Android Based Plant Disease Detection Using Arduino

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Abstract—In this paper an automated system has been developed to determine whether the plant's leaf is healthy or disease affected. The normal growth of the plants, yield and quality of agricultural products is seriously affected by plant diseases. This paper aims to develop a computer vision based automatic system for the diagnosis of diseases in plant leaves. Automatic disease detection using computer vision approach involves the segmentation using k mean clustering and feature extraction of diseased area of the leaf, textural descriptors using gray level co-occurrence matrix (GLCM). Color moments are extracted from diseased and non-diseased leaf images resulting in feature values. CNN and BRNN are used for classification. Classified leaves with diseases result to display on android APP using Bluetooth. And also pesticides are sprayed on the detected unhealthy leaves using centrifugal motor pump.

Keywords— CNN, BRNN, Arduino, Lcd, Motor, Bluetooth

I. INTRODUCTION

The plant diseases detection is very important technology for agriculture; in this paper propose to plant diseases detection section using image processing technology and monitoring section using android APP. The image processing technology has four steps, the first step is image preprocessing, second step segmentation and third one feature extraction and fourth step is classification. Next the monitoring section using embedded platform. The embedded unit using hardware components is ARDUINO and LCD, Bluetooth, and motor.

II. IMAGE PROCESSING METHODOLOGY

A. *Image Preprocessing*

The preprocessing aim is an improvement of the input plant diseases leaf image. This process using Gabor filter, this method to remove the noise and resize the image.

B. *Image segmentation*

The goal of the image segmentation is the plant leaf digital image in to multiple segments and partitioning process is called segmentation. This process using algorithm k means clustering.

C. *Feature extraction*

The Feature extraction using gray level co-occurrence matrix (GLCM) and this paper calculate 12 types of feature values.

D. *Classification*

The classification process using CNN and BRNN classifier, these propose to classifier plant diseases type of anthracnose, bacterial, blight, leaf spot and healthy leaf.

III. HARDWARE METHODOLOGY

In the proposed method hardware implementation of plant leaf disease detection using arduino and android app is designed. The block diagram below depicts the step by step procedure to detect plant leaf diseases using arduino and to display it on LCD and android app using Bluetooth technology. And also pesticide sprayer is used to provide pesticides for the identified disease affected leaf.
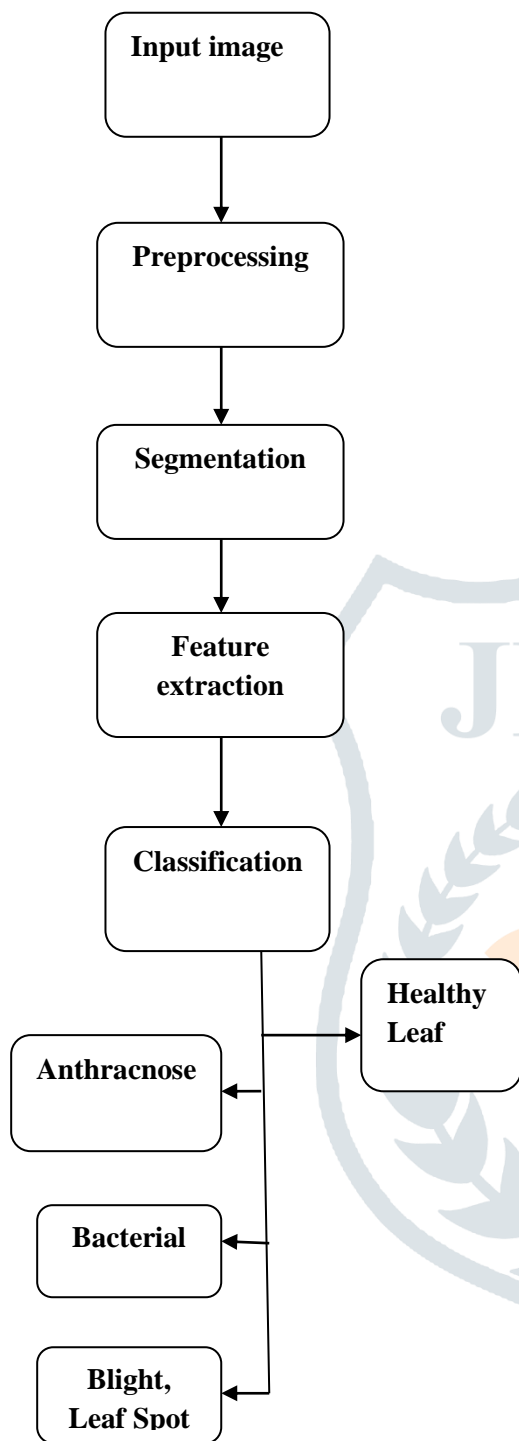
Fig.2 block diagram for power supply

F. Arduino

Ardunio is one of the microcontroller families and open source platform. And easy to interface hardware and software, controller chip using atmega328.in this controller has 28pins, 6 analog pin and 14 digital pin.

Fig.4 ARDUINO board

G. Relay driver

Relay driver is an electromagnetic switch. It is used to turn ON, and turn off a circuit, relays are switches and open and closed circuit is electronically.

H. Motor

Motor main function is electrical energy into mechanical energy, this project using pesticide sprayer. When the classifier to detect the plant diseases leaf, that time the sprayer automatically ON, remain time OFF condition.

