



HOME SECURITY SYSTEM

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Abstract

We are living in a hi-tech era where crime is increasing day by day. Due to increase in numbers of threats and intrusions in society, everyone needs a Hi-Tech security system which can keep their belongings secure and at the same time we also want to protect our home assets from any kind of hazard. It remarks the uses of customers end application such as Telegram to securely transmit information through layers of IoT architecture. This paper aims at providing a low-power, cost effective and unobtrusive IoT based home security system which assist in presence detection, identification and authentication of stranger. The proposed solution makes use of USB Webcam as an image capturing unit, Fingerprint reader for authenticity and Telegram which has an amazing feature as Telegram Bot which provide APIs to build solutions which is compatible with Raspberry Pi IoT infrastructure. The system employs a fingerprint reader which controls the opening and the closing of a safety locker door. The person has to verify his/her user identity using fingerprint verification before entering the home. If the user is authorized, the door will be open, otherwise the image will captured and the system transmits to the owners mobile phone. The project includes a PIR module which constantly monitoring the home. It can detect the theft, fire and sends an alert signal to the owner. Python language is used along with telegram application.

Keywords: Security, PIR module, Fire sensor, Raspberry pi, Internet of Things, Telegram, Fingerprint module.

1.INTRODUCTION

The concept of smart home has been so popular now-a days. A Smart home can be viewed as an intelligent or automated home where the home appliances can be automated and monitored remotely. Security system is an essential part for any organization, Banks and homes .The goal is basically to protect individuals and property from various hazards such as fire, crime and loss. The Internet of Things (IoT) is the physical network of things or objects—devices, buildings, vehicles, and other items embedded with electronics, software, sensors, and network connectivity that enables these things or objects to collect and exchange data. Internet of Things is expected to produce high degree of human to machine communication along with machine to machine communication. This project proposes the security system using IOT, which prevents theft in home. The primary objective of this project is to reduce human work. Automation has always been a prime factor for security system. We aimed in the project is to design and implement a security system. System that offers controllability through a hand held mobile phone by means of IOT. The commands from a mobile phone are used to allow/deny access to home .

We propose IOT based theft detection project using Raspberry Pi .In this proposed system, theft can be presented using Raspberry pi and PIR sensors. In this system PIR sensors, camera, buzzer, fire sensor, fingerprint module and motor are connected to Raspberry pi. PIR sensors are able to detect the presence of human being. After detecting any person, relays are triggered to switch on the lights. If authorized person is entering the home, the person has to verify his user identity using fingerprint verification .If fingerprint matches the door will be open. When the user is not authorized, the

image will be captured using the camera and send it to the owner using telegram application. The owner can view the image using the mobile application and he can deny/allow access. If the owner allows the access then the door will automatically open. Otherwise it will be close. The PIR sensor are used to detect user behavior at various access points. If the user is not there, then automatically the electronic appliances such as light, fan etc will be automatically turned off. During home fire the fire sensor will detect fire and produce an alarm.

II.EXISTING SYSTEMS

There are different types of systems are existing now. They are all used for security of home and for home automation.

1. iOS-based home automation security system using General Packet Radio Service (GPRS).

The home devices and the iOS application are connected to the cloud which acts as the server. The system used video cameras, microphones, and motion sensors to provide security to the home. The video cameras are motion triggered and can be viewed by the user on their GPRS enabled devices using the client application or over a web browser. Accessing the security system over the web browser opens it up to a different set of browsing-related security issues like session hijacking, cookie stealing, and crosssite scripting.

2. Machine-to-machine Communication Based Smart Home Security System by NFC, Fingerprint, and PIR Sensor with Mobile Android Application

Here a multi-layer home security system (HSS) has been developed which maintains six levels of security and necessary control responses against unwanted burglars and intruders. As a part of this development, 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. In the final stage of security, if an intruder wants to enter the room by breaking the password without NFC tag and

fingerprint encryption, a Passive Infrared (PIR) motion sensor will work and sounds a buzzer for alarm. Therefore, the automatic and embedded operation of the proposed HSS makes it more secure, reliable and robust than other traditional systems.

3. Home automation security system using Short Messaging Service

The unauthorised access into the home is identified by monitoring the state of the home door using Light Emitting Diode (LED) and IR sensors. The proposed system also allows legitimate users to control home lights and set the 4 digit passkey using SMS. The LED and IR sensors used to identify intrusions could easily be spoofed by a sophisticated attacker. Informing the user about an intrusion via SMS is not a good practice, as the user may not be near to the phone to receive the alert on time.

