ENGINEERING IN ADVANCED RESEARCH SCIENCE AND TECHNOLOGY

ISSN 2350-0174
Vol.03, Issue.02
April-2023
Pages: 624-629

IMPLIMENTATION OF INTRUDER DETECTION SYSTEM BY USING RASPBERRY PI

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ABSTACT: ***In surveillance, CCTV camera is costly because of the use of computer. It reserves too much space for continues recording and also require manpower to detect the unauthorized Activity. But compared to the proposed system Raspberry pi system is much cheaper with better resolution and low power consumption feature. Here pyroelectric infrared (PIR) sensors are used as a simple but powerful people presence triggers. This system is suitable for small personal area surveillance. i.e. personal office cabin, bank locker room, parking entrance. Whenever the motion is detected through PIR sensor inside the room the image is captured through camera and temporarily stored in the raspberry pi module. Internet of things based application can be used remotely to view the activity and get notifications when motion is detected. System works standalone without the PC once programmed. One android Application is used to get the notification on motion detection.***

Keywords: Intruder detection system, raspberry pi, Pir sensor, pi camera, python idle software and pushbullet, smart phone.

1. INTRODUCTION:

Nowadays, people attach much more importance to security. Security is related to both the security hardware in place on a property and personal security practices. Security hardware includes doors, locks, alarm systems, lighting, motion detectors, security camera systems, etc. that are installed on a property. IOT in our lives has many advantages helping individuals, businesses and on everyday basis. safety, security are some forms in which new concepts are merging in IOT. It can be very beneficial to integrate IOT in security systems and this project aims to integrate IOT in security systems to detect motion, for example every day when you are at work you will be able to monitor and get notifications if any activity happens at your home. It has low energy consumption and also comes at a low cost. The project aims to simplify motion detection and the interface to be user friendly, which would send prompt notifications when motion is detected. Intruder detection systems for surveillance and security systems. They either need human intervention to detect intruder or need a long work for the installation and there is also a possibility of false alarms. In Surveillance system, the intruder is detected using the video recordable cameras which are already installed and stored in an external storage disk. But in this system needs a huge investment for installing, storing and monitoring the activities.

Our framework would right away tell the client about the in-house situation alongside the live streaming. The framework consolidates security utilizing IoT (Internet of Things). The security module effective sends notices after distinguishing intruder utilizing wireless and wired procedures where administrator /owner further can make essential moves along these lines upgrade accommodation and security, save energy proficient.

2. LITERATURE REVIEW:

The definition of protection and safety is one area where technology can help us. The fact that the majority of our population now carries technology on their person, as opposed to earlier years of smartphones, makes the idea of smartphones acting as a security warning system more appealing. Two factors are needed for proactive crime prevention, time and facts. Individuals can now track house/office/store security conditions on a continuous basis; thanks to the recent increase in availability and usage of smart IoT devices and the ubiquity of smartphones.

This project's major impact for society is to establish a viable and easily available approach to the community by gathering data and identifying

risky behaviors in the smart-home environment. In this research, we developed a system (smart IoT system) that allows the user to detect unauthenticated access in the smart-home.

People's demand for a safe, comfortable and intelligent living environment is becoming more urgent as the economy, living conditions, and the environment deteriorate. A smart home is becoming increasingly popular. Future life can be more intelligent, consume less resource and make better use of renewable energy. The safety factor of smart homes has improved as technology has progresse.

Smart home technology has steadily made its way into the average home. Despite the fact that some technologies are fairly mature, there is still a lot of room for innovation in this sector. Smart home systems focused on the Internet of Things (IoT) have inevitably become a research hotspot in recent years. As a consequence, this article delves into the viability of smart home device design from both a hardware and software perspective.

Using the stereo matching algorithm, the device information is analyzed and monitored accurately by constructing the application of an IoT module. The system's overall structure has been strengthened, ensuring the security and intelligence of users' homes while also encouraging the production of smart homes. The world has changed drastically as a result of technological advances.

3. EXISTING SYSTEM:

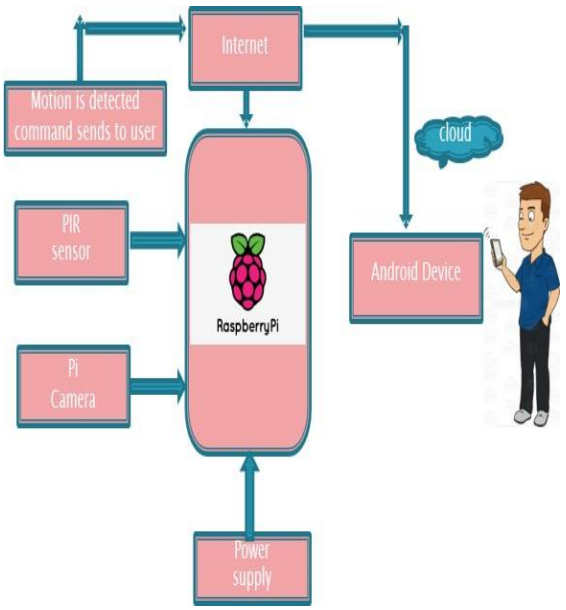
In general CCTV cameras are only using to record the Video and if any theft or any suspicious activities happen the after the incidents are happening then only we will get to know that the activity was happen by referring to the Video again and there we will see the limitation of storage for the video also. And late few systems with using Arduino was came into picture but it has less capabilities in place of connectivity and coverage. In Surveillance system, the intruder is detected using the video recordable cameras which are already installed and stored in an external storage disk. But in this system needs a huge investment for installing, storing and monitoring the activities. Thought the occurrence of activity is less, the footage is to be deleted, after examining by the owner.

