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An IoT based Intruder Theft Detection Using Raspberry Pi

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Abstract

IoT-based theft detection using Raspberry Pi, PIR sensor, Pi camera,and USB is a system that detects intruders and alerts the owner in real-time. The PIR sensor detects the presence of human beings by sensing their body heat and motion, while the Pi camera captures images and videos of the intruder. The captured images are then transmitted to the owner's device using a USB interface. The Raspberry Pi acts as the central hubthat processes the information from the PIR sensor and Pi camera and sends alerts to the owner's device. The system can be easily set up and configured using open- source software, and it can be customized to suit specific requirements. Overall, this system provides an effective and affordable solution for securing homes and offices against theft and unauthorized access.

In conclusion, IoT-based theft detection using Raspberry Pi, PIRsensor, Pi camera, and USB is an affordable and effective solution for securing homes and offices against theft and unauthorized access. It is easy to set up and configure, and can be customizedto suit specific requirements.

Keywords: IOT, Theft.

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I.INTRODUCTION

In today's world, security and protection are the main concerns of personality. We use C-mount monitors to monitor and identify them, but the C-mount has too many recording functions and requires personnel to monitor illegalmovements. Mobiles such as smartphones and I-pads Devices areused to perform everyday tasks thatare done on commercial computers and laptops. Surprisingly, we found that the RP-3 model with IOT has more reasonable settlement and less power consumption characteristics compared to the existing system. Below is a live video photo treatment that uses movement to spy on the stealer and focus on areas where the movement is reproduced. This model uses the RP camera and the RP-3 model together and routes witha virtual show infrared for night time and his USB stick for data storage. This model uses imaging to spy on the camera's precise motion field and highlights when spying on camera movement. The model sent photos of the event via theInternet of Things and made them available for viewing online by end users. Also save the footage to a USB stick for additional reference. End users can now transform online storage transmitted through the Internet of Things model to view live photos of movement over the Internet. This model therefore offers a particularly powerful approach to theft espionage in the Internet of Things.

II. METHODOLOGY

Hardware Setup: The first stepis to set up the necessary hardware components. This includes connecting sensors, cameras, and other devices to the Raspberry Pi using wires orwireless connections.

Programming: The next step is to write code for the RaspberryPi. The code should define the behaviour of the sensors and cameras and instruct the Raspberry Pi to send alerts when it detects any unusual activity.

Sensor Calibration: Once the code is written, you need to calibrate the sensors to ensure that they are working properly.This involves setting the thresholds for the sensors and adjusting their sensitivity as needed.

Testing: After the sensors are calibrated, you should test thesystem to ensure that it is working properly. This involves

simulating different scenarios, such as opening a door or window, and checking if the system sends alerts as expected.

Alert System Setup: Once the system is tested and working properly, you need to set up an alert system to notify you of any unusual activity. This involves configuring the Raspberry Pi to send alerts via email, text Live Video Footage: If you have connected cameras to the Raspberry Pi, you can also set up a live video feed to monitor your home or office in real- time.

III. HARDWAREDESIGN

The hardware design of IoT based theft detection using Raspberry Pi, PIR (Passive Infrared) sensor, Pi camera, and USB typically involves connecting these components to the Raspberry Pi and configuring them to worktogether. Here's a brief overview of the hardwaredesign:

a. Raspberry Pi: The Raspberry Pi is a small, affordable computer that serves as the central processing unit (CPU) for the system. It connects to the PIR sensor and the Pi camera, and runs the code that controls the behaviour of the sensors and sends alerts.

b. PIR Sensor: The PIR sensor is a motion sensor that detects changes in infrared radiation emitted by living beings or objects. It is typically connected to the Raspberry Pi using wires,and its sensitivity can be adjusted to detect motion within a certain range.

c. Pi Camera: The Pi camera is a small camera that is connected to the Raspberry Pi using a ribbon cable. It can capture both

images and videos and can be configured to provide a live feed of the area being monitored.

d. USB: A USB module can be used to connect the Raspberry Pi to the internet, allowing it to send alerts and live video footage to a remote server or a mobile device.

