



AN OPEN CV BASED AUTOMATIC LEAF DISEASE IDENTIFICATION AND FERTILIZED AGROBOT USING IOT

¹S.Jansi Rani, ²Akshayaa.P, ³Anushree.P, ⁴Asmitha.S

¹Assistant Professor, ^{2,3,4}UG Students,

Dept.of Information Technology ,Sri Ramakrishna Engineering College,Coimbatore,
Tamilnadu..E-mail:akshayaapradeep07@gmail.com²

Abstract

Our country economy highly depends upon the Agriculture productivity .The disease in plants are quite natural thus, detection of diseases in plants is much needed. Detection of these diseases through some automatic technique is beneficial as it reduces a large work of monitoring big farms of crops and at very early stage and detects the symptoms of disease. Initially, it identify and capture the infected region and latter image preprocessing is performed. After the disease is identified the Agrobot will spray the fertilizer. The paper proposes a new strategy to replace humans in various agricultural operations like detection of presence of disease in leaf, spraying of fertilizers, etc. there by providing safety to the farmers and precision agriculture.

Keywords: disease and detection ; Fertilizer; Agrobot.

I.INTRODUCTION

The base of Indian economy is agriculture and still it is done in traditional way. There is need to replace it by advanced method to improve the performance and take high yield. The technics which are preferred by farmers are time consuming, required large amount of manpower and are done in inappropriate way, which affects the quality of soil, quality of crop and amount of yield .as the lands are farming lands are reducing day by day, So we have to replace this traditional way of farming which will help to grow more crops in small areas. Now a days plowing, seed sowing and digging is done by using advanced system but still fertilizers are

dispense in random way. Due to this the quality of soil reduces and it affects growth of plants, quality of crop as well. Agriculture in India constitutes more than 60% of the occupation. It serves to be the backbone of Indian economy. It is very important to improve the efficiency and productivity of agriculture by simultaneously providing safe cultivation of the farmers. The objective of this project is to monitor the leaf and identify the diseases in the plant for sustainable agriculture. This is done by observing the leaf patterns and using the open cv. By this method shows the difference between healthy leaves and diseased leaf and the Agrobot will spray the fertilizer in the diseased leaf. The Concept of image processing through python OpenCV platform has been used for leaf disease identification through leaf detection. Leaf Identification means to recognize a particular leaf through his unique structure like pattern, texture, color and leaf type disease. The automation in agriculture could help to framers to reduce their effort and their working time the automation in agriculture filed could be more effective and efficient as compare to tradition methods of framing. So our focus will be on reduce labor cost, daily working hours, environmental all impact and safety issues and most important is to reduce framer effort.

In this system using open cv image processing is done and the leaf detection is processed by recognizing the leaf patterns, color, unique type. In the existing system MATLAB is used which uses interpreted language that is slow and make the process tedious. Robotics is being implemented in our system in which the

diseased leaf is detected and the fertilizer is sprayed on it. The project gives a smart machinery for agriculture to overcome day to day challenges. The existing methodology for disease detection is a just optic observation by specialists through that identification and detection of plant diseases is completed. For doing thus, an oversized team of specialists still as continuous watching of specialists are needed, that prices terribly high once farms are massive. At an equivalent time, in some countries, farmers don't have correct facilities or maybe concept that they'll contact specialists. Because of that consulting specialists even price high still as time overwhelming too. In such condition, the advised technique proves to be helpful in watching massive fields of crops. And automatic detection of the diseases by simply seeing the symptoms on the plant leaves makes it easier still as cheaper.

II. RELATED WORKS

INTEGRATED SMART SURVEILANCE SYSTEM FOR DISEASES MONITORING

Monitoring of forests pest and diseases and their resultant damage is critical input to the IPM process [8]. In this work, we develop an online and mobile application for pest and diseases monitoring in plantation forests. The application contains three main components, namely digital library, monitoring system and automatic identification through digital image processing.

EFFICIENT HUMAN IDENTIFICATION THROUGH FACE DETECTION

Human Identification can be performed through various technique like as fingerprint, palm detection, iris detection as well as face detection.

This paper focus on implementation of face detection system for human identification based on open source computer vision library (OpenCV) with python. The model of face recognition has been performed on both laptop and raspberry pi whereas for an implementation of this project on laptop, SQLite studio has been used as a database and for raspberry PI PHPmyadmin has been used. In this paper the concept of detection has been established by writing different code for dataset generator, Trainer and detector. Finally the information that will be displayed along with detected photo

has been stored on database. This concept has a higher scope on security and surveillance projects and various automation operation.

AGRICULTURE ROBOTIC VEHICLE BASED PESTICIDE SPRAYER—this paper deals with the exposition of how robotics can be applied to various fields of agriculture. One of the most important occupations in a developing country like India is agriculture. It is very important to improve the efficiency and productivity of agriculture by replacing laborers with intelligent machines like robots using latest technologies. The paper proposes a new strategy to replace humans in various agricultural operations like detection of presence of pests, spraying of pesticides, spraying of fertilizers, etc there by providing safety to the farmers and precision agriculture. The developed system involves designing a prototype which uses simple cost effective equipments like microprocessors, wireless camera, various motors and terminal equipments which is an aid to the farmers in various crop field activities.

