

# Design Of Environmental Monitoring System in Farm House Based on Zigbee

N. VENKATESH<sup>1</sup>, P. SURESH<sup>2</sup>, M. GOPINATH<sup>3</sup>, M. RAMBABU NAIK<sup>4</sup>

<sup>1,2,3,4</sup>Assistant Professor, KKR &KSR Institute of Technology and Sciences, Guntur, Andhra Pradesh, Directed to UG students

Email: Venky566.nvc@gmail.com<sup>1</sup>, polisetty.suresh999@gmail.com<sup>2</sup>, maddiguntlagopinath@gmail.com<sup>3</sup>

Received: 10.01.22, Revised: 14.02.22, Accepted: 25.03.22

## ABSTRACT

In these days there are rapid changes in the environment which causes the major effects in the world. The farms are having the certain requirement to maintain the environment. Manually this process cost a huge Manuel work. In large poultry's it is hard to check and maintain the required environment in the suitable level for the animals in the farm. we proposed a solution for the problem by designing the automatic environmental monitoring system in the Animal forms. Here we are detecting the hazard situations and working on them to retain the environmental conditions in that farm to normal. The controller or maintenance officer of that farm can check these values either in the control room in pc or in the mobile screen. We are using the latest Zigbee technology to transfer the data from the control board to the computer. In case of the temperature fluctuations and humidity fluctuations it is hard for the animals to survive in that hard temperature. So when there is low labor available or in night times then this board plays key role to control the situations. When the situations are critical then this automatic environmental monitoring system works effectively to bring the situations under control. We designed this controlling process in a low cost manner so when compared to the labor wages here it is very low cost. When there are more number of farms in a particular area then we can access the data of all the farms at a time in the monitoring system. Here we are using the short range communication device for high speed.

**Keywords:** To control and monitor the environmental conditions in animal farms, Zigbee.

## Introduction

The environmental conditions in the world are changing from day to day which results in the climate changes in humidity and temperature. Due to the some gas leakages there is a huge damage to the surroundings. In the past we have seen many animals in the farms are died due to these poisonous gases leakages and sometimes it leads to the extinct of these animals. The human friendly animals or domestic animals are habituated in the society and they are grown in the farms. This project mainly focusses on the automatic controlling system which helps to get the reduced in the labor. Here we are calculating the different environmental parameters to check the condition in the society. We are using the ZIGBEE technology to have the shortest range of communication and also the highspeed data transfer. A X-Bee modem provides the communication interface. It transports device protocols transparently over the network through a serial interface. X-Bee modules are designed with low to medium transmit power and for high reliability wireless networks. The modules require minimal power and provide reliable delivery of data between devices. The interfaces provided with the module help to directly fit into many industrial applications. The modules operate

within the ISM 2.4-2.4835 GHz frequency band with IEEE

> 802.15.4 baseband. Transmit Power of X-Bee module is up to 1 watt / 30 dBm nominal. X-Bee module Receiver Sensitivity is up to 107 dBm. The system senses gas, temperature as well as humidity and conveys this to the user wirelessly through X-Bee. Our system uses Gas sensor to detect hazardous gases. Also a DHT-11 humidity sensor is used to detect current humidity and temperature conditions. All this data from sensors is conveyed to the microcontroller. The microcontroller now processes this data and passes is on to X-Bee modem interfaced to it. The X- Bee modem now sends this information to user. This project is aimed to design a system using Zigbee technology. The system senses gas, temperature as well as humidity and conveys this to the user wirelessly through Zigbee. Our system uses Gas sensor to detect hazardous gases. DHT-11 humidity sensor is used to detect current humidity and temperature conditions. All this data from sensors is conveyed to the microcontroller. The microcontroller now processes this data and passes is on to Zigbee modem interfaced to it. The Zigbee modem now sends this information to user. Thus this puts forward a wireless X-Bee based Chicken

house environment monitoring system where the person does not need to be near the equipment to constantly monitor environment reports. The data is automatically sent to the user via X-Bee. And also depends upon sensors data we get Buzzer alert. This project uses regulated 5V, 500mA power supply. Unregulated 12V DC is used for relay. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transform.

**Existing Method**

The project is based on the wired technology for data transmission. It calculates only the temperature and humidity values. It contains only the lcd display so every time the workers have to check for the data values in the display. The existing environmental monitoring system is having only the ability to monitor the situations with respect to temperature and humidity. It cost very high for the wiring from farm to the pc which is in control room. It results in increase of the maintenance cost of the farm house. Incase if workers are not available then it results in any unexpected results. Sometimes if there any accident occurs then the huge damage will occur.