- By using this existing system there are some limitations.
- **Expensive to purchase:** CCTV systems can be expensive to install, operate and maintain especially for large or complex systems.
- **Privacy concerns:** CCTV cameras can intrude on people's privacy by constantly monitoring and recording their actions. The use of CCTV cameras can raise privacy concerns as they record individuals in public spaces, which could potentially infringe on their privacy rights.
- **Vulnerability to hacking:** CCTV systems can be vulnerable to hacking, which can compromise the security of the footage captured. CCTV systems can also pose security risks as they are vulnerable to hacking or other forms of cyber-attack, which could potentially compromise sensitive data.
- **Maintenance issues:** CCTV cameras need regular maintenance and cleaning to ensure they function properly and capture clear footage.
- **Limited coverage:** CCTV cameras can only cover a limited area and may not capture all relevant activity, especially in large or complex environments.

Closed-circuit TV cameras supposed to catch violent thugs have been trained on roads instead - to trap and fine motorists who stray into bus lanes. The most common home security system used is a CCTV system. CCTV stands for Closed circuit television. It is considered a revolutionary invention when it comes to security. Due to its advantages it gained fame in no time. It is often used for security purposes in house, stores and banks etc. It keeps an eye on the visitors. It can also be used in schools to track the behavior of a student. It has countless advantages, but that does not mean that it is perfect. Yes! CCTV has its disadvantages as well. In this article we are going to discuss the disadvantages of CCTV camera. In some cases the camera may miss the detail of the crime scene. For example a concealed weapon the camera is unable to view it in the first place. The video of a CCTV can be hacked by a hacker easily. Suppose there is a CCTV installed near an ATM machine. So the hacker will hack the video of that camera and can easily get the pin code and any other information he wants about a customer or ATM user.

4. PROPOSED SYSTEM:

Here we are implemented intruder detection system using raspberry pi which be connected to the Pi Camera, and PIR sensor. The aim is to make a smart surveillance system which can be monitored by owner remotely through android application. As it is connected with the system with IOT, system will send the push notification to android device when an intrusion is detected inside the room. It is required to develop and implement and affordable low cost web-camera based surveillance system for remote security monitoring. Authorized user can access to their monitoring system remotely via internet with the use a mobile phone and monitor the situation on application. This entire work is done on raspberry pi with Raspbian operating system ported on it.



The proposed system Raspberry pi system is much cheaper with better resolution and low power consumption feature. Here pyroelectric infrared (PIR) sensors are used as a simple but powerful people presence triggers. This system is suitable for small personal area surveillance. i.e. personal office cabin, bank locker room, parking entrance. Whenever the motion is detected through PIR sensor inside the room the image is captured through camera and temporarily stored in the raspberry pi module. Internet of things based application can be used remotely to view the activity and get notifications when motion is detected. System works standalone without the PC once programmed. One android Application is used to get the notification on motion detection.

4.1 WORKING:

OS installed on raspberry pi: Raspberry Pi OS is the official Operating System of the Raspberry Pi Foundation. Download the Raspberry Pi Imager for your operating system and follow the installation instructions. Launch Raspberry Pi Imager. There are 3 versions of Raspberry Pi OS available. We will briefly touch on each one but we will be using Raspberry Pi OS (32-bit).

Complete the raspberry pi setup: After installing the operating system we have given user name and password, and we have to set up country, time, and connect the Wi-Fi on raspberry pi. Login to the VNC viewer account on raspberry pi, which is visible to the personal laptops PCs, and mobile phones. Create a file write the code for the project.

Install Push bullet app in user phone: Push notifications are just like instant messages that pops up on a smartphone or desktop/laptops. Now a server is needed to host the push notification service. For this we have many platforms like Pushetta, Push safer, and Pushbullet etc. From all these services, Push bullet is easy and free to use. Pushbullet has prebuilt libraries for python which makes it easy to use it with Raspberry pi. After install the push bullet app in your phone, generate one token, this token is given to the code then there is a communication between raspberry pi and pushbullet. So users get push notifications.