I. LCD

Fig.1 block diagram of image processing

E. Power supply

Power supply is voltage source of all components, main function of power supply is 230V AC convert to 5V DC. The power supply components are transformer, rectifier, filter, and regulator.
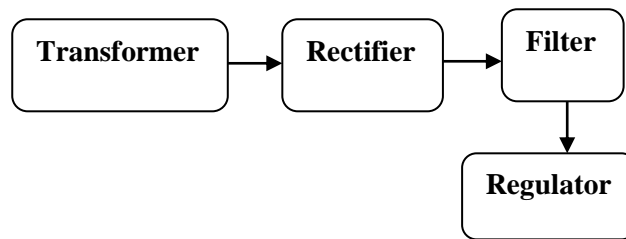
Lcd is liquid crystal display is the technology for to display the classification output of plant leaf diseases detection. When the classifier output diseases detection time the lcd to display on diseases plant leaf detection, when classifier to detect healthy leaf that time the lcd display on healthy plant leaf.

J.   Bluetooth

Bluetooth is a wireless technology; main function is exchange the data. mainly used this project for the controller data send to mobile APP. The serial number of Bluetooth is HC-05.frequency range of Bluetooth is 2.45GHZ.

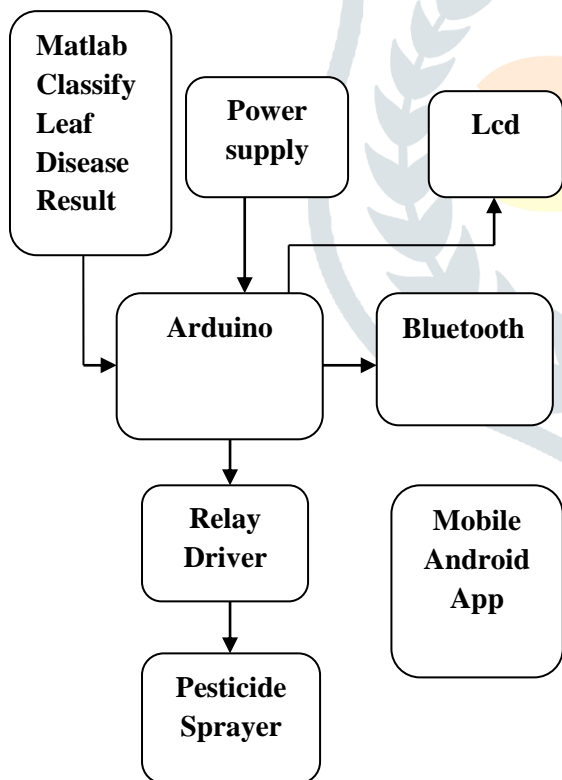*Fig.5 LCD Board*

Fig.7 Bluetooth board

IV. RESULT AND DISCUSSION

The hardware section result properly got it from LCD and android APP.

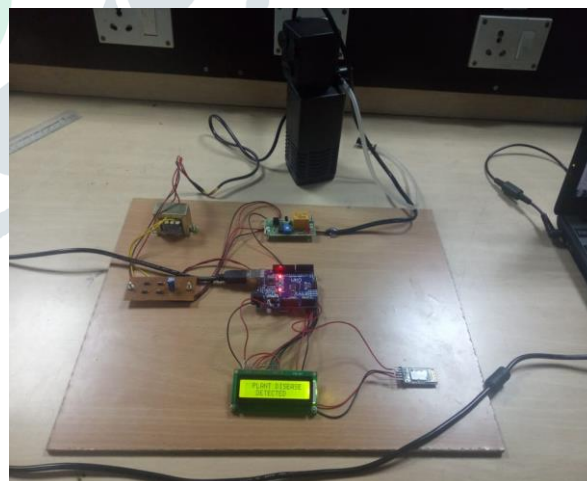*Fig.6 block diagram of hardware section*
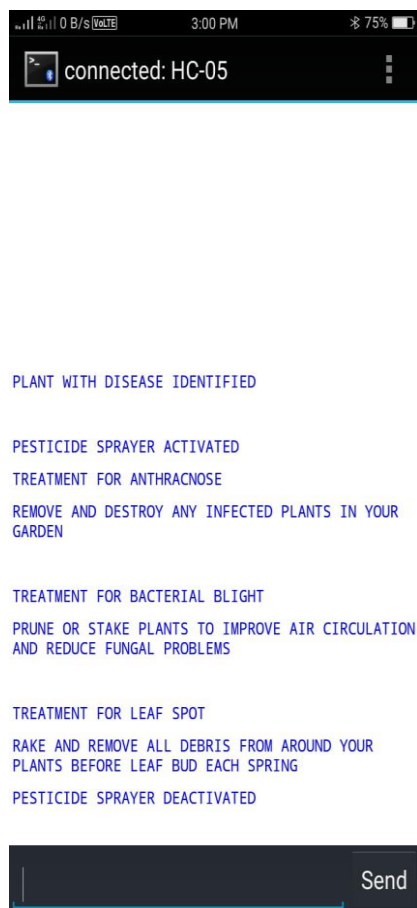

Fig.8 hardware section output

Fig.9 Mobile APP section output

V. CONCLUSION AND FUTURE ENHANCEMENT

Thus the paper proposed to plant diseases detection and identification using mobile APP. The proposed software and hardware output method verified. The output properly got it from mobile APP, in order wise the proposed output successfully completed. And the MATLAB classified output properly to detected using CNN and BRNN. This paper to detected three types of plant disease only detected. Therefore the future enhancement to detect many types of plant diseases identification using python.

VI. REFERENCES

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