

# GSM based Greenhouse Monitoring and Controlling

Kashid Vishal Ganpat<sup>1</sup> Gharal Mahesh Ganpati<sup>2</sup> Shinde V. D.<sup>3</sup>

<sup>3</sup>Assistant Professor

<sup>1,2,3</sup>Department of Electronics & Telecommunication Engineering

<sup>1,2,3</sup>Dr. Daulatrao Aher College of Engineer, Karad

**Abstract**— Today there is great need of automation to increase efficiency of work and to reduce people efforts. In our project we have introduced a system which controls the water pump in the green houses automatically by using sensors and GSM module. Microcontroller AT89s51 is used as main control element in this system. The monitoring and controlling system is developed in this project. That can be used in green house applications, where real time data of whether conditions and other environmental elements are sensed. Then monitoring system can take decision and system sends SMS to user automatically.

**Key words:** Sensors, LM35, AT89C51, GSM, Relay, ADC, DOL starter

## I. INTRODUCTION

Now a days, consumer need agriculture products for increase in productivity. Many advanced technologies are available in market. Products like strawberry require control whether condition. Using GSM based technique we can implement various conditions such as monitoring temperature, and water level in the soil. Temperature play's important role for growth of the plants. We use Global System for Mobile Communication (GSM) and short message service (SMS) to collect information from the green house with sensors which gives information to farmers to their mobile phone. This system can reduce human effort. It also increases the productivity of the crop because of controlled environment.

## II. PROPOSED SYSTEM

Various sensors collect local information to make necessary decision about the physical environment. The Temperature sensors LM 35 senses the temperature and send to ADC, which converts it to digital signal and send to Control Unit. The non-corrosive moisture sensor (NCMS) which check the moisture in the soil of the Greenhouse. From the readings of the sensor controller takes decision of turning ON or OFF AC. Using GSM Module status of

The Greenhouse can be sent to user Mobile. Depending on the moisture of soil controller take decision of turning ON or OFF motor, which \reduce human effort. Soil moisture is sensed using non corrosive moisture sensor and if it is below required threshold value motor is turn ON which maintain moisture in soil. Temperature is sensed using temperature sensor. Depending on temperature AC can turn ON or OFF.

So current situation of greenhouse can be controlled using GSM. Using GSM we can turn ON or OFF AC and motor, reducing human effort. Status of AC and ON /OFF is conveyed to user via SMS.

## III. BLOCK DIAGRAM

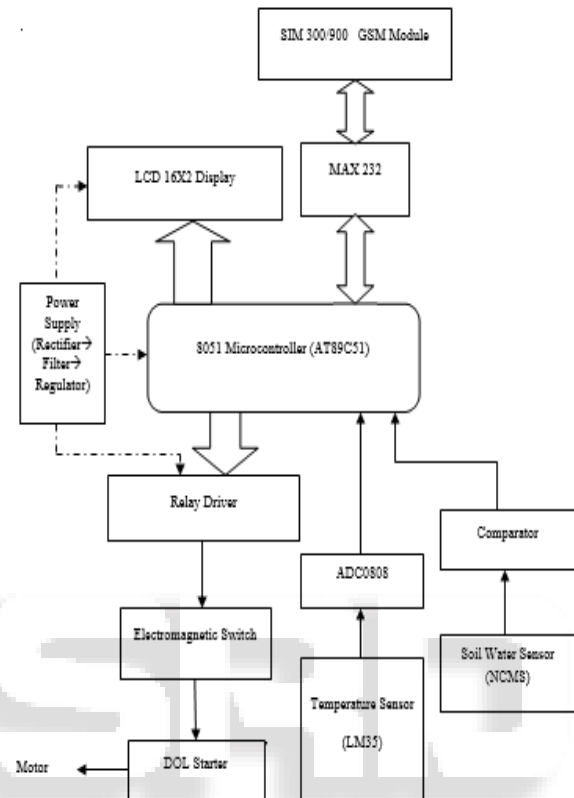


Fig. 1: Block Diagram of Overall System

## IV. SYSTEM DESIGN

The AT89S51 [2] is a low-power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with In-System Programmable Flash on a monolithic chip, the Atmel AT89S51 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

