An IOT based Solar Integrated Home Security System by using GSM Module and Raspberry pi

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Abstract—At present the world advancement depends on its technology. IoT (Internet of Things) is the latest technology which connects the devices over a network using cloud computing and web applications to for efficient operation. Home security systems comprise a GSM module and Raspberry Pi with relay which is door security sensors. These systems can response rapidly when burglar intrudes in a home, office etc. And alerts the respective holder. Suspected activities are conveyed to user through SMS or CALL or SNAP SHOT of the burglar to the mobile by using GSM technology the total system is operated a single credit card sized computer that is Raspberry Pi.
Keywords— Internet of things (IoT), Raspberry Pi and GSM Module, Camera.

I. INTRODUCTION

Home automation or home security system offers many benefits. After so many research I gave a mainly focused on GSM based home security. It is very easy to install and having a very less cost. Basically it installed over the entry door and that door consist with sensors which is connected to relay, as relay detached from sensors, signals will generate via relay and sends it to Raspberry Pi and action takes place according to piece of code written in the chip and GSM module sends the burglar snapshot of themail and also message to owner's phone. There has been much research done on various types of Home Security systems like Sensor based Home security System, Figure print, Palm print and keypad activation for authentication and so much. All type of Security system uses only a technique of GSM module. In this project the work mainly focuses on the security of home when the user is out from the place. GSM module and Raspberry Pi based technology proposed to keep updated owner about house security. In this security system is SMS based and snapshot uses GSM technology to send SMS to the owner and burglars snapshot send to the mail. Normally the aim of this type of system is to keep secure home from intruders.This project home security system comprises a IOT based on GSM module and

Raspberry Pi with relay which are door security sensors. This system can response rapidly when burglar intrudes in a home, office, banks, shopping malls etc., and alerts the respective holder.

II. LITERATURE REVIEW

Santo's Budijono [1] et.al Proposed a system presents Home Security System. The System Hardware of this system has been designed using microcontroller, PIR (Passive Infra Red)motion sensor as the primary sensor for motion detection, camera for capturing images, GSM module for sending and receiving SMS and buzzer for alarm. The proposed system uses PIR sensors and sending SMS, save image capture by camera, and make people panic by turn on the buzzer when trespassing surrounding area that detected by PIR sensor.

B V Sumangala [2] et.al. Proposed a system is mainly implemented on the present doors lock-key method. Thus providing Double Authentication i.e. the door can only be opened with the right password and right key. The system is designed and developed using simple locally available components and by considering every tiny factor it is made both reliable and affordable. Another feature of the system being that, using different logic gates combination the system is designed in such a way that the buzzer won't be switched off even through the intruder cuts the wires connecting the Buzzer and main control circuit.

Omorogiuwa Eseosa [3] et.al. Proposed a system this work involves design and construction of GSM intelligent home security system for real time monitoring of intruders. It consist of intrusion detector sensors, (Pressure, Smoke/Fire, Gas and PIR motion), wireless sensors, programmable microcontroller in embedded C language, regulated power supply unit, protease (circuit simulator),relays GSM modem, mobile phone, data acquisition node and an interface program development.

Nikhil Agarwal [4] et.al in this paper uses password protected door system methodology in home automation system. The door lock is password protected with an LED

based resistive screen input panel which operates by detecting difference in light intensity captured by the photo diode which is emitted by surrounding red LEDs and reflected by the finger. The display is a 16X2 LCD panel. IR Laser sensors are used to detect any obstacle while monitoring the windows and doors at night or when away. Fire alarm system uses temperature sensor LM35 which senses sudden considerable increase in temperature and raises alarm. They uses the following components in those automation system i.e. IR sensors, LCD Display, Temperature Sensor, Microcontroller, Relay, Power Supply, GSM Modem.

From the above literature review, it is clearly understood that the home security system always based on the sensors, Raspberry Pi, GSM module and relay with the help of new technology is IOT, and solar integrated power consumption.

