Advanced Home Security System

Bharti Chouhan[1], Tasneem Banu[2], Pankaj Rathi[3]

Electronics & Communication Engineering, Shrinathji Institute of Technology & Engineering, Nathdwara Rajasthan, Inda[1]
Electronics & Communication Engineering, Shrinathji Institute of Technology & Engineering, Nathdwara Rajasthan, India[2]
Electronics & Communication Engineering, Shrinathji Institute of Technology & Engineering, Nathdwara Rajasthan, India[3]
[1]bhartichouhan1993@gmail.com,[2]tasbanu52@yahoo.com,[3]rathi.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 degreed launch an up-to-date, reliable associate degreed 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|an impact|an impression|an effect|a bearing|a 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:
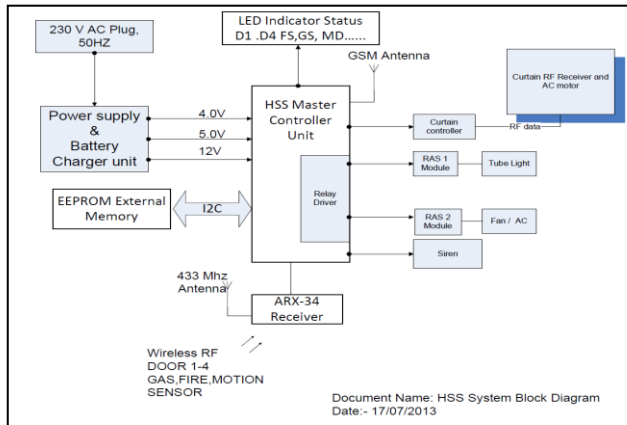
Conceptual model of the system:

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.

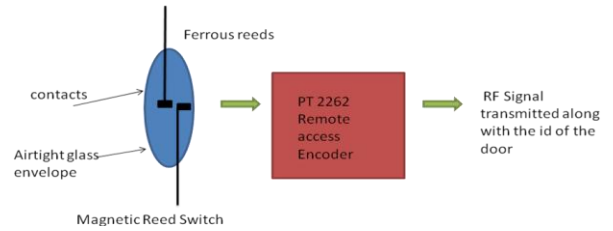Analysis of the system and design:
❖ *Door Sensor:*

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.
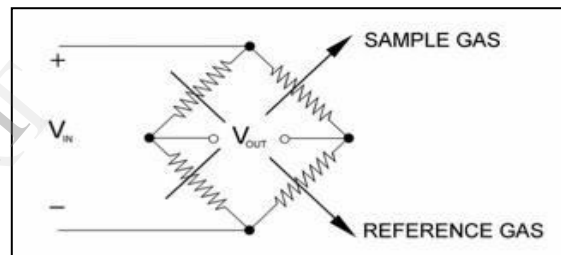
❖ *Gas Sensor:*

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.
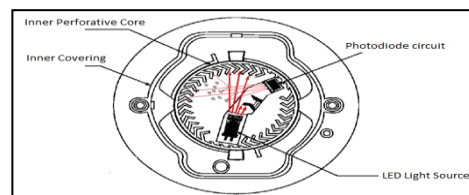
❖ Smoke Detector:

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:
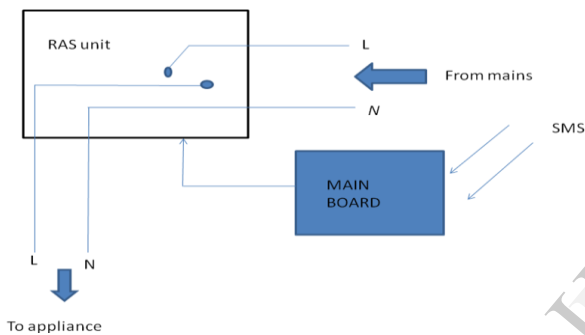

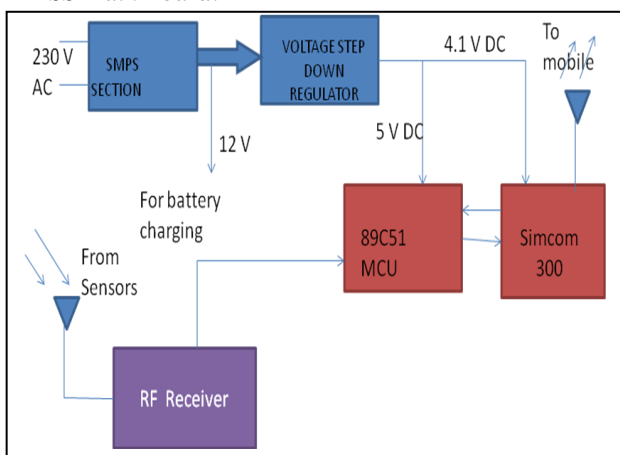Fig.5: Appliance Control Block Diagram

❖ *HSS Main Board:*

Fig.6: 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 advance 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.

