SECURED HOME USING RASPBERRY PI

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Abstract - *Secured home using raspberry pi is a mobile app based that basically allows to monitor the house using mobile device. The proposed system requires a Micro SD card with Raspbian OS for the Raspberry Pi. This system embeds on 2 modules android application and raspberry pi in which they communicate with each other. In this design we have merged security modules such as live streaming, instruction detection, face recognition, Text to Speech. The core working of the proposed system is raspberry pi and its OS. Raspberry pi camera monitors, operate and grant access in the associated design. It captures real time images, performs facial recognition based on pixel patterns, live streaming video services as per client request, Also text to speech is provided for using the speaker as a voice of raspberry pi. Tracking, pattern matching and image Processing with pixel data plays a huge part. Secured home system is developed to maintain the CIA principle of Information Security. This Raspberry pi based security system presents idea of monitoring a place in remote area. This proposed solution offers a cost effective and Indifferent security solution which is efficient and easy to implement. The advantage of this system is that it can be handled well from many different remote locations.*

*Key Words***: Surveillance, image recognition, pixel patterns, live streaming, text to speech, Notification.**

1. INTRODUCTION

It's a brilliant idea to create a device that can be regulated and tracked from anywhere in the Internet of Things (IoT) world, since we have all the technology to revolutionise our lives. There are several different types of good security systems and cameras available for home security, but they are all very costly, so we will create a simple Raspberry Pi based Intruder Warning System that not only sends you an notification, but also sends you a picture of any intruders it detects. Home automation has been a common term since the late 1970s. People's perceptions of what a home should do or how utilities should be delivered and accessed at home have evolved dramatically over time as technology and services have advanced, as has the concept of home automation systems. When we examine various home automation systems over time, we can see that they have always attempted to provide reliable, easy, and secure ways for residents to access their homes. The purpose of a home automation system has remained the same regardless of changes in user preferences, technological advancements, or the passage of time.

1.1 Problem Statement

People nowadays have an excessive amount of trouble securing their surroundings. Despite the fact that we live in a digital environment with many technological choices, thieves and intruders have also become highly advanced. With a few taps, the attacker will gain access to your device. As a result, we are constructing a machine that is much more efficient in every way. There is only one administrator for this device, and he or she can operate it from anywhere. Furthermore, since we are combining modules, intrusion detection, face recognition, text to speech and live streaming into one project, the protection provided by the device will be better than previous ones.

2. Literature Survey

Padmashree A. Dhake and Sumedha S. Borde [3] proposed an embedded home surveillance system that evaluates the implementation of a cost-effective alerting system based on small motion detection .Their framework makes it possible to track household activities in real time from any place, and it is based on a microcontroller, which is now considered a restricted resource and an open source solution as compared to Security Based Camera.

D. Jeevanand [4] worked on the development of a Raspberry Pi-based networked video capture system.The proposed system captures video and distributes it via networked systems, as well as alerting the administration person via SMS alarm, as the client requests. Their concept is based on the Raspberry Pi Security Based Camera and was developed to function in real-time situations.In contrast to other embedded systems, their real-time implementation uses an alerting module and an Security Based Camera platform to provide client video monitoring.

Sneha Singh d and her [5] team identified a Raspberry Pi-based IP Camera Video Surveillance system. The researchers wanted to create a system that could capture real-time images and view them in a browser via TCP/IP. On the Raspberry Pi, a face recognition algorithm is being introduced, allowing for live video streaming as well as the detection of human faces. Surveillance reactions were not included in the study.

Gharge Anuradha and Mahima.F.Chauhan [6] offered to design and build a real-time video surveillance system based on the Raspberry PI B+ Board's embedded web server. Their framework is low-cost, free, and portable, as well as simple to maintain and update. As a result, this application framework offers more secure solutions. This method can be used in banking halls, manufacturing, the environment, and military arts.

Uday Kumar [7] worked on the Raspberry Pi-based implementation of a low-cost wireless remote surveillance system. Traditional wireless CCTV cameras are commonly used in low-cost surveillance systems. He and his team used a Raspberry Pi camera to create a low-cost, reliable surveillance device, and the images captured had to be transferred to a drop box using a 3G internet dongle. This was accomplished with the aid of a Raspberry Pi and a 3G dongle.

2.1 OBJECTIVE

The main goal is to provide homeowners with a secure device that can be used while they are not at home. To provide new tools for understanding current and emerging threats to the IoT-based economy and citizens' networks.

To investigate and analyze how Blockchain can help improve IoT solutions. Furthermore, to comprehend how to fix well-known IoT and blockchain problems.

To add a second, security-focused physical layer to the manufacturing of existing IoT platforms and devices in order to provide a secure-by-design architecture and network monitoring capabilities. To investigate the use of Blockchain as a protection and privacy layer for IoT. Along with addressing the flaws in the current initiatives devoted to it.

To present a methodology and a toolchain for the automated generation of design-driven security features monitors and validators for IoT platforms and networks using IoT architecture and behaviour model specifications.

2.2 REQUIREMENTS

i) SOFTWARE REQUIREMENTS:

A) Operating system:
LINUX (The Raspberry Pi uses a Linux-based operating system to have a smooth user interface.)

B) Programming languages:
R-Pi Library has a Python library installed.

C) Raspbian OS:
Raspbian is a Debian-based operating system. It is basically free OS for Raspberry pi module. Raspbian offers more than just an operating system; it also includes pre-installed applications, with over 35000 packages packaged in a convenient format for Raspberry Pi installation.

ii) HARDWARE REQUIREMENTS:

A) VGA to HDMI Converter:
HDMI to VGA convertor allows HDMI output from a laptop or tablet to be connected to a VGA display or projector, saving the cost of upgrading to HDMI compatible.

B) Relay Interface Circuit:
The relay interface circuit connects household electronic or electrical equipment to the R-Pi board. A relay (12v, 50A), a transistor, and a freewheeling diode are used to drive the relay input in this circuit.

C) SD Card & LAN:
Since the R-Pi has no internal storage, it needs an SD Card to store the operating system.
Increased Connectivity: (Internet) This could be a standard RJ45 Ethernet/LAN cable or a USB Wi-Fi adaptor.
A Virtual environment through VNC viewer can also be installed to access the raspberry pi.
PI Camera: Used to capture and record images.
PIR sensor: For human motion detection (basically, it scans for motion and then sends a signal).
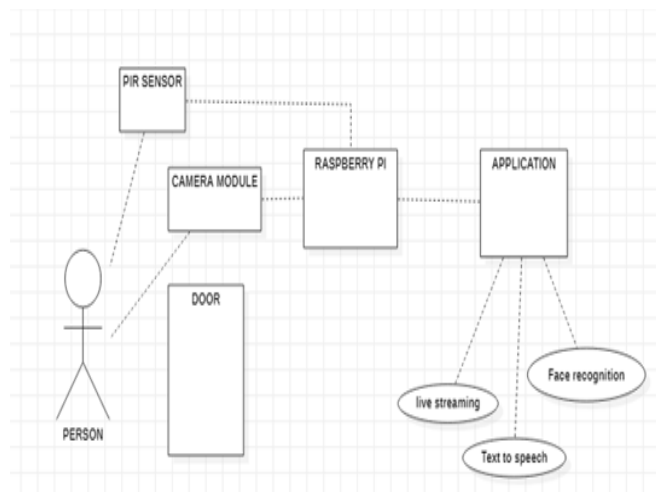
2.3 METHODOLOGY

Fig-1: Methodology Used

The Intrusion detection system, which consists of a Raspberry Pi model 3B, a PIR sensor, and a PI camera, will be installed outside the door first. It is equipped with additional microphone and speaker modules. When someone stands in front of the door, the PIR sensor detects human activity and notifies the Raspberry PI then instructs the pi camera to take a picture and launch a live stream, as well as sending an intruder warning to the administrator. PI gathers the images of the intruder from the different angles and compares them with the pre saved ones in the database .If they match, then user can give the permission to the person to enter or admin can deny the access.

The steps shown below is the formal working of secured home system:

Step 1: Use a PIR sensor to detect human activity.

Step 2: Notify the Raspberry Pi, switch on the camera, and take pictures.

Step 3: Compare the images to the database-stored images.

Step-3.1: If they match, grant the access to the person

Step-3.2: If the images don't match, reject the access.

2.4 FLOWCHART

This project's flow chart is simple to comprehend. If the system in the project activates, the registered user will be notified via email and smartphone, and the user will be able to access the live system through the use of the project's app.
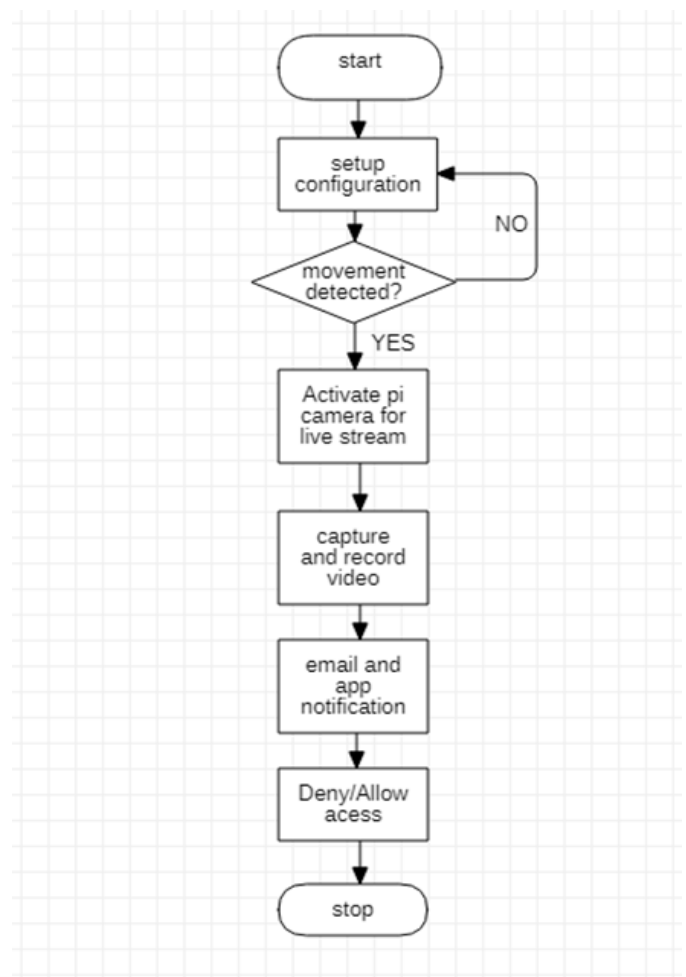

Fig-2: Flowchart for Secured Home
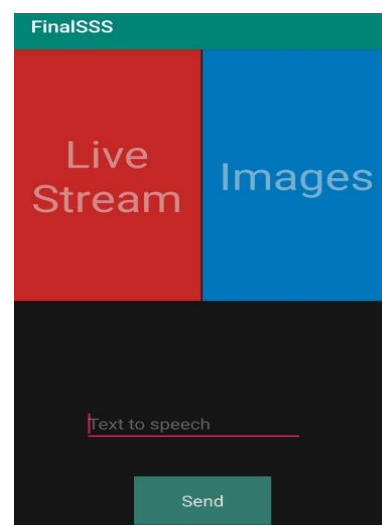
2.5 RESULT

Fig-3: App interface

Fig-4: Secured Home System

3. CONCLUSION

Our analysis focuses on the current home system's security and highlights its shortcomings. It demonstrates how the context of the word "intruder" and the sense of protection have evolved in modern homes. The paper highlights the inadequacies of current home security systems in detecting and preventing unwanted individuals. For future work in the field of home automation security, we encourage the researchers to consider a home automation system as a whole and develop behaviour Prediction and advanced sensing parameters that can help to identify and prevent skilled and professional intruders. For the proper implementation and development of home automation systems, security is essential. Furthermore, it gives residents of a home a sense of security and puts their minds at ease. This paper compares and contrasts all of the proposed systems, revealing some of the systems' advantages and disadvantages.

REFERENCES

[1] Tracking System for Mobile Users Based on CCTV, Information Networking (ICOIN), 2014 International Conference on, Phuket, 10-12 February 2014, pp. 374-378. Yong-ik Yoon and Jee-ae Chun, Tracking System for Mobile Users Based on CCTV, Information Networking (ICOIN), 2014 International Conference on, Phuket, 10-12 February 2014, pp. 374-378.

[2] J. G. J., 2014. "Development and Construction of an Innovative ARM Based Monitoring System Utilizing Wireless Connection."

[3] P. S. Dhake and B. Sumedha S., "Embedded Surveillance System Using PIR Sensor," vol. 02, no. 3, 2014.

[4] J. D., "Real Time Integrated Ip Camera Capturing And Notifications Alerting System," June 2014.

[5] "Raspberry Pi Ip Surveillance Security System," February 2015, by S. Sneha

[6] F. C. Mahima and A. Prof. Gharge. NCRRET., "Design and Build Realtime Monitoring System Centered on Integrated Virtual Server Raspberry PI B+ Board," pp. (IJAERD).

[7] U. Kumar, R. Manda, S. Sai, and A. Pammi published "Implementation Of Low Priced Wireless Picture Acquisition And Distribution To Client Program Using Raspberry Pi For Remote Monitoring." Vol. 4, no. 3, 2014, pp. 17–20, International Journal of Computer Networking, Wireless and Mobile Communications (IJCNWMC).

[8] P. Sanjana, J. S. Clement, and S. R. published "Smart Surveillance Tracking System With Raspberry PI and PIR Sensor Module" in 2014.