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AGRICULTURE FIELD MONITORING ANDPLANT LEAF DISEASE DETECTION

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Abstract
Agriculture are becoming a common feature in today's urban environment. It is difficult to keep a track on the plant's growth and health. Various pathogens are present in the environment which severely affects the plants and the soil in which it is planted, thereby affecting the production. Current systems cannot help people about the disease with which the plants leaves are affected by and what steps should be taken in order to prevent it from being damaged. The proposed system provides the leaf disease detection along with complete surveillance of the field with real-time values of field factors like temperature, humidity, moisture, etc. i.e. real-time monitoring. User can automatically control the flow of water if not physically present via app, also the real-time values can be tracked.

Keywords: Internet of Things, Image processing, disease and healthy leaf , MATLAB.

I. Introduction

India is the largest freshwater user in the world, and the country's total water use is greater than any other continent . The agricultural sector is the biggest user of water, followed by the domestic sector and the industrial sector. A small scale practice of doing the farming is Gardening, which is done at the backyards of houses or in balconies. Gardening is the practice of growing and cultivating plants as part of horticulture. In such congested environment, rooftops and terraces of buildings remains as a valuable sources for urban horticulture. Crop diseasesare a major threat to food security, but their rapid identification remains difficult in many parts of the world due to the lack of the necessary infrastructure. In field of agriculture, detection of disease in plants plays an important role. The existing method for plant disease detection is simply naked eye observation by experts through which identification and detection of plant diseases is done. To detect a plant disease in very initial stage, use of automaticdisease detection technique is beneficial.

II. Literature

Ms.Nilam , R.Thorat, Prof.Swati Nikam (2017), "Early disease detection and monitoring large field of crop byusing IoT" the monitoring of diseases at early stage by using the sensors like temperature, humidity and soil moisture after that it will provide recommendation about disease and its fertilizers. With using above method it willtrain and test dataset. In train dataset there are number of images were taken for training and only few sample imagesare used for testing. After testing phase it will try to match the train dataset image with the tested sample images. After that disease images foreword to

the pre-processing phase. In the Pre-processing phase k-means clustering is used for cluster the image into number of parts and then that parts will classified by using Support Vector Machine(SVM) classifiers. Edge detection is done by using the genetic algorithm and then it will give effective results. Proposed systems have evaluated three objectives of this dissertation work like monitoring, detection and quality of services.

III. Existing method

1.1 Soil Testing In Laboratory :

This method involves soil testing in laboratory. It may take weeks or days to test the soil. The people take soil samples and give them to the laboratories for soil testing. They detect the pH values of soil by using chemical analysis.

1.2 Plant disease Detection :

The existing method for plant disease detection is simply naked eye observation by experts through whichidentification and detection of plant diseases is done**.**

IV. Proposed method

This proposed work is intended to offer ease of use. Effective and reliable control system. It helps in reducing the amount of water and energy required. This system will increase yield for farmers at a moderate and accessible cost. The proposed system is modelled using Arduino mega development kit which connects to light sensor for measuring the light intensity, environment temperature/humidity sensor for getting the temperature and humidity in surroundings. Moreover, this system can be used to continuously analyse the temperature, water level and the amount of light reaching the plants which is vital for greenhouse system. Temperature and humidity measurement are required for the analyzing the environmental surrounding of the plants. Various plant species have distinct idealtemperature and humidity ranges. Examining and controlling the temperature and humidity of the plants from droughts and extreme temperatures and also we monitoring soil pH level. Based on the pH level crop will be select.

1. Image Acquisition The pictures of the leaves are caught using the high definition camera having RGB components not the grayscale. Shading change segments of the leaf picture are distinguished, and after that,forwarded to a device capable of autonomous shading change.

2. Image Pre-processing To expel commotion in a picture or elective article expulsion, entirely unexpected pre-preparing procedures are considered. Picture cutting, for instance, editing of the leaf picture to instigatethe intrigued picture locale. Picture smoothing is done through the smoothing channel. Picture improving is managed for expanding the qualification. The RGB pictures into the dark pictures abuse shading change utilizing condition i.e. f(x)=0.299*R + 0.58*G + 0.114*B At that point, the visual diagram accomplishmentthat appropriates the powers of the photos is connected to the picture to support the sickness pictures. The added substance appropriation perform is utilized to

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disperse power esteems.

3. Image Segmentation The third phase is segmentation, means that image partitioning into numerous portions and segments of similar intensities and similarities. The process of segmentation is often done in many waysusing algorithms for instance Otsu methodology, HIS model, k-means algorithm, etc.

4. Feature Extraction: Feature extraction is a process in which the image can be analyzed by using differentparameters such as size, colours, etc.