   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 U1zxxxxxxxxxxxxz –

   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 & 2 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<=6 then check the intrusion on door d. If there's intrusion then the system send alert SMS for door d to Ru & to 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<=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 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. equally within the gas discharge, the device scan for sensing element and therefore 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.

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.

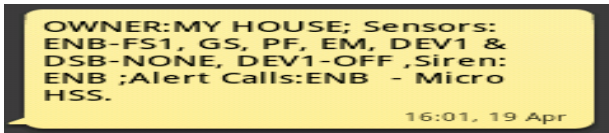Here, a message is sent to the user signaling the switching ON of the device. In case a fire

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.
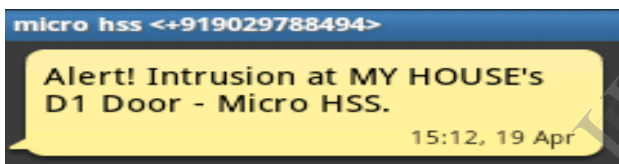

Fig.8: Intrusion at door image

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 theat. Given below is a diagram of the LED panel along with its function when the sensors are enable or disabled.

Table 1: LED Status:

	LED panel	ARM (if sensors are disabled)	DISARM (if sensors are enabled)	EVENTS (when any intrusion occurs)
	Door1	Led on	Led off	Led blinking until disarm
	Door2	Led on	Led off	Led blinking until disarm
	Door3	Led on	Led off	Led blinking until disarm
	Door4	Led on	Led off	Led blinking until disarm
	Gas	Led on	Led off	Led blinking until disarm
	Fire1	Led on	Led off	Led blinking until disarm
	Power led	When mains present – led on	When power failure– led off	----------
	RF led	When any intrusion occurs this led will blink for 3 times	In normal condition it is off	
	SI LED (SYSTEM INDICATION)	When network properly available this led will keep on blinking continuously with 3sec interval	When network not properly available this led will keep on blinking continuously with 1sec interval.	----------
	Bat LED (battery)	When main present and if battery is charging – led blinking and if battery is fully charged – led off	When power failure – led on, when battery low message received – led blinking (indicating battery getting discharged)	----------

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 system additional feature is additional that's life saving feature. these days the suicide makes an attempt ar increasing mistreatment hanged from fan. In schools and different education or non education fields suicides ar will increase. that the aim of the project to reduces the suicides cases and save the life. this technique solely appropriate for hanged from fan.

The small device is hooked up to the fan once any activity on fan is detected then the device get a symptom and it offers the message or alarm and conjointly crumple the fan in order that the suicide uphill.
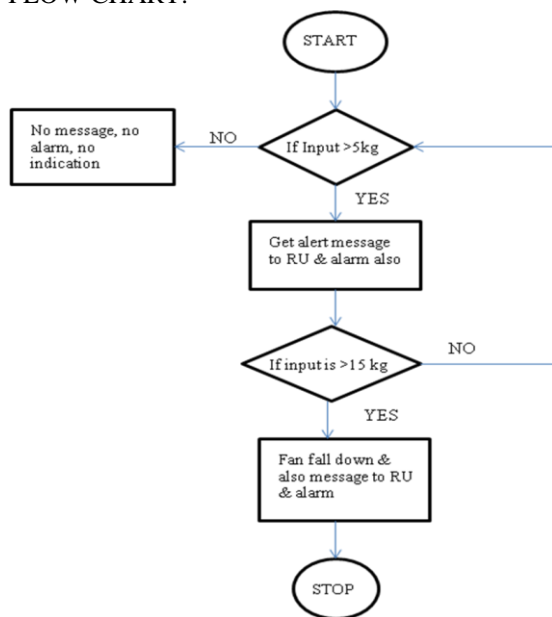
FLOW CHART:

Fig.: Flow chart of saving life feature

VII CONCLUSION

The rule in our project 'GSM primarily based Home Security Systems' has been developed in such the simplest way that it will send word the user of danger in his house at any time once the system has been put in. this technique is made for real time observance service for perimeter wherever standard systems fail to supply twenty four hours security. As real time observance has been designed, it will with success sight the threat and send a message to the user via the GSM module therefore vouching for system potency.

Using GSM over different wireless technologies for home security has numerous benefits as explicit during this project. GSM is employed worldwide for basic communication and today, everybody having a transportable are employing a GSM affiliation. the flexibility to channel this technology to supply security to our homes is what makes this project higher. the concept that simply a lively SIM arrange is all that's needed to stay a watch on your home is on the far side unbelievable. The sensors employed in this project square measure sensitive enough to sight changes within the surroundings touching on their several condition. The detector to microcontroller affiliation is wireless and therefore the controller has the flexibility to dependably classify the signals and consequently send a message to the user via the GSM module for the threat detected.

The use of an easy day to day technology like GSM to supply home security at the side of the flexibility to make sure quality and responsibility of the system has been done to an appropriate level. shoppers can like this technique because it is comparatively low price as compared to different product within the market that fail to fulfill the fundamental client demand.

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