- 4K Bytes of In-System Programmable (ISP) Flash Memory
- 4.0V to 5.5V Operating Range.
- Fully Static Operation: 0 Hz to 33 MHz
- Watchdog Timer
- Dual Data Pointer
- Power-off Flag
- Fast Programming Time
- 128 x 8-bit Internal RAM
- 32 Programmable I/O Lines

- Two 16-bit Timer/Counters
- Six Interrupt Sources
- Full Duplex UART Serial Channel

1) *Temperature Sensor (LM35):*

The LM35 [5] is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional. Temperature sensor detects the current temperature value of greenhouse.

2) *Soil Moisture Sensor:*

The moisture sensor is used to sense the moisture of the soil. The sensor gives information to the microcontroller. Then controller takes decision weather turn ON/ OFF motor.

3) *MAX232:*

The MAX232 [9] is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5-V supply.

4) *ADC:*

The ADC0808 [6], ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog -to-digital converter, 8-channel multiplexer and microprocessor compatible Control logic. The 8-bit A/D converter uses successive approximation as the conversion technique.

5) *Dol Stater:*

The Direct On-Line (DOL) starter is the simplest and the most inexpensive of all starting methods and is usually used for squirrel cage induction motors. It directly connects the contacts of the motor to the full supply voltage.

6) *GSM Module:*

This GSM Modem [3] can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port for communication and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control. In GPRS mode you can also connect to any remote FTP server and upload files for data logging. This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 applications. Supports features like SMS, Data/Fax, GPRS and integrated TCP/IP stack.

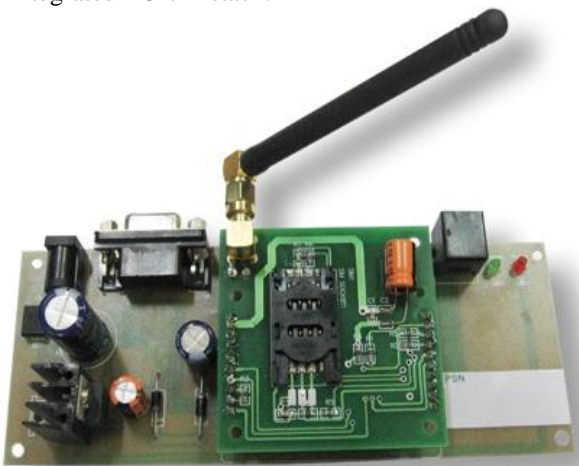


Fig. 2: GSM Module

V. FLOWCHART

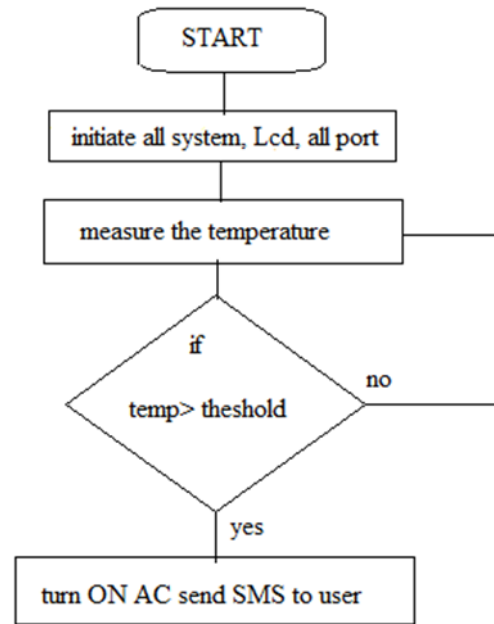


Fig. 3: Temperature Process

Temperature is sensed using temperature sensor and depending on temperature AC can be turned on or OFF, and SMS send to user.

