

Smart Greenhouse System

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Abstract— Monitoring and controlling greenhouse environment play an significant role in greenhouse management. To monitor the greenhouse environment parameters effectively, it is necessary to design a controlling system. Green House Monitoring and Controlling is a complete system designed to monitor and control the humidity temperature, water level and lights inside a greenhouse using an Android mobile phone, connected using WI-FI to a central server which connects via serial communication to a ARM 7 processor and sensors. In greenhouse controlling process takes place effectively by both manual mode and automatic mode. By using android mobile and PC in our system we can use ARM7 processor and communication between processor and appliances and pc(server) is serial communication using RS232.It will check real time greenhouse environmental condition and send signal to the appliances of greenhouse through wi-fi. we can also control the activities through PC and it acts as server. There are 4 kinds of activity that are performed such as humidity level ,temperature level, turn on and off the motor, lights, water level designed in the system The main objective is to design a simple and easy system to install ARM 7 processor -based circuit to monitor and record the values of temperature, humidity, and water level of the natural environment that are continuously updated to greenhouse farmer and achieve maximum plant growth and productivity.

Key words: LPC 2138, LM35.SY-HS220, LDR, RS232, Android mobile, greenhouse appliances, pc

I. INTRODUCTION

India is the agriculture country. Agricultural sector is very important Indian villager's point of view. Greenhouse farmer can faces number of problem of environmental condition such as humidity, temperature, water level. Greenhouse farmers cannot precisely detect level of humidity, temperature, water inside the green house. They only know the condition inside the greenhouse manually and feel it by themselves. So greenhouse farmer cannot give proper result and therefore it reduces the growth and productivity of crops. Today's rising demands related to greenhouse for crop production and quality and this system have significantly increased the utilization of high quality and productivity of greenhouse. In greenhouse plants and crops require certain conditions for their proper growth.Over the years the greenhouse systems became more reliable but with increased complexity. Earlier automated control systems consisting independent thermostats and timers provided major advances in efficiency and product quality making growers' lives simpler. However, many of these control devices and methods cannot deliver the level of automation and efficiency needed in today's dynamic and competitive environment Several models have been developed to represent greenhouse environments over the years varying in complexity and detail. As operating costs increased and greenhouse systems became increasingly

complex, the demand for increased control capability grew. The computer revolution of early 80s created the opportunity to meet the needs for improved control. In the last decade, there has been tremendous rise in use of computers for green houses. The main improvements in computer based control are found in data logging. In order to design successful control system it is important to realize that these parameters are interdependent. This paper presents the system that collects and automatically as well as manually controls condition of greenhouse environment and by using different sensors. The existing control system monitors the temperature and humidity in the greenhouse but other factors like soil moisture, and light intensity are equally important. To make up for this weak point, this paper proposes and collects the information regarding temperature, humidity, soil moisture and light intensity so that the change of condition of crops depending on internal environment factors of greenhouse can be estimated

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II. PROPOSED SYSTEM

Our more important goal is related to our system is improved crop productivity , accuracy in work, idea about the real time condition of greenhouse atmosphere ,reduced farmer effort so we can implemented "smart greenhouse system" as proposed system .Here we have combined our all previous concepts for an effective way and good productivity of plants. To develop android based system capable of controlling many appliances in greenhouse using android operating system with a mobile handset, where data transmission is carried wirelessly .Another important point is not only monitor the temperature and maintain humidity level in the field for proper growth of plants but also save water, energy and man power in the agriculture sector. So we design such a system that will be efficient and effort reducing of the greenhouse farmer.

Hence we design the system which is operated manually as well as automatically from remote locations by using android operating system.

III. ARM7 (LPC2138)

Controller is heart of our system . we used 32 bit controller LPC 2138 in ARM family The important consideration of this controller is our system is inbuilt ADC and sensed real time data other 8 bit controller is not compatible of this application and 16 bit controller is more complicated to handle data .in controller programming. we stored threshold value of Temperature , Humidity , water level and light controller check the sensed analog value coming from sensor and compare with threshold value and appropriate action can take place. And other and this value is send to control room through RS 232. ARM processor is one of the family of CPU based RISC architecture developed by

This resistance is called as dark resistance. The value of dark resistance is 1012Ω . And if the device is allowed to absorb light its resistance will decrease. If a constant voltage is applied to LDR its intensity of light is increased and the current starts increasing.

LDR

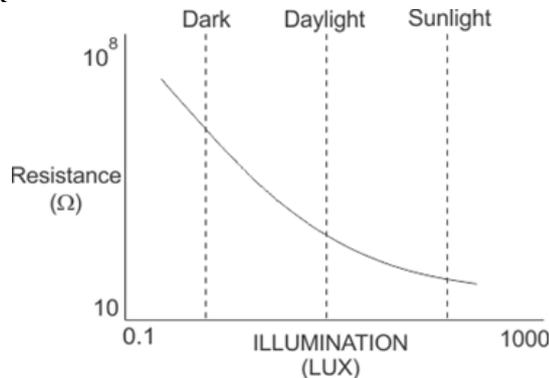


Fig. 4: Characteristics of LDR

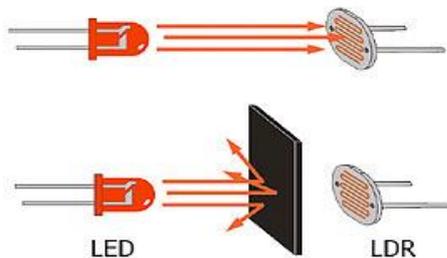


Fig. 5: Principal Of LDR

V. RS 232

We used RS 232 for data transmission controller to pc. RS 232 is standard used for serial communication. RS-232 is serial port used for connections to modems, printers, mice, data storage, uninterruptible power supplies, and other peripheral devices to communicate to each other. RS232 standard is an asynchronous serial communication method. Serial means, the information is sent one bit at a time. Asynchronous means the information is not sent in predefined time slots.

VI. ANDROID MOBILE PHONE

Android mobile phone can be used greenhouse farmer for monitoring and controlling parameter in real time. The user will be able to observe the data from anywhere in the world as the devices are connected through Wi-Fi. Android is mobile operating system developed Google and designed for touchscreen mobile devices smartphones and tablets.

VII. WI-FI

In our system send the real time data to farmer using Wi-Fi module. Wi-Fi is a local area wireless computer networking technology electronic devices to connect the wireless network and mainly using the 2.4 gigahertz (12 cm) UHF and 5 gigahertz (6 cm) SHF ISM radio frequency bands.

VIII. SOFTWARE

The software is designed to maintain and control the environment of the greenhouse. Keil software is used for the programming of the microcontroller in software

implementation, c program is used for measuring temperature humidity, level of water and this value send to android smartphone through wi-fi modem using serial communication. Proteus software is used for PCB designing.

IX. CONCLUSION

We have successfully implemented the smart greenhouse system for controlling and monitoring the greenhouse parameter in real time. In our system temperature sensor, humidity sensor, LDR, water level sensor are used to detect the greenhouse parameter effectively this sensor are sensed the data and given to the controller. controller compare this value to threshold value and activate and deactivate the relay and appropriate device is on and off and future development o proposed system is log sensed data in control room research and analysis.

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