An enhanced approach to build Home Security System

Pranav Sharma, Santhosh Kumar L, Vaidhehi V, Deepika K B

***Abstract*— The conventional design of home security systems typically monitors only the property and lacks physical control aspects of the house itself. Also, the term security is not well defined because there is a time delay between the alarm system going on and actual arrival of the security personnel. This paper discusses the development of a home security and monitoring system that works where the traditional security systems that are mainly concerned about curbing burglary and gathering evidence against trespassing fail. The user here can interact directly with the system through a web-based interface over the Internet, while home appliances like air conditioners, lights, door locks and gates are remotely controlled through a user-friendly web page. An additional feature that enhances the security aspect of the system is its capability of monitoring entry points such as doors and windows so that in the event any breach, an alerting email message is sent to the home owner instantly.**

***Index Terms*—PIR Sensor, Fire Sensor, Stress Sensor, Alarm, Microcontroller.**

I. INTRODUCTION

Home security system is much popular nowadays because of increasing theft and robbery.

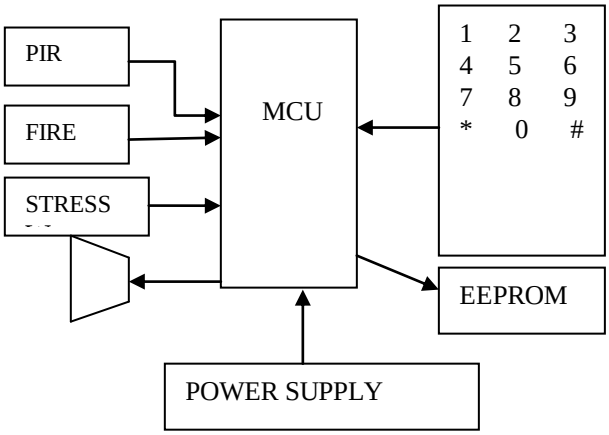

Fig.1 Block Diagram of Home Security System

Manuscript received August, 2015.

***Pranav Sharma**, Department of Computer Science, Christ University., Bengaluru, India, 7022158404.*

***Santhosh Kumar**, Department of Computer Science, Christ University., Bengaluru, India,9986296992.*

***Deepika K B,** Department of Computer Science, Christ University., Bengaluru, India, 9739726371.*

***Vaidhehi V**, Department of Computer Science, Christ University., Bengaluru, India, 984525691.0*

Not only robbery and theft but also fire Home security is primary concern for everyone. In the society the system provides a design of effective security alarm system that can monitor a home with different sensors. The unauthorized door access, Fire accident and Fire detection can be monitored by the status of each individual sensor. In case of emergency a call is made to predefined numbers with predefined message and alarm alerts people in the surrounding.

To avoiding this robbery and theft, This paper introducing home security system. Due to tremendous improvement of microcontroller unit it can embedded all the sensors and make them to provide security by monitoring people house. The objective of this paper is to build home security system using different sensors.

Home security system can send warning signal to neighbor or police station whenever there is an attempt to break-in. If it is in passive mode this home security system stops monitoring and people can enter or go-out of the home without causing any kind of warnings. It contains different sensor called motion, fire and stress. Each sensor does particular task. An alarm system is comprised of a main control box and it is directly connected to all the sensor.

This paper is organized in different sections. Section II explains about the various literature work happened in the development of home security system. Section III briefs about the motivation behind this research work. Section IV the methodology to implement this research work is discussed in detail. Section V discusses the results obtained in this research work. Section VI concludes and gives future directions for the research work.

II. LITERATURE REVIEW

To know the working principle of the arduino Uno R3 microcontroller we referred [1] and we came to know Arduino is an open-source electronics prototyping platform based on flexible, easy to use hardware and software. It is an integrated computer on a chip, input for this microcontroller like different sensors (Fire, Stress, PIR) and output would be a light, a screen and so forth. Arduino is a small computer that we can program to read and control electrical components connected to it. Understand each component in that board and also we learnt how to write the programs. We learnt how to switch it off or on the LED and then learnt how to blink LED on and off for 2 seconds at a time.

ISSN: 2278 – 7798

The codes we write for arduino are known as sketches. They are written in C++. Every sketches needs two void type functions, setup () and loop (). To know working of sensors regarding home security system [2] is referred.. Fire sensor can be placed in floors, bedroom and hallway. If sensor is activated from any of this position, the common burglar alarm give beeps sound. Using [3] which provides an idea of sending messages and alarming concept when any sensor senses the motion, and the usage of LED's individually for each sensor. If any motion detects by any sensor used in the research work, first, it will send signal to microcontroller further this microcontroller activates the auto dialer. Then auto dialer makes a call to predefined numbers which is stored in EEPROM. If that person is not responding then alarm will start beeping. To know about PIR sensor, this work requires to refer [4] and learn about PIR allows to sense motion, always which is used to detect if human has moved in or out of the sensor range, it is small and cost is very less.

III. MOTIVATION

Security is essential for everyone. So to allow home owners to know what is happening in their house, this paper give a better solution to monitoring the home. As everyone knows from ancient times when the human civilisations started to live in colonies had problem of home security, because the way the humans have evolved and are protective towards our colonies.

In modern day when technology is in its zenith and the security threats has increased immensely so this paper need to counter it by the technology itself.

Today's modern home security systems consists of many sensors and components such as Carbon monoxide detectors, security system detection devices and many such fancy and costly devices which decreases the security threat to a extent. This project aims to implement a application which will allow a common man to afford it and makes it's availability to a wider market. This project is developed in order to detect motion (PIR Sensor), fire (Smoke Sensor), pressure (Stress Sensor) and force (Magnetic Sensors) in suitable positions to provide a complete security check. Other objective towards choosing "Home Security" is that present day of market all the time which will cater our business need as well.

IV. METHODOLOGY

This section explains about the methodology adopted for this research work. The system is built by using different sensors like PIR, fire and magnetic door sensors to increase the security with less cost. The sensors should be positioned properly. This approach will enhance the security of the home and it protects from the intruders.

A maximum of 3 sensors can be connected to the burglar alarm. These sensors need to have their contacts closed when in the inactive state (i.e. Normally Closed). In addition, each sensor needs to have its tamper connection wired as well. A power supply voltage of +5 VDC is available for each sensor at the corresponding wiring terminals.

Unauthorized User: PIR sensor is used to avoid unauthorized users to enter the house by detecting the motion of intruders it will send a signal to microcontroller then this will trigger the number which is previously stored in a EEPROM, if the user did not pick the call it will place prerecorded message to the user number. The procedure to record the numbers and save a message in EEPROM is required few steps.

One of the main component of this system is a 12 key matrix keyboard which is used to store the mobile number in the EEPROM. To store the mobile number, this project following some rules to implement such as

Process1: Press 1 on keyboard to store first contact number. When key 1 is pressed, buzzer will give a small beep sound.

Process2: Enter the mobile number between 0 to 9. Maximum telephone number length 20 digit.

Process3: To store the number press "* / PROG". When press "PROG" key buzzer give you long beep.

Process4:To cancel the number press "# / ENTER" key, buzzer give you two small beeps and all LED's are off.

Repeat the processors for other two numbers. In the first step press "2" for second number, and "3" for third number.

Unauthorized Access: Triggering call and place message to the number is same for all the sensors which are used in this research. Magnetic door sensors is used to avoid unauthorized users enter to the home. Magnetic door sensor used on doors, windows, and sliding doors. These contact switches for ideal for doors, windows, and sliding doors. Measuring 2.48" long and half an inch high, they attach with wood or sheet metal screws to the frame of the door or window and the case or jam. Mount the magnet on the door or window so that the two are in contact with each other when the door or window is closed. Slotted mounting holes make it easy to adjust the distance between the magnet and the sensor.

Auto dialer contains three parts and they are all simple:

A switch to connect and disconnect the phone from the network - This switch is generally called the hook switch. It connects when the user lifts the handset.

A speaker - This is generally a little 50-cent, 8-ohm speaker of some sort.

A microphone - In the past, telephone microphones have been as simple as carbon granules compressed between two thin metal plates. Sound waves from the user's voice compress and decompress the granules, changing the resistance of the granules and modulating the current flowing through the microphone

ISSN: 2278 – 7798

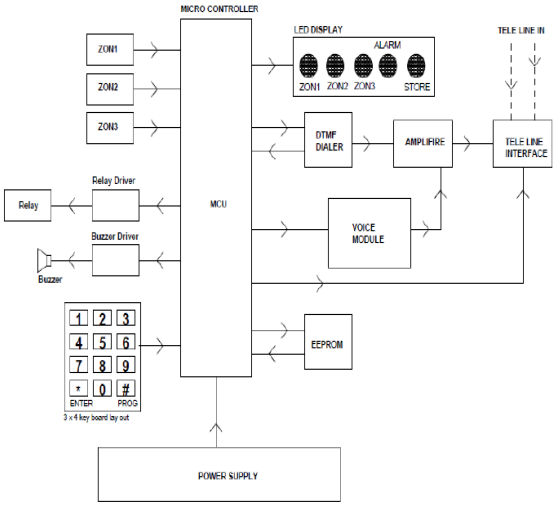

Fig.2 Working of home security system

V. RESULTS AND DISCUSSIONS

Results obtained in the research work is shown in table 1. DTMF telephone worked with the preloaded telephone numbers. Sensors detected properly. The working of the sensors are indicated by the LED lights. Battery usage was also tested and their performance were tabulated.

Table 1. Results

Case	Expected Outcome	Outcome
DTMF telephone line	Call should made to predefined numbers	Calls dialed to recorded numbers
Battery Test(12v)	Determined up to 5 hour	Obtained 5 hour 20 min
Battery Test(9v)	Determined up to 1 hour	Obtained 50 min.
Three Sensor Detection	LED should glow if sensor detects any fire, any door opening action and if IR beam is cut.	LED glows.

VI. CONCLUSION:

This main aim of the project is to design an effective security alarm system that can monitor a home with different sensors. The sensors used in this system are capable of detecting fire, smoke and any unauthorized access. The owner of the house records predefined message to be delivered in case of emergency.

When an intruder or any unusual activity is detected, the auto dialer automatically calls the predefined numbers. After loop is pulled, receiver automatically triggers the external sirens and dials the preset numbers for help. So the home security system with auto dialer is used to prevent loss of property and saves the user's life. Reduces the chances of losing property. The siren that is fixed indoors scares off anybody who enters into home and fails to deactivate the alarm. Any smoke or fire detected in the surrounding can alert the user at the earliest through phone call and buzzer. This system can be enhanced as Biometric systems using fingerprint and face recognition can be used. Camera can be fixed near the door for continuous monitoring of the activities. GSM module can be included to send SMS to mobile numbers. Ultra Sonic motion sensor can be included to enhance security.

REFERENCES

[1] http://www.forefront.io/a/beginners-guide-to-arduino
[2] www.usfa.fema.gov/prevention/outreach/smoke_alarms.html
[3] Y. Zhao and Z. Ye: A Low Cost GSM/GPRS Based Wireless Home Security System, IEEE Transactions on Consumer Electronics, Vol. 54, No. 2, MAY 2008
[4] www.electronics.lab.com/projects/sensors/007/Michael
[5] McRoberts: Beginning Arduino Second Editionsystem via mobile phones", *WSEAS Transactions on Communications*, vol. 5, pp. 1061- 1066, 2006.
[6] A. Alheraish, "Design and implementation of home automation
[7] system", IEEE Transactions on Consumer Electronics, vol. 50, pp. 1087–1092, 2004.
[8] H. Kanma, N. Wakabayashi, R. Kanazawa, and H. Ito, "Home
[9] appliance control system over bluetooth with a cellular phone", IEEE
[10] Transactions on Consumer Electronics, vol. 49, pp. 1049–1053, 2003.
[11] E. M. C. Wong, "A phone-based remote controller for home and office
[12] automation", IEEE Transactions on Consumer Electronics, vo1.40, pp. 28–34, 1994.
[13] S. -M. Tsai, P.-C. Yang, S. -S. Wu, and S. -S. Sun, "A service of home security system on intelligent network", IEEE Transactions on Consumer Electronics, vol. 44, pp. 1360–1366, 1998.
[14] Nios II Development Kit Cyclone II Edition–http://www.altera.com.
[15] Microsoft Online Safety–http://www.microsoft.com/protect/
[16] Home Security and Alarms–http://www.homesecurityandalarms.com.

ISSN: 2278 – 7798