IJESC

Microcontroller Based Home Security System

Shreyash Chandak[1], Purvi Multani[2], Pratik Kawadkar[3], Radhika Agrawal[4], Bhumika Neole[5]
Student[1, 2, 3, 4], Assistant Professor[5]
Department of Electronics and Communication Engineering
Shri Ramdeobaba College of Engineering and Management, Nagpur, India

Abstract:
Security is one of the most important enablers for the way we live. Home security is becoming necessary nowadays as the threats related to domestic security are increasing day by day. It has been a major issue of concern because of the dramatic increase in crime rate. It is a very important aspect these days particularly with the kind of theft or vandalizing we hear.Lot of research been carried out deploying sensors like PIR, Sensor Camera, GSM modules towards detecting the intruder at home. But the drawback in all these systems is that they are all too expensive to be deployed integrated with LCD panel or Camera. As a part of our research project we have developed an integrated three level HSS. The first level being authentication access for the residents, wherein we have used a finger print scanner. The next level in our HSS is to detect any unwanted intruder entering the house. The third level is to detect fire in the house.

Keywords: PIR, GSM, Fingerprint Scanner

I. INTRODUCTION

The most important things for a person are property and life, and he aims to secure these. Home Security System fulfils this need. In olden days people used to secure the homes, when they leave by using locks and key. But now such kind of systems can be easily broken and owners are not aware of it. Today, the home security system has moved to a next level where the control lies completely in the hands of the house owner. Research has been conducted in regards to automated home monitoring using Web Camera and accordingly information delivered to user's phone via GSM. We perceived the drawbacks of these systems, and aimed to overcome them through our project .

II. LITERATURE SURVEY

Research has been conducted in regards to automated home monitoring. One of the research done was on an advanced Internet of Thing based Security Alert System for Smart Home in order to detect an intruder or any unusual event at home, when nobody is available there. At a point when the thief movement is beginning at your home then the PIR sensor is connected with the framework and sensed the action happened at home. After that, it offers flag to the raspberry pi. Raspberrypi is computational circuit which processes the information inside it.

Therefore, with help of raspberry pi it can offer flag to another segment. Here, we utilize the camera for catching the present action of your home. Camera is catching the picture and offer back to the raspberry pi with the goal that it sends the email to the owner whose mail id was already put away inside it.

The email is send through IMAP (Internet message get to convention). For that the raspberry pi is associated with the Internet through either RJ45 or the WIFI module. This Home security provision using raspberry pi and Web Camera is in economical and not feasible, also requires high maintenance. Also, there is a need of internet connectivity for this system.
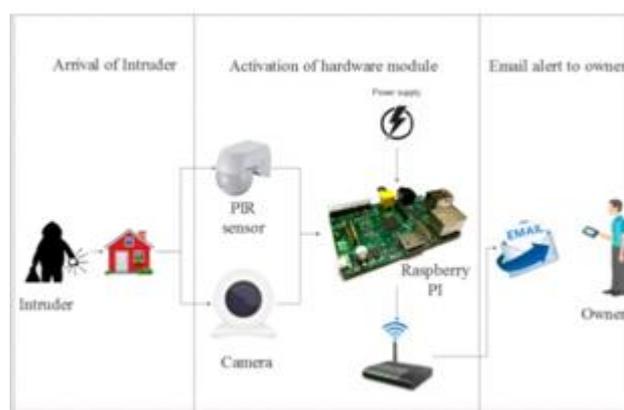

Figure.1. Block Diagram of Internet of Things Based Home Security System

Other research done was on Machine-to-machine Communication Based Smart Home Security System by NFC, Fingerprint, and with Mobile Android Application. Machine-to-machine (M2M) communication takes place between embedded devices at one end and a network server at the other end via an internet network using either wired, wireless or a combination of both, the first security level uses Near Field Communication (NFC) tag, the second level uses a secured password system and the third level uses fingerprint authentication. After that, a GSM module embedded with the proposed HSS sends the logged password to a remote server via M2M communication. The server encrypts the password and notifies the homeowner via an android based mobile application whether the person is an authenticated person or not.Thissystem with a smart android mobile application (i.e. apps) lead to battery drainage and requires a sufficient amount of precious storage in the user's mobile phone.
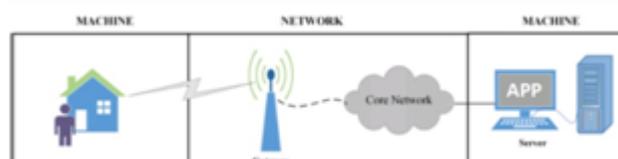

Figure.2. Block Diagram of the M2M communication

III. SYSTEM COMPONENTS

PIR sensors: PIR sensors allow us to sense motion if a human has moved in or out of the sensing range. They are small, inexpensive, low-power consumption, easy to use and tough. For these reasons we have used this in our home security system.