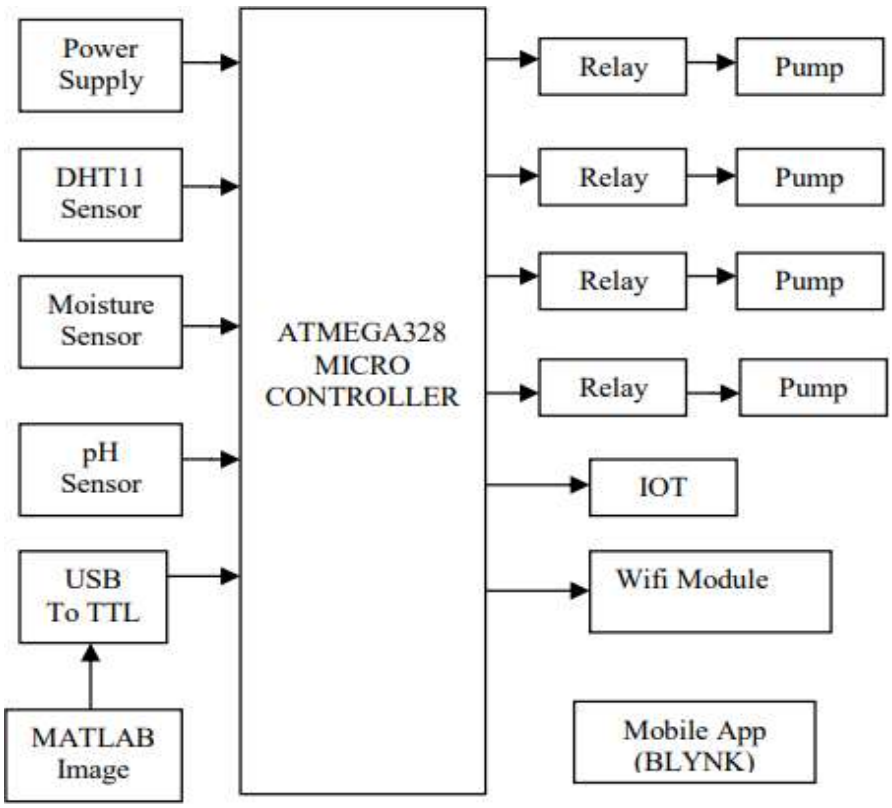

Fig 1.Work flow diagram for proposed system

V. Hardware and Software Requirement

ATmega328 microcontroller

ATmega328 is an Advanced Virtual RISC (AVR) microcontroller. It supports 8-bit data processing. ATmega- 328 has 32KB internal flash memory.ATmega328 has 1KB Electrically Erasable Programmable Read-Only Memory (EEPROM). This property shows if the electric supply supplied to the micro-controller is removed, even then it can store the data and can provide results after providing it with the electric supply. Moreover, ATmega-328has 2KB Static Random Access Memory (SRAM). Other characteristics will be explained later. ATmega 328 has several different features which make it the most popular device in today's market. These features consist of advanced RISC architecture, good performance, low power consumption, real timer counter having separate oscillator, 6 PWM pins, programmable Serial USART, programming lock for software security, throughput up to 20 MIPS etc. The ESP8266 is a really useful, cheap WiFi module for controlling devices over the Internet. It can work with a micro-controller like the Arduino or it can be programmed to work on its own.

Blynk App Working

Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data.it can store data, visualize it and do many other cool things.
There are three major components in the platform:

Blynk App

It allows to you create amazing interfaces for your projects using various widgets we provide.

Blynk Server

It responsible for all the communications between the smart phone and hardware. You can use our Blynk Cloudor run your private Blynk server locally It's open-source, could easily handle thousands of devices and can even belaunched on a Raspberry Pi.

Blynk Libraries

For all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands.

Now imagine: every time you press a Button in the Blynk app, the message travels the Blynk Cloud, where it magically finds its way to your hardware. It works the same in the opposite direction and everything happens in a blynk of an eye.

Arduino software

The name MATLAB stands for Matrix Laboratory. MATLAB was written originally to provide

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easy access tomatrix software developed by the LINPACK (linear system package) and EISPACK (Eigen system package) projects. MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming environment. Furthermore, MATLAB is a modern programming language environment: it has sophisticated data structures, contains built-in editing and debugging tools, and supports object-oriented programming.

VI. Future devolopment

smart farming helps farmers to better understand the important factors such as water, topography, aspect, vegetation and soil types. This allows farmers to determine the best uses of scarce resources within their productionenvironment and manage these in an environmentally and economically sustainable manner.

