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Intelligent Irrigation System by Measuring Parameters of Agricultural Field using Sim 800

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Abstract:- The irrigation system is essential for the better crop development. In our project we are using the system which can automatically supply water to irrigation land depending on the condition of the soil such as moisture, pH and Temperature. By using this system we can supply water to crop automatically, without any interruption. An object sensor can enhance the security of field by buzzer and SMS using GSM sim800.

Keywords:- *Arduino, GSM module, LCD,Moisture sensor, Object sensor, pH sensor.*

I. INTRODUCTION

Usually in farm or field, workers have to keep an eye on parameters of land and they have to operate the water pump and check the pH of water manually. This may take time if fields are large or the farmers have to work in night. There may be a problem associated with power supply or proper measurement of water during night. The farmer may have to spend entire time for this only. Our smart irrigation project will overcome these problems and has very high accuracy-Intelligent Irrigation Systemby measuring parameters of agricultural fields.

II. AIM AND OBJECTIVE

The main Objective is to make the irrigation smart and more useful to the back bone of India i.e., farmers. The idea is to increase the crop production by utilizing all available sources in an effective manner and benefits in all levels as much as possible.

By using latest technology in agriculture, it is possible to get rich crops and healthy crops. The equipment used is easily programmable depending on the conditions suitable for the different crops. Thus the presented project is capable to work for all types of plants and trees.

III. BLOCK DIAGRAM

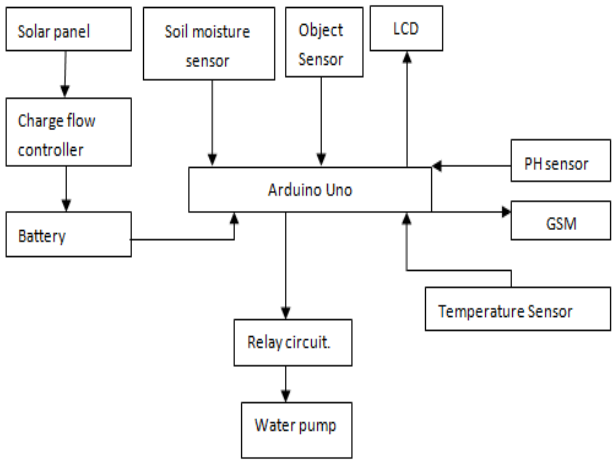

Fig 1:- Basic block diagram

The working principle of this system is very simple. The different sensors gives different readings such as moisture sensor gives the measurement of water content of soil, temperature sensor gives the ambient temperature reading and so on. These different readings are sent to the Arduino. Arduino will take decisions based on these readings and programmed values and perform functions like messaging user via GSM module or turning on and off of motor to control water on field.

The controlling system is powered by solar charging unit. The solar charging unit consists of solar panel, charge controller and battery. The panel generate 12V dc voltage which is fed to controller and the controller controls the direction of charge flow and voltage level to load and battery

A simple LCD is used to read the functions that are being carried out by the processor. And respective information is passed to user by SMS using GSM module. A good network covering sim is used for the GSM module.

IV. PARTS AND COMPONENTS

A. Arduino Uno
B. GSM module
C. LCD
D. Moisture Sensor
E. pH sensor
F. Object Sensor

A. Arduino Uno

The microcontroller Arduino Uno is based on ATmega 328. The chip consists of 14 digital pins which can be used for both input and output. 6 Analog pin and 16MHz resonator. It is powered by a 5V dc adopter socket or directly by USB cable. The operating current The Arduino can be programmed by the official software of Arduino company. It mayvary from 40m A to 50mA. ATmega328 has 32KB of flash memory, 2KB of SROM and 1KB of EEPROM.

Fig 2:- Arduino Uno front

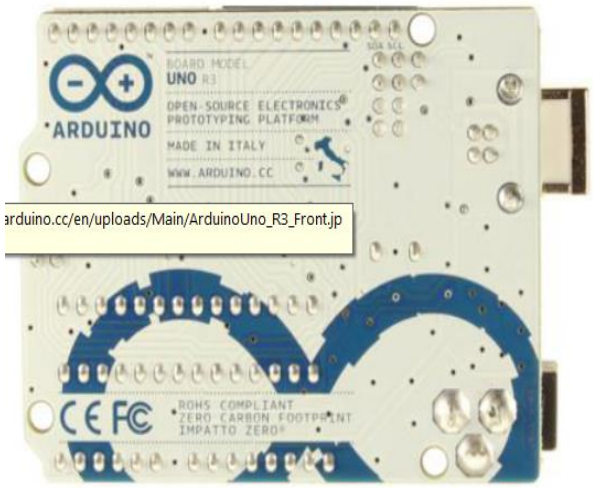

Fig 3:- Arduino back

B. GSM module

GSM module or modem is build with two bands. SIM800 uses frequencies 900 and 1800 MHz for communication. It can also be connected to pc as well using RS232 interface. The working baud rate is of 9600 to 11520 through AT command.

A build in LED will show the network status in build TCP/IP protocol enables the data transfer over GPRS.

The operating voltage is about +12V. Due to absence of keyboard it just accepts certain type of commands which are called as AT commands. For sending message it need to be programmed for a 10 digit number to receive the SMS and receive already programmed commands.

Feg 4:- GSM module SIM900

C. LCD

Liquid Cristal Display here used is 2 line*16 character display with brightness adjusting register. It has 8 data pins, enable, R/W, RS GND, Vo and Vcc.

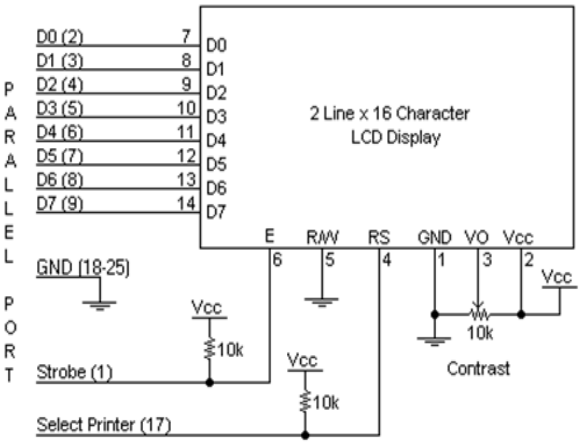

Fig 5:- LCD Pin diagram

The pins Vcc and GND used to supply the power of +5V and ground to LCD. The RS pin used to select between command and data register allowing user to send commands and send data to be displayed on LCD respectively. R/W is for read and write information on LCD, and the pin E[enable] is used to latch the information present in its data pins. For our project we are using data pins from D4 to D7.

D. Moisture Sensor

The Moisture present in soil is the amount of water content which is measured by Soil Moisture Sensor. The sensor will give logic output when moisture is high or low. With the help of this sensor the sensitivity is adjusted depending on the type of crop present. It uses 5V supply. The sensor consists of two electrodes which are inserted on soil for measurement.

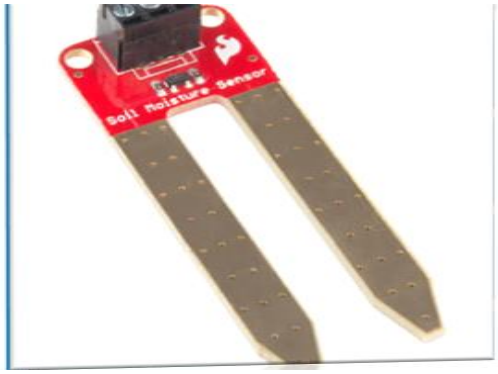

Fig 6:- Moisture Sensor

E. pH sensor

The pH sensor is a device that used to measure the pH content of water which is essential for the growing crops. The sensor we are using is of 3 in 1 that can be used for light, pH and moisture as well. The length of the electrode is 21cm and weighing 57g. It is also a non-battery sensor. The range of pH 6-8 is considered as suitable for healthy crop.

Fig 7:- pH sensor

F. Object Sensor

IR based Object sensor is used to detect different objects and shapes with the adjustable range of 30cm. the sensor is used is of operating voltage of 5V and gives the logic output 0/1. The main purpose is to detect the thief and runaway animals.

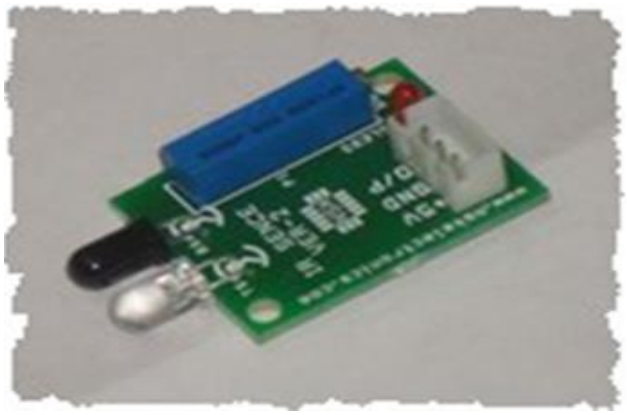

Fig 8:- IR sensor

V. ADVANTAGES

- No need of employees as it is totally automatic.
- It saves water and of low cost.
- Compact and saves farmer's time.
- Fast operation and effective.
- Reprogrammable and adjusting the range of sensors.

VI. APPLICATION

- Large fields.
- Gardens.
- Forests.
- Seeds farming.
- Bud grafting farms.

VII. CONCLUSION

The agriculture areas are of prime importance for computer control process. The green house process parameters which are under consideration here whose process data temperature, humidity, soil Moisture and light intensity should be acquired from the field, logged in a database and the data is further used for supervisory control. The GUI is made in virtual instrumentation domain Lab View.The system has successfully overcome quite a few shortcomings of the existing systems by reducing the power consumption, maintenance and complexity, at the same time providing a flexible and precise form of maintaining the environment

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