Smart Surveillances using PIR Sensors

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Abstract **- In today's world, security is of prime importance. Surveillance is important in helping countries monitor threats. A threat can be from a local robber to an anti-national element. And all these threats cannot be suppressed without due monitoring. All these camera systems available in the market run 24x7 and have enormous junk data stored in the form of videos. Our system uses a trigger mechanism which activates the camera only when some motion is detected in front of the camera. Raspberry pi is a credit- card sized computer. It functions almost as a computer. Whereas, here, even if the user is moving from one place to another, he/she can keep track of what is happening in that particular place. Very small space is required as com-pared to existing available surveillance systems in the market. There are no fixed surveillance centers, we can observe it from anywhere at any time. It can work on battery power supply, because of very less power consumption.**

INTRODUCTION

Surveillance is the monitoring of the behaviour or activities, or other changing information, usually of people for the purpose of influencing, managing, directing, or protecting them.

PIR sensor are low cost security system for home applications in which Passive Infrared (PIR) sensor has been implemented to sense the motion of human through the detection of infrared radiation from that human body.

PIR sensor notice the presence of human in the home and generates signal which is read by the microcontroller.

INTRODUCTION TO IOT DOMAIN

Internet of Things (IOT) is a growing network of everyday objects from industrial to consumer goods that can share information and complete tasks without human intervention

When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation, and smart cities.

These devices, often called "connected" or "smart" devices, can sometimes talk to other related devices, which is called machine-to-machine (M2M) communication, and act on the information they get from one another.

Humans can interact with the gadgets to set them up, give them instructions or access the data, but the devices do most of the work on their own without human intervention.

LITERATURE SURVEY

Communication mainly is the transfer of whatever thing or exchanging of data, so that the Internet of things is naught but the transferring or ex-changing of anything with several other things.

The using of internet authorized system or devices roughly calculated as that by 2020 there will be nearly about billions.

The purpose of the paper is to define a safekeeping alert device spending little handling power by Internet of things which help out to observer plus alerts when gestures or else motion are there then send images to a cloud server.

This is supposed to be costly and not a reliable process. Innovative headways have cleared path in private homes too. Shrewd homes are turning out to be all the more a need in this day and age.

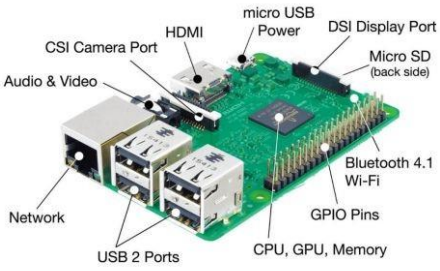
Sensors are initiated amid your nonappearance or when you inform the arrangement of your nonattendance at home. It is conceivable to program the security framework to record exercise through the surveillance camera when a development is identified.

For example, movement in the family room, opening and shutting of entryways, breaking a window. A motion detector is a device that detects moving objects, particularly people, security system captures information and transmits it via a Wi-Fi to a static IP, which is viewed using a web browser from any smart device. Both private areas and public areas alike require these types of surveillance systems to ensure security and are generally very costly. In this paper, is proposed, an innovative surveillance system which is powered by the Raspberry Pi, Amazon Web Services and Google Drive that provided results with minimal latencies. The images are showed straight to a cloud attendant, when the cloud attendant is not accessible at that time the records are put in storage close by on a Raspberry Pi.

SYSTEM ARCHITECTURE AND DESIGN

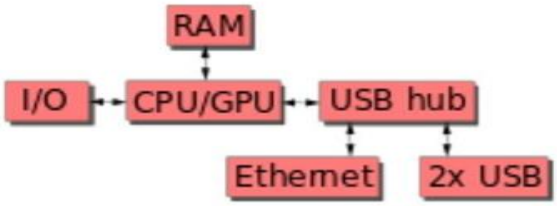
RASPBERRY PI 3 MODEL B

Raspberry Pi is a credit-card sized computer. Raspberry Pi 3 Model B, shown in figure 3.2, was released with a 1.2 GHz 64-bit quad core processor, on-board Wi-Fi, Bluetooth, and USB (Universal Serial Bus) boot capabilities.



