

# GREENHOUSE CONTROLLING SYSTEM USING GSM

Yash Soni & Kalgi Trivedi

Guided by- Asst. Prof. Bhagirathi Dodiya

Electronics & Communication Engineering, Sal College of Engineering, Gujarat Technological University, Gujarat, India

Email- [soniyash6989@gmail.com](mailto:soniyash6989@gmail.com)

**Abstract** - The system proposed in this project is “Green House” which is a smart technology to provide plants and trees the required nourishment from the sunlight and to prevent the same from the harmful effects. Therefore this project focuses on developing a system that can automatically monitor and predict changes of temperature, light, humidity and soil moisture in the greenhouse. The objective of the research is to develop an automatic control and monitoring system using sensors and Short Message Service (SMS) technology. This proposed system also has a mechanism to alert farmers regarding the parameter changes in the greenhouse so that early precaution steps can be taken. System components used are Humidity sensor, Temperature sensor, soil moisture sensor, light sensor, Transistor switches, relay nodes for automatic control, Microcontroller to control greenhouse information. To make this more efficient a GSM has been linked with the system.

**Keywords** - Greenhouse controlling, automatic Greenhouse, Embedded Greenhouse, Greenhouse controlling using sensors, GSM operated Greenhouse

## I. INTRODUCTION

We live in the world where everything can be controlled and operated automatically, but there are still a few important sectors in our country where automation has not been adopted or not been put to a full-fledged use, perhaps because of several reasons one such reason is cost. One such field is agriculture. Agriculture has been one of the primary occupations of man since early civilizations and even today manual interventions in farming are inevitable. [12]Greenhouses form an important part of the agriculture and horticulture sectors in our country as they can be used to grow plants under controlled climate conditions for optimum produce. Automating a greenhouse envisages monitoring and controlling of the climatic parameters which directly or indirectly govern the plant growth and hence their produce. Automation is process control of industrial machinery and processes, thereby replacing human operations.

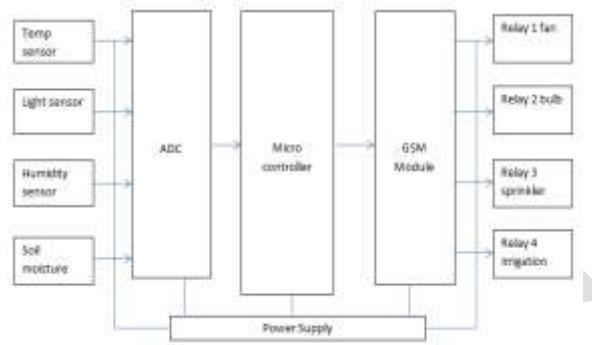
## II. LITERATURE REVIEW

The concern with a lot consumer needs and demand for the agriculture products has stimulated awareness among the farmer that increases their products in the market by implementing advance technologies in the industry. The products that are important that may come to farmers’ interest that controls the use of natural sources and natural environment which controls agriculture with various aspects. Therefore, this problem makes farmers’ interest to implement agro-conditions sending alert notification messages to farmers using GSM and SMS technology. The proposed system is aimed to be a reliable and cost.

The agro-environmental remote monitoring system can be implemented in various conditions such as in monitoring temperature, soil and water levels. By utilizing existing technology, the natural environment and resource which we get naturally, the temperature is very important criteria for the plants to be monitored efficiently.

Previously, human labor plays major role in the monitoring farm and plants in the agriculture field. For some crucial plants such as vegetarian and flower plants, which need 24 hours attention from human so that the plant quantities and qualities are controlled with proper management by the collected data and information from the field. This will provide enormous foundation for future growth and future development of their plants in the green house. However, with the increasing size in farming areas, this type of manual practice is increases time consuming the cost of the labor.[2]

### III. IMPLEMENTATION



Sensors: -

We are going to use temperature sensor, Light sensor, Humidity sensor and Soil moisture sensor to sense temperature, light intensity, humidity in plants and soil moisture respectively. These sensors sense the parameters and gives corresponding voltage output.

ADC: -

Sensors can sense the variation in environmental parameter such as temperature, humidity, light and soil moisture and gives the reading in variation with voltage. So using the analog signal we can't directly send to the GSM modem. So, we have to use analog to digital converter.[1]

Microcontroller: -

We are going to use microcontroller of 8051 family. The microcontroller is the heart of the proposed embedded system. It constantly monitors the digitized parameters of the various sensors and verifies them with the predefined threshold values and checks if any corrective action is to be taken for the condition at that instant of time.[8]

GSM Module: -

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.[3] [4] [5] [10]

### IV. WORKING & TESTING

The system above consists of four input (temperature, humidity, Light and soil moisture sensor) are four outputs (Fan, water pump, Lamp and sprinkler). Microcontroller is the main brain for this system because it controls the overall system in the Green house. Temperature sensor used to detect the temperature in the greenhouse. When temperature sensor detects the high temperature, microcontroller will send the signal to the fan to stable the greenhouse condition. Then, when light sensor detects no light, microcontroller will send the signal to lamp and lamp will be ON automatically. Water pump is used to supply water to the sprinkler and make sure the sprinkler watered the plants in the greenhouse.

