

# Wireless Data Transmission for Greenhouse Environment System Using Lab-view

Trupti N. Chaudhari, Prof. Deepali H. Shah  
Instrumentation and control Engineering Department,  
L.D. College of Engineering, Ahmedabad.

**Abstract** - This article discusses technique of remote monitoring of greenhouse systems using Labview and what is require for the variations in software and hardware implementation. This paper mainly focuses on higher efficiency for the real-time monitoring result, low cost systems and can significantly reduce the workload for greenhouse environment monitoring. The major factors that usually rule the development of greenhouse systems are higher efficiency, satisfactory automation, a user friendly interface with the computer, and complexity of computation, profitability while minimizing unintended effects on green house environment.

**Keywords** - Greenhouse, Wireless sensors, LAB View, Data acquisitions

## I. INTRODUCTION

Climatological condition monitoring is one of the very important aspects in agricultural production that has a direct impact on the productivity and maintenance of crop. A major loss occurs every year due to damage of crops by various diseases caused by improper climatic conditions. Greenhouse is the modern facility available in which we can control the climate to increase plant growth and avoid the effect of season changes on the plants. Greenhouse is playing a important role in the production of out-of-season fruits, vegetables and flowers as well as high value and sensitive plants like capsicum. The aim of greenhouse environmental monitor is to get the best climatic conditions (controlled temperature, humidity, light and level of carbon dioxide) for crop growth, increased crop yields, improved quality of crops, and regulated growth cycle of crops [1].

Greenhouses are generally used for growing flowers, vegetables, fruits, and tobacco plants. Most of the Greenhouse systems still use the manual system in monitoring the temperature and humidity [2]. A lot of difficulties can occur not for worker but also affects production rate because the temperature and humidity of the greenhouse must be continuously monitored to ensure optimal conditions. The Wireless Sensor Network (WSN) can be used to collect the data from point to point to trace down the local climate parameters in various parts of the big greenhouse to make the greenhouse automation system work properly. The data are transmitted to a central location and used to control heating, cooling, and irrigation systems [2].



Figure 1. Greenhouse concept [2]

The communication modes of environmental monitoring system generally have the following kinds: wireless communication based on Bluetooth [8], Zigbee protocol [1], Internet [3],[5], GSM[6]. The mode of short distance wired data communication has several disadvantages, such as poor expansibility, very short transmission range, instable system, etc.

TABLE 1: Comparison of Zigbee, Wi-Fi, Bluetooth

Technology	Zigbee	Wi-Fi	GSM
Range	1-100+	1-100	Wide
Source metrics	Reliability, Cost, power	Speed, Flexible	Cost
Application	Monitor & Control	web, email	Data X^er

However, compared with wired data communication, ZigBee communication mode is suitable for short-distance communication in the greenhouse because its advantages, such as, no complicated wire, flexible networking, easy to upgrade [3].

In this paper designing, developing and implementing a sensor-based wireless communication system to monitor and control the greenhouse parameters such as temperature, humidity & light in real time for better management and maintenance of agricultural production and to prevent the several attack of diseases on the crops cause by the climatic conditions and efficient data transmission wirelessly are the main goal of this work.

## II. SYSTEM DESCRIPTION

Remote monitoring of greenhouse environment system is composed by wireless sensors which are running in greenhouse & host computer using labview. This work is basically divided into following module first is sensors module with signal conditioning circuit, second is atmega168-20AV microcontroller and third is the transceiver at both end. At receiving end zigbee is connected to the host computer for the continuous monitoring and database maintenance. Design of remote monitoring system consists of hardware & software both.

In software process aurduino software is used to design the connection & all interfacing process. After that entire program has been designed to connect with the atmega168-20AV microcontroller. Labview software is used to present the data at the user end.

In hardware development process includes zigbee transceiver module, atmega microcontroller, temperature sensors, humidity sensors, light sensors & host computer.

In this work atmega168-20AV microcontroller is used to transfer the data to zigbee module serially. The sensors data is transmitted to analog input pins of the microcontroller. After processing that data it is transmitted through zigbee which is connected to serial output pin of microcontroller. At the receiver end zigbee is connected to host computer.