TECHNICAL SPECIFICATIONS

SoC: Broadcom BCM2837
CPU: 4× ARM Cortex-A53, 1.2GHz
GPU: Broadcom Video Core IV
RAM: 1GB LPDDR2 (900 MHz)
Networking: 10/100 Ethernet
2.4GHz 802.11n wireless
Bluetooth: Bluetooth 4.1 Classic
Bluetooth Low Energy
Storage: micro SD
GPIO: 40-pin header, populated
Ports: HDMI, 3.5mm analogue audio-vido jack, 4× USB 2.0, Ethernet.
Camera Serial Interface (CSI)
Display Serial Interface (DSI)

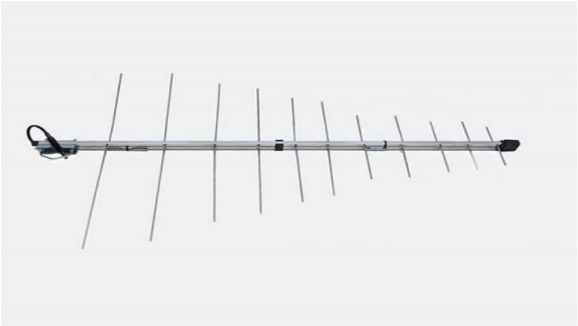


WIRELESS AUDIO

Wireless radio is very small markings can only be properly seen through a microscope or magnifying glass, the Broadcom BCM43438 chip provides 2.4GHz 802.11n wireless LAN (Local Area Network), Bluetooth Low Energy, and Bluetooth 4.1 Classic radio support.

ANTENNA

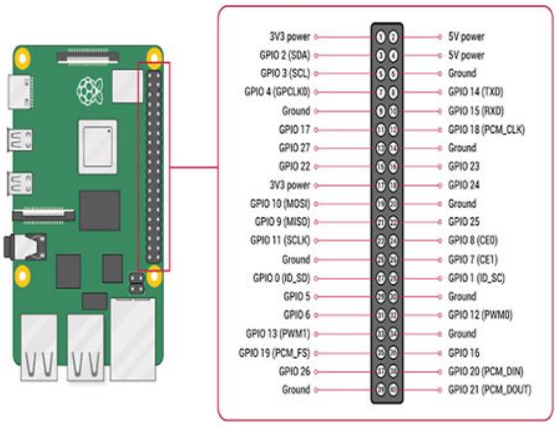
SoC Built specifically for the new Pi 3, the Broadcom BCM2837 SoC includes four high-performance ARM Cortex-A53 processing cores running at 1.2GHz with 32kB Level 1 and 512kB Level 2 cache memory, a Video Core IV graphics processor, and is linked to a 1GB LPDDR2 memory module on the rear of the board. The BCM2837B0 chip is packaged slightly differently to the BCM2837A0, and most notably includes a heat spreader.



GPIO

GPIO stands for General Purpose Input Output. The Raspberry Pi has two rows of GPIO pins, which are

connections between the Raspberry Pi, and the real world. Any existing GPIO hardware will work with switch to which UART (Universal Asynchronous Receiver/Transmitter) is exposed on the GPIO's pins.



GPU

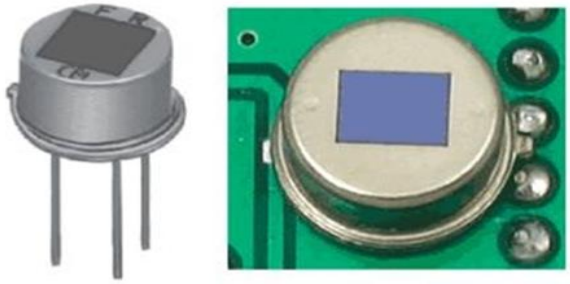
It's cheap, powerful, has an open environment aimed at development and is very portable. But perhaps the most exciting aspect of the Pi is the General-Purpose Input/Output (GPIO) header. When used with Python, the GPIO instantly opens the Pi up to the physical world around it.

HOW PIR SENSOR WORK?

