CROP DISEASE DIAGNOSIS USING ARTIFICIAL INTELLIGENCE

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Abstract—The historyof agriculture dates back thousands of years, and its development has been driven and defined by greatly different climates, cultures, and technologies. Though there arelots of development in agricultural field in this modern era, the disease control mechanism and identification of disease acts in the crops remains as a threat. Diseases in plants cause major production and economic losses as well as reduction in both quality and quantity of agricultural products. Farmers experience great difficulties in switching from one disease control policy to another. The naked eye observation of experts is the traditional approach. Early information on crop health and disease detection can facilitate the control of diseases through proper management strategies. This technique will improves productivity of crops. Hence, it is the time to focus on diseases which spoils our crops. This project rolls around the problems that are mentioned above and helps farmers to ease their work. The system is done with the help of camera as sensors and ZigBee technology for transmitting data that can be received by using the receiver which is used by the farmers using any computer system. The software in the computer system is designed in such a way that it can diagnose any abnormality in the crop.

1. INTRODUCTION

People cannot live without food for whichthey are dependent on farmers, but who cares about them? Farmers do face a lot of problems in the mode of diseases by genetical disorder or by any insects and also by environmental changes.Farmers always need satisfactory and easy advice from agricultural experts. An expert system should have enough knowledge about the domain. Gathering enough knowledge and representing it in a machine understandableformat is time consuming and difficult job. Since, a single picture is worth a thousand words, it will be a good idea to acquire knowledge from it ratherthan text. Image is an easy way of communication without any boundary of languages.This idea is designed with the help of MATLAB,SQL and JAVA.MATLAB is used to handle the image processing technique. The image processing can be used in agriculturalapplications for following purposes: (i)to detect infected leaf, stem or fruit, (ii) to quantify affected area by disease, (iii) to determine size & shape of fruits, etc.The image (captured by using camera as sensors), normal and abnormality detail measurement(using image processing) of the crops are stored in a database created using SQL. Here it is used in the software along with the MATLAB as a front-end process.JAVA is used to compare the image processed by the MATLAB with the database created.The goal of this paper is to diagnosis the diseases in crops and improves the yield of the crops and encourages the farmers to continue in their field. Eventually it leads to the minimization of agricultural land eradication and also improves the productivity in agricultural field by using image processing technique and ZigBee technology.

2. EXISTING SYSTEM

There are some diagnosis techniques implemented using image processing. Zhao and Wu[1] focused on the crop diseases and insect pests based on heuristic and/or graph search.Mohmmad Ei-Helly[2] in paper of title "Integrating Diagnostic Expert System with Image Processing via Loosely

Coupled Technique", developeddiagnostic expert system with the help of image processing technique.Jayamala and Rajkumar[3] used image processing to study plant diseases. A methodology for detecting plant diseases earlyand accurately using diverse image processing techniques has been proposed by AnandH.Kulkarni et al. [4]. In all these an expert guidance is needed every time when they diagnose which leads in cost effectiveness. The drawbacks of the work in are: (i) An expert guidance is needed every time, (ii) Frequent diagnosis is complicated. These drawbacks can be overcome using this proposed work and farmers can see the type of disease and preventive measures are being suggested.

Fig 2.1.Existing Diagnosed System.

3. PROPOSED SYSTEM

In this proposed system all the symptoms of crop disease and infections caused by insects are being stored in a database. The crops are being monitored with the help of a camera. It frequently sends the image of the crops to the system which the software checks with the already existing images of healthy crops which is stored in the database. It alerts the farmer to prevent the crop deploitation by taking necessary steps.

The techniques used are as follows:

    A. Zigbee technology
    B. Image processing
    C. Knowledge based Artificial Intelligence (KBAI)

A. ZIGBEE TECHNOLOGY:

Zigbee is a technology developed as an open global standard to address the unique needs of low-cost, low-power wireless networkcontrol and monitoring applications.ZigBee devices can transmit data over long distances by passing data through a meshnetwork of intermediate devices to reach moredistant ones. With this advantageszigbee technology isused in our system to transmit the images taken to the farmers system.

B. IMAGE PROCESSING:

The image processing is processing of images using mathematical operations which is done with the help of MATLAB. The preferred steps for this technique are described below.

(i) Image Acquisition :

Image acquisition helps us to connect to the industrial and scientific cameras. Generally, the image acquisition stage involves preprocessing, such as scaling etc.

(ii)Image Enhancement:

Image enhancement techniques is to bring out detail that is obscured, or simply to highlight certain features of interest in an image such as changing brightness & contrast etc.

