Advanced Home Security System

Bharti Chouhan¹, Tasneem Banu², Pankaj Rathi³

Electronics & Communication Engineering, Shrinathji Institute of Technology & Engineering, Nathdwara Rajasthan, India¹
Electronics & Communication Engineering, Shrinathji Institute of Technology & Engineering, Nathdwara Rajasthan, India²
Electronics & Communication Engineering, Shrinathji Institute of Technology & Engineering, Nathdwara Rajasthan, India³

¹bhartichouhan1993@gmail.com,²tasbanu52@yahoo.com,³rathi.panks@gmail.com

Abstract - This project is aimed toward providing security to homes by providing services like detection gas escape and management of appliances like fans, lights, air conditioners, geysers etc. exploitation GSM technology. In any of the on top of mentioned cases, if you're out of your home then the device sends SMS to the registered user. The LPG Gas detector are often used as a wireless Gas leak detector in home security system. It is designed to modify AN LPG detection detector to be interfaced to Microcontroller. By interfacing the microcontroller to a GSM electronic equipment we will additionally receive notification through SMS. household appliance system relies on GSM network technology for transmission of SMS from sender to receiver to regulate the turning ON/OFF of home appliances like AC’s and FAN, the additional feature is-side is that the life saving feature to save lots of the life from suicides try.

Index Term: AT command, Appliance, GSM, GPRS, Modem, SMS(short service message), RAS Unit, Simcom.

I. INTRODUCTION

Home security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition, there is need to automate home so that the user can take the advantage of technological advancement. This project presents a model that will provide security to their home, office or cabin etc via SMS using GSM technology.

The aim of this project is to provide security to the restricted area even if the owner is anywhere in the world. For this purpose user can use any type of Mobile. This way it overcomes the limited range of infrared and radio remote controls. Short Message Service (SMS) is defined as a text-based service that enables up to 160 characters to be sent from one mobile phone to another.

In a similar vein to email, messages are stored and forwarded at an SMS centre, allowing messages to be retrieved later if you are not immediately available to receive them. Unlike voice calls, SMS messages travel over the mobile network’s low-speed control channel. Basic Idea of our project is to provide GSM Based security even if the owner is away from the restricted areas. For this we adopted wireless mode of transmission using GSM. Beside this there are many methods of wireless communication but we selected GSM in our project because as compared to other techniques, this is an efficient and cheap solution also, we are much familiar with GSM technology and it is easily available.

The highlights of our system are the long range of communication and password security. The security is provided by sending a message to our access number, controlling and acknowledgement is done through SMS code between our access number and the authenticated user.

II. OBJECTIVES

The aim of our project is to develop associate degree launch an up-to-date, reliable associate degree user friendly security system to automatize home security victimization small Controller electronic equipment synchronized with GSM module with associate degree objective to produce most attainable security supported an automatic emergency care response victimization sensors and detectors.

III. PURPOSE, SCOPE AND APPLICABILITY:

The new age of technology has redefined communication. the majority today have access to mobile phones and so the planet so has become a worldwide village. At any given moment, any explicit individual is contacted with the portable, however the appliance of portable cannot simply be restricted to causation SMS or beginning conversations. New innovations and ideas is generated from it which will additional enhance its capabilities. Technologies like Infra-red, Bluetooth, etc that have developed in recent years goes to indicate the actual fact that enhancements square measure doable and therefore these enhancements have relieved our life and the means we have a tendency to live. Remote management of many home appliances could be a subject of growing interest and in recent years we've seen several systems providing such controls.

Home security has been a serious issue wherever crime is increasing and everyone needs to require correct measures to forestall intrusion. additionally, there’s have to be compelled to modify home in order that the user will take the advantage of technological advancement. This project presents a model that may offer security to their home, workplace or cabin etc via SMS victimisation GSM technology.

We have used the construct to style a system that acts as a platform to receive messages that actually square measure commands sent to manage totally different appliances and devices connected to the platform. we've designed management/impact impression effects bearing sway system that is predicated on the GSM technology that effectively permits control from an overseas space to the required location, the appliance of our steered system is vast within the ever dynamical technological world. It permits a larger degree of freedom to a private whether or not it's dominant the home appliances. the requirement to be physically gift so as to manage appliances of a precise location is eliminated with the utilization of our system.

Our project may also be extended to massive scale applications like industrial and business functions. Preventive
measures may also be additional to this system to form it additional economical.

IV. ANALYSIS AND DESIGN FLOW:

Conceptual model of the system:

Fig. 1: Block Diagram of the system

The higher than given diagram is that the basic schematic for our GSM primarily based Home Security System. The circuit includes of the subsequent devices:

Sensors that area unit accustomed observe danger at intervals our home. The sensors getting used are:

- Smoke detector
- Door sensing element
- Gas sensing element

Microcontroller whereas the opposite sensors area unit wireless and is 1st perceived by the RF receiver before passing it onto the Microcontroller. The varied sensors are explained soon.