III. PROPOSED SYSTEM

The components in the system are Relay, PIR sensor, Raspberry Pi, LED, GSM module, Device in which GSM technology is used. Basically this device is used to protect a house from theft or robbery. The door of the house contains with sensors. And sensors will be connected with a relay, if Relay is connected to a security system there will be a buzzer and if it is disconnected the light flashes red light. It takes an appropriate action through written code in chip. Because of that action GSM module gets active and sends SMS on the phone number which is declared in the piece of code embedded in Raspberry Pi. Because of that the house owner gets alert. The main function of relay is to switch between two terminals as shown in figure.1.
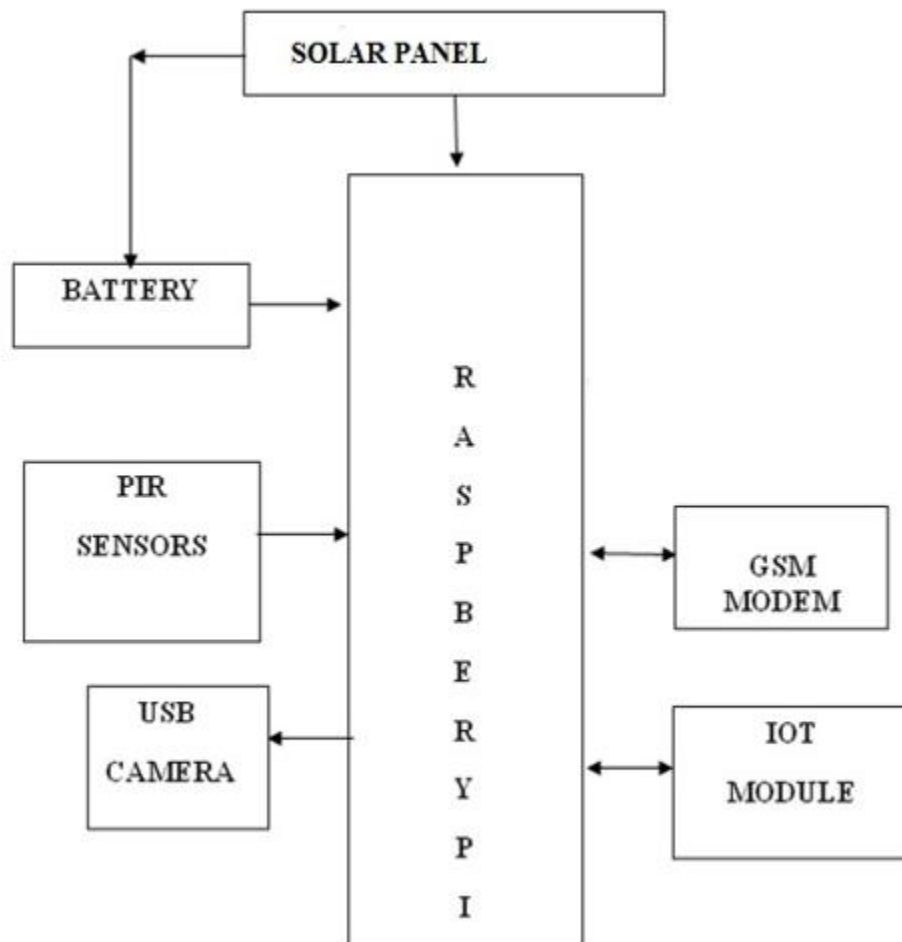

Fig.1: Block diagram of IoT based solar integrated home security system by using GSM module and Raspberry Pi.

IV. EXPERIMENTAL SET UP

All type of Security system uses only a technique of GSM module. In this project the work mainly focuses on the security of home when the user is out from the place. GSM module and Raspberry Pi based technology proposed to keep updated owner about house security. In this security system is SMS based and snapshot uses GSM technology to send SMS to the owner and burglars snapshot send to the mail. In this entire system works with solar panel.