VII. Result

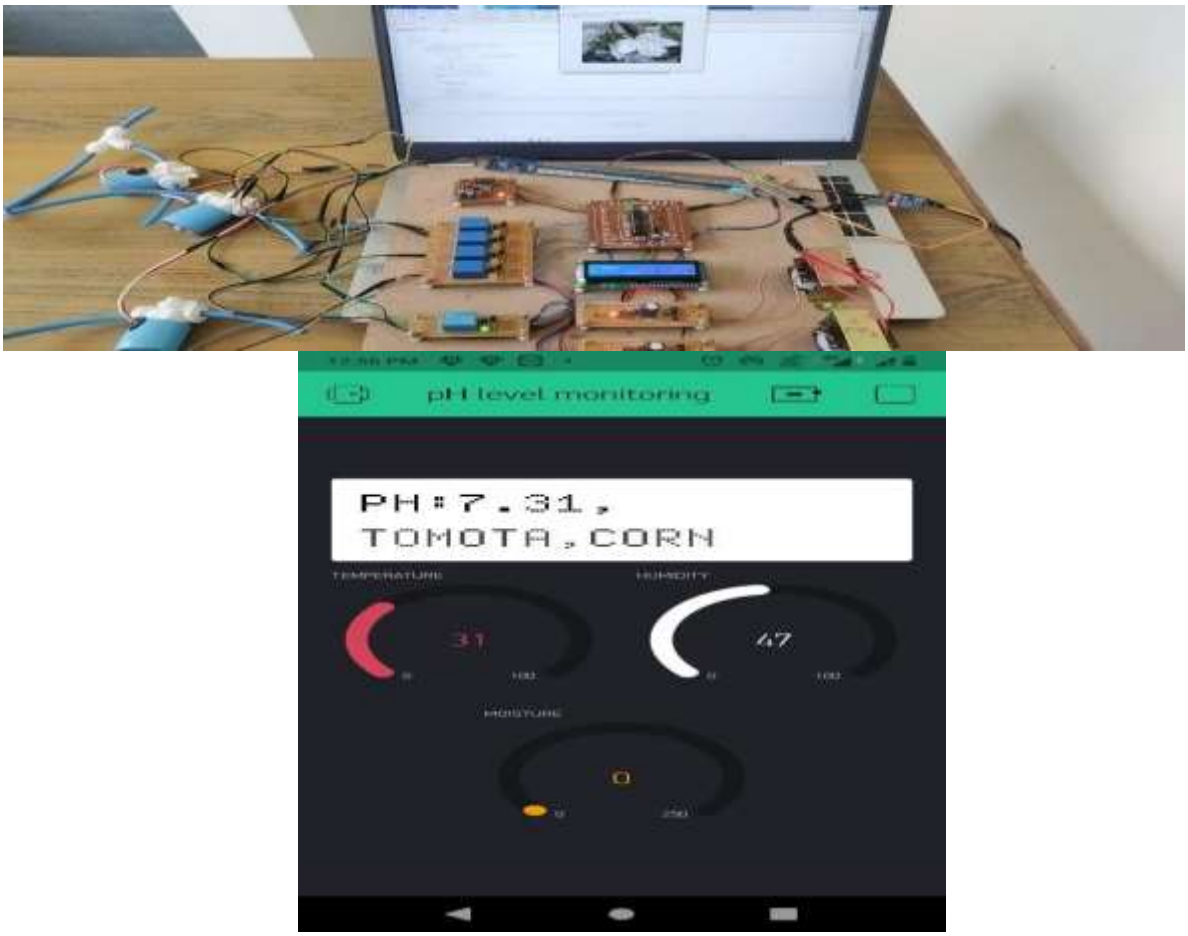

Fig 1.2 Output of the project

The overall agricultural system is mentioned in the Fig 1.2 Temperature sensor, moisture sensor and humiditysensor are integrated in this system. If the temperature goes abnormal state the water pump will turn on automatically. In other way if the temperature reaches the normal state then it will turn off automatically The end user will receive the message regarding the leaf disease. This message contains temperature, moisture, humidity level of the environment, leaf name, disease name and particular solution for that disease.

VIII. Conclusion

An application to detect, controls, and monitor the plant disease helps the farmer to reduce their work as well astime. This application helps the farmer to reduce their effort, and also helps in increasing the farm of production. The proposed method helps to find the plant disease and in monitoring the several environmental conditions. The image has been processed in MATLAB and the status of the leaf has been identified. Then the environment circumstances such as temperature, humidity and moisture has been monitored. After the image has been processedin the software it sends SMS to the user through Blynk app. The SMS contains leaf status, particular solution and environmental conditions. If the environmental condition is abnormal, then the pump will automatically turn on. Ifit is normal, it will remain turned off .In further work ,we will extend our dataset for more plant disease identification.

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