Android Based Greenhouse Monitoring

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Abstract

In agricultural country like India, greenhouses form an important aspect of agricultural and horticulture sectors. In greenhouses, plants are grown under favourable climatic conditions for its production and growth. Thus monitoring and control of greenhouse environment is necessary for production and management of greenhouses. The existing system has the ability to yet lack the ability to control indoor humidity. Green House Monitoring and Controlling is a complete system designed to monitor and control the humidity inside a green house. This software uses an Android mobile phone, connected using Wifi to a central server which connects via serial communication to a microcontroller and humidity sensor. The result shows that the condition specified in sensor's datasheet and system in reality is appropriate. The achieved test result concludes that the system is working properly.

Keyword: *green house, Android, wireless network, embedded system*

I. INTRODUCTION

Green house farmers cannot precisely detect level of level of humidity inside the green house. They only know the condition inside the green house manually and by feel it by themselves. Ultimately ,experiences play a bigger part on their daily operations. If the condition is too dry, they will give water to the plants or soil, but if it is too humid, they will open the rooftop of the green house, especially in the daylight. In designing this device, there is limitation to problems, to see how far this system can do its tasks. This limitation according to the situation where this system will be used later. There are 3kinds of activity that are designed in the system.

First, monitor the humidity level in the green house. Secondly, if the green house is too dry, the water sprayer can be activated, to increase the humidity level. It also can deactivated water sprayer. Third, if the green house is too humid, the rooftop can be opened to lower the humidity level. The third function can be use to open or close the rooftop based on the needs.

This embedded system for monitoring and controlling the green house is based on measuring the humidity and temperature by sensor that located at different places. The monitoring and controlling is conducted through Android Smartphone.

II. SYSTEM DESIGN

Basically the system is embedded system designed for greenhouse monitor and control based on measuring humidity and temperature sensors which are located at different places. Here the monitoring and controlling is done with the help of Android smart phone.

The system consists of temperature, light, moisture and humidity sensors which are interface to the microcontroller. The microcontroller periodically reads the sensor value and updates to the android via Bluetooth.
Hardware components:

1. Four sensors - temperature sensor , LDR (a light sensor), Humidity and Moisture sensor.
2. AVR microcontroller.
3. LCD for display.
4. Power supply.
5. Bluetooth.
6. Android phone.

The software is designed to maintain and control the environment of the greenhouse. Keil software is used for the programming of the microcontroller. The system is a greenhouse system in which there are four sensors. These sensors act as input to the microcontroller system. The input feed provided to the microcontroller is in the form of analog data. This data is converted by the controller into digital format. The data is shown on the LCD display and also on the android phone via Bluetooth. Thus the monitoring of temperature, moisture and other parameters is done automatically. Once the parameter values are monitored they can be control by the embedded system which is built with coding. This is automating controlling system. The android phone is operated by the user. The

android application is used for controlling as per the user knowledge and required output.
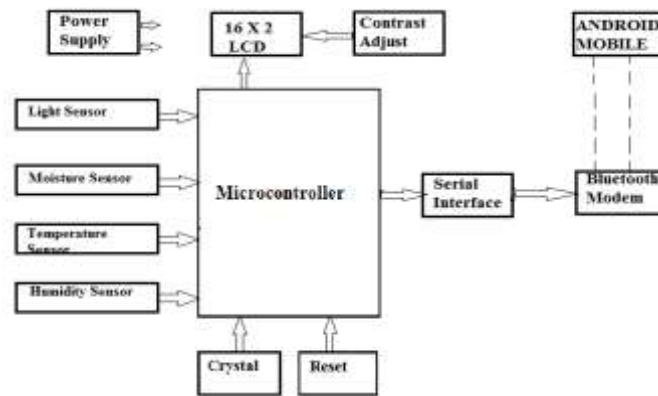
III.   IMPLEMENTATION OF GREENHOUSE MONITORING

A. **Hardware Implementation**

In the hardware implementation, all the sensors are connected to the microcontroller through the wires. There is also LCD and stepper motor mounted on the board. A DC Power Supply of 5V is given to the microcontroller, stepper motor and to the sensors.

Then the connection is made between the microcontroller and the sensors through serial communication. The Bluetooth works as a path to receive and transfer values for sensor for monitoring and input for controlling.

B.Software Implementation:

In Software Implementation, C program is used for measuring humidity, to send the value to Bluetooth modem and then to Android Smartphone using serial communication.. Next receive input from Android Smartphone then control the stepper motor and LED module. PHP code is used for communication path and modules for application in android are written in C program.

IV.   CONCLUSION

An novel approach in designing the microcontroller based system for measurement and control of the three essential parameters for plant growth, i.e. temperature, humidity and light intensity, has been followed. The android software is appropriate with the purpose in the starting, that is to get parameters value from green house The system has successfully overcome quite a few shortcomings of the existing systems by reducing the power consumption, maintenance and complexity, at the same time providing a flexible and precise form of maintaining the environment.

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