The hardware design typically involves connecting these components to the Raspberry Pi's GPIO (General Purpose Input/Output) pins and configuring the Raspberry Pi to interact with the sensors and camera. The PIR sensor is connected to a GPIO pin that is configured to read the voltage changes produced by the sensor when it detects motion. The Pi camera is connected to the Raspberry Pi's CSI (Camera Serial Interface) port, and its settings can be adjusted using the Raspberry Pi's camera module software.

Once the hardware is connected and configured, thecode for the Raspberry Pi can be written to define the behaviour of the sensors and camera. The code typically involves setting thresholds for the PIR sensor, defining the actions to be taken when motion is detected, and configuring the camera to capture.

IV. SOFTWARE DESIGN

The software design of IoT based theft detection using Raspberry Pi, PIR (Passive Infrared) sensor, Pi camera, and USB typically involves writing code to control the behaviour ofthe sensors and camera and to send alerts when motion is detected. Here's a brief overview of the software design.

a. Python Programming: Python programming is commonly usedto develop the software for IoT-based theft detection using Raspberry Pi, PIR sensor, Pi camera, and USB. It allows developers to interact with the hardware components and to process data received from sensors and cameras.

b. Operating System: The Raspberry Pi typically runs on a Linux-based operating system such as Raspbian. The operating system is responsible for managing the hardware andsoftware components of the system.

c. PIR Sensor Code: The code forthe PIR sensor typically involves setting up the GPIO pins to read the voltage changes produced by the sensor when it detects motion. The code also sets the threshold levels for detecting motion and defines the actions to be taken when motion is detected.

d. Pi Camera Code: The code forthe Pi camera typically involves using the Raspberry Pi's cameramodule software to capture images or videos and to streamthem over the network. The code also defines the resolution, frame rate, and other camera settings.

e. Alert System Code: The code for the alert system typically involves sending notifications or alerts when motion is detected. This can be done using email, SMS, or other communication protocols.

f. Integration: Finally, all the components and software are integrated together to create the complete IoT-based theft detection system. The PIR sensor and Pi camera work together to detect motion and capture images or videos, andthe Raspberry Pi runs the codethat controls the behaviour of the sensors and camera and sends alerts when motion is detected.

The software design typically involves testing the system to ensure that it is working correctly and that alerts are being sent when motion is detected. Any bugs or issues are identified and addressed in the code, and the system is re- tested until it is working reliably.

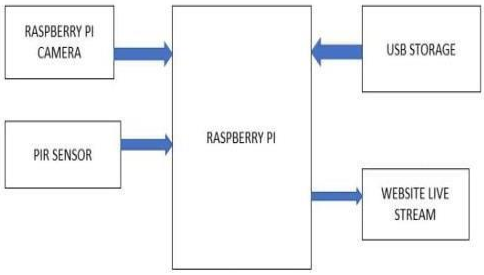

Fig 1.1 block diagram

V. CONCLUSION

In conclusion, an IoT-based theft detection system using Raspberry Pi, PIR sensor, Pi camera, and USB has been developed. The PIR sensor detects motion and sends a signal to the Raspberry Pi, which triggers the Pi camera to take pictures or videos of the intruder. The captured media is then stored on a USB device, which can be accessed remotelyusing the internet. This system can be useful for home security and surveillance purposes.

However, the accuracy and effectiveness of the system maydepend on various factors, such as the placement of the sensors and camera, lighting conditions, and the reliability ofthe internet connection.

Overall, with proper implementation and testing, anIoT-based theft detection system using Raspberry Pi, PIR sensor, Pi camera, and USB canbe an affordable and efficient solution for theft prevention and security

VI. FUTURE SCOPE

The IoT theft detection using Raspberry Pi project has a widerange of future scopes that canbe explored to further enhancethe system's capabilities and usefulness. Some possible future scopes of this project are:

Integration with other IoT devices: The system can be integrated with other IoT devices, such as smart locks andcameras, to create a more comprehensive security

solution. This would enable thesystem to not only detect theftbut also prevent it by providingadditional security features.

1. use of machine learning
2. integration with other IOTdevices
3. cloud integration
4. use of blockchain technology

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VIII. REFERENCE

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