
INTELLIGENT MONITORING & CONTROLLING OF AGRICULTURAL FIELD PARAMETERS USING ZIGBEE.

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ABSTRACT— The main objective of the present paper is to develop a smart wireless sensor network (WSN) for an agricultural environment. Monitoring agricultural environment for various factors such as temperature and carbon monoxide along with other factors can be of significance. A traditional approach to measure these factors in an agricultural environment meant individuals manually taking measurements and checking them at various times. This paper investigates a remote monitoring system using Zigbee. These nodes send data wirelessly to a central server, which collects the data, stores it and will allow it to be analyzed then displayed as needed and can also be sent to the client mobile.

1. INTRODUCTION

The agricultural practices such as irrigation, crop rotation, fertilizers, pesticides and animals were developed long ago, but have made great strides in the past century. The history of agriculture has played a major role in human history, as agricultural progress has been a crucial factor in worldwide socio-economic change. The concern of better quality agricultural products from the consumers made the farmers adapt to latest agricultural techniques by implementing modern technologies for producing better agricultural products. Among the important things which are taken into consideration by the farmers are the qualities of agricultural land, weather conditions etc. Traditional farming involves a human labour. With proper data the farmer will be able to deliver the quality product to the consumer. In this paper we have discussed about online monitoring of agriculture parameter using multiple sensors are like temperature, rain ,carbon monoxide and light sensor, Zigbee wireless technology. We update the parameter result from the sensor node data is transferred to the Zigbee to another end server PC. From the PC, the sensor values are transferred to the client so the farmer may know the status of their agricultural field. The ability to monitor environmental conditions is crucial to research in fields ranging from climate variability to agriculture and zoology. Being able to document baseline and changing environmental parameters over time is increasingly essential important and researchers are relying more and more on unattended weather stations for this propose. Zigbee wireless sensor network usually works in a complex environment, and the energy of sensor node is very limited, so energy consumption is a big problem in Zigbee wireless sensor network especially in the multi-sensor system.

2 . PROPOSED SYSTEM

A. BLOCK DIAGRAM AND ITS DESCRIPTION

The proposed system consists of different components interfacing to a microcontroller. In this paper we are using ATmega8L-8pu microcontroller, the heart of the system. The ATmega8L-8pu microcontroller is a low-power; high performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable flash memory and it is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