GSM Module: A GSM module is a specialized type of compact modem which accepts a SIM card, and operates over the subscribed mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. We chose using GSM module as it has the most widespread network and is the most stable cellular technology. This increases the probability of reception of messages to the owner at the right time, even at remote locations.

Smoke Detector and Fire Sensor: A smoke detector is a device that senses smoke, typically as an indicator of fire. A fire sensor basically senses a change in the intensity of light near it and indicates when it encounters a fire. We propose on using the smoke detector in cognizance with the fire sensor so that none of the two sensors initiate a false alarm and thus increasing the precision of the security system.

Finger print scanner: The finger print scanner uses a biometric sensor to authenticate the users into the home. It uses a flash memory to store predefined number of fingerprints and then compares it whenever someone tries to access the home.

IV. SYSTEM DESIGN AND ARCHITECTURE

The Home Security system proposed in this paper is an integrated three level security system. The three levels have been explained in detail below:

Authentication Access:

This part of the security system is constricted by using a fingerprint scanner module (Sunrom 1125). It will be installed at the entrance of the home. This module performs three basic functions: ADD, SEARCH and EMPTY. The ADD switch, when pressed allows the user to add the desired number of authentic finger prints and hence stores this biometric data in the module's flash memory. The SEARCH button needs to be pressed when someone scans his/her finger print and is willing to enter the house. The EMPTY button clears the flash memory and resets the module with no finger prints in its memory. When someone redundantly enters a wrong finger print for 3 consecutive times, the controller informs the owner via sending a text message and puts the alert buzzer on.
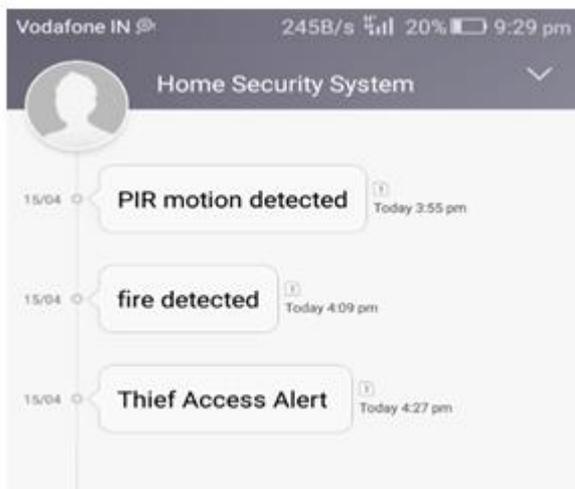

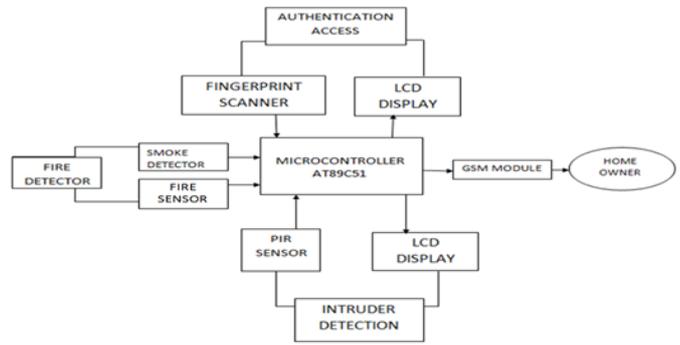**Figure.3. Screenshot of the messages from the HSS to the GSM module**

Figure.4. Block Diagram of Home Security Syste

Intruder detection:

The intruder detection block of the security system is completed using a PIR sensor. A PIR sensor detects Infrared energy emitted by a human in its field. The Passive Infrared Sensors will be installed at all the window panes of the house and all other possible places from where an invasion can take place. When the house is empty or the PIR circuit is active, any human movement in the path of the PIR sensor is sensed. On reception of signal from the PIR sensors the controller will activate the buzzer circuit and also warn the owner by sending a text alert.
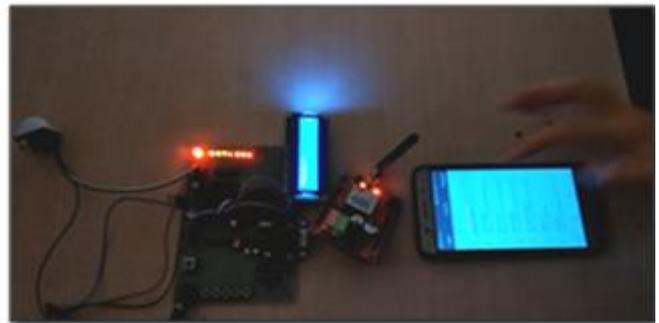

Figure.5. Hardware Unit of Home Security System

Fire Detection:

Fire is the most hazardous threat to a home and hence becomes the most important part of the home security system. This action of fire detection is completed using two sensors simultaneously, smoke detector and fire sensor. When both of these sensors are active, only then the controller confirms a fire in the house. A smoke detector senses the presence of smoke in the home, but there could be other reasons for presence of smoke, such as essence sticks, or a person smoking cigarette, or any other human activity. Hence, to eliminate these errors, a fire sensor is used which senses a change in the intensity of light in the home. When both of these parameters are high, only then the fire is confirmed. On detection of fire, the controller starts the alarm, and sends the owner an alert. To protect the house from any further damage and the controller trips the main electric supply using a relay which saves the appliances and fire due to the electric line.

V.CONCLUSION & FUTURE WORK

Home security has been a major issue of concern because of the major increase in crime rate, which indicated towards increasing the security homes and belonging. So towards achieving this objective, lot of research been carried out by employing Webcamera, Raspberry-Pi, Ultrasonic Sensors with LCD display for alerting the personnel towards security threat. But none of these systems are economical and feasible for every common man. So we here have developed Home based

Security system for owner authentication, intruder detection and fire detection, by employing Fingerprint Scanner, PIR sensor and Smoke Detector interfaced with Microcontroller towards alerting the home owner via GSM for action and alert. These are shown as screenshots. By using this system, the security services like police and fire brigade of a nearby region are also informed about the intrusion instantly and they can take steps immediately. So this system is safe and cost effective. The research is still not complete as there is more room for improvement towards future work. Home Security System can be extended by allowing the system to alert the owners and nearby police station with the help of a call which will help to take preventive measures and protect the house from theft. Also, a provision could be made to start water sprinkling at the particular point, in case of fire detection. For the authentication access of the owner, additional biometric verification such as iris, face detection can also be provided.

VI. REFERENCES

- www.ieee.org

[1]. S. Tanwar, P. Patel, K. Patel, S. Tyagi, N. Kumar, M. S. Obaidat, 'An Advanced Internet of Thing Based Security Alert System For Smart Home'. India : May 2017

[2]. Sayidul Morsalin, A. M. Jahirul Islam, Golam R. Rahat, Syed R. H. Pidim,Abdur Rahman, Md A. B. Siddiqe, 'Machine-To-Machine Communication Based Smart Home Security System By Pir Sensor With Mobile Android Application'. India :2016

[3]. Suresh.S ,J.Bhavya, S.Sakshi, K.Varun And G.Debarshi, 'Home Monitoring And Security System'. India: 2016

[4]. Arun Cyril Jose And Reza Malekian, Senior Member, Ieee,'Improving Smart Home Security: Integrating Logical Sensing Into Smart Home', India:2017

[5]. Shrikrushna Khedkar , 'Using Raspberry Pi And Gsm Survey On Home Automation', India:2016

[6]. Home Based Fire Monitoring and Warning System

[7]. IOT Based Smart Security and Home Automation   System

- www.freepatentsonline.com

[8]. Robert J. Gaffigan, 'Home Security System'. Usa: 1989

[9]. Joseph A. Tabe, 'Interactive Wireless Home Security Detectors', Usa: 2013