- The circuit additionally consists of a household appliance feedback circuit that is employed for the shift ON/OFF of the device. It consists of a 230V offer connected to a RAS circuit.
- The schematic additionally consists of AN 8051 Microcontroller that is employed to manage the various devices at intervals the circuit.
- There is AN EEPROM that is employed to store tiny amounts of information that has to be saved once power is removed.
- The main block of our GSM primarily based Security System is that the GSM Module that is employed to convert the signal received from the 8051 microcontroller to the AT command set that is then sent to the user mobile telephone. The GSM module is additionally accustomed receive signals via a text that is then used for Appliance management.
- Power offer.

Analysis of the system and design:

- **Door Sensor:**

  Fig. 2: Door Sensor

  The door device works on the property of attraction and repulsion. The most elements within the circuit could be a magnetic reed switch during which 2 metallic element rods area unit placed within Associate in nursing airtight glass envelope as shown on top of. A magnet is connected to the door. Once the magnet is unbroken near the reed switch the 2 points are available in contact with one another. Once it’s emotional off from the switch the points repel and an indication is transmitted to the most board. The PT2262 IC encodes the id of the door into a wave form that is then transmitted.

- **Gas Sensor:**

  Fig. 3: Gas sensor working principle

  The Gas sensing element is employed for detection of LPG inside your home. It primarily consists of a bridge circuit circuit. As we know, a bridge circuit is Associate in nursing electric circuit accustomed live Associate in nursing unknown electrical resistance by equalization 2 legs of a bridge, one leg of which incorporates the unknown part.

  Now, once the LPG gas makes its means into the inventor bridge; there’s chemical process chemical reaction leading to the heating from the resistance. As a result, the electrical resistance equalization the circuit is broken that results in unbalancing of the circuit. This makes the circuit send a symptom to the RF receiver from wherever it is sent to the user for notification that a Gas leak has occurred at His/her place.

- **Smoke Detector:**

  Fig. 4: Smoke Detector

  Smoke detector is a device used for detection of fire. It consists of a covering in which lies an inner perforated core. Inside the core is a photodiode circuit which is used to detect
the presence of smoke. Once smoke is detected, a signal is sent to the controlling circuit from which a signal is sent to sound the Siren and another signal is sent to the RF receiver through which the user can be notified.

This is the basic photodiode circuit. Here, there is a LED from which there is a light constantly falling on the photodiode. Once smoke enters the system, the supply of light from the light source to the photodiode is stopped so a signal is sent to the controlling circuit which switches on the Siren and sends an RF signal to the main board.

- **Appliance Control:**
  This circuit is essentially used for Appliance management i.e. the change ON/OFF of a tool. As just in case of each appliance, our RAS unit additionally consists of a sharpie and a neutral wire that is then connected to the appliance to be controlled. once a message within the kind of AN SMS is distributed from the user, the most board transfers the signal to the RAS unit that successively closes the circuit in order that current will flow resulting in Application management. The figure shows the appliance Control below:

- **HSS Main Board:**
  This is the HSS main board wherever we've got associate degree initial power management section. AT the input we've got the 230 V AC power provides that area unit more responsible the SMPS section wherever it's down born-again to 12V. The 12V is employed for Battery Charging, any the twelve V is more responsible a voltage step down regulator which provides US 5V DC for the small controller and four.1V DC for the Simcom three hundred. We even have associate degree RF Receiver that receives signals from the assorted sensors and sends the information to the Microcontroller that works beside the Simcom300 to send the suitable message to the user.

In the advanced home security system, the security relies on this project like intrusion, fire, gas through GSM technology. This security system works on the RF & GSM technology. However, GSM network is actually needed for the functioning of the system. On set out the system send welcome SMS to the Ru by victimisation command i.e.

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**OWNER Name – e.g.: MY House**

Initially the Register User will add up to three Add-On users victimisation the subsequent command via SMS of variety 44[metallic element|metal} mobile number U1zzzzzzzzzzzzz – e.g.: U1z911234567887z

Add-on user one created victimisation this command. once this assignment method the Ru change all the sensors within the system i.e. Doors, hearth sensing element, Gas sensor, Motion detection, power outage message, Emergency messages & electrical devices.

When any intrusion within the house, the device scans for sensing element intrusion. If there's Door intrusion the device scans the sensing element and gets the input for e.g.: one in digital type. Then check condition of the Door ID is d&le;6 then check the intrusion on door d. If there's intrusion then the system send alert SMS for door d to Ru & Add-on users, WHO area unit allotted this doors & if they need enabled their messages and therefore the SMS is send to the cellular phone of the RU/Add-on users from system.