A PIR-based motion detector is used to sense movement of people, animals, or other objects. They are commonly used in burglar alarms and automatically –activated lighting systems. They are commonly called simply "PIR", or sometimes "PID", for "Passive infrared detection". These entire system controlled to the Raspberry Pi and GSM module with help of Solar.
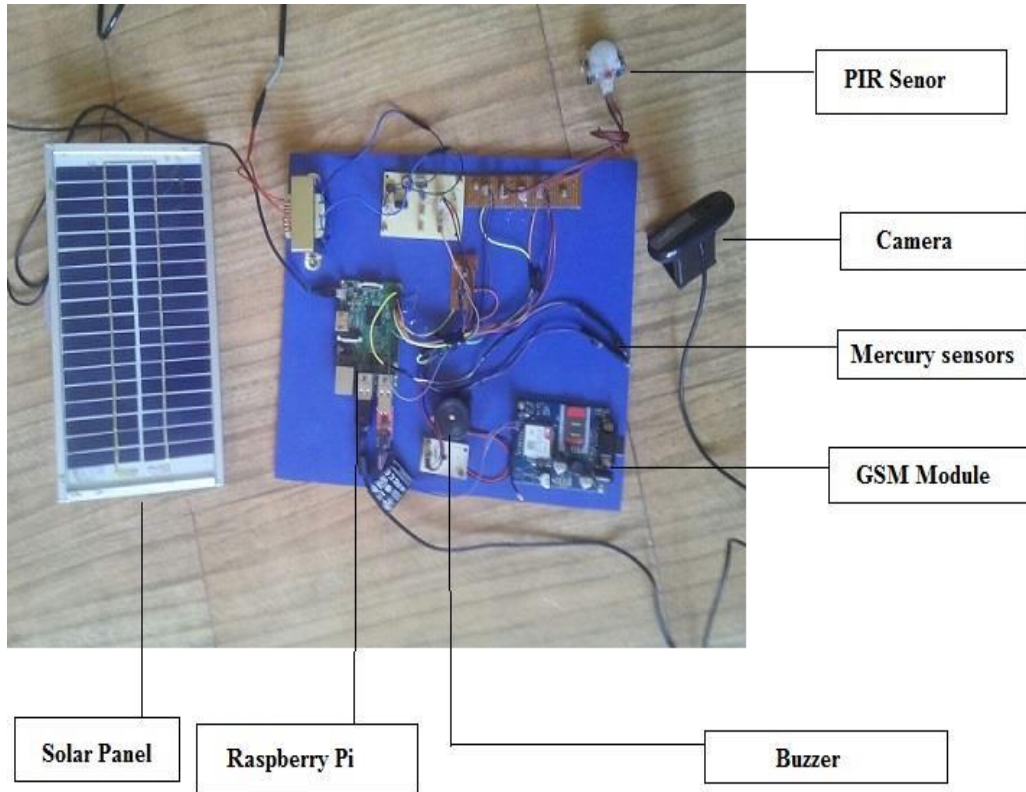

Fig.2: Experimental set up of proposed system
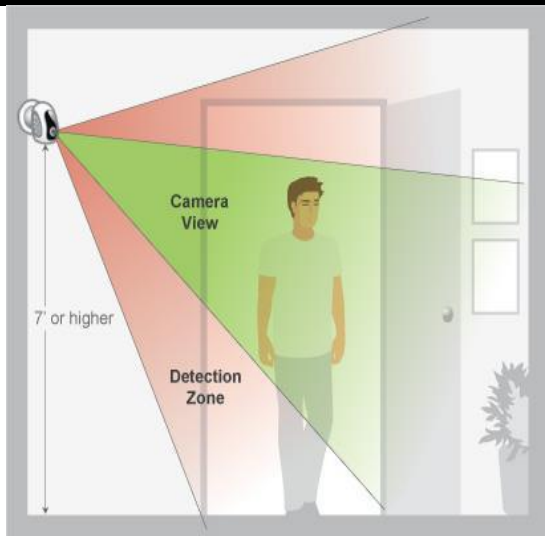