(iii) Image Restoration:

Image restoration is an area that also deals with improving the appearance of an image. Restoration techniques tend to be based on mathematical or probabilistic models of image degradation.

(iv) Color Image Processing:

In an image, a great deal of extra information may be contained in the color, and this extra information can then be used to simplify image analysis. So here we use this technology to clearly used the details of the images.

3.1. WORKING PROCESS OF THE PROPOSED SYSTEM

(v) Wavelets and Multiresolution Processing:

Different parts of the images may differ in their sizeand degree. Wavelets are the one that represents images in various degrees of resolution.

(vi) **Compression:**
Image compression is minimizing the size in bytes of a image file without degrading the quality of the image to an unacceptable level. The reduction in file size allows more images to be stored in a given amount of disk or memory space. It also reduces thetime required for images to be sent over the Internet or downloaded from Web pages.
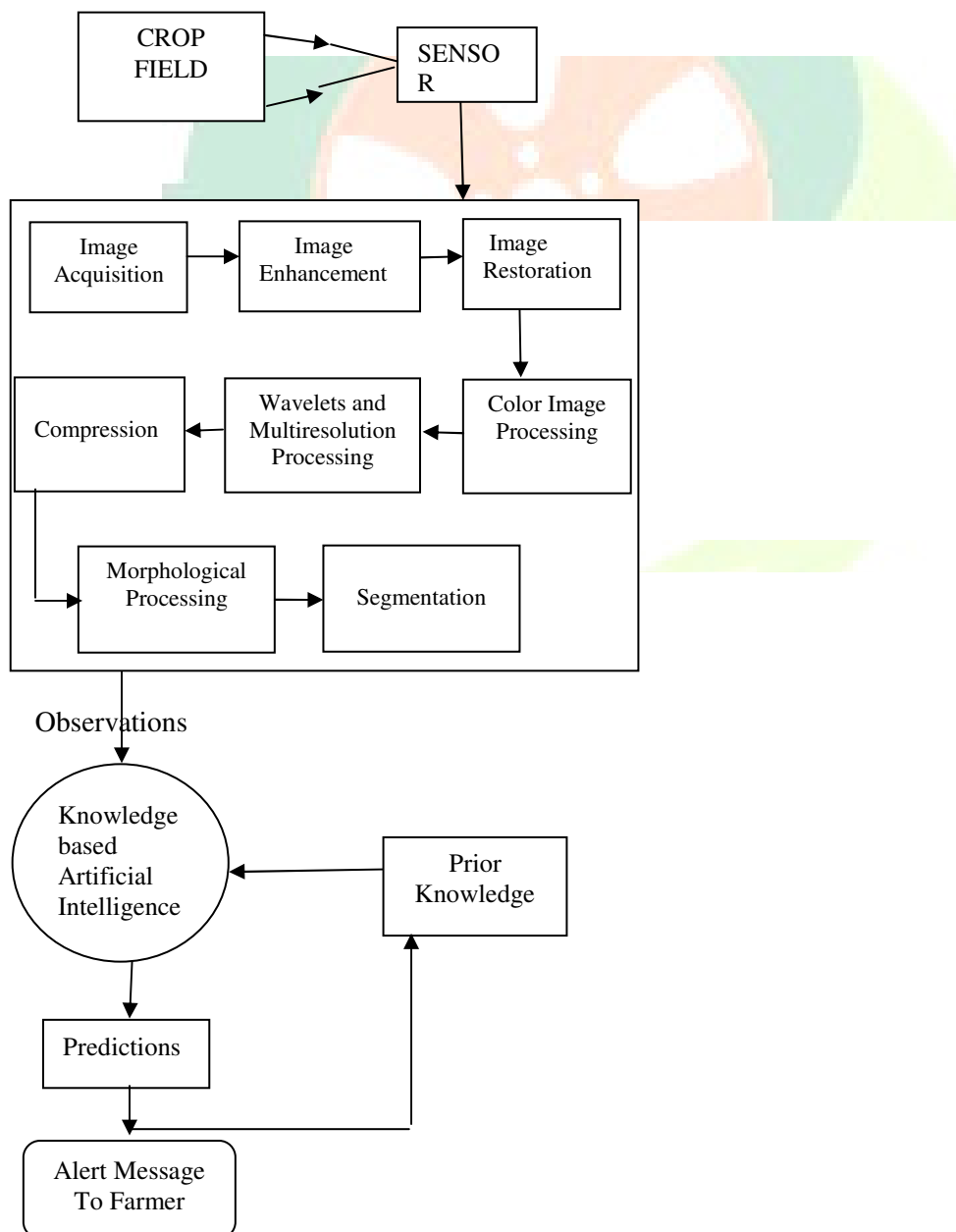
(vii**) Morphological Processing:**
Morphology is the word that basically deals with the structure. Morphological processing is for extracting image components that are useful in the representation and description of shape.

