IJCSE International Journal of Computer Sciences and Engineering Open Access
Research Paper Volume-6, Issue-4 E-ISSN: 2347-2693

Design and Implementation of Smart Home Security System based on GSM Technology

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Available online at: www.ijcseonline.org

Received: 20/Mar/2018, Revised: 28/Mar/2018, Accepted: 19/Apr/2018, Published: 30/Apr/2018

***Abstract*—**Home security has becoming an important issue nowadays. Home security is becoming necessary as the possibilities of thief are increasing day to day. Safety from theft are the most important issue of home security system for people. Smart home security system gives the signals in terms of calling ,SMS, Alarm. However, the GSM based smart home security systems provides intensify security as Whenever there is a motion in front of sensor or if thief try to open the door it directly call the owner or send the SMS In this there are two method for smart home security system. The first system uses calling And SMS system . Whenever there is a motion in front of sensor or if thief try to open the door it directly call the owner or send the SMS. The second method .The second system uses the camera. We can see through camera who is trying to enter the in house.

Keyword*—GSM(Global System For Mobile Communication), Arduino Controller, SMS(Short Message Service)*

I. INTRODUCTION

Today's A smart home is one that incorporates advanced automation systems in order to provide its inhabitants, the sophisticated monitoring and control facilities over us various functions. For example, a smart home may have automated facilities for con trolling lights, fans, air conditioners, temperature, multimedia systems such as home theatre systems etc., security, window, door operations, curtains and many other functions. In the past few decades the demand for home automation has increased at a great pace[1]. Home automation is a process for improving the quality of residents, life by facilitating a flexible, com for table and secured environment . A smart home consists of three elements[2].

(i) internal home network.
(ii) intelligent control .
(iii) home automation with wired/wireless access gateways[6].

An adaptive smart home would be the one that provides convenience for remote access to, the home appliances. Thus a smart home provides an user the convenience, comfort, remote control facility, connectedness of all appliances/gadgets and updated information of all activities inside the house. A secured smart home aims to keep the home safe from intruders and external dangers that includes fire accidents and LPG gas leakage. Usually the appliances and gadgets inside home are connected to specific sensors, which help to reduce human labour and physical effort, by sensing and proactively responding to their needs, automatically. A Home Security System should provide security and safety for a home, by alarming the home inmates from intruders, burglary, natural calamities and accidents such as fire accident, gas leakage, animal invading etc. In this paper, we aim to develop a prototype mutli-functional home security system, and discuss related technologies. In a secured smart home, security is an important aspect and feature [3]. Technologies involved in a home security system have been changing significantly the last few decades, and will be changing much further in the upcoming years [4]. The emerging concept of secured smart home offers a safe environment, operational convenience and a comfortable life for its occupants. Generally a home security system alerts the home inmates in terms of alarm systems, thereby keeping their valuables safe from intruders. The features of a home security system, may offer more advanced functionalities. There is a great need of advanced home security system these days, also to protect property, detect crime, notify the fire or LPG gas leak etc., thereby giving peace of mind to all residents of a home. The sense of being safe from intruders makes a person more focused, productive and healthy. Hence, installing an advanced home security system to our homes may help in giving us an additional layer of defense against a ny potential burglars. This paper is organized in the following wa y. Section II, dis-cusses the technologies about "Secured Smart Homes", which can be adopted for Home Security and Home Automation Sys-tems. Design details of the proposed SSH system, Hardware and Software are described in Section III.

Results of some of the performance evaluation experiments and observations are discussed in Section IV. Section V gives a brief summary and conclusion of the prototype SSH system developed, along with the scope of further work.

II. RELATED WORK

PIR (Passive Infrared Sensor) Detect the human\Movement. This device Detect the human by Body Heat. The human body content heat, thus it can be detected by PIR sensor when there is a movement of a human. After Detection we can see in camera who is trying to enter in the house. Here we use GSM system so every time it send SMS\Call the owner. Here we use Wireless Camera.

Methodology

A specific Security Algorithm is also used identify the theft with the help of image processing and sensor based on multiple security system company in the world like (Frontpoint).

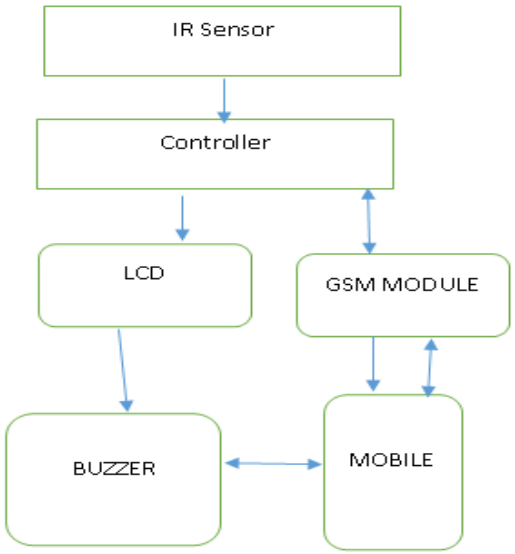

Fig 1: Representation Smart Home Security System .

III. PROPOSED SYSTEM

Our proposed system is controlled by an Atmega644p microcontroller And collects information from the sensors, makes a decision to sends SMS And call to a corresponding number. Smart Home Security System based on GSM Technology is a Embbed And IoT based Device to support the people to secure their home. There are multiple system but they are not more secure because in that system it calls the single person but on our System it call the all the Family member one by one ,if someone is busy other can see and take the proper action on it.

We are using multiple algorithm in this. In our System if all the family member is outside the home and someone try to enter through the door then door sensor send the SMS and call the all family member. After this Owner can See through camera who is entering in the home and start the alarm.
A smart home security system offers many more benefits. This paper mainly focuses on the security of a home when the user is away from the Home. There are two Methods ,

I. Is based on GSM technology .
II. Uses web camera to detect the intruder.

The first method uses GMS for Calling And Sending the SMS to the Register User. The Second Method Uses Wi-Fi Camera installed in House premises, which is operated by application installed on User mobile and it Uses Internet for Communication.

Our proposed System Developed Multiple thing like Android App for accessing camera, If User want to turn on or off the system he can do by just sending the SMS or by Miss Call. Our System has Battery Backup up to 9 to 10 Hrs. so we don't have to afraid of cutting the Light.

After several tests were done, there are some modifications to increase the sensitivity of the user to display. An alarm has been installed on circuit and programming has rearranged in order to ensure that User can easily handle it. The alarm will be activated when it detect movement of human. Therefore, the operator will be alerted and observe the data display more attentively during anomalous events.

IV. SYSTEM INTRODUCTION

This is Smart Home Security System Based On GSM Technology For enhancing better security to the user. In this System we are using PIR Sensor, Door Sensor, Camera, GSM Kit, LCD etc.

Smart Home uses many technology and services through a network for better quality living. A smart home Security System allows the home to be automated and therefore provide easy life and convenience to everyday activities in the home. Many people think this technology as pure networking. Others think this technology will reduce their work load, but smart home security system is combination of both technology.

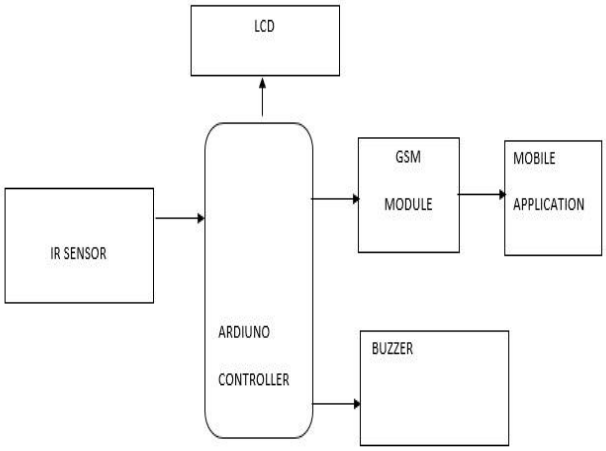

Fig 2: Architecture Of Smart Home Security System**.**

How PIR works: Body temperature is usually around 37 degrees Celsius higher than the background temperature. When people walk past the sensor, high temperature will result in higher charges in pyroelectric material. Small signal generated by the amplifier circuit will be expanded by adding infrared energy and connected to the comparison of the difference (differential COMPARATOR). The comparison is used to distinguish the signal from the reading before giving output. However, this simple arrangement can operate and monitor from any other sources of a sudden temperature change, such as flash or bright lights or reflections of objects in hot weather. Several techniques are used to reduce the error due to external interference. First, the human body radiates infrared energy waves of 9-10 um.. It will focus the infrared energy emitted over a wider area into the sensor and is divided into zones of cold and heat sensitivity

The Main Features of the Smart Home Security System:

I. Arm or disarm the **system** via your **smart** phone.
II. Remote controls and siren
III. Smart cameras.

V. SYSTEM IMPLEMENTATION AND DEVELOPMENT

In the Implementation of Smart Home Security System Based on GSM technology.

1. Draw the Circuit Dig. On PCB.

2. Soldering The Devices on PCB.

3. Test the System.

1. Draw the Circuit Dig On PCB.

For drawing the circuit dig on pcb we need carbon paper after this we need to use permanent marker on pcb. Using marker we draw the circuit on pcb. After drawing we are going to clear all the copper besides circuit dig. we need copper only on Circuit dig.

2.Soldering the devices on PCB .

For soldering we need to drill on pcb. After drilling on pcb we are going to mount the devices on the Circuit of pcb.

We need to multiple devices like

I. GSM Kit.
II. PIR Sensor.
III. Transformer Controller etc.

3. Test the System.

After Soldering we need to test the kit. In this we check Proper current is flowing or not. All the device on the PCB Is correctly responding or not.

For this we test the device like open the door it Display message Door is open and send sms & call on register mobile number.

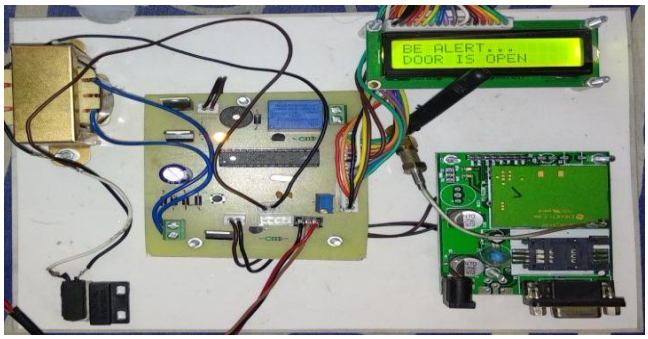

Fig 3: Overview of Smart Home Security System.

VI. RESULTS

A. Study the system

In Smart Home Security System we are using multiple algorithms. Algorithm helps to detect the intruders. Image processing is used to identify theft by their face. There is Wi-Fi camera for face detection And PIR Sensor is for detecting human by their Body heat.

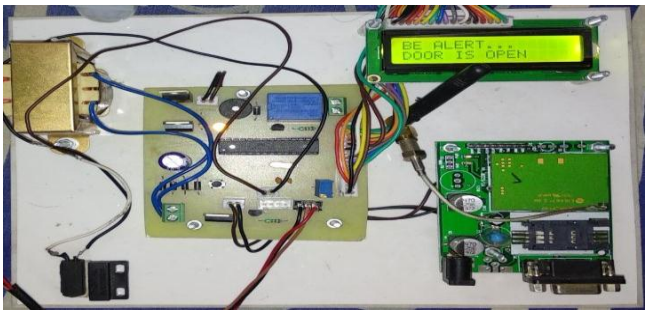

Fig 4: Overview of Smart Home Security System.

The fig: 5, Shows the Door is open Someone try to enter in the house by door. It shows the message Door is open, send sms or call on register mobile number.

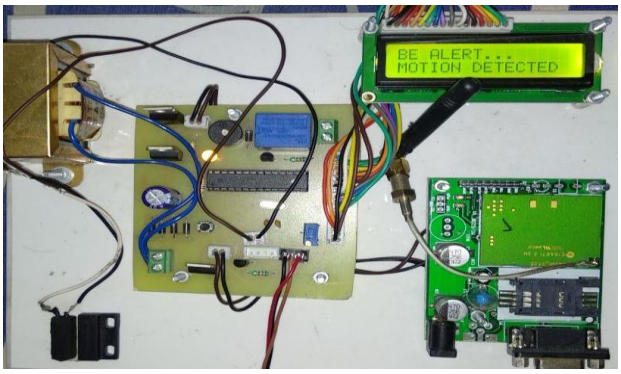

Fig 5: Overview of Smart Home Security System,

Fig 6 Shows intruder try to enter in house by window or backdoor, PIR sensor detect thief by body heat and movement.

Fig 6: Overview of camera System.

B. Output

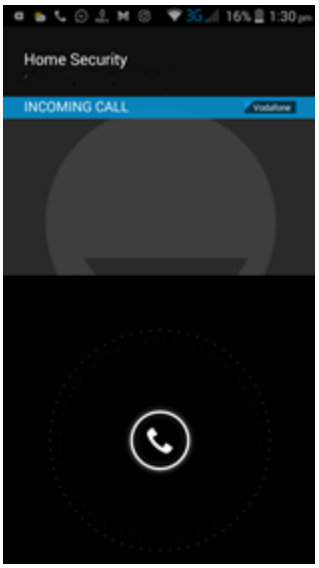

Fig 7: Overview Calling System.

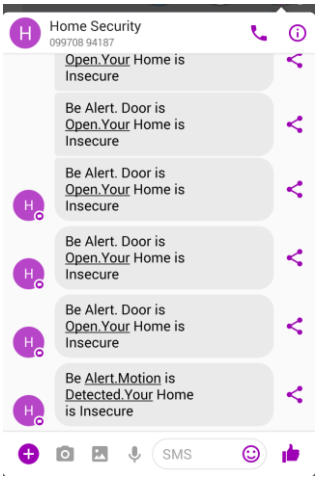

Fig 8: Overview of Message System.

Fig 9 : Overview of camera System.

VII. CONCLUSION

Overall, this study has been completed properly. All Sub objective of this study has been completed, thus resolved the main objectives and research problems. This system help users to identify theft around the houseThe GSM based security system helps to communicate between configured number and system with ease. Web-cam takes photos whenever PIR sensor signals the micro-controller and sends it to the user over Mobile App. This provides an additional security to our home. As GSM is a wireless technology the user can get alerts anywhere in the world thus making the system independent of location

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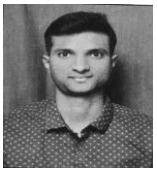

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