The block diagram is shown in Figure 1.1

BLOCK DIAGRAM

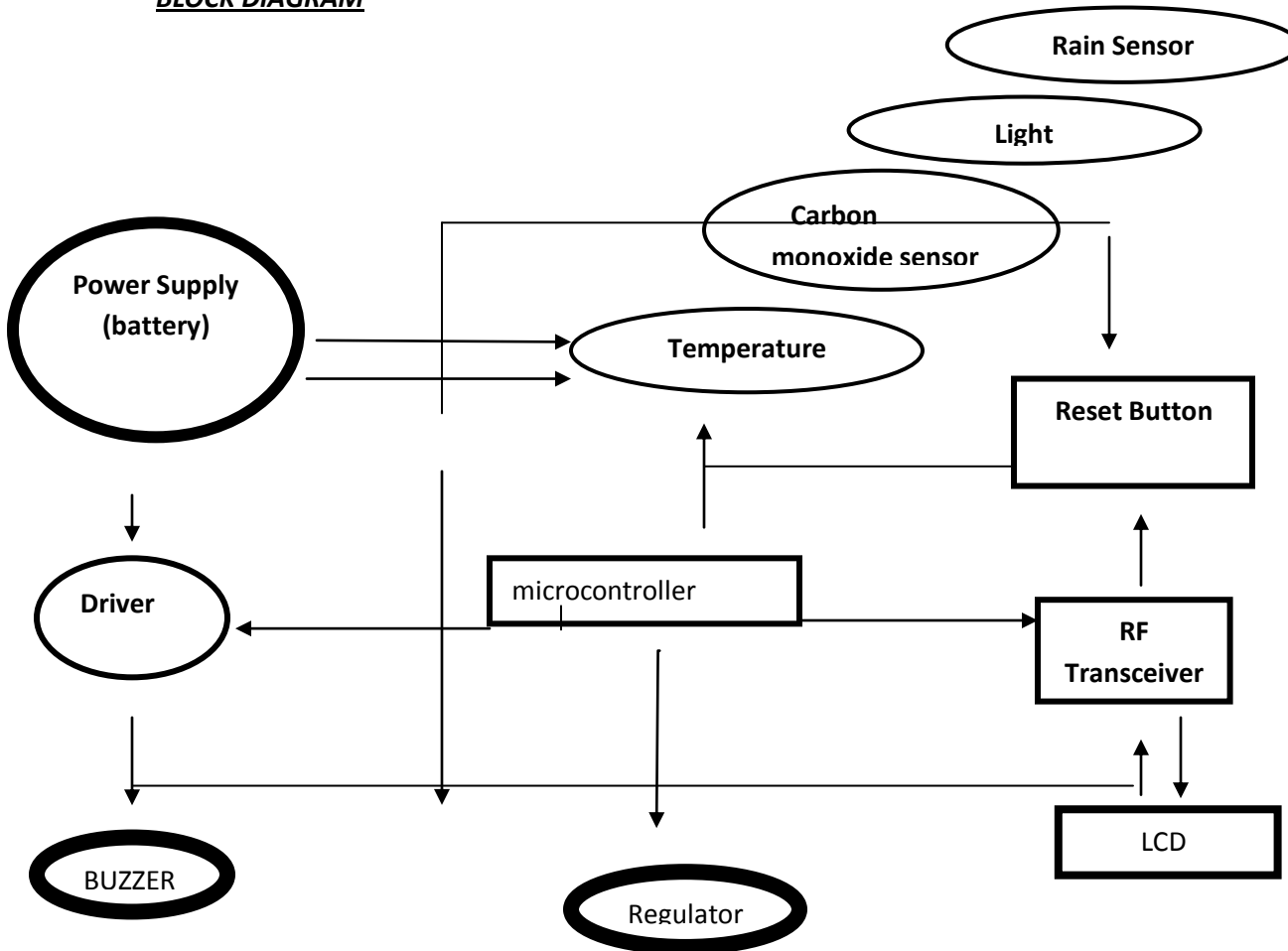


FIGURE 1.1

The input power is step down to 5v DC from 230v AC power line by the power supply unit. LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. The JHD 16x4A LCD is used and is connected to the output port of micro controller to display the cyclic

operations of Agricultural parameter device. The microcontroller can communicate with the serial devices using its single serial port. The logic levels at which this serial port operates is TTL logics. But some of the serial devices operate at RS 232 logic levels. So in order to communicate the microcontroller with modem, a mismatch between the logic levels occurs. In order to avoid this mismatch, in other words to match the Logic levels, a **serial** driver is used. A MAX232 is a serial line driver used to establish communication between modem and microcontroller.

B. WORKING:

The system which is implemented is divided into three parts. They are field side, server side and client side.

FIELD SIDE:

Field side circuit given below in fig 1.2 which consist many sensor like temperature, rain, light and carbon monoxide sensor.

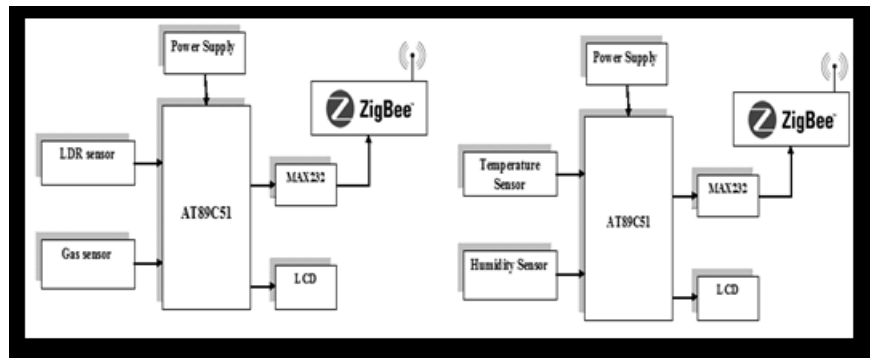


Fig 1.2

A prototype hardware board has been implemented .In this prototype the hardware gets the carbon monoxide, temperature , rain and light sensor from corresponding sensor in hardware circuit then it send all the information using the zigbee transceivers

