

Monitoring System for Intelligent House with Modern Security

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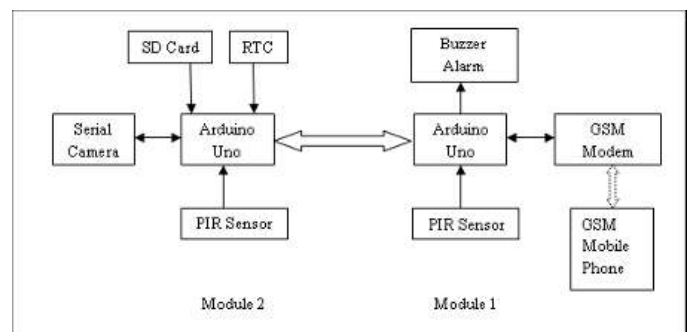
Abstract — In this paper, design and implement of a microcontroller based home security system with GSM technology have been presented and analyzed. Two microcontrollers with other peripheral devices which include Light Emitting Diode (LED), Liquid Crystal Display (LCD), Buzzer and Global System for Mobile Communication (GSM) Module are responsible for reliable operation of the proposed security system. In addition, a mobile phone is interfaced with microcontroller through a Bluetooth device in order to control the system. Moreover, a manual keypad is another way to lock or unlock the system. A Compiler Code Vision AVR is used to design a program that controls the system along with maintaining all security functions Proposed system has Irrigation Management system using similar sensors. The proposed smart home system has three modes of operation, namely, remote wireless control mode, autonomous control mode and manual control mode. This system mainly focuses on the increase in efficiency for real time monitoring, low system development cost, and reduce the workload of the person to maintain the entire greenhouse system.

Keywords—Microstrip antennas; Wi MAX; mobile antennas; WLAN; GSM; Bluetooth; wideband antennas.

I. Introduction

From last few year home security is an essential requirement of households to keep home safe from intruders to get rob. So the researchers and companies tries to implement an algorithms and make some gradates that keep your home safe from intruders. This leads to advance technology that make your home intelligent or modern this called as home automation system also. With this technology house owner can control other appliances as well like lighting system, dimming, electrical appliances and many more. Now a day's wireless technology is used to control home appliances instead of wired topological connection. GSM (Global System for Mobile Communication) technology makes used to communicate input signal from appliances to output message on device. That means after detection of any intrusion GSM Modem sends the appropriate message to house owner's phone. The signals or data which is comes from sensors or other equipment digitize it by GSM module and send it to receiver. Through this facility messages can send quickly, accurately and at a low cost. Mobile phone with SMS facility will be very useful when applied to integrated security systems, where the information send by a security system and the information received by the user mobile phone in the form of SMS. Another SMS facility are activate - deactivate system using two way information via SMS. Based on this, an integrated security system is made to be able to send information without using a PC (Personal Computer), which helps monitor the situation the house quickly and cheaply^[3]. C programming language is used in making this system, the program was applied to create a security system works automatically, which can make two way communication with user mobile phone when there is a security breach in the house^[4]. The two way communication used to turn off the buzzer after active when security breach occur. Modular in design use to make easy expandable for add more sensors to the core system - arduino uno open-source microcontroller platform^[5].

A. System Diagram:



II. Proposed Methodology

A Remote monitoring and control system of smart home comprises of wireless sensors used in the smart home & host mobile and computer. Entire smarthome is unbinded into 3 parts. First sub module consists of various sensors with the signal conditioning circuit, second is atmega328 based Arduino microcontroller board to interpret the sensor values and controlling the output circuits [5]. The third sub module consists of circuit for transmission and reception of data to and fro from system to host and vice versa. At receiving end any mobile can be used or host computer for the continuous monitoring and controlling. Design of remote control system consists of software and hardware. In software process Arduino software is used to design the connection & all interfacing process. After that entire program has been designed to connect with the atmega328 Arduino based microcontroller. LabVIEW software can be used to create the GUI to display the parameters at the user end or and SMS can be received on the host cell phone [6]. The entire system is shown in the fig. 2. and it also consists of an LCD display to show some important parameters outside the smart home for manual control.

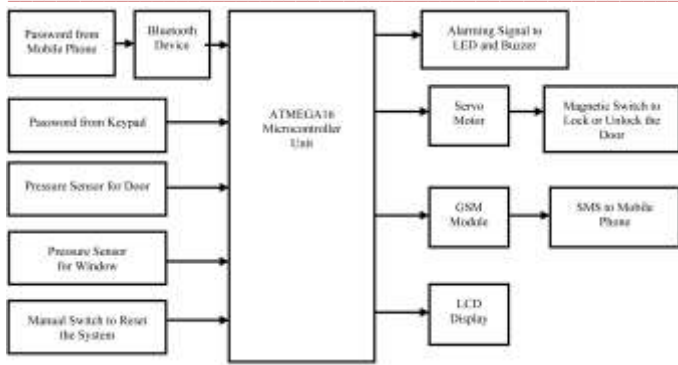
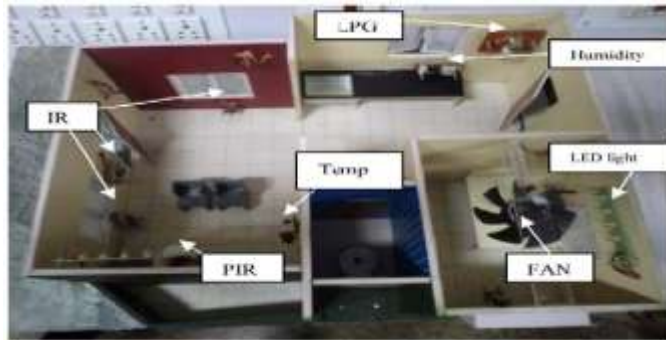


Fig.2 Block Diagram of suggested System.