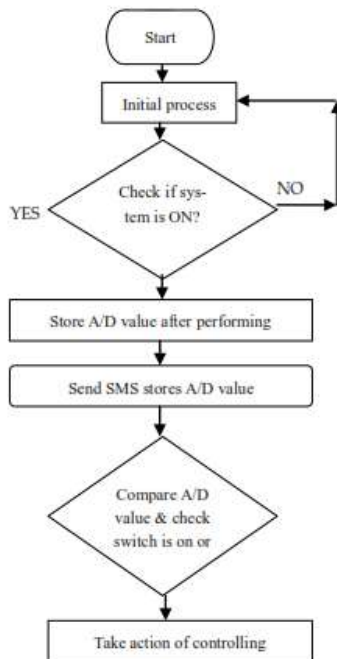
As we see in figure, the microcontroller controls circuit that will be connected to the soil sensor, humidity sensor, temperature sensor and light sensor. The microcontroller receives the value from sensors and analysis and then compares it with the threshold value stored in the microcontroller memory, based on this value the microcontroller takes the appropriate procedures and also controls the output device based on these values; the microcontroller sends the report by the GSM modem to the farmer's phone.

As soon as the change of temperature or humidity absence of air for instance has been detected, GSM modem sends SMS on a number provided in the GSM code. Through this section user can manage greenhouse hardware or manage the SMS service.

Initially a temperature point is set. The temperature sensor senses the change in input temperature. After signal conditioning, this analog signal is given to the microcontroller. The microcontroller converts it to digital format using on chip value, the controller unit will start the heater. Once it reaches to the set limit, it will start the blower to bring the temperature down. Once it reaches below a set point, it will switch of the blower. In this way, temperature is controlled. Similarly, an intensity of light can be controlled.[11] Initially, intensity point is set. Light dependent resistor senses the change in input intensity of light. If the intensity of light sensed below the low limit set, the controller unit will switch on bulb. Once it reaches the set limit it will switch off the bulb. In this way, intensity of light is controlled[7]. Humidity can be control by using humidity sensor. Initially humidity sensor is set. Humidity sensor senses the change in humidity. If the humidity sensed below the low limit set, the controller unit will turn on the dehumidifier. Once it reaches the set limit it will switch on the humidifier. In this way, humidity is controlled. After it senses intensity of temperature, light, humidity and soil moisture it gives digital display at the output on LCD.[6]



## V. SOFTWARE DESIGN



## VI. CONCLUSION & FUTURE WORK

The system could be developed by different ways such as sending emails when an alarm happens, or using different devices such as PLCs, in addition to measure the conditions that have been mentioned, other conditions may be included like shade and fire detection.

This project offers a design of fully automated greenhouse management system. From the experiment it could be seen that it is fulfilling all requirements related greenhouse monitoring. The automatic greenhouse sensor design could help in increasing the productivity of plants.

As it has been mentioned earlier, we are not only providing automatic control over the devices like light, motor pump but also we have a mechanism to alert farmers regarding the parameter changes in the greenhouse so that early precaution steps can be taken. Thus this construction, productivity of cropping can be continuously increased so it can handle famine problem around the world. Thus we can say that the greenhouse monitoring system using GSM is far better than the same system using the different technologies.

#### REFERENCES:

- [1]ADC, Intersil, [www.intersil.com](http://www.intersil.com)
- [2]Advantages & Disadvantages of Greenhouse, retrieved from the EHOW online website: <http://www.ehow.com>
- [3]GSM tutorial. Retrieved from the website: <http://ecee.colorado.edu/~ecen4242/gsm/index.htm>
- [4]GSM characteristics. Retrieved from the GSM server online website: <http://gsmserver.com/articles/gsmcharact.php>
- [5]GSM technical Specification (1995) GSM 11.11.V 5.0.0, p.1-91
- [6]Humidity sensor, MaxDetect Technology Co. LTD, <http://www.humiditycn.com>
- [7]Light sensor, Texas Instruments, [www.ti.com](http://www.ti.com)
- [8]Microcontroller AT89C51 datasheet [www.atmel.com](http://www.atmel.com)
- [9]Soil Moisture sensor, Vernier software & technology, [www.vernier.com](http://www.vernier.com)
- [10]SIM 300 module, SIMCOM Ltd,.
- [11]Temperature sensor LM35, National Semiconductor Corporation, Dec 1994
- [12]Top Greenhouses LTD. Retrieved from online website: <http://www.top.pro>