Real Time based Human Identification and Security Alert System Using Raspberry Pi

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***Abstract*:- Face detection is concerned with finding whether or not there are any faces in a given image and, if present, returns the image location and content of each face. The system takes images of people, analyze, detect and recognize human faces using image processing algorithms. The system can serve as a security system in public places like banks, Malls, Universities, and airports etc., It can detect and recognize a human face in different situations and scenarios. We present an interesting IoT based security alert system, in which the system detects the presence of an intruder and sends an Email containing the pictures of an intruder as an attachment which are captured and is triggered by raspberry pi. Raspberry Pi is used to control the whole system, and also authorized persons will get the personal message notification and emergency call.**

Keywords: IOT, Security System, Raspberry Pi, Image Processing

1. INTRODUCTION

Now days, automation plays a crucial role in all work places and living homes. Presently automation techniques are implemented either using microcontroller or computer. Microcontroller cannot run multiple programs at a time. We can achieve this with the computer, but using the computer is very expensive for this purpose and consumes more power [1]. The Raspberry Pi is a single board computer and it can be used to overcome these problems. Simply, the Raspberry Pi system functions like a computer; it contains GPIO and USB ports [2].

Home Security Systems are a need of the modern days house. It is possible to design a simple home security solution by using Raspberry Pi and utilizing the power of Internet of Things. The home security system designed in this paper is a simple and easily installable device built using Raspberry Pi 3, Web Cam and Ultrasonic Sensor [3]. The Raspberry Pi 3 Model B + comes equipped with on-board Bluetooth (BLE) and Wi-Fi (BCM43438 Wireless LAN), so, it can be easily connected with a Wi-Fi Router to access a cloud service. The device designed in this paper can be installed at the main entrance of a house.

The home security system designed in this paper, though being simple, is a powerful application. The user can keep surveillance of his house from anywhere, any time and always by just installing this small device at the main entrance. Many such devices can also be installed to further add security layers [6]. The entrance of any intruder can be detected and alerted by the Email on the smart phone, and then the user is free to take appropriate action like calling police, informing law enforcement etc.

2. PROPOSED SYSTEM:

According to the analysis of various common researches, the IoT based security alert systems are designed in such a way to alert the user based on the motion detection of an intruder which is sensed by an ultrasonic sensor deployed at the entrance of the system which when detected, triggers the Raspberry Pi to command the HD camera to capture the picture at the moment of the intruder detection. The images so captured by the HD camera are saved in the SD card or an USB pen drive which is inserted or connected to the Raspberry Pi and are sent as an attachment to the user's registered mail ID with the date and time of the image capture as the name of the picture. At the same time theft catching unit will be enabled, this unit contains Chloroform spray, virtual door and electric shock.

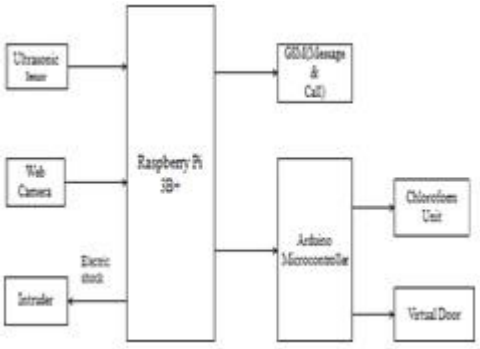

Fig.1 Schematic Diagram of Security System using Raspberry Pi

➢ *Ultrasonic Sensor*

The working of the ultrasonic sensors is quite simple and they are easy to interface with the microcontroller. The sensor module has 4-pins out of which Pin-1 and Pin-4 are +Vcc and Gnd respectively. Pin-2 is Trigger and Pin-3 is Echo pin.

When a High pulse of 10us is applied at TRIG pin, the ultrasonic transmitter sends 8 consecutive pulses of 40 kHz frequency. As the Eighth pulse is sent the ECHO pin of the sensor becomes HIGH. Now when the ultrasonic waves reflect from any surface and are received by the receiver, the ECHO pin becomes LOW. The time it takes to leave and return to sensor is used to find the distance from the reflecting surface [8].

➢ *GSM-GPRS Module*

GSM-GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission

rate [10]. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. The MODEM is the soul of such modules.

➢ ***Web Camera***

A webcam is a camera that connects to a computer. It captures either still pictures or motion video, and with the aid of software can transmit its video on the Internet in real time. Today most webcams are either embedded into the display with laptop computers or connected to the USB or FireWire port on the computer. Here it is used to capture the picture of an intruder to send an email to the authorized person.