3. Smart Eye

It uses a real time home automation and monitoring system using GPRS. The proposed system alerts the user about an intrusion who in turn can view the home using a live camera. Each home is connected to the central server, the user sends control commands to server which the home system reads from the central server and executes. When a device at home changes state it sends the information to the central server, which the user can access. The central controller based security system proposed by S. Tsai et al.called „Home Security System on Intelligent Network“ failed to implement any modern security hardware or did not consider defence against sophisticated intrusion attempts. A central controller based security system raises some serious privacy and security concerns considering the large scale user data available at the central controller and increases the potential for large-scale surveillance. Moreover, central controller based security systems are not feasible for single isolated home.

III.PROPOSED SYSTEM

We propose IOT based theft detection using Raspberry Pi .In this proposed system, theft can be prevented using Raspberry pi and IR sensors. In this system PIR sensor,IR sensor,camera, buzzer,fire sensor,fingerprint module and motor are connected to Raspberry pi.PIR sensors are able to detect the presence of human being. After detecting any person, relays are triggered to switch on the lights. If authorized person is

entering the house, before that the person has to verify his user identity using fingerprint verification. If fingerprint matches, the door will be open. When the user is not authorized, the image/video will be captured using the camera and send it to the telegram application. The owner can view the image using the mobile application and he can deny/allow access. Telegram is a non-profit cloud-based instant messaging service. Telegram client apps are available for Android, iOS, Windows Phone,

Windows NT, macOS and Linux. Users can send messages and exchange photos, videos, stickers, audio and files of any type. If the owner allows the access then the door will automatically open, otherwise it will be close. The fire sensor will detect fire and produce an alarm. The IR sensor will be kept near to the doors to sense the human behavior. When the home is empty the owner will ON the theft mode. If any human behavior detected the message will be send to the owner via the telegram application.

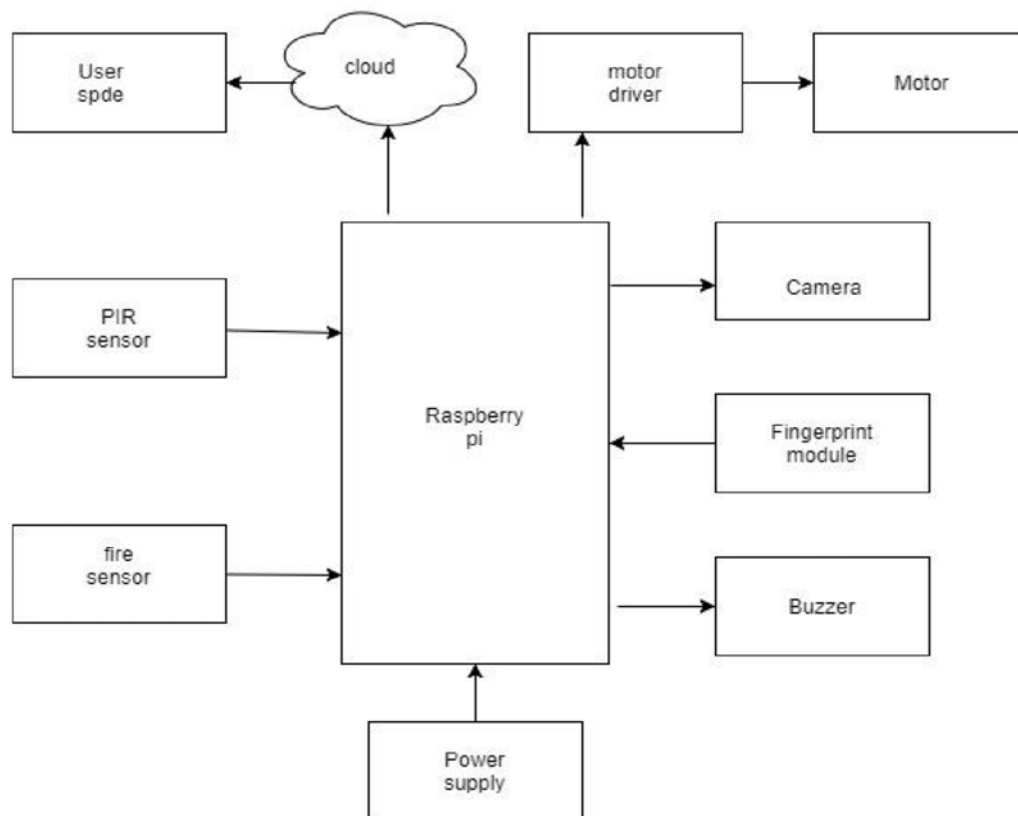


Figure 1.1 System Model

IV.METHODOLOGY

There are many types of good security systems and cameras out there for home security but they are much expensive so today we will build a low cost simple Raspberry pi home security system, which not only alert you but also sends the picture of intruder when it detects any. In our project Raspberry pi3 is used and python is the language used here. Our project can be divided into following modules.

IDENTITY VERIFICATION PROCESS

Our work utilizes fingerprint verification for authorized users. We store the finger prints of the authorized persons in the home in to the database. If anyone wants to enter the home,

he/she has to verify his/her fingerprint. Then it compare with the fingerprint already stored in the fingerprint module, if it matches then the door will be automatically opened.

IMAGE CAPTURING

When the user is not authorized, then the image will be captured and send it to the owner using the telegram application. The owner can view the image using mobile application. The owner can either allow/deny the access.

ENERGY CONSERVATION

The PIR sensors are used to detect user behavior at various access points. If the user is not there, then automatically the electronic appliances such as light, fan etc will be automatically turned off.

FIRE ALARM

During home fire the carbon monoxide and the ambient temperature levels in the area of the fire will go up and inversely the humidity in and around the area will go down. If there is no change in humidity, temperature or carbon monoxide levels, the algorithm warns the user about a possible attack attempt which the user can verify

PYTHON LANGUAGE

Python is a widely used high-level programming language for general-purpose programming. Python is a popular language for writing various utilities because of its simplicity and powerful packages. The combination of Raspberry Pi and Python can be used for multiple purposes such as Connecting Raspberry Pi to multiple sensors and receiving data from them or control hardware

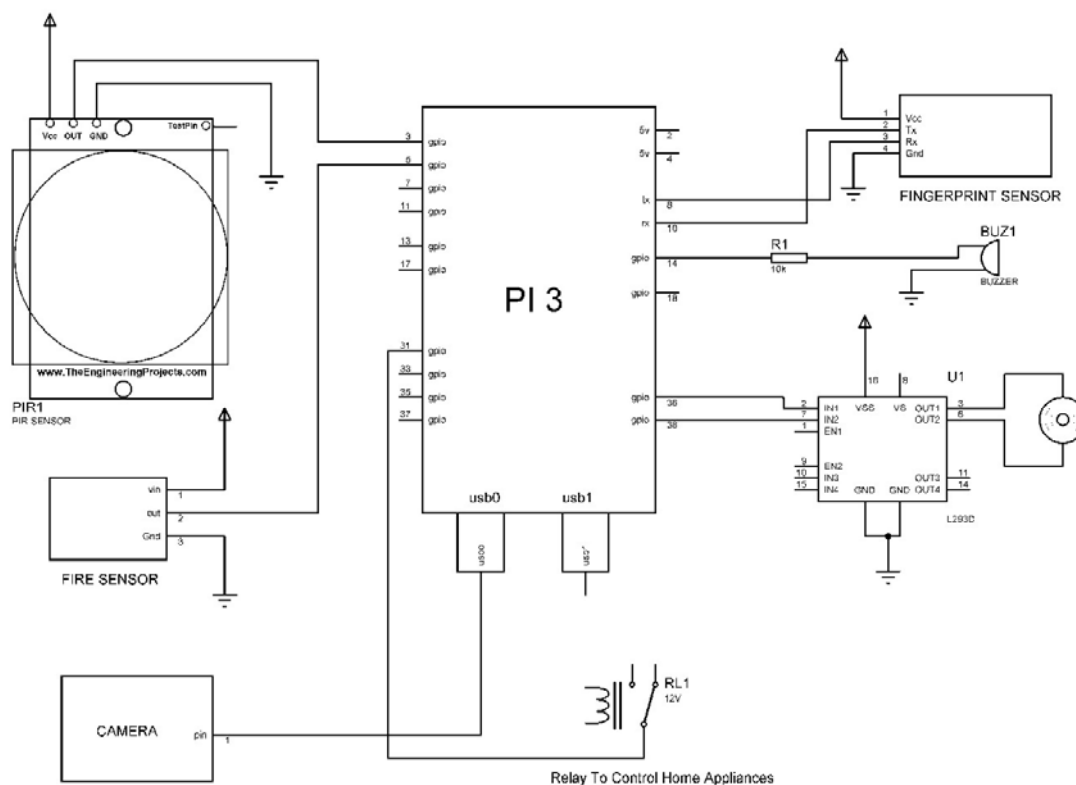


Figure 1.2 circuit diagram

V.FINDINGS

Nowadays, at every point of time, we need security systems for protection of valuable data and even money. There are other methods of verifying authentication through password, RFID, facial recognition but this method is most efficient and reliable. Generally passwords, Identification cards and PIN Verification techniques are being used but the disadvantage is that the passwords could be hacked and a card may be stolen or lost. And also the facial