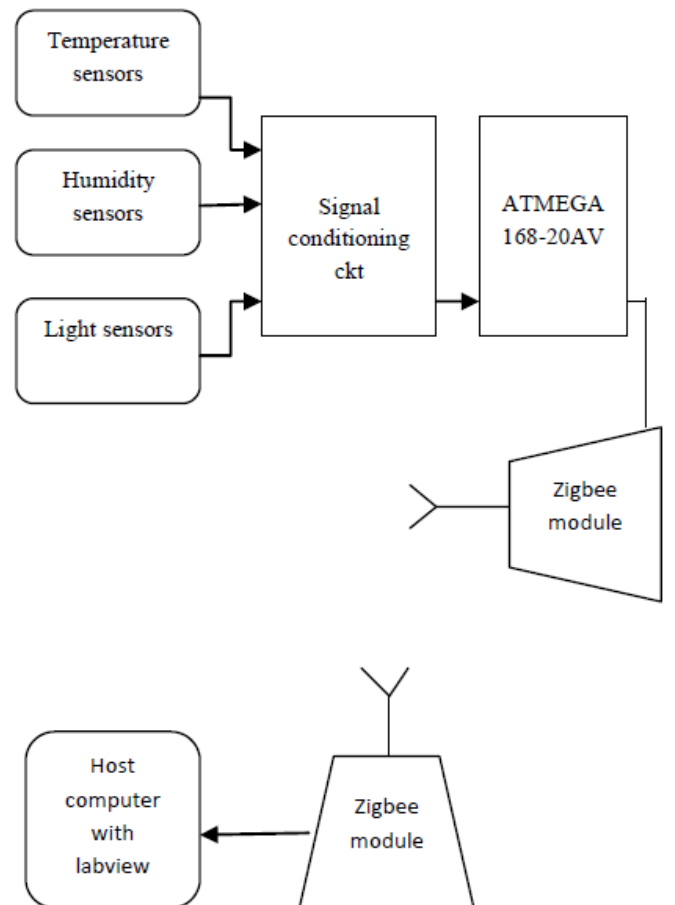


Figure2. Block diagram of Remote Monitoring system

Labview is used to display the data at the user end, this data is stored in text file for data maintenance and backup. The LABVIEW program is in such a way that it can be worked in two different modes, read mode and write mode. In read mode it will read the received data and present it in the front panel and in the write mode the generated control signals are sent from the LABVIEW. These control signals are transmitted to the zigbee module in the greenhouse field from the control room zigbee module.

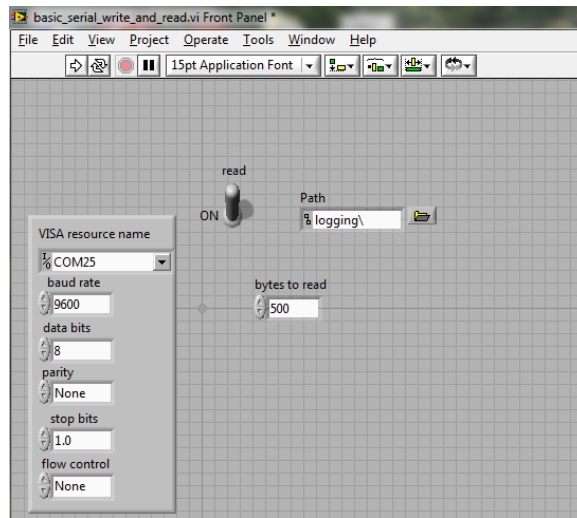


Figure4: Front panel of serial communication

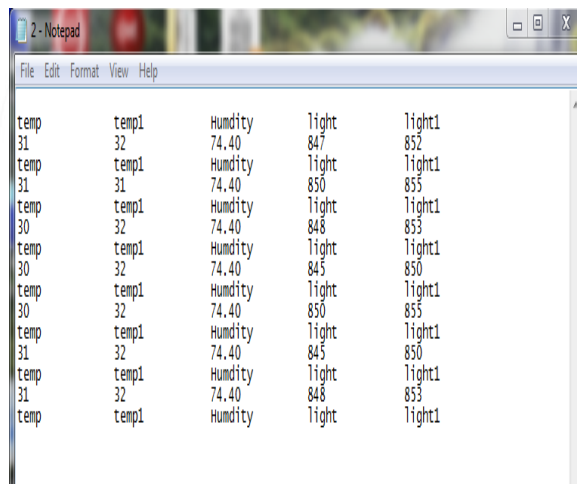


Figure5: Text file which store the monitoring data.