(viii**) Segmentation:**
Image segmentation is the process of partitioning a digital image into multiple segments (sets of pixels, also known as superpixels). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze

(ix) **Representation and Description:**
Representation and description almost always follow the output of a segmentation stage, which usually is raw pixel data, constituting either the boundary of a region or all the points in the region itself.

C. KNOWLEDGE BASED ARTIFICIAL INTELLIGENCE:

This compares the prior images which are affected by insects, natural changes and genetic problems with the observed images from the field. If any changes in the images it alerts the farmer without the help of experts. It also gives some of the recommendations what can be done to recover from the problem. If any new symptoms found in the crop it can also be updated in the knowledge base.

4. METHODOLOGY

In the field, where the diagnosis is to be done, the cameras are being fixed. They are fixed in such a way that they can frequently send the image to the computer system where the software is being fixed. The image transfer is done with the help of ZigBee technology as mentioned above.

Here in the computer software, MATLAB is used to process the image received from the camera. Then the processed image is compared with the ones which are already stored in that database. These comparison operations and finding the desired one from the database are done with the help of the interface programmed with java.

HEALTHY AND INFECTED CROP

In the database, both the healthy crop image and the infected one's image are stored already which are used by the program to compare with the current image sent by the camera. If the image matches with the infected one, it suddenly alerts thefarmer. If the current image does not match any of the storedinstances, a special alert is sent to the farmer.

5. CONCLUSION

Thus, this system will help the farmers do their work easily without worrying about the infection in cultivation crops and diseases. This can be implemented to increase crop productivity by ensuring the quality and quantity of the food product.

6.REFERENCES

[1] Tushar H Jaware, Ravindra D Badgujar and Prashant G Patil," Crop disease detection using image segmentation", Proceedings of "Conference on Advances in Communication and Computing (NCACC'12)", April 21, 2012.

[2] P. Revathi M. Hemalatha," Homogenous Segmentation based Edge Detection Techniques for Proficient Identification of the Cotton Leaf Spot Diseases", International Journal of Computer Applications (0975 – 888)Volume 47– No.2, June 2012.

[3] S. Phadikar, J. Sil, and A. K. Das," Classification of Rice Leaf Diseases Based on Morphological Changes", International Journal of Information and Electronics Engineering, Vol. 2, No. 3, May 2012

[4] H. Muhammad Asraf, M. T. Nooritawati, M.S.B. Shah Rizam," A Comparative Study in Kernel-Based Support Vector Machine of Oil", Procedia Engineering 41 (2012) 1353 – 1359.

[5] Jayamala K. Patil. Raj Kumar. "Advances In Image Processing For Detection Of Plant Diseases". Journal of Advanced Bioinformatics Applications and Research ISSN 0976-2604 Vol 2, Issue 2, June-2011

[6] SatishMadhogaria, MarekSchikora, Wolfgang Koch, Daniel Cremers," Pixel-Based Classification Method for Detecting Unhealthy Regions in Leaf Images", Informatik 2011 - Informatikschafft Communities 41.Jahrestagung der GesellschaftfürInformatik , 4.-7.10.2011, Berlin.

[7] Yuan Tian, Chunjiang Zhao,Shenglian Lu,and XinyuGuo,"SVM- based Multiple Classifier System for Recognition of Wheat Leaf Diseases", Proceedings of 2010 Conference on Dependable Computing (CDC'2010) November 20-22, 2010, Yichang, China.

[8] T. Rumpf,A.K. Mahlein,U.Steiner,E.C.Oerke, H.W. Dehne, L.Plumer,"Early detection and classification of plant diseases with Support Vector Machines based on hyperspectral reflectance",2010 Elsvier B.V.

[9] Zhao Chunjiang,WuHuarui, "Research on the Diagnosis Method of Crop Pests and Diseases Based on the Heuristic Search", IEEE Sixth International Conference on Fuzzy Systems and Knowledge Discovery, 2009.

[10] G.N.R. Prasad, Dr. A. VinayaBabu, "A Study on Various Expert Systems in Agriculture,"Georgian Electronic Scientific Journal: Computer Science and Telecommunications 2006, No.4(11).