Install python IDLE library on raspberry pi: pip or pip3 is a command line tool for installing Python 3 modules. Modules can be downloaded as packages from the Python Package Index and installed on your computer automatically. To install a module, use the pip install name of module command.

Install push bullet library on raspberry pi: After installing python libraries we should install pushbullet library on raspberry pi. “Sudo apt get install pushbullet”.

Hardware and software design: The raspberry pi is connected to the PIR sensor and Pi camera. Write the code for the project, run the code and observe the output. Whenever anyone or intruder comes in range of PIR sensor, PIR Sensor triggers the Pi Camera through Raspberry Pi. Raspberry pi sends commands to Pi camera to click the picture and save it. After Raspberry Pi sends messages to the user Android phones.

5. RESULT AND DISCUSSIONS:

The current project presented the implementation of intruder detection system. The system implementation is based on the RaspberryPi3 Model B controller, Pir sensor and pi camera, which has been programmed to control a security purpose based on commands received from the user's mobile phones, by using push bullet application. The system has been programmed to have Wi-Fi communication capability. Whenever the motion is detected to the pir sensor the camera captured that image**.**

The raspberry pi Send captured image and push notification on user android phone: Run the code we will get output. Whenever the motion is detected to the pir sensor and the pi camera is captured that image. The captured image is stored on raspberry pi, then the raspberry pi is send the captured image and push notification to the user android phone. By using Pushbullet application. We have to get security alerts on user phone. By using pushbullet we have to get security alerts to your phone through internet connectivity. So we have to know what happens and who entered in your personal areas from anywhere

6. APPLICATIONS:

Home security: Various home security systems have been developed to solve home invasion problem. Home and office security system seem to have high demand from users.

Remote monitoring: It can be very beneficial to integrate IOT in security systems and this project aims to integrate IOT in security systems to detect motion, for example every day when you are at work you will be able to monitor and get notifications if any activity happens at your home.

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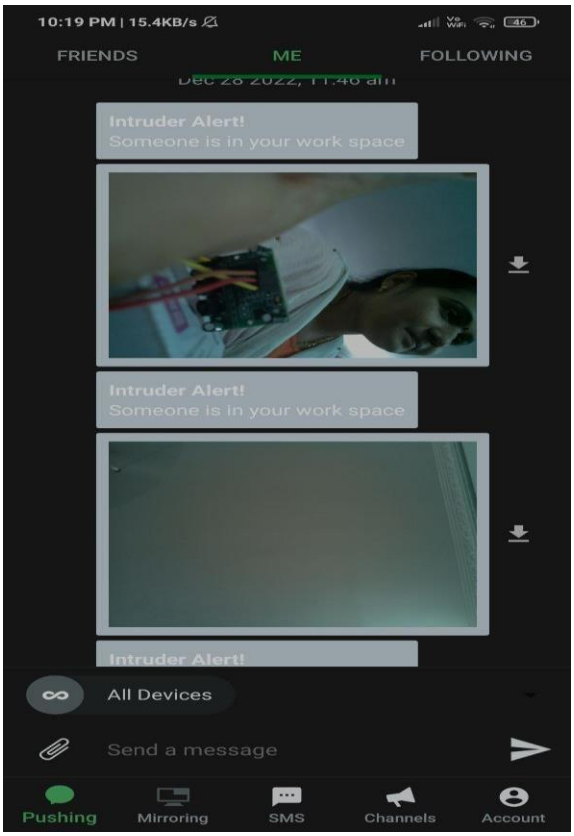

5.1 CONCLUSION: The implementation of this project overall is successful. The motive of making the project cost efficient and user friendly is taken into account and achieved. The project is comprised of components such as a Raspberry Pi 3 model B, Pir sensor, pi camera an Android mobile device and an Android application (Push Bullet, VNC Viewer). Furthermore, with the discussions and objectives presented, it can be concluded that the objectives of the project have been achieved. Taking into consideration the target audience of elderly and handicapped people, the project developed is user friendly. In this proposed project we have develop a real time surveillance system using Raspberry Pi camera module. It is an active surveillance system which will alert the user when the event happens. The camera being an infrared night-vision camera captures near clear pictures and has a still picture resolution of 3280 × 2464 and consists of Sony IMX219 8-megapixel sensor.

Less cost compare to CCTV: The security system to be designed in this project can be used extensively to monitor facilities by owners. The owner shall be able to monitor their property from wherever they are in the world.

7. ACKNOWLEDGEMENTS:

We would like to express our sincere gratitude to our project supervisor **MRS. D. MEENA,** for

providing us with guidance and valuable insights throughout the project. We would also like to acknowledge the support of our friends, and faculty who contributed their time and effort in helping us with the project. Finally, we are grateful to the IEEE community for providing us with a platform to share our research and contribute to the implementation of intruder detection system by using raspberry pi.

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