These control signals changes the status of the relays in the greenhouse field. The host computer displays the current value of the parameter such as temperature, humidity and also the status of the relays in the greenhouse. Relays are controlled by the control signals from the host computer based on the set points specified by the user. In the greenhouse field the relays are connected to the microcontroller to carry out the required control function.

### III. RESULT & ANALYSIS

Temperature and humidity is one of growing factors for the plants. When the temperature of the greenhouse environment rises system will switch on the fan. When temperature will drop then system will switch on the Heater. When the humidity of the greenhouse rises then system will switch on the circulation fan. On the other way, when the humidity is too low, the system will start to spray water.

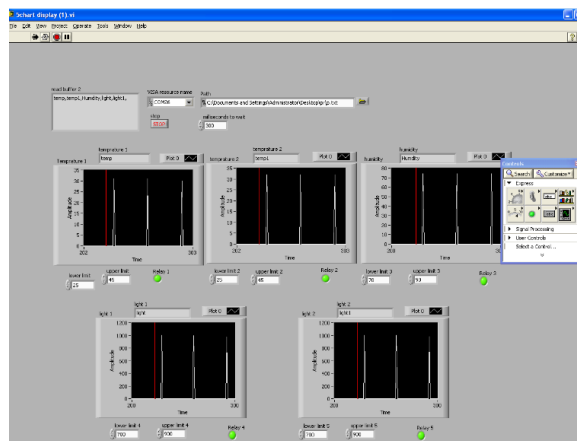


Figure6: Front panel of monitoring system

#### IV. CONCLUSION

The system design here user friendly, low cost, easily implement & stable, it should be more efficient. In this paper greenhouse management approach to monitor and control the environment is demonstrated.

#### REFERENCES

- [1] Akshay C., Nitin Karnwal, Abhfeeth K.A., Rohan Khandelwal, Tapas Govindraju, Ezhilarasi D., Sujan Y., “Wireless sensing and control for precision Green house management”, 2012 IEEE Sixth International Conference on Sensing Technology (ICST)
- [2] A. Salleh, M. K. Ismail, N. R.Mohamad, M. Z. A Abd Aziz, M. A. Othman, M. H. Misran, “Development of Greenhouse Monitoring using Wireless Sensor Network through ZigBee Technology”, International Journal of Engineering Science Invention ISSN, Volume 2 Issue 7, July. 2013 , PP.06-12
- [3] Li Guofang, Chen Lidong & Qi Yubin & Liu Shengtao, Xue Junya , “Remote Monitoring System of Greenhouse Environment Based on Lab VIEW”, 2010 IEEE International Conference On Computer Design And Applications (ICCD A 2010)
- [4] Chen Peijiang, Jiang Xuehua, “Design and Implementation of Remote Monitoring System Based on GSM”, 2008 IEEE Pacific-Asia Workshop on Computational Intelligence and Industrial Application
- [5] Junlong Fang, Fulu Wang, “Design of Greenhouse Remote Monitoring System based on LabVIEW”, Fund project: Harbin science and Technology Agency Foundation of Returned Overseas
- [6] Chen. Chiung Hsing, Chen,Guan Yu, and 1Chen. Jwu Jenq, “Greenhouse Environment System Based on Remote Control”, International Conference on Chemical, Ecology and Environmental Sciences (ICCEES'2011) Pattaya Dec. 2011
- [7] Izzat Din Abdul Aziz, Mohd Hilmi Hasan, Mohd Jimmy Ismail, Mazlina Mehat and Nazleeni Samiha Haroon, “ Remote Monitoring in Agricultural Greenhouse Using Wireless Sensor and Short Message Service (SMS)”, International Journal of Engineering & Technology IJET-IJENS Vol:09
- [8] Purnima, S.R.N. Reddy, “Design of Remote Monitoring and Control System with Automatic Irrigation System using GSM-Bluetooth”, International Journal of Computer Applications (0975 – 888)Volume 47– No.12, June 2012
- [9] A. Rahali , M. Guerbaoui, A. Ed-dahhak, Y. El Afou, A. Tannouche, A. Lachhab,B. Bouchikhi, “Development of a data acquisition environment control system based on GSM”, International Journal of Engineering, Science and Technology Vol. 3, No. 8, 2011, pp. 297-306
- [10] B.VidyaSagar, “GreenHouse Monitoring and Automation using GSM”, International Journal of Scientific and Research Publications, Volume 2, Issue 5, May 2012