The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a warm body like a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves.

PIR SENSOR

PIR sensors are rather generic and for the most part vary only in price and sensitivity.

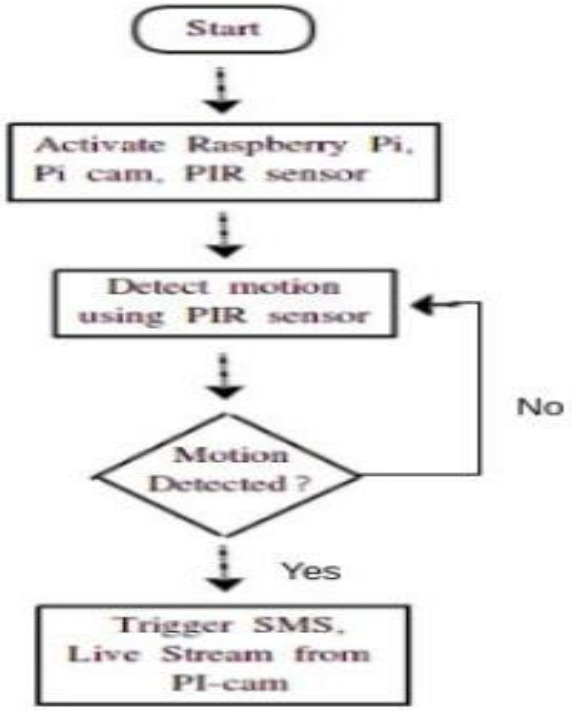


RASPBERRY PI CAMERA

The Raspberry Pi Camera Board is a custom de-signed add-on module for Raspberry Pi hardware. It attaches to Raspberry Pi hardware through a custom CSI interface. The sensor has 5-megapixel native resolution in still capture mode.

RESULTS AND IMPLEMENTATION

SYSTEM IMPLEMENTATION



Once the device is switched ON, the Raspberry Pi, Pi cam and PIR sensors are activated. PIR sensors checks for any form of motion, if detect-ed SMS is trigged and LIVE STREAM from PI cam is turned on for the user to monitor the activities. For homes and offices, it is just not enough to have security guards. For 24*7 surveillance, we require a closed-circuit television (CCTV) system. CCTV security system is an effective way and the perfect solution to the security problems.

CCTV cameras offer a perfect combination of technology and personnel. They allow a business modern security with low cost and risk by protecting the assets seamlessly and continuously.
These cameras have replaced the expensive security guards and increased reliability and accountability by providing real-time remote video surveillance.
These points are just not sufficient to describe the importance of a CCTV camera.

- Reduce Cost and Risk
- Prevent Employee Theft
- Help Law Enforcement
- Prevent and Deter Crime
- Encourage Good Behavior

RESULT

We successfully configured the Raspbian operating system, which is freely available. Configuration of static IP for Raspbian operating system is done through putty software. So, this static IP facilitates remote access. This project describes the design of a security system of surveillance using Raspberry Pi. The design senses the presence of humans in surveillance areas. When the design senses a motion it immediately sends a message to the user. The design starts recording the motion it detects and streams it live for the host to view on a web server.

The main theme is to develop a low cost surveil-lance security system and the target has been achieved.

CONCLUSION

The project as well as application of the proposed keen security observation arrangement with IoT approach by means of the Raspberry-Pi is done successfully. Tested fully developed system to demonstrate its feasibility and effectiveness. The monitoring system contains the hardware as well as software operations. The hardware implementation involves the Raspberry Pi, Pi-camera and the motion detection sensor (PIR sensor), and the software implementation in-volves the software program that is programmed in the Raspberry Pi using Python so that the devices were capable of communicating with each other. The screenshots of the smart security surveillance system developed have been presented.

FUTURE SCOPE

The system can also be extended to be used at the following scenarios

1. In hospital for patient surveillance.
2. In city buses or in Wi-Fi enabled trains to re-duce the crime.
3. In any big housing apartments, in big organizations or in big institutes.
4. In the companies where surveillance is needed.
5. Also, on the international borders for the surveillance purpose.

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