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Room Light Control Using Raspberry Pi Based CCTVSurveillance System

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Abstract :

Now days, living without electricity is unimaginable, hence it is our responsibility to conserve the energy.

However, due to the busy schedule, many of us forgets to turn off the lights/fans and other appliances which are in use. We have to turn them off when this appliances are not in use. This is a big problem in the majority of the country. Over last few years, remarkable progress has been made in educational system. And by bringing new ideasto the sector of consumer electronics.

If we have to reduce the energy consumption in our classroom, we have to automate the whole system by using latest technologies. Automation offers many forms of benefit. Our research proves detection of person motion as a parameter to Decide, whether the power supply should be turned on or off. Python is the programming language thatwe are using. We have completed our working strategy.

Keywords : Automation, Raspberry pi, Person detection.

Introduction :

We are designing a smart automated device which controls the switching of Power system in the classroom based on presence/absence of a persons. As we know that we're not strangers to the lighting automation.

The system is currently manually operated and turning the lights on and off each time you enter or leave the classro om is labor intensive. Equipment prices in market are both expensive and have not correct ratings. Even the use of infrared sensors is full with issues. So we are using an image processing technique to detect motion and then decide whether to switch on or off the classroom's power supply based on the results.

In this project we are a raspberry pi. So when we starts it up, a program is run which executes the algorithm and begins to detect person detection. When the camera captures any movement then the raspberry pi is detected and then the algorithm sends it a message. The message indicates that someone is in the classroom. There are GPIO pinson raspberry pi, which activates the relay and turns on the light.

Literature survey :

[1] Z. Sundas, "Motion Detecting Camera Security System with Email Notifications and Live Streaming UsingRaspberry Pi." use of this project is for motion detection of person.

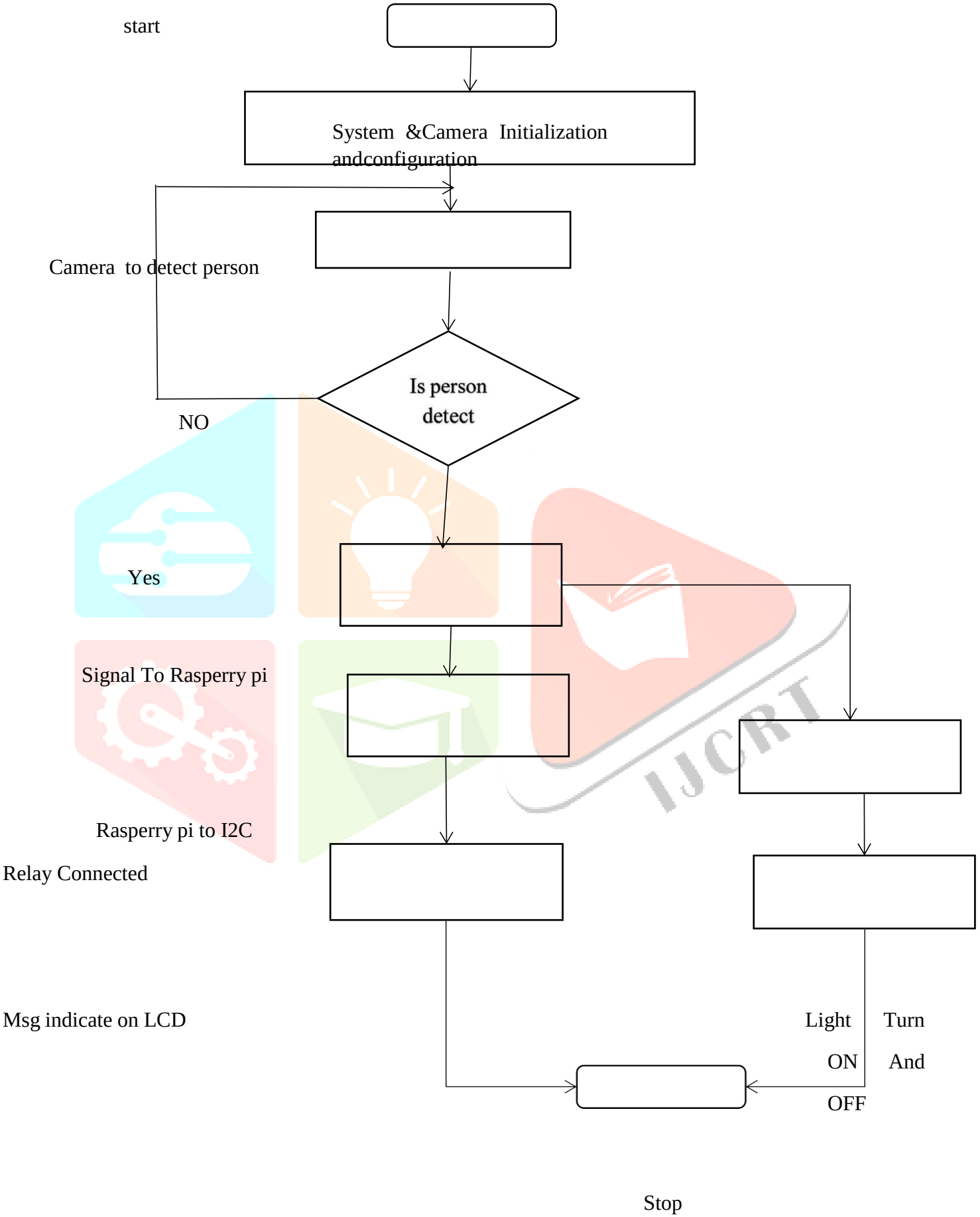
[2] M. Peter and H. David, "Learn Raspberry Pi with Linux," Apress, 2012. Used for information about raspberry pi.

