

AUTOMATED GREENHOUSE SYSTEM WITH GSM MODULE

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Abstract : Appropriate environmental conditions are necessary for optimum plant growth, improved Crop yields, and efficient use of water and other resources. Automating the data acquisition Process of the soil conditions and various climatic parameters that govern plant growth allows information to be collected at high frequency with less labor requirements. The goal of the project is to develop irrigation system by continuously monitoring the soil moisture level, Temperature, Humidity, Light intensity on the field. Whenever the various climatic parameters is not suitable for the growing plant then the controller automatically sends a message to the authorized person by using GSM module. After the person receives a message then he can ON/OFF the required system according to his requirement by sending a simple message. The objective of this project is to provide a combination of manual supervision and partial automation and is similar to manual set-up in most respects but it reduces the labor involved in terms of Irrigation design is simple, easy to install, microcontroller-based circuit to monitor and record the values of soil moisture, Temperature, Humidity, Light intensity environment that are continuously modified and control.

Keywords- Arduino, ATmega328, Atmospheric sensors.

I. INTRODUCTION

The research in the agriculture field of Microsystems is progressively directed towards smart electronic interfacing, which provides the ability of performing complex operations. Specially designed interfacing electronics for specific applications improve the performances of the Microsystems and provide a user-friendly environment for the control and the communication with it. Data acquisition system is extensively employed in a number of automatic test and measuring equipments. They are used to collect the required data from any peripheral input devices, such as meters, sensors and etc. via controlling program.

This system uses Arduino UNO microcontroller ATmega16. The inbuilt ADC receives analog data from sensors and converts it to digital data and passes it to the microcontroller. The sensors continuously send data from the distant site. This system is interfaced with a GSM modem and senses the conditions continuously and a message is sent to a mobile number using SMS and also displays on LCD in interval of 10 minutes. Using this system, the operator can monitor the signals from remote location. The GSM modem is connected to microcontroller using RS232 interface. Whenever an SMS is sent to the GSM modem, the GSM modem receives the data and sends to microcontroller. After receiving the signal from the microcontroller it processes the data and sends the read data to mobile number through GSM modem. The collected data forms a database and is stored in a personal computer. The received data is displayed on the LCD.

II. RELATED WORK

This project describes the design of a greenhouse monitoring & controlling system using Arduino. Some of the previous systems used android phone to monitor the green house but lacked to control it using android from remote locations. One of them was based on Global System for Mobile Communications (GSM) in which notifications are sent via SMS, but disadvantage of this system was every time user had to type commands which was time consuming and costly. The biggest disadvantage of these systems was that one person always had to be present in the green house or in the vicinity of the green house. The first problem which is overcome in our system is that a person need not always be present in the greenhouse. Plants in green house are grown under controlled environment. The temperature differences can cause harm to plants. Sometimes the farmers cannot predict which action needs to be taken so to control the environment and may take wrong decisions thus causing more harm to the plants in the green house. Our system will allow him to take proper decisions by providing the status of the sensors to the farmer with accurate information through the IOT web server. Thus this system helps farmer to control green house from remote locations

III. THEORY

A. Arduino UNO

The arduino Uno is a microcontroller board based on the ATmega328, It has 14 digital input/output pins, 6 analog input, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The Uno differ from all preceding boards in that it does not use the FTDI USB to serial driver chip. "UNO" means one in Italian and is named to mark the upcoming release of arduino 1.0. The Uno is the latest in a series of USB Arduino boards and reference model for Arduino platform. The Arduino Uno can power via the USB connection or with external power supply. External power can come either from an AC to DC adapter or battery. The board can operate on an external supply of 6 to 20 volts. If supply with less than 7v,

