into red, green, and blue layers and edge detection technique which detecting edges of the layered images. Once the histograms are generated for both samples and the testing image, immediately we applied the comparison technique based on the histogram. The future work mainly concerns with the large database

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