

# A Comprehensive Review of Remote Sensing using GSM Technologies

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**Abstract**— The purpose of this paper is to give a brief review of the applications of remote sensing and its advantages in various fields. Paper also reviews how GSM network can be used for remote sensing. The development of the new technologies in the field of electronics has brought tremendous changes in the day to day life of every human being. They have entered the fields like industry, medicine, telecommunication and also home automation. This paper introduces the intelligent automation system for various Microcontrollers, Technologies and Applications. The paper also focuses on increasing use of PIC controllers because of their several fascinating features. The advantage of the automated detection and alarm system is that, it offers faster response time and accurate detection during an emergency. The system should provide safe and secure remote monitoring of the environment in laboratories, industries and it has high reliability and easy to implement a system like this wherever needed.

**Key words:** PIC microcontroller, Dual UART module, GSM module, Wireless Industrial Application, Embedded System and Remote Sensing

## I. INTRODUCTION

Remote sensing technology is an extensive science, drawing for many areas for support and development. The remote sensing with control system is used in many fields. The paper discussed various applications designed to monitor status of various parameters. User can send sensed data in various form to remote places. But using GSM system can be significant for the purpose. This system can automatically send the real time sensor status periodically (based on settings) in the form of SMS. The system can be designed to send SMS alerts whenever the safe value of monitored or sensed parameters are exceeded. Such system can be developed by making use of an onboard computer which is commonly termed as microcontroller. This onboard computer can efficiently communicate with the different sensors being used. The controller is provided with some internal memory to hold the code. This memory is used to dump some set of assembly instructions into the controller. And the functioning of the controller is dependent on these assembly instructions. The controller is programmed using ASM or Embedded C languages for different microcontroller. Also it is observed that PIC family has certain features which are unique to them like having two UART, less power consumption etc., which can be used.

## II. REMOTE SENSING AND GSM TECHNOLOGIES

In this part an overview of GSM technologies and remote sensing is presented

- 1) A system has been proposed for remote measurement and control system of large-scale greenhouse based on GSM-SMS. The whole system consists of a central station and base

stations. The central station is composed by a PC server along with its application software, the GSM module, and the database system. The base station consists of a microcontroller, sensors, the operation administrator, and GSM module. Different gases are sensed in this system.

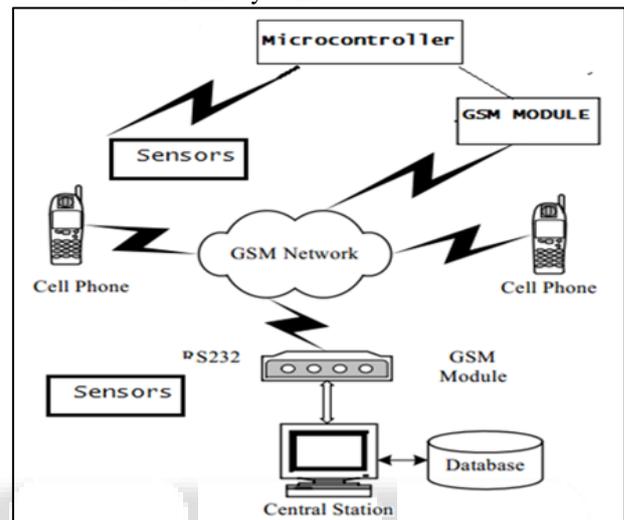


Fig. 1: Remote sensing of large scale green house

- 2) Intelligent home automation system (IHAM) is developed using PIC microcontroller with the ZigBee wireless communication technology, speech recognition technique and GSM network technology that control the home appliance. The paper based on this explains the security system for fire hazards that may occur through smoke sensor and GSM Module that is controlled by the same controller that sends the SMS to the user if the smoke is detected.
- 3) Remote Monitoring and Control are one of the most important criteria for maximizing production and process plant availability. System is required to be able to acquire, save, analyze, and process real time data. It is also required controlling related instruments to change those environment factors and monitoring in long distance so that it realizes modern, intelligent, and accurate control. In this work author uses Ethernet and GSM as a mean to transmit data frame a remote plant to office or control room.
- 4) A hardware design and implementation of GPRS based positioning system using PIC microcontroller for tracking position of vehicle has been proposed. The Microchip PIC 16F877A microcontroller is the main operational unit of the tracking device. It communicates with each of the other operational GPRS delivery service units via its built-in UART interfaces.
- 5) A system has been proposed for tracking the vehicle position and remote sensing of temperature

and operating voltage inside the vehicle .The whole work is divided into two main parts one consist of base station and other vehicle itself both are connected with GSM module and PIC 184f52 is used as a controller inside vehicle as it provides a single unit compact module with built in ADC and UART module

- 6) Work has been done to sense, monitor and control the temperature, humidity and irrigation in the greenhouse from remote location using the Zigbee technology and using PIC 18F452 microcontroller having standard features as on chip program (code) ROM, data RAM and data EEPROM, timers, ADC, UART etc. but this system is limited by a distance range due to use of Zigbee technology.
- 7) Design and development of Intelligent Remote Terminal Unit (RTU) based on Global System for Mobile (GSM) communication has been done. The RTU provides monitoring fault operation, controlling functions and data collection for analysis. This system involves the detection of fault connected to the microcontroller PIC18F77A and GSM modem. When the fault occurs, the sensor will send the signals to the PIC18F77A. The PIC is programmed to process the data and send the signals to the GSM modem.



Fig. 2: Setup for laboratory based on GSM technology

- 8) System was discussed which aims at complete monitoring of a variety of real-time data and the states of a laboratory, judging the environmental index automatically, and detecting intrusions from outside which accompanied with sound and light alarm using GSM technologies . Nowadays remote monitoring the laboratory and its building is necessary for safety and security purpose, which also help us to know the environmental status of the laboratory. The environmental parameters inside the laboratory, such as presence of alcohol, gas and fire can be detected using respective sensors and the sensed data are then transferred to the microcontroller. The microcontroller takes the control action of activating an alarm whenever the

presence of these parameters is found. In turn, the Voice alarm and alert message as SMS through GSM are also sent to the remote area.

### III. CONCLUSION

Remote sensing is used almost everywhere and have proved advantageous in many ways. Also there are variety of wireless technologies such as RF, Wi-fi, GSM, Zigbee , Mi –Wi etc . The Advantage of GSM Technologies is that we can access the whole system all over the world where the GSM range is present and huge network access. The disadvantage of GSM Network is that it depends on service provider of particular network company and delay can be involve for sending and receiving of Message which may be critical in case of emergency. But increasing network range has overcome this problem to an extent .GSM technology has the characteristics of low cost, low power consumption, flexibility networking, without cabling, friendly interface, etc. Through Wireless Technologies we can realize the function of the data networking, remote monitoring.

If we take an example of Fire or Smoke Sensor, Early warning about these hazards at the neck of time can save precious resources and valuable lives .In a similar manner sensing certain parameters and obtaining there real time values can be of utmost importance in various fields .Also it has been realized that PIC controller has certain advantages which can be used for a particular task.

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