[3] P. Sanjana, J. S. Clement, and S. R., "Smart Surveillance Monitoring System Using Raspberry PI and PIR Sensor.,"2014. Used for video surveillance system.

[4] B. E. Reddy, M. Veeresha, and N. Rao, "Image Processing: A Survey." Used for image processing.

[5] "113-115-OBJECT-DETECTION-AND-TRACKING-USING-IMAGEPROCESSING.pdf." used for object/person tracking and image processing.

Flow chart :


start
System &Camera Initialization andconfiguration
Camera to detect person
Is person detect
NO
Yes
Signal To Rasperry pi
Rasperry pi to I2C
Relay Connected
Msg indicate on LCD
Light Turn ON And OFF
Stop

Hardware details :

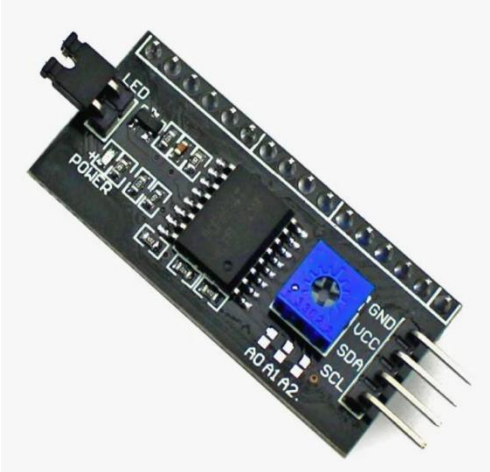
1. **Raspberry Pi 3 model A+ :**

The Raspberry Pi 3 Model A+ is a compact single-board computer developed by the Raspberry Pi Foundation. so, basically it is a mini CPU, from which we can run a computer and do programmingIt was built mainly to aid indeveloping open source game.. The Raspberry Pi 3 Model A+ can be used for various projects such as home automation, robotics, media centers, Internet of Things (IoT) devices, and learning programming and electronics.

Specifications :

- Processor: Broadcom BCