GSM Based Automatic Garden Monitering System

Avinash.G[1], Kiruthika Sakthi.P[2]
[1, 2] Dept of Electronics and Telecommunication Engineering
[1]Karpagam College of Engineering, Coimbatore
[2]Vellore Institute of Technology, Chennai

Abstract- *In our daily life, irrigation is one of the main problem in gardens across the countries which are in developing stage. The reason behind this is lack of rainfall. Due to this more land is unirrigated. Farmers usually work on large areas of land to grow different types of crops. It is not always possible for a single person to be able to keep tracks and moniter the growth of entire farmland all the time. To solve this problem, Automatic garden management system ensures the growth of plants .Soil content is sensed through which plants at exact time based on soil condition will helps the crops in their growth by taking essentials required from soil when needed. This system also alerts us through SMS when we are not in our town.*

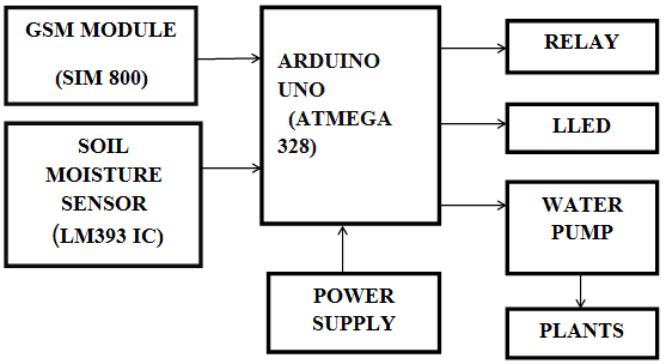
Keywords- Arduinouno, GSM Module

I. INTRODUCTION

In our present life, agriculture has been associated with the production of essential food crops for Several decades. Besides farming, agriculture, includes forestry, dairy, fruit cultivation. Nearly, 75% of our population depend only on agriculture for thier livelihood. The result of the non-development of non-agricultural activities to absorb the fast-growing population is this high percentage in agriculture. The starting works on precision agriculture were performed using remote sensing technologies. It showed an improvement over the conventional agriculture system but the use of remote sensing is quite expensive apart and complex technology.

A microcontroller is an integrated circuit designed to perform a specific operation in a complex system like embedded. A microcontroller consists of processor, memory and input/output (I/O) peripherals on a single chip. One of the open-source, electronic platform to easily handle both hardware as well as software is Arduino UNO. Arduino is based on ATmega 328 microcontroller which consists of 14 digital input/output pins in which 6 can be used as Pulse Width Modulation(PWM) Output ,6 analog input pins. Power supply to arduino can be done with USB connection or with an external power supply. In GSM based Garden monitoring System, moisture level of the soil is tested and if it is found low, microcontroller switches ON the water pump to provide water to the plant. Water pump gets automatically OFF when system finds enough moisture in the soil. An alert is sent to the user with the help of GSM module, updating the status of water pump and soil moisture. This system is very useful in gardens, homes and in various places.

II. PROPOSED SYSTEMDIAGRAM

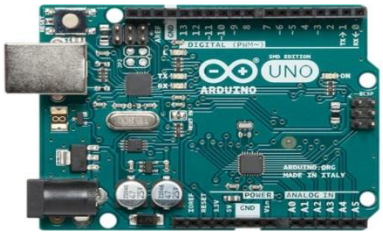


III. COMPONENTS AND SPECIFICATIONS

A) ARDUINO UNO

Arduino consists of ATMEGA 328 microprocessor and provides 2-way communication between devices and peripherals. Arduino is customized using Harvard architecture with 8 bit RISC processor core. It is easily programmable using Integrated Development Environment (IDE) and programming languages like C, C++.

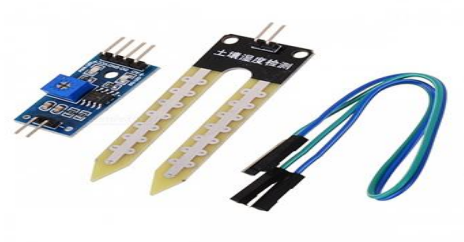
It reads information from the sensors and addressable through I2C serial bus. Arduino uses PWM pins, has in-built LED at pin 13. It contains storages like flash, Electrically Eraseable Programmable Read only memory(EEPROM).



USB-to-serial chip and USB connection to the computer is implemented with the help of two TX and RX pins which is used to flash the data to be transmitted. It has features like RS 232 serial Interface, Atmel Atmega 8 bit microcontroller chip, Communication ports.

B) SOIL MOISTURE SENSOR

A soil moisture sensor consists of 2 parts, the sensor dynamics and the control board.



Sensor dynamics consists of a couple of conductive probes that can be used to measure the volumetric content of water in soil.

The control board, which is made up of ICLM393, is a voltage comparator. The board has components like connectors, LEDs, resistors to measure the Soil Moisture level.

C) GSM MODULE

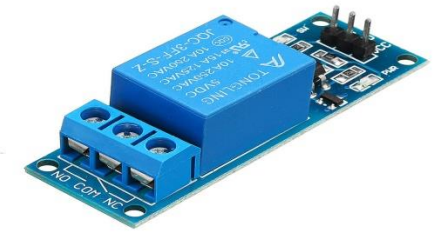
The abbreviation for GSM is Global System for Mobile communication. We use TTL SIM800 GSM module.

The SIM800 is a Quad-band GSM/GPRS Module which can be easily embedded by customer or hobbyist.

The SIM800 delivers GSM performance for voice, SMS, Data with low power consumption. It has one UART port, one USB port which is for updating firmware and for error detection. It has an operating voltage ranging between 3V to 5V. SIM cards can be inserted in GSM module. Our SIM cards are first registered in the core part of GSM which is the mobile switching center. This mobile switching center is stationed between the base station and the Public Switched Telephone Network.

D) RELAY

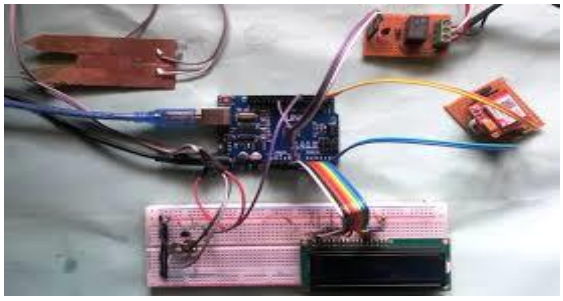
A relay is a switch operated in a electrical way. Relays play a major role in controlling a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.



During the initial centuries, relays were used as amplifiers in long distance circuits and then they repeated the signal coming from one circuit and re-transmitted it to another circuit. Relays are widely used in telephone exchanges and transistor is used as a switch. Relay is used to control the water pump**.**

IV. WORKING AND CIRCUIT EXPLANATION

Firstly, we Interface Soil moisture sensor, SIM card inserted GSM module for communication, relay, water pump with Arduino UNO microcontroller. Soil Moisture probe is used to sense the soil moisture level. The two electrodes present in the sensor determines the soil level. The GSM module alerts the user by keeping track on the soil level. A message is sent to the user indicating the soil level. 4G network system is used for communication.



The system power is delivered from the arduinouno. The farm owner can gets to know about the current moisture level from a remote location and control the water supply. To do this, the user only has to toggle the “Motor status” from

'ON-OFF' or 'OFF-ON'; and the "water pump" will be 'turned ON' or 'turned OFF' according to the purpose. Thus the 'soil-moisture' of the gets monitored and the 'water supply' can be controlled just by the toggling the "Motor status". This system can also be useful for people having small gardens, university , school gardens. t may not be possible for a person to be continuously present at his/her garden especially when he is not present in his hometown. This project is useful to keep a track of 'soil-moisture' and ensure proper water supply even from a distance.

V. CONCLUSION

This is an automated system. So, there is no necessity that man has to keep track on status of the soil level and growth of the crop. This system can be used in several applications like schools, colleges and mainly in farm land. This system helps in reducing the cost, minimises the water usage and easily controllable. This project can be further improved by introducing Internet Of Things(IOT) concept which would be efficient in collecting and managing the data with cloud computing

REFERENCES

[1] Yin YinYibn, San SanLwin, Win Win Maw, "Automatic Plant monitoring System using ArduinoUNO for university park",Volume-3,Issue-4, e-ISSN:2456-6470, May-June 2019.
[2] H.Cetin, J.T.Pafford and T.G.Mueller, "Precious agriculture using hyperspectral remote sensing and GIS", proceedings of 2nd International conference on recent advances in space technologies,2005 pp.70-77. Mithya V, Aishwarya M, Gayathri S, Mahalakshmi L S, Pavithra S, "Smart Gardening System"
[3] (IJITEE) ISSN: 2278-3075, Volume-8 Issue-5S March, 2019.
[4] Sneha.G.M ,Sneha P.B, Sushma.C. R ,V.Supriya, Pavana.H, "Automatic Irrigation Control and Soil monitoring using GSM module",IJARSE,Volume-7,ISSN:2319-8354.
[5] www.agriculturegoods.com
[6] https://circuitdigest.com/microcontroller-projects/arduino-automatic-plant-watering-system
[7] Muthunoori Naresh, P Munaswamy, " Smart Agriculture System using IoT Technology"(IJRTE) ISSN: 2277-3878, Volume-7 Issue-5, January 2019