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IOT Theft Detection Using Raspberry Pi!

Dhanya Shree.V

Department of computer science -Sri Krishna Arts and Science College

ABSTRACT

Here we propose IOT based theft detection project using Raspberry Pi where we use image processing on live video to detect theft using motion and also highlight the area where motion occurred. This system secures offices/homes from theft by instantly detecting theft as well as allowing user to view the theft details thereby highlighting the theft details and saving the video in a usb drive. In this system we use a camera along with raspberry pi along with a circuit with LCD display IR for night vision and USB drive for storage. The system is powered y a 12V power supply. As soon as camera motion is detected in camera footage the system uses image processing to detect exact area of motion ccurrence and highlights it accordingly. The system now transmits the images of the occurance over IOT to be viewed by user online. We here use IOT Gecko to develop the online system. Also it stores the footage in a USB drive for further reference. The user can now decode the data sent online using IOT Gecko IOT system to view the images of the motion occurance live remotely over internet. Thus the system provides an innovative approach to theft detection using IOT.

KEYWORDS:

IoT, Leveranging,(RFID),Sensor,LCD,Industries, Raspberry Pi.

INTRODUCTION

IoT enables your organization to analyze and act on data, allowing you to make smart decisions in real-time. With the timely and relevant insights about your business and customers that come with these new sources of data, there's great potential for industries of all kinds—including manufacturing, transportation, energy, agriculture, retail, and government—to operate more efficiently and provide new value to customers by implementing the right IoT solution.

Theft prevention would become a godsend in this increasingly technology conscious world. Many of the theft detection systems are available to catch the thief, which can be further improved. By using these technologies, in some scenarios, the thief cannot be caught. Even if the thief is caught, the victim cannot ‘get back his/her valuable belongings. "Prevention is better than cure". If the theft is being prevented from happening, the person will be at no loss. The project is aimed evaluating the performance of an operating . The Internet of Things (IoT) has brought about a new era of connectivity, where devices are interconnected and can communicate with each other over the internet. While this has brought about numerous benefits.

The system we will build will be customizable and adaptable to various environments and objects. It will be able to detect when an object is moved, tilted, or vibrated, and can be programmed to trigger an alarm or send a notification to the user's mobile device. The Raspberry Pi will also be able to store data, such as the time and location of the theft, which can

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be useful for law enforcement investigations.This project will guide you through the process of setting up a Raspberry Pi, connecting sensors, and programming the system to detect theft.

LITERATURE SURVEY

A survey of related literature refers to a study done before or after selecting a research problem to know about the previous research work, ideas, theories, procedures, techniques, problems occurring during the research, etc.With embedded systems fast expanding its reach, subject matter related to this field isavailable in abundance. While working on thisproject we have studied matter from various sources such as books, online articles, and reference manuals. The knowledge gained from this activity has been of great help to us in understanding the basic concepts related to our project and has ignited further interest in this topic.“Linux for Embedded and Real Time Applications”, by Doug Abbott has been of great help in providing an introduction to the process of building embedded systems in Linux. It has helped us understand the process of configuring and building the Linux kernel and installing tool chains.We understood the preponderance of the ARM processors in the field of embedded systems and the features of ARM processors from thedocument “The ARM Architecture” by Leonid.The ARM architecture is a confluence of manyuseful features that make it better than otherpeer processors. Being small in size and requiring less power, they prove useful in providing an efficient performance in embedded applications.

PROPOSED SYSTEM

The block diagram of IOT Based Theft detection using Raspberry PI shown in fig.1, in this System whenever, IR sensor senses motion and gives sensed signal to raspberry pi to take detected camera footage, the system uses image processing to detect an exact area of motion occurrence and highlights it accordingly. The system now transmits the images of the occurrence over IOT to be viewed by the user online. Proposed System means the assembly of an
operational group of computer programs that will perform, without modification, a significant portion of the functional requirements contained in this RFP.

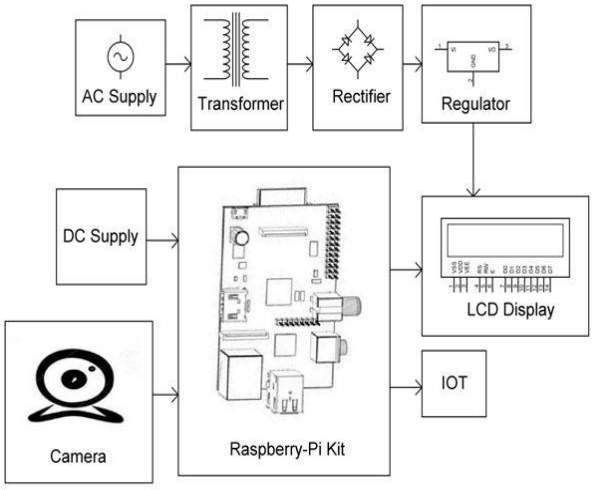

Fig .1 Raspberry pi process

III.1 Hardware Material

For implementing this project, we are using the following

1. Raspberry pi development board

2. Uvc (universal video class) driver camera

3. Its sensors

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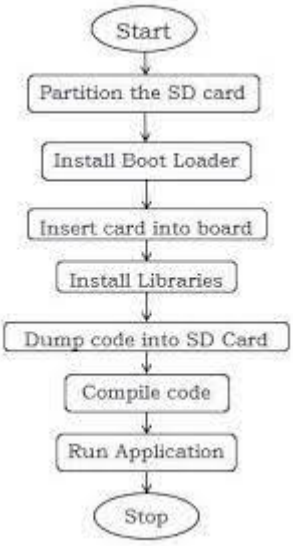

Fig .2 installation process

Raspberry Pi 3 Model B

The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools.The Raspberry Pi has a Broadcom BCM2837 system on a chip (SoC), which includes an ARM1176JZF-S 700 MHz. .processor, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded (Model B & Model B+) to 512 MB. It does not include a built-in hard disk or solid-state drive but uses an SD card for booting and persistent storage.

Model B is the higher-spec variant of the Raspberry Pi, with 512 MB of RAM, two USB ports, and a 100mb Ethernet port. It's our most popular model: you can use it to learn about computing; to power real-world projects (like home breweries, arcade machines, musical root vegetables, robot tanks and much more); as a web.

Server; a bitcoin miner; or you can just use it to play Minecraft.The Raspberry Pi board contains a processor and graphics chip, program memory (RAM) and various interfaces and connectors for external devices. Some of these devices are essential, others are optional.It operates in the same way as a standard PC, requiring a keyboard for command entry, a display unit, and a power supply. Since raspberry Pi board operates like PC it requires 'massstorage', but a hard disk drive of the type found in a typical PC is not really in keeping with the miniature size of RPi. Instead, we will use an SD Flash memory card normally used in digital cameras, configured in such a way to 'look like' a hard drive to RPi's processor. RPi will 'boot' (load the Operating System into RAM) from this card in the same way as a PC 'boots up' into Windows from its hard disk.

Fig.3 Raspberry pi 3 Model B

If you are providing a driver for a webcam or a digital camcorder, consider using the system-supplied universal serial bus (USB) Video Class driver, Usbvideo.sys. The USB Video Class (UVC) driver is a Microsoft-provided AVStream minidriver that provides driver support for USB Video Class devices. When your device uses UVC, you do not need to supply your own driver. Instead, the device works automatically with the system-supplied driver.

In the USB Video Class model, vendors do not write drivers; instead, vendors implement video streaming hardware according to the guidelines in the Universal Serial Bus Device Class Definition for Video Devices

Specification document located on the USB Implementers Forum website. The UVC driver queries the hardware directly to obtain its capabilities and then drives the device, with no proprietary driver required.You can optionally extend UVC driver Afunctionality to add vendor-specific processing.

FUTURE SCOPE

This final section of the report outlines some features that could potentially be implemented in future releases.The current set of features implement is a minimum to what a consumer would expect. In future, we can store the images with help database and we can also increase the processing speed with help of advanced board.

Home security

With the rise of smart homes, homeowners are increasingly turning to IoT devices for their security needs. A Raspberry Pi-based theft detection system can integrate with existing home automation systems to provide real-time alerts and monitoring.

Retail stores

Retail stores can benefit from IoT theft detection by using sensors and cameras to monitor for shoplifting and theft. A Raspberry Pi-based system can also provide analytics on customer behavior and foot traffic, which can help retailers optimize their store layouts and inventory.

Industrial facilities

Manufacturing plants and other industrial facilities can use IoT theft detection to prevent equipment theft and unauthorized access to restricted areas. A Raspberry Pi-based system can be integrated with existing security systems to provide enhanced monitoring and control.

Transportation

The transportation industry can use IoT theft detection to prevent cargo theft and unauthorized access to vehicles. A Raspberry Pi-based system can be installed in trucks, trains, and other modes of transportation to provide real-time tracking and monitoring.

Overall, the future of IoT theft detection using Raspberry Pi is promising, as more and more industries look to implement IoT solutions for security and surveillance purposes. With the increasing availability of affordable sensors and cameras, it is becoming easier and more cost-effective to deploy these systems at scale.

CONCLUSION

The project “IOT Based Theft Detection Using Raspberry PI” has demonstrated how to get a fully functional embedded product developed from scratch. This included the cross compilation and deployment of essential libraries, the configuration of embedded Linux and cloud computing technology. 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. The main Advantage of the project is Easy to implement, Low cost with High quality. IoT Theft Detection using Raspberry Pi is a promising technology with a wide range of potential applications in industries such as home security, retail, industrial facilities, and transportation. With the increasing popularity of IoT devices, it has become easier and more affordable to deploy these systems at scale. A Raspberry Pi-based system can integrate with existing security systems, providing enhanced monitoring, control, and real-time alerts. As technology continues to evolve, we can expect to see even more advanced IoT solutions for theft detection, making our homes, businesses, and communities safer and more secure.

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