In field side we are using four sensor to measure the soil parameter and agricultural parameter .these sensor are used to measure the external parameter which affect our crops. And send the data to our driver whose collect this data and send to controller .controller transmit data to client side .client side data shown on LCD display or on computer screen.

CLIENT SIDE:

In the server prototype the gathered values from the Zigbee transceivers are saved in the form of Microsoft Excel format and then it is transferred to user as mobile data using Drop Box technique so that it can be retrieved immediately and also for future references. The received data is stored in the server pc for later reference and also the stored real time information is securely send to user or client by using drop box synchronizing technique between mobile and server. So that user can able to get real-time information about the land at anywhere at any time.

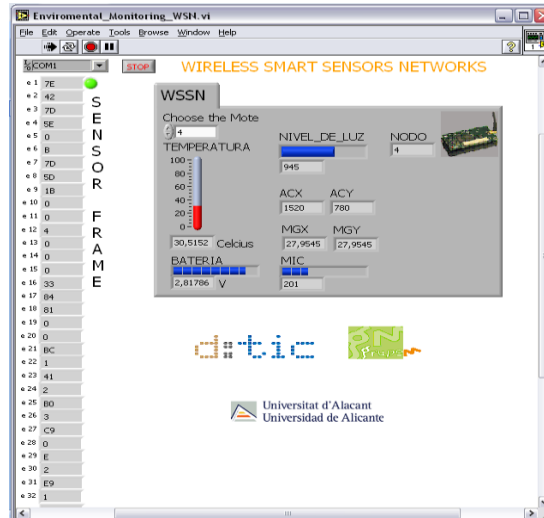


Fig 1.3

CLIENT AND SERVER :

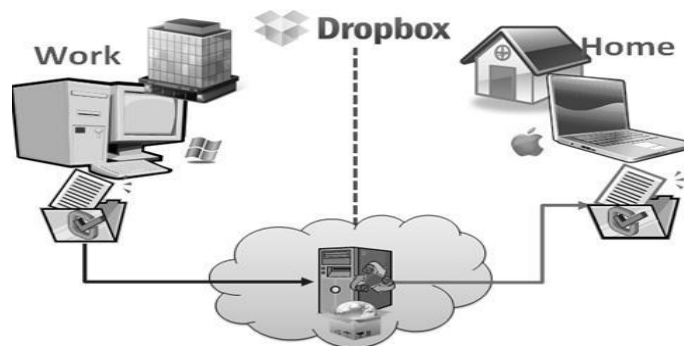


Fig 1.4

Fig1.4. Architectural Diagram The hardware circuit in the field side measures the soil parameters using the rain sensor, carbon monoxide sensor, and Light sensor and Temperature sensor. This information is collected by the hardware controller and transmitted using Zigbee transceiver. On the other side all this information are received by the Zigbee transceiver which is stored in the server computer .Then the information which is collected is send to the mobile of the user using or the other instrument using by the user like LCD display technology.

3. EXPERIMENT RESULT

This paper gives a different way of approaching the problem in agricultural field. It increase the production of crops and reduce the disease endanger in crops. It controlled mostly parameters which affect our field or crop. It controlled carbon monoxide, light, rain ,temperature and humidity and other parameter.

4. CONCLUSION

Zigbee-based agriculture monitoring system serves as a reliable and efficient system for efficiently monitor the environmental parameters. Wireless monitoring of field not only allows user to reduce the human power, but it also allows user to see accurate changes in it. It is much cheaper in cost, consumes less power and can control many devices, which in turn leads to the development of lots of new technologies like Home Automation, Health Care Automation Etc. It provide an efficient result where rain, temp. , and environment pollution is measure cause.

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