WSN BASED GREEN HOUSE OR IRRIGATION MONITORING AND CONTROL SYSTEM USING SMART PHONE

[1]VEENA A.PATIL, [2]SONALI.B.PATIL, [3]SWETHA.S.GOGI, [4]SATAPPA.M.PARAMAGOND, [5]SIDHARTHA.A.VARDHAMANA

[1]*Asst. Prof. Dept. of CSE BLDEA's Vachana Pitamaha Dr.P.G.Halakatti College of Engineering And Technology, Vijayapur, Karnataka, India.*

[2345]*Final year students , B.E (CSE) ,BLDEA's Vachana Pitamaha Dr.P.G.Halakatti College of Engineering And Technology, Vijayapur,Karnataka, India.*

---***---

Abstract - *This paper represents the modeling and optimization on WSN based greenhouse monitoring and controlling. In agricultural country like India, greenhouses form an important aspect of agricultural and horticulture sectors. In greenhouses, plants are grown under favorable climatic conditions for its production and growth. Thus monitoring and control of greenhouse environment is necessary for production and management of greenhouses. This project is designed to monitor and control the indoor humidity and weather conditions affecting the plants using embedded system and Android mobile phone. The android phone is connected to a central server which then connects to microcontroller and humidity sensor via serial communication. Thus the sensor records and manages the required weather conditions proved to be appropriate for plant growth.*

1. INTRODUCTION

There is continuous increase in demand for food production technology. India is a country where the economy is dependent on a agricultural produce. Agricultural means can satisfy the food production demand. But due to isotropic climatic conditions, lack of water reservoir, agricultural produce does not meet the demands. At the present scenario, farmers have been using different irrigation technique for increasing production. These techniques were done by human intervention. But due to this sometimes either the plants consume more water or the water reaches late up to the plants. This ultimately affects the plant growth. Also there are many such problems associated with it. To overcome from this problem, we can use an automatic micro controller based system. For automatic monitor and control we are developing an embedded system which will record the temperature, moisture and other parameters that will control the environmental conditions in the plant field. Moreover for effective control, an android application is used along with embedded system.

2. SYSTEM ASPECTS AND DESIGN DETAILS

The system is a greenhouse system in which there are four sensors. These sensors act as input to the microcontroller system. The input feed provided to the microcontroller is in the form of analog data. This data is converted by the controller into digital format. The data is shown on the LCD display and also on the android phone via Bluetooth. Thus the monitoring of temperature, moisture and other parameters is done automatically. Once the parameter values are monitored they can be control by the embedded system which is built with coding. This is automating controlling system. The android phone is operated by the user. The android application is used for controlling as per the user knowledge and required output.
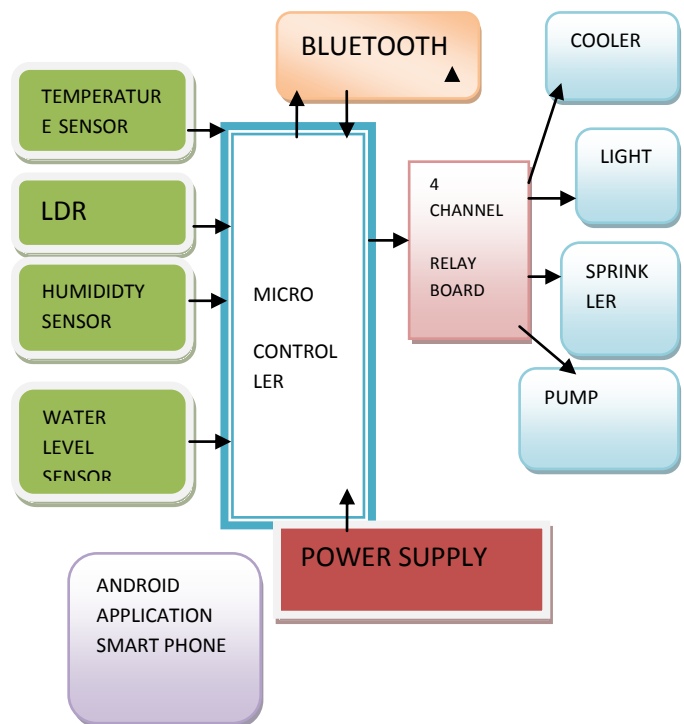

Fig.2.1 Block diagram

---

3. SYSTEM OPERATION

In this greenhouse system in which there are four sensors. These sensors act as input to microcontroller system. The input provided to microcontroller is in the form of analog data. This data is converted by the controller into digital format. The data is shown on the android phone via Bluetooth automatically.

Once the parameter values are monitored they can be control by the embedded system which is built with coding. This is automating controlling system.

Flow Daigram
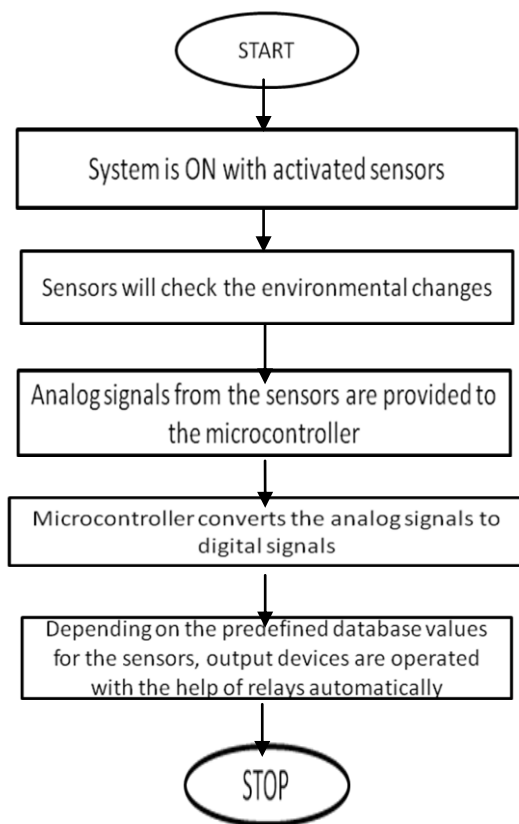
ARDUINO KIT

Fig 3.1 Arduino Kit

Arduino is an open source, computer hardware, user community that design and manufactures micro controller kits. Variety of microprocessors and controllers are used to design arduino board.

The Arduino board has 6 analog input pins,14 digital I/O pins , a 16 MHz crystal oscillator, a USB connection, a power , an ICSP header, and a reset button. It works by simply connecting it to a computer. To start system we use USB cable or a AC-to-DC adapter or battery. USB is also used for loading programs from personal computers.

In UNO it uses Atmega8U2 programmed as a USB-to-serial driver converter, instead of FTDI USB-to-serial driver chip. "UNO" is next version of Arduino 1.0.

HUMIDITY SENSOR

Presence of water in air is called Humidity. Water vapor in the air can affect human comfort and also manufacturing processes in industries. Water vapor in air also influences various physical, chemical, and biological processes.

Fig 3.2 : Humidity Sensor

Measurement of humidity is difficult in industries because it affects the health, safety of workers and also affects on cost of product. Therefore humidity sensing is important, in the monitoring and control systems.

In industrial & domestic applications controlling and monitoring the humidity is important. Humidity sensors also plays an important role in Semiconductor Imdustries, Chemical Industries, Medical applications, Soil moisture monitoring, and some other applications.

WATER LEVEL SENSOR

These sensors are used to detect the level of substances that can flow. Such substances include liquids, slurries, granular material and powders.

In our system we used water level sensors for the purpose to measure the water content present in the tank which provides water to the plants.

Level sensors play an important role in variety of industrial applications. Level sensors are designed using various types of sensing principles. It is important to select an appropriate type of sensor suits the application requirement.

TEMPERATURE SENSOR

Temperature sensors use a solid-state technique to determine the temperature. They don't use mercury , bimetallic strips, and thermistors. Instead, whenever temperature increases, the voltage across a diode also increases at a known rate. By precisely amplifying the voltage change, generating the analog signal is easy, that is directly proportional to temperature.

Since there are no moving parts in this sensor, they work under many environmental conditions, and are consistent between readings and sensors. The major advantage is inexpensive and easy to use.

LDR

Light Dependent Resistor or Photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. LDR is also known as photo cells, photoconductors. It is a type of semiconductor and LDR conductivity changes with proportional change in the intensity of light.

Principles of LDR are as follows:

LDR works on principle of photoconductivity. When photons incident on the device , a photon is absorbed and electrons in the valence band of the semiconductor material into conduction band. To make electrons exite from valence band to conduction band, photons that incident on the device must have greater energy than the band gap of semiconductor material. The result of this process is current starts flowing through the device.

$$\lambda_o = \frac{h.\,C}{e.E\text{ш}}$$

In the above equation, value calculated must be less than equal to wavelength of radiation. If the wavelength is greater than the value, there will be no change in the resistance of this device.

Construction of a LDR: Cadmium Sulphide (CdS) and Cadmium Selenide (CdSe) materials are used to manufacture the photoconductive cells.

4. ADVANTAGES AND DISADVANTAGES

Advantages:-

- Market oriented results.
- Greater saving in the natural resources.
- Low cost setup with maximum automation.
- Less expenditure and low labor cost.
- System can be easily modified for adding the new features.
- Single defective part will not affect the whole system.
- Sensors used have high sensitivity.
- Complete setup is easy to operate.
- Income flow is increased.

Disadvantages

- Requires uninterrupted power supply.
- Proper installation of setup is required.
- Connection is for limited range.

5 . CONCLUSION:

This paper describes the design of a greenhouse monitoring and controlling system based on wireless sensor network. Agriculture projects even in urban areas are on a rise in recent times, in unique forms. Technological progress makes the agricultural sector grow high, that is made by the Android Application. This control and monitoring system use different parameters to provide the current values of temparature, humidity,water level and light. The system can be proved it is well profitable and it also optimize the resources in the greenhouse. The complete module is of low cost, low power operation. Hence, easily available to everyone.

REFERENCES

[1] Mittal,D., Vaidya,.B. , J Mathew, 2014, A GSM based low cost weather monitoring system for solar and wind energy generation, International Journal Digital Information and Web Technologies.

[2] Miss. Madhuri Prakash Patil, Mr. K P Rane, 2016, Cloud Based Weather Monitoring System, International Journal on Recent and Innovation Trends in Computing and Communication, Vol. 4, No.5, pp 446-450.

[3] Ashenafi Lambebo, Sasan Haghani, 2014, A Wireless Sensor Network for Environmental Monitoring of GreenhouseGases,ASEE2014ZoneIConference,University of Bridgeport, Bridgpeort, CT, USA.

[4] Rajdeep Kumar, Sazid Khan, Manik Chand Yadav; S K Dubey, Weather monitoring system‖, International Journal of Advanced Technology in Engineering and Science May 2014 Volume 02, Issue No. 05.

[5] Kelly.W, K. Kronfeld, T. Rand, 2000, Cockpit integration of uplinked weather radar imagery, published in Digital avionics system conference.

Proto-pic.co.uk