expressions may vary depending on other facts. The most secured system is fingerprint recognition because a fingerprint of none person never matches the other. Fire sensor frequently monitor the fire existence inside the home and necessary action can be taken in less time in the emergency conditions. Energy conservation is also an important part of the project. The PIR module detects the presence of human being inside the home and controls the light and fan. All these features make the project unique from the other existing systems.

VI. TELEGRAM APPLICATION

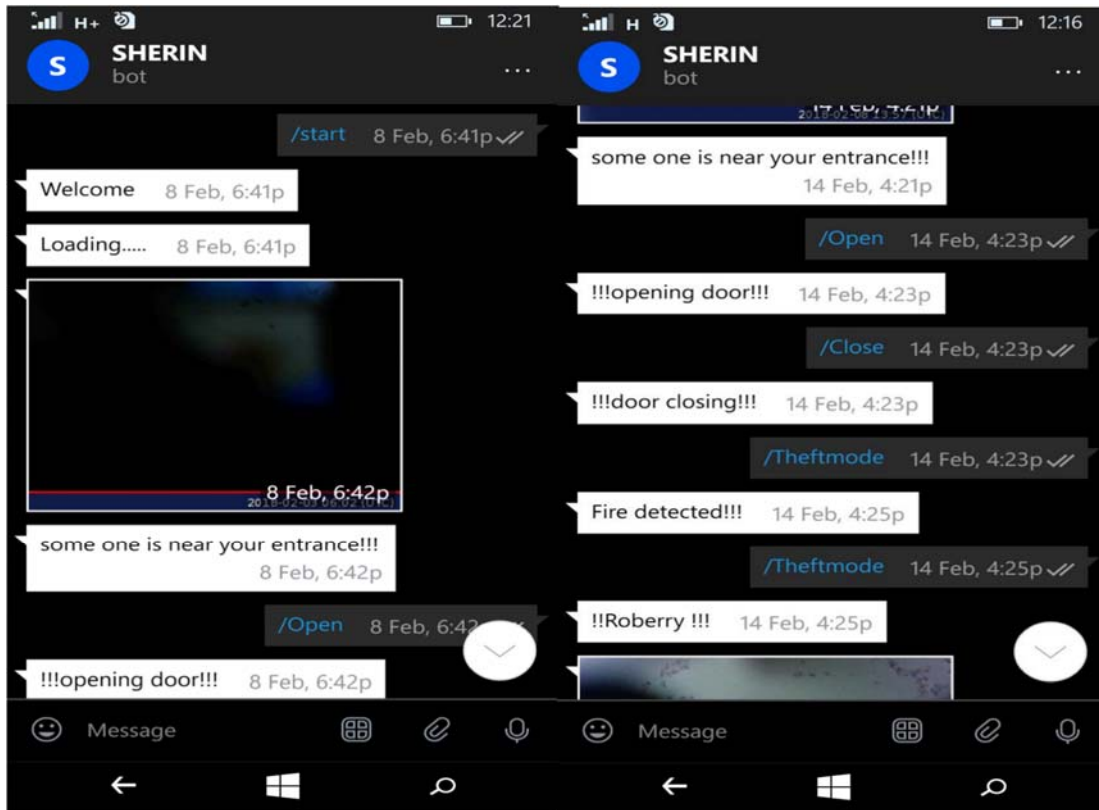


Figure 1.3: Screenshots of User's Telegram Application

VII. CONCLUSION

Home security system is a solution to problems like theft, intrusion, fire, energy conservation etc. The Raspberry Pi is a great platform for building highly capable, embedded systems. This makes it possible for users to rest assured that their belongings are secure. Now a day's people are not aware about the importance of energy conservation. So in our project we are implementing a system for energy conservation by the use of PIR sensor. So this will save the electricity. The end product will have a simplistic design making it easy for users to interact with. The project is aimed at developing the security of Home against Intruders, and Fire.

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