**Proposed Method**

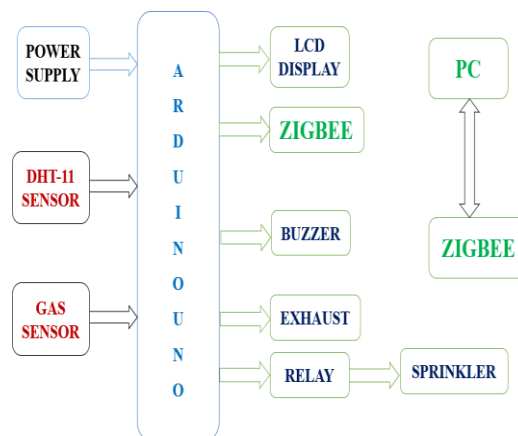
We are facing the environmental fluctuations in climate daily due to various situations. It is getting burden for the workers in these farms to monitor the

farm for 24 hours. It is getting difficult for workers to maintain healthy environment in the farm for good health of animals. In this project, we are designing the system in an effective way to monitor and also to control the situations in the farms.

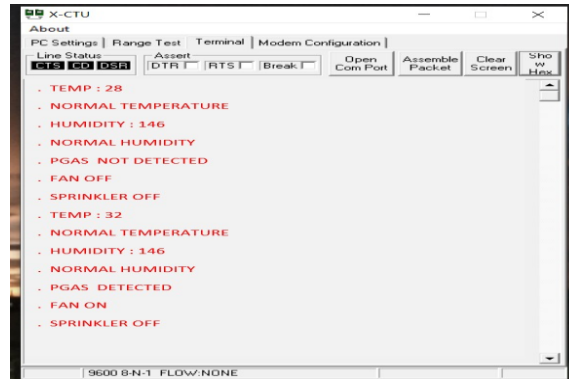
Here we are using buzzers to alert the workers in the farms Here we are using the Zigbee technology to maintain the high data rate and short range communications. Sprinklers are used to control temperature and humidity levels Gas sensor is used to detect the poisonous gases. We are using wireless technology Exhaust fans are used to exhaust the air outside the farm to maintain good oxygen levels. ZigBee module.

Incuse of any fluctuations in the temperature or the humidity levels in the farm house results in health effect of the animals in the farm. This system will automatically respond in getting the system into control. The temperature and humidity values are recorded using the DHT-11 sensor at the located positions. Incase of detection of any poisonous gases ( H<sub>2</sub>S, NH<sub>3</sub> ) in the poultry , the gas sensor Mq-3 detects and sends the data to the Arduino. The data from the sensors is transferred through the Arduino. By using the Zigbee Technology, this data will be displayed on the screen of the PC. Buzzer will buzz , In case of the heavy temperature , low humidity or detection of poisonous gases, showing that it was a threat to animals.

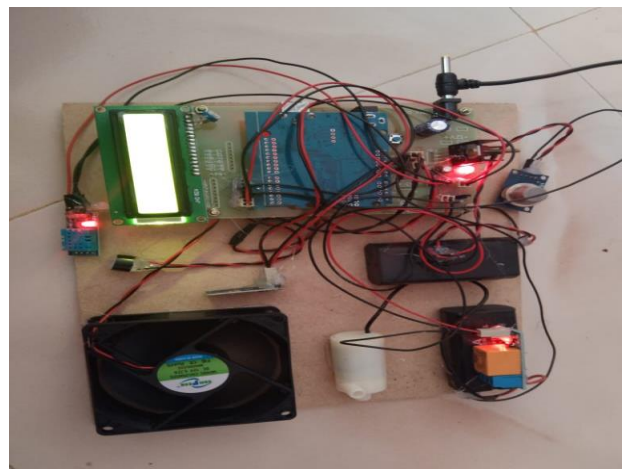
**Block Diagram**



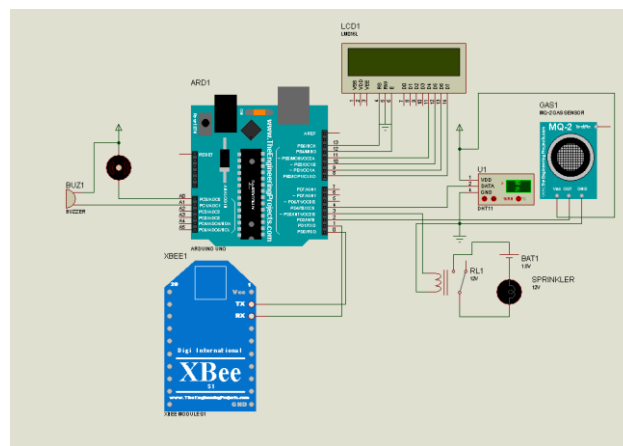
### Output display



### Proto type circuit



### Schematic diagram



### Technical Specifications

#### Hardware

Microcontroller Board: Arduino UNO

LCD : 16X2

Buzzer : 5V/10V Physio Electric

DHT-11 Sensor

MQ-3 sensor

Zigbee modules : 2

Water sprinkler

Exhaust fan

#### Power supply

Transformer : 12V step down

Filter : 1000uf/25V

Voltage Regulator : 7805, 7812

#### Software

- Arduino IDE
- X-bee

#### Applications

- Animal farms.
- Industrial

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