- e.g.: Alert! Intrusion at MY HOUSE Door -Micro HSS
- In case of Fire/Smoke, the device scan for sensing element & get the input S1 and check the condition f&le;2, then check the fireplace detected at sensing element fires. If these conditions area unit satisfy then the system sends alert SMs for hearth to Ru & Add-on users, WHO area unit allotted these doors & if they need enabled their messages and therefore the SMS is send to the cellular phone of the RU/Add-on users from system.

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**VI. SIMULATION RESULTS**

As shortly as a threat is detected, the individual detector sends an indication to the controller wherever a light-emitting diode associated with that individual detector is lit on the device. The controller additionally sends an indication to the GSM module from wherever a message is shipped to the user exploitation the AT command set. All the messages square
measure sent to the registered user however except for this, there square measure a most of three add on user to that individual detector designation will be hooked up. Given below square measure the set of messages sent to the registered user.

Here, a message is sent to the user signaling the switching ON of the device. In case a fire

![Image](Fig.7: ENB – all, DSB – None message)

This message is sent to the user when he requests the status of all the sensors. Here, we can see the sensors that are enabled and disabled.

Where,
- FS1: Fire Sensor(1)
- FS2: Fire Sensor(2)
- GS: Gas Sensor
- PF: Power Failure
- EM: Emergency Message
- Dn: (n = 1 to 7) Door Names i.e. D1, D2, D3, D4, D5, D6, D7
- DEVn: (n=1-2) Electrical / Device Names i.e. Dev1 & Dev2
- RU: Registered User

This message is sent to the user as soon as smoke is detected in his/her home. FS1 is the sensor that detects the smoke.

![Image](Fig.8: Intrusion at door image)

This message is sent to the user as soon as there is an intrusion into his/her house. In this particular image, we can see that the intrusion has been made from door D1.

As soon as a threat is detected, the respective LED in the device also lights up signaling that the respective sensor has detected a threat. Given below is a diagram of the LED panel along with its function when the sensors are enable or disabled.

![Diagram](LED panel diagram)

Table 1: LED Status:

<table>
<thead>
<tr>
<th>LED panel</th>
<th>ARM (if sensors are disabled)</th>
<th>DISARM (if sensors are enabled)</th>
<th>EVENT S (when any intrusio n occurs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door1</td>
<td>Led on</td>
<td>Led off</td>
<td>Led blinking until disarm</td>
</tr>
<tr>
<td>Door2</td>
<td>Led on</td>
<td>Led off</td>
<td>Led blinking until disarm</td>
</tr>
</tbody>
</table>

Light Emitting Diode (LED) indication panel is used to show the status of the System.
- Sensor ARM: LED of particular sensor will be on.
- Sensors DISARM: LED of particular sensor will be off.
- Particular LED will blink continuously till the sensor is disarmed.

These are the operating conditions for the system:
- Operating Voltage: 110 - 230 VAC
- Operating Temperature: -2°C to 55°C
- Frequency Range: 900 MHz / 1800 MHz (Dual Band GSM)
Sensors Included:
- Electromagnetic Sensors (like doors).
- Smoke Detector (optional)
- Gas Leakage Detector (optional)

Battery Details:
Ni-MH – 7.2V, 1300mAh
Backup for 3-Hour Duration

Life Saving Feature:
In these systems, additional features are included that save lives. These days, suicides are increasing, with some attempts involving fans. In schools and various educational fields, suicides are common. The aim of the project is to reduce suicide cases and save lives. The technique is specifically designed for preventing suicides.

FLOW CHART:

The small device is connected to the fan, so once any activity on the fan is detected, it signals a symptom and offers a message or alarm, thereby stopping the suicide attempt.

VII CONCLUSION
The role in our project ‘GSM primarily based Home Security Systems’ has been developed in such a way that it will send a message to the user of danger in his house at any time. The system has been tested, and this technique is used to real-time data collection from the perimeter wherever standard systems fail to provide 24-hour security. As real-time observance has been designed, it will work with success by detecting the threat and sending a message to the user via the GSM module, thus vouching for system potency.

Using GSM over different wireless technologies for home security has numerous benefits. GSM is used worldwide for basic communication, and today, everyone has a transportable device with a SIM card. The concept of using this technology to ensure security in our homes is what makes this project unique. The idea of simply hooking up a SIM card to your home is unbelievable. The sensors employed in this project are sensitive enough to detect changes in their surroundings, making the controller and microcontroller classification essential for real-time data.

The use of an easy and reliable technology like GSM to supply home security at the side is made possible by this flexibility. The system has been designed to ensure quality and responsibility of the system has been done to an appropriate level. Shoppers can like this technique because it is relatively low cost compared to different products within the market that fail to fulfill the fundamental client demand.

REFERENCES
[5] SIMCOM, Doc Id: SIM300_AT_V1.03, Date of release: 2005-11-08