III. DESCRIPTION OF THE PROPOSED SYSTEM COMPONENTS

1. RASPBERRY PI 3 MODEL B

Raspberry PI is a small computer which has been used to develop an embedded system to perform a specific particular task. This electronic module has been operated with the use of raspbian operating system and is based on LINUX platform. This module has SD card slot, Inbuilt WIFI and Bluetooth Connectivity, 40 GPIO pins for Input output operations, PI Camera Port, PI Display port, Audio Port, HDMI cable Port, 4 USB port for connecting pen drive, Mouse, Keyboard, USB Camera etc. It also has Ethernet port for data sharing as well as network sharing between computer and raspberry PI.

2. OPENCV

OpenCV (Open Source Computer Vision) is a library that can be imported in almost all computer languages like python, C, Java etc. It contains optimized image processing tools. Using OpenCV in python boosts its abilities by incorporating numpy (Numerical Python). In image processing, images are dealt as large 3D arrays and numpy serves as a robust tool for numerical array computations [5]. The

commands used for installing OpenCV, Matplot library and numpy in raspberry Pi are “sudo apt-get install python-opencv”, “sudo apt-get install pythonmatplotlib”, ”sudo apt-get install python-numpy”. The concept of using Matplot library in python is to plot a graphical representation as well as drawing steps.

3. CAMERA

Camera is specially designed to interface with raspberry PI and is a standard camera for a raspberry PI. Generally Camera has been found of about 5Mega Pixels. Through this camera we will take a sample picture of user and is stored on the dataset generator folder. After running Detector.PY script then PI Camera opens to take the real time images and it will be displayed on picture window along with the relevant information that will be accessed through Database.

4. SPRINKLER MOTOR

The sprinkler motors are used for spraying pesticides. A motor of high speed is used to spray pesticides at proper velocity and pressure. The farmer uses the joystick to turn on the sprinkler motor. Pre-mixing of pesticides is done to achieve faster and efficient field results. So the amount of pesticides sprayed can be efficiently controlled. Specific spraying of pesticides at needed location is possible as the control of the motor is in the farmer’s hands. Various new technologies can be used to improve the efficiency and control of spraying rates.

IV. SYSTEM ARCHITECTURE

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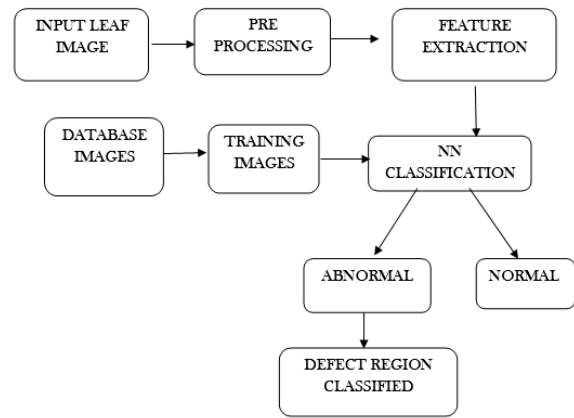


Figure1:Block diagram

Continuous supervision of agricultural field is possible with automatic performance of such agricultural field is possible with automatic performance of such agricultural vehicles[1]. Abilities of the agricultural vehicles can be categorized as guidance, detection, action and mapping. The way of navigation by the vehicle is termed as guidance, extraction of environmental features is termed as detection and execution of the assigned task is termed as action and mapping the field with its features is mapping.

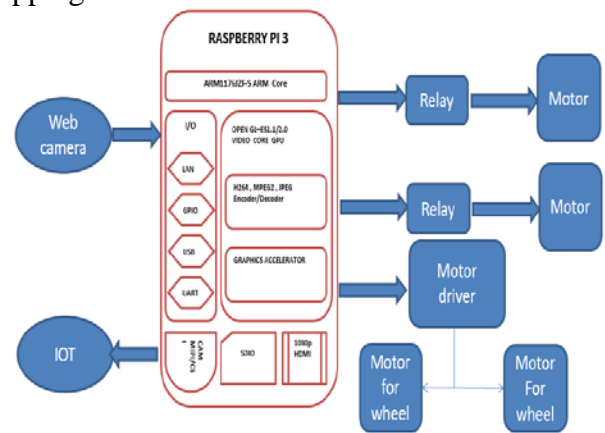


Figure2:Block diagram







Healthy leaf 	Leaf spot 	Leaf blight 
Leaf curl 	Phyllode rust 	Anthracnose 

Figure 3: Example dataset containing healthy and infected leaf

V.CONCLUSION

Plant disease detection attracts significant attention in the field of agriculture where image based disease detection plays an important role. To improve the yield of plants, it is necessary to detect the onset of diseases in plants and advice the farmers to act based on the suggestions. It is very difficult to monitor the plant diseases manually. It requires tremendous amount of work, expertize in the plant diseases, and also require the excessive processing time. Hence, image processing is used for the detection of plant diseases. Smart farming and precision agriculture involve the integration of advanced technologies into existing farming practices in order to increase production efficiency and the quality of agricultural products. As an added benefit, they also improve the quality of life for farm workers by reducing heavy labor and tedious tasks.

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