

Green House Automation using Zigbee and Smart Phone

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This paper proposes a new approach towards the wireless monitoring and controlling of greenhouse environment based on Zigbee and smart phone for solving the problems such as poor real time data acquisition and to overcome the shortcoming of the wired system such as complex wiring and I am going to make our own Visual Basic Software Web Server which will communicate with the other devices such as Android mobile phone using synchronizing software (TEAM VIEWER). This software will keep all the devices in synch with the server. A wireless camera is attached to monitor in real time Also the devices can view the required information anywhere from the world as these devices are connected via Internet enabling owner to check and control in a real time manner .The information is also updated to the user through SMS service. If the Greenhouse parameter falls below the threshold value, the controllers will be turned off automatically.

I INTRODUCTION

A greenhouse (also called a glasshouse) is a building or complex in which plants are grown .our aim is optimization of environmental conditions for better plant growth. The aim of the paper is to control the devices or equipment's from the remote place through a web page and I am going to make our own Visual Basic software Web server which will communicate with the other devices such as Smart mobile phones PC's etc . The devices will communicate with server using synchronizing software (TEAM VIEWER). This software will keep all the devices in synch with the server. The main advantage of this technique is that the devices connected to the web server need not store the offline data or have the software required to view the data. In this way the devices connected need not store or run the software whenever they want to view the data. All the required software and the data are stored in the web server and the Client devices need not store the data neither the software. Also the devices can view the required data anywhere from the world as these devices are connected via Internet. The nature and complexity of the software systems had changed significantly in the last 30 years. The web-server is connected to LAN or Internet. The client or a person on the PC is also connected to same LAN or Internet The sensors attached to the green house are interconnected to exchange houses various parameters required to determine efficient crop yield like Temperature , Soil Moisture, Light Intensity, Humidity are sensed and

sent to the Arm microcontroller for monitoring and control through Zigbee In some of the countries, most of existing greenhouse control systems used wired communication, which faces with wiring problem. The wiring problem includes high cost, installation and maintenance difficulties and that broken node is likely to cause the entire system out of work. By using wireless communication we can overcome these kinds of problems. The wireless communication does not require wiring, it's low cost and easy to maintain.

II LITERATURE SURVEY

Jia Song proposed a system on Greenhouse Monitoring and Control System Based on Zigbee Wireless Sensor Network using 8051 controller. In this paper we have discussed about Greenhouse Monitoring and Control System Based on Zigbee Wireless Sensor Network using ARM controller and is accessible to the user through the Internet. I have discussed about Green House environment monitor technology implementation based on android mobile platform, which uses android mobile phone as the monitoring terminal. In this paper parameters in the green house are monitored on the PC as well as the android mobile phone from anywhere in the world as it is connected to the internet through the team viewer software. They had discussed about humidity and moisture monitoring in green house using Zigbee monitoring system.

Here we are using an embedded systems approach to design an automated green house. Control of various environmental parameters artificially is of importance to increase crop yield and productivity. The parameters, Light, Soil Moisture, Humidity and Temperature are monitored and controlled using ARM processor ,transmitted through the Zigbee to the VB based web server and then to the android mobile phone via a internet connection. so an efficient, low cost and reliable method is used to implement the same with the TEAM VIEWER software .

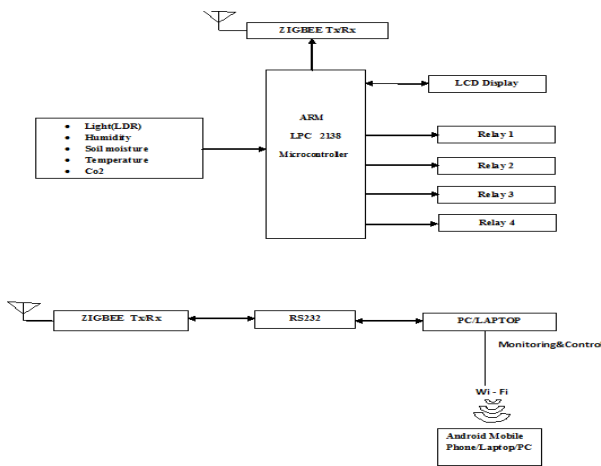


Fig.1 Block Diagram of Zigbee System

The block diagram of the proposed system is as shown above .It consists of :A. **ARM Microcontroller:** The ARM7TDMI-S is a general purpose 32-bit microprocessor which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) and the instruction set and related decode mechanism are much simpler than those of micro programmed Complex Instruction Set Computers (CISC). Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. In pipelining one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory. The LPC21xx microcontrollers are based on a 16-bit/32-bit ARM7 CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory.

Advantages of using RISC machine:

- Smaller in size
- Shorter time to develop
- Possible higher performance than CISC
- High clock rate with single cycle

In these days some of the manufacturers of ARM architecture chips have started offering combinations of on-chip memory and peripherals, and price that put them into the same marketplace with 8 and 16 bit microcontrollers. If system requires lots of memory and performance, it is worth looking at ARM chips. B. **Zigbee:** Zigbee is a high level communication protocols using small, low- power digital radios based on an IEEE 802 standard for personal area networks [7]. Zigbee devices are often used in mesh network form to transmit data over longer distances, passing data through intermediate devices to reach more distant ones. Zigbee is targeted at applications that require a low data rate, long battery life, and secure networking. Zigbee has a defined rate of 250 kbit/s, best suited for periodic or intermittent data or a single signal transmission from a sensor or input device. Low current consumption, Efficient, SP I interface, Easy for application, Operating voltage:1.8V ~ 3.6V ,high sensitivity.