For wireless communication, there are various modules available in hardware development, like ZigBee transceiver module, Bluetooth module, Wi-Fi module or GSM network. Characteristic of the different modules discussed above with the specification in tab 1. All of which can send data serially to either PC or host cell phone [7]. The sensor values are transmitted in digital form from the microcontroller to the controlling user.



Bluetooth modem (HC-05)



Model of Smart Home

III. Hardware and Software

3.1 Controller Unit

The control unit is built using Arduino Uno open-source microcontroller. The Arduino Uno shown in Figure 2 is a microcontroller board based on the ATmega32. It has 14 digital input/output, 6 analog, ceramic resonator, USB connector, power connector, ICSP, and reset button. Support everything needed for the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started^[6]



HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband.

3.2 GSM modem

The GSM modem unit is built using SIMCOM SIM900 Modem^[7] that specialized for arduino uno controller as shown in Figure 3. This unit can send SMS to user mobile phone and also can receive SMS from user.



3.3 PIR sensor

This Passive Infra Red sensor has a potentiometer to calibrate distance and delay time^[8]. Sensor unit is easy to use, affordable price as shown in Figure 4. This sensor requires 100uA - 150uA and voltage conditions 3Volt - 5Volt to operate, has an accuracy from 0.1 to 6 meters with the ability to work at a temperature of-200C to 700C. other than that, this sensor module also has a working wave length 7um - 14um and angle of coverage in 1200.



3.4 Buzzer alarm

This is the DFRobot Buzzer Unit^[9]. Through the Arduino, this unit will be able to control the buzzer sounds. used in combination with the Arduino board sensors, to achieve the control of an interactive. The module pin definitions: 1 - Output, 2 - Power Supply, 3 - ground. Module has interface socket for PH2.0 as shown in Figure 5. This unit can create sound by arduino controller instruction.

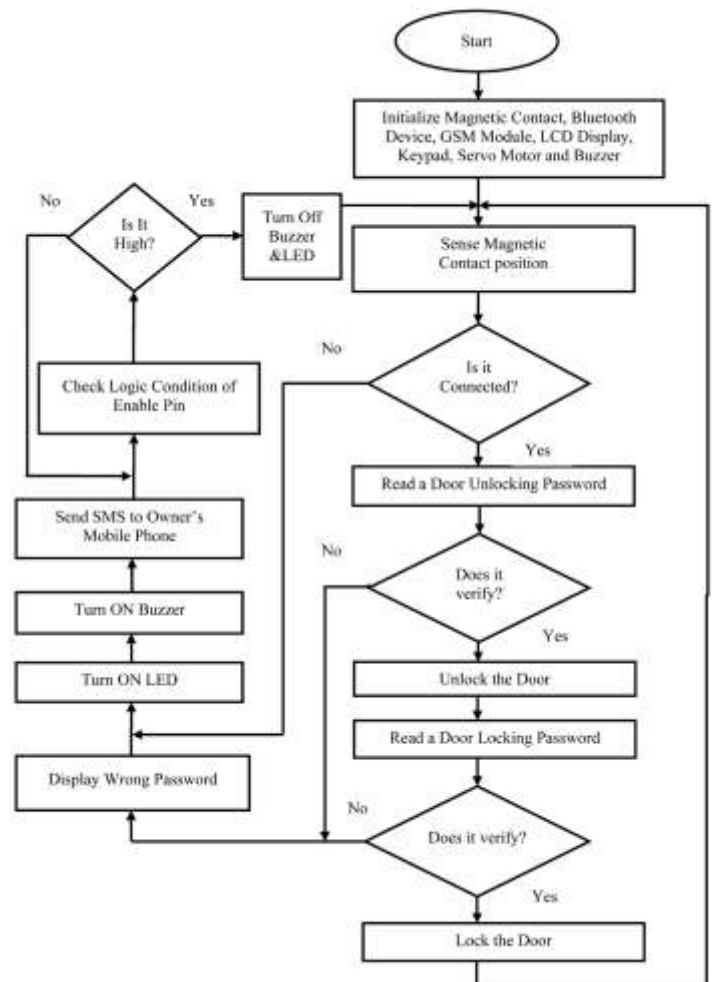


3.5 SD Card

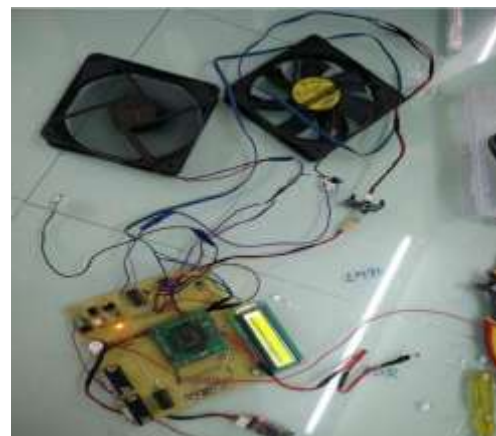
The unit Arduino SD Card Shield is a simple solution for transferring data to and from a standard SD card^[12]. The pinout is directly compatible with Arduino as shown if Figure 8.



IV. Software



V. Experimental Results and discussions





VI. Conclusion

This paper presents design and implementation of a smart home security system based on microcontroller along with GSM for user friendly application. The system is intelligent enough to monitor the secure environment. In addition, the user is informed about the security breach through GSM network that provides a special opportunity whenever the user stays at far away from home. However, Android application is the most stunning feature in order to control the system through a Bluetooth device. Moreover, the system provides the reliable operation within reasonable cost and removes the system complexity. In this work, traditional burglar alarm mode, LED lights and LCD are the promising features used to ensure reliability.

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