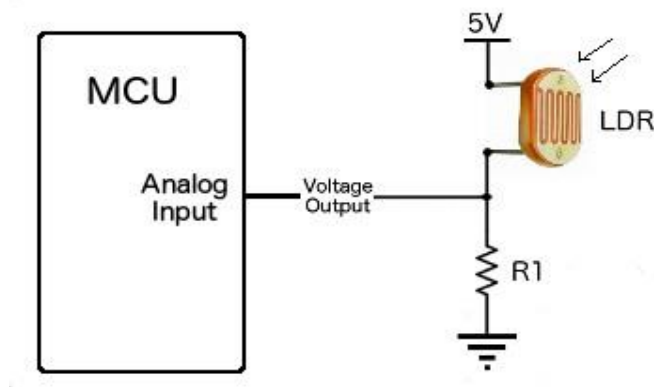


Figure 3: Light Dependent Resistor(LDR)

iii) Humidity Sensor (DHT11)

Humidity sensor is used for sensing the vapours in the air. The change in RH (Relative Humidity) of the surroundings would result in display of values.

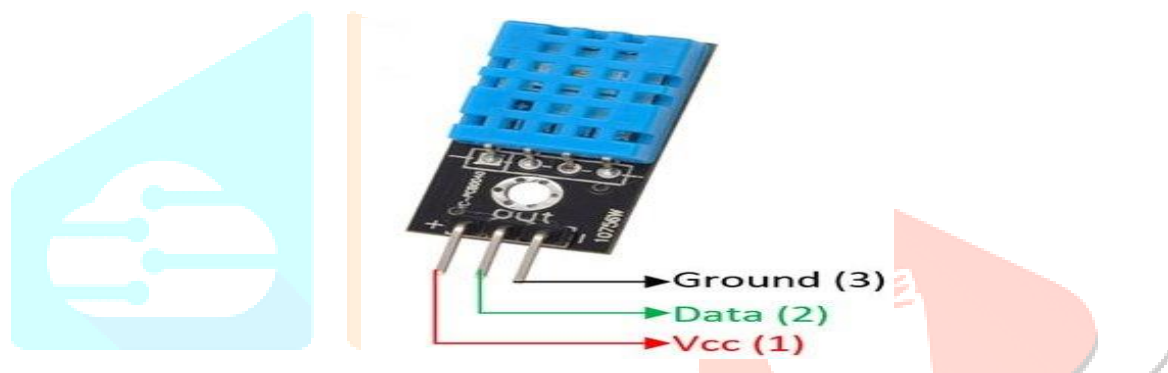


Figure 4: DHT11 sensor

IV. SIGNIFICANCE AND SCOPE

Automatically control environmental conditions within greenhouse allowing any type of plants to be grown all year round. Eliminates risk of greenhouse not being maintained at specific environmental conditions due to human error. Minimize labor costs involved in maintaining a greenhouse. A customer able to define specific greenhouse conditions. "Plug-And-Play" product. This project describes the design of a greenhouse monitoring & controlling system based on Arduino. Agriculture projects even in urban areas are on a rise in recent times, in unique forms technological progress makes the agricultural sector grow high. This monitoring & controlling system precepts different parameters inside the greenhouse using sensors and GSM to provide the updates. The developed system can be proved profitable as it will optimize the resources in the greenhouse. The complete module is of low cost, low power consumption.

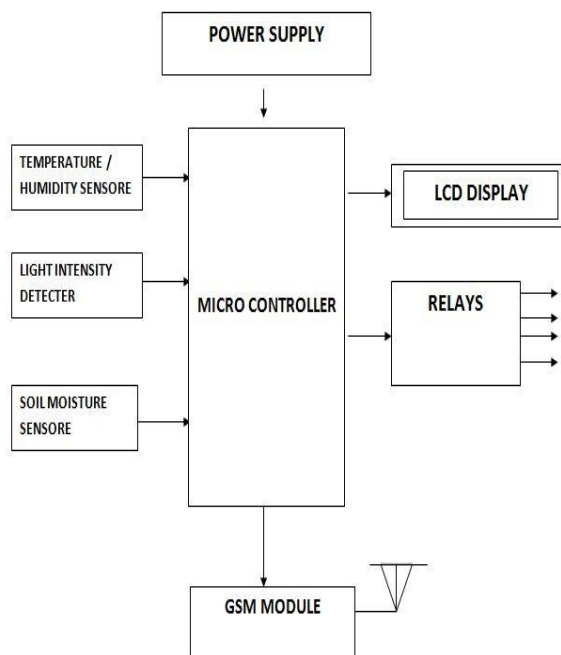


Figure 5: Block diagram

The basic block diagram of greenhouse system is as shown in fig .5. An Arduino platform micro- controller is used to obtain values of physical data through sensors connected to it. And then sensor’s collected data is given to GPRS module.

A. Software Implementation

The software part programming through Arduino Uno software (IDE). It is easy to write code and upload it to the board.C and C++ language are used for programming.

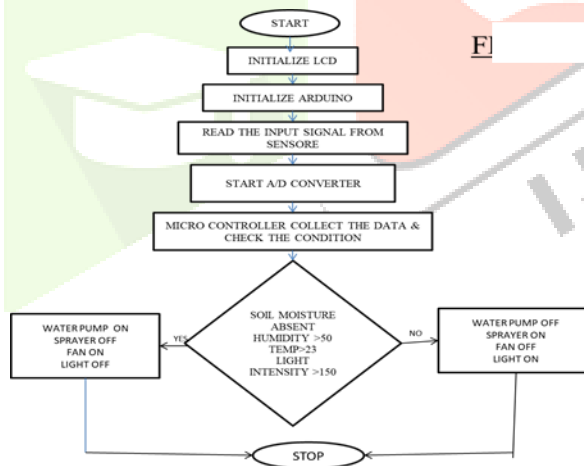


Figure 6:-Flow chart

V. EXPERIMENTAL RESULTS

In this proposed system we have used atmospheric sensor’s, which is LDR light sensor, DHT11 humidity and temperature sensor. For these sensor’s we have denoted some specific conditions or the threshold values .As per their climate the value will be change and the controlling action will be taken by relays which is connected to the output side. And the changed data of atmospheric sensor’s we can observed for analyzing on the screen of serial monitoring using the arduino uno kit.

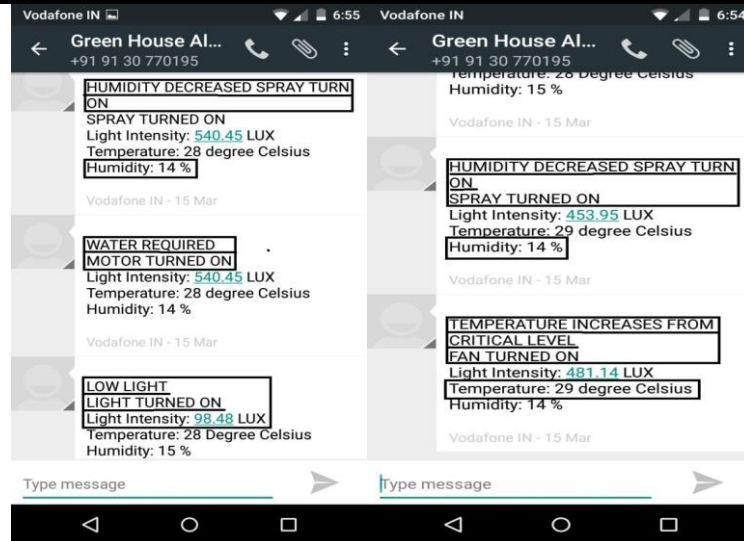


Figure 7:-Screenshots of messages received by user.

VI. CONCLUSION

The system supervise and control the irrigation, light, temperatures, and humidity levels for optimum plant growth. This automating technology saves time and money by eliminating the need for service personnel to visit each site for inspection. By using this system water can be used more effectively and we can get higher yield production.

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