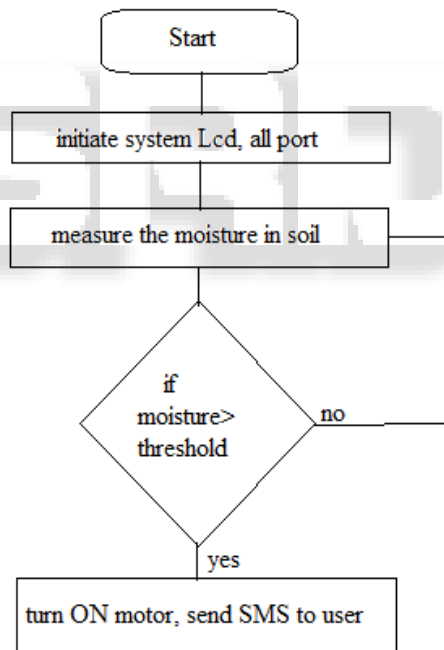


Fig. 4: Soil Moisture Process

Soil moisture is using non corrosive moisture sensor and if soil moisture is below required value motor is turned on which maintains moisture in soil.

VI. FUTURE SCOPE

Also we monitor other parameter like soil PH and at a time control it also. Real time data can send using internet. Also we plot graph of parameter using computer.

## VII. RESULT

### A. Screen Shot of Result:

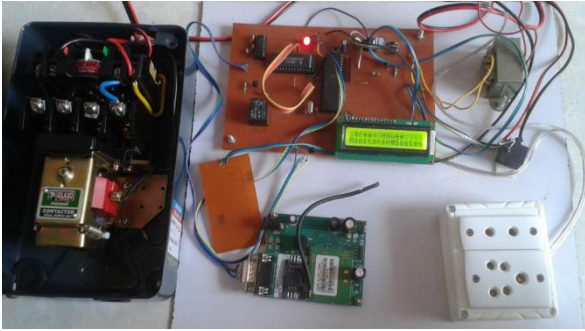


Fig. 5: Total Hardware System



Fig. 6: Display of No Moisture In Soil

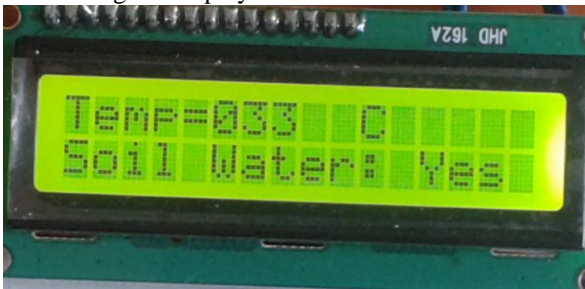


Fig. 7: Display Moisture after Turn ON Motor

## VIII. CONCLUSION

Using proposed system productivity of crop increases because of automation of greenhouse. Status of greenhouse is known to user via SMS, Which reduce human effort.

## REFERENCES

- [1] Remote Monitoring in Agricultural Greenhouse {Izzatdin,hilmi\_hasan}@petronas.com.my,jimmy@utp.edu.my
- [2] <http://wikipedia.org/wiki/PIC/microcontroller>
- [3] <http://www.developershome.com/sms/GSMModemIntro.asp>
- [4] Microcontroller AT89C51 Datasheet.
- [5] Datasheet of sensor lm35
- [6] Datasheet of ADC  
<http://sfe-electronics.com/id/integrated-circuit/1201-adc0809.html>
- [7] Relay datasheet  
[http://ijarcsse.com/docs/papers/Volume\\_3/7\\_July2013/V3I7-0382.pdf](http://ijarcsse.com/docs/papers/Volume_3/7_July2013/V3I7-0382.pdf)
- [8] B.Vidya Sagar(Mtech), Embedded systems K.L.University  
Email id-Vidyasagar.bollineni@gmail.com
- [9] Datasheet of max232
- [10] Wang Zhu, Wei Debao, Wang Ling. Design of Greenhouse