➢ ***Chloroform***

Chloroform is a man-made by- product formed when chlorine is used to disinfect water. It is a colorless liquid with a pleasant, non-irritating smell and a slightly sweet taste. Here we are using this chloroform unit, to unconscious the intruder.

➢ ***Virtual Door***

The virtual door is used to lock the intruder in case of theft detection.

3. EXPERIMENTAL DESCRIPTION

➢ ***RASPBERRY PI 3B+***

The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting a 64-bit quad core processor running at 1.4GHz, dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4.2/BLE, faster Ethernet, and PoE capability via a separate PoE HAT The dual-band wireless LAN comes with modular compliance certification, allowing the board to be designed into end products with significantly reduced wireless LAN compliance testing, improving both cost and time to market. The Raspberry Pi 3 Model B+ maintains the same mechanical footprint as both the Raspberry Pi 2 Model B and the Raspberry Pi 3 Model B.

The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range.

- Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz
- 1GB LPDDR2 SDRAM
- 2.4GHz and 5GHz IEEE 802.11.b/g/n/ac wireless LAN, Bluetooth 4.2, BLE
- Gigabit Ethernet over USB 2.0 (maximum throughput 300 Mbps)
- Extended 40-pin GPIO header
- Full-size HDMI
- 4 USB 2.0 ports
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touch screen display
- 4-pole stereo output and composite video port
- Micro SD port for loading your operating system and storing data
- 5V/2.5A DC power input
- Power-over-Ethernet (PoE) support (requires separate PoE HAT).

➢ ***ARDUINO MICROCONTROLLER***

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and Genuino hardware to upload programs and communicate with them.

4. RESULT ANALYSIS

Finally, by using the above technique, we can get the information about the intruder through email and can get security alert through messages and calls. And the advantage over this method is that the intruder can be locked by the virtual door, electric shock and by the chloroform unit.

5. CONCLUSION

We designed the System which reduces human efforts and provide security. Proposed system is cheap, reliable and components are easily available. It is also portable and easily upgradable. System provides Security for home, office and commercial places connivance security and energy efficiency for user. Raspberry Pi- 3Model B+ operates and controls motion detector and cameras for capturing the image of the guest. The security level is increased due to the usage of Raspberry Pi-3Model B+ which sends the images to the user and also we have included Arduino and GSM to send message and phone calls. It has in built capabilities of connecting to external devices. Raspberry pi proves to be smart economic and efficient platform for implementing the home security system and for automation. Two advantages provided by the system is that, Necessary action can be taken in short span of time.

6. REFERENCE

[1] AI Based Automation Robbery/Theft Detection Using Smart Surveillance in Banks Rutvik Kakadiya U.G. student, Department of computer Engineering St. Francis Institute of Technology Mumbai, India Kakadiyaruktvik18 @gmail.com.

[2] Trasiva Sikandar and Kamarul Hawari Ghazali, Int'l Journal of computing, communications & Instrumentation Egg. (2016). A Review on Human Motion Detection Technique for ATM-CCTV Surveillance System.

[3] Robert Olmos, Siham Tabik, and Francisco Herrera, soft Computing and Intelligent Information Systems research, Automatic Handgun Detection Alarm in Videos Using Deep Learning.

[4] Afzal Godil Roger Bostlemanwil Shackleford Tsai Hong M Shneier Performance Metrics for Evaluating Object and Human Detection and Tracking System Published 2014.

[5] http:/www.youtube.com/watch?v=c1_oEddtexPCso

[6] https://www.tryolabs.com/blog2018/01/18/faster-r-cnn-down-therabbit-hole-of-modern-object-detection.

[7] https://medium.com/@smallfishbigsea/faster-r-cnn-explained-864d4fb7e3f8

[8] http://www.youtube.com/watch?v=c1-g6tw69bU&list=P LKRkKTC6HZMzp28TxR-fjYZ-K8Yu3mEQw0&inde x =2

[9] Michal Grega, Andrzej Matiolnski OrcID, Piotr Guzik and Mikolaj Leszczuk "Automated Detection of Firearms and Knives in a CCTV Image "http://www.mdpi.com/1424-88220/16/1/147

[10] Michal Grega*, Andrzej Matiola nski, Piotr Guzik and Mikolaj Leszczuk (2016). AGH University of science and technology, Article Automated Detection of Firearms and Knives in a CCTVImage.