□ **Temperature sensor:** LM35 is used to sense different temperature values. With LM35, temperature can be measured more accurately than with a thermistor. It also possesses low self -heating and does not cause more than 0.1oC temperature rise in still air. The operating temperature range is from - 55°C to 150°C. The output voltage varies by 10mV in response to every o C rise/fall in ambient temperature, i.e., its scale factor is 0.01V/o C.

□ **LDR (Light Dependent Resistor)** is very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically, allowing current to pass through it. Generally light intensity is measured in LUX and therefore for demonstration 100 LUX light is used as defined or threshold level. If light intensity exceeds from 100 LUX, the artificial lights automatically turns on.

□ **Humidity Sensor:** HYSH 220 humidity sensor is used to sense the humidity values, it converts relative humidity to voltage.

□ **Soil Moisture Sensor:** here I am connecting a moisture based Electrode sensor. When the water dries up then the electrode voltage rises to 5v which is applied to the non inverting terminal and the output of the amplifier is 0v which will in turn, turn on the AC motor. When the water level is up then the electrode voltage drops to 0v which is applied to the non inverting terminal and the output of the amplifier is 5v which will in turn, turn off the AC motor.

D. **Relays:** There are four relays connected. It operates in two modes:

- Normally Open
- Normally Closed

Different devices can be controlled i.e. they can be turned On/Off whenever required.

E.**LCD (Liquid Crystal Display):** LCD is used to display the prescription provided by the ARM microcontroller and is interfaced to the microcontroller. F. **GSM Modem:** It is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. The GSM modem is interfaced with the ARM microcontroller. If the parameter values of temperature, humidity, light intensity and soil moisture exceed the set points a SMS alert is sent to the user through the GSM .

III SOFTWARE ARCHITECTURE

The software part will consist of:

1. Keil
2. Orcad
3. Dip Trace
4. Visual Basic

In this I am going to make our own Visual Basic Software Web server which will communicate with the other devices such as Smart mobile phones, PC's etc. The ARM microcontroller will be programmed using the Kiel

software. The different sensors light, temperature, humidity, soil moisture are connected to the ARM-7 micro controller. The different values are monitored controlled and are transmitted through the Zigbee, to the VB based server .The Zigbee is connected to the controller. They are further transmitted to the android mobile phone through the internet, enabling the user to get real time access of the information

IV RESULT

The results below show the server window displaying real time values of the parameters and their detail timely reports with along with their graphs and the camera window.

IV CONCLUSIONS

In this paper automated greenhouse control is discussed with advantages of low cost and accuracy. The benefits that

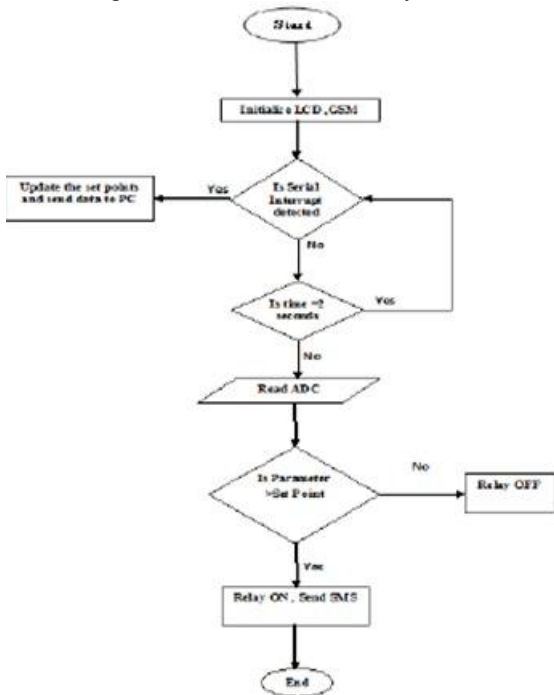


FIG 2 Flowchart of Software Architecture

a fully automated greenhouse control systems bring to the grower are many. In this there will be the labour saving. In

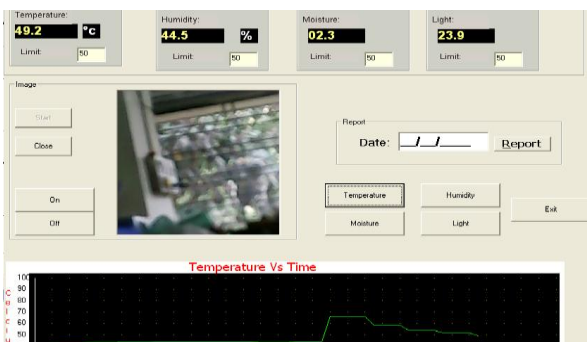


FIG 3: Temperature versus time

IV CONCLUSIONS

In this paper automated greenhouse control is discussed with advantages of low cost and accuracy. The benefits that a fully automated greenhouse control systems bring to the grower are many. In this there will be the labour saving. In this we propose a new approach using the team viewer software so the user can view the required data anywhere from the world on his android mobile phone as these devices are connected via Internet. Various other



FIG 4: Humidity versus time

applications include in Biomedical data transfer system to monitor the parameters like body temperature and gas and level etc and send it to servers cabin, it can be used in hazardous areas like in coal mines, at high altitudes, in high temperature working environment such as in steel plants where human beings cannot monitor things properly and continuously etc. In our future work ,we can work on implementation of system using VLSI technology and propose to design the system using an embedded ARM web server. If the signal is low ,we can't get the message .In order to improve that signal booster is used in future.

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