Fig.3: Raspberry Pi
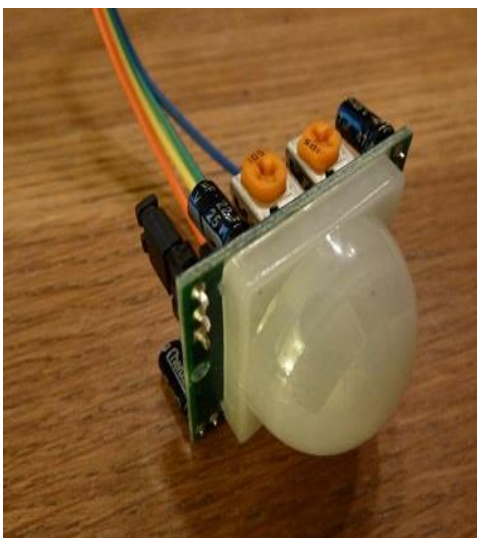
Fig.3: Detection zone by camera view

Fig 4: PIR sensor

V.   WORKING PROCEDURE

The home security system is PIR sensors can detect the human beings, animals and other objects which are movable. In this sensors detect& the camera captures the image. The Raspberry Pi is the main component of this project, it will be help to the camera to capturing. The GSM module is also one of the part in this system there will be a separate modem to send messages to the house owners mobile. The camera captured image will besend to the owner's mail. These all are depending on the programming which is to be in built of the Raspberry Pi. Home security systems comprise a GSM module and Raspberry Pi with relay which is door security sensors. These systems can response rapidly when burglar intrudes in a home, office etc. And alerts the respective holder. Suspected activities

are conveyed to user through SMS or CALL or SNAP SHOT of the burglar to the mobile by using GSM technology the total system is operated a single credit card sized chip called is Raspberry Pi.

VI.   RESULTS AND DISCUSSION

The system is based on the latest technology available in Smart phones, with the help of iot based solar integrated security system which gives a proper result. This system is easy to use and very simple. The model can be installed with a economical cost. The GSM technology gives a good response after receiving a message of particular action from Raspberry Pi. SMS and Mail received time to house owner is basically depends on the signal strength range that owner has got through mobile tower.   It isdeveloped using C language & tested. Which can defect the persons. Who enter through the door.

This system can response rapidly when burglar intrudes in a home, office etc., and alerts the respective holder. And the total system is operated on a single credit card sized computer

The home security system send the SMS and mail to the owners. The following figures   are alerts messages.
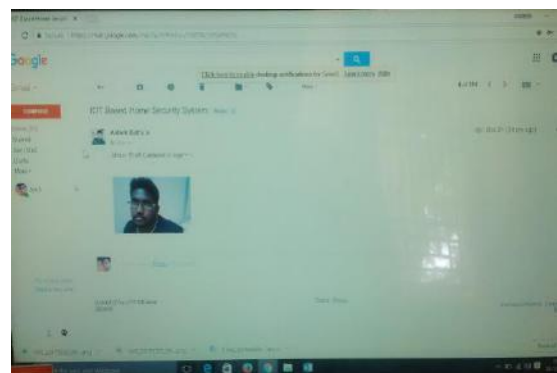

Fig.5: SMS alerts

Fig.6: Receiving the mail with snap shot.

APPLICATIONS:
- Household & Industrial applications.
- Security applications.
- Used For lab monitoring system.
- Banking sectors, highly security areas.

VII.   CONCLUSION

The IOT based home security system has been designed and tested with the mobile network. The user can get alerts anywhere through the Raspberry Pi and GSM technology thus making the system location independent. A flexible way to control and explore the services of the mobile, AT commands is used in the system. The communication of home is only through the mail, SMS which has been tested with the mobile networks and is working on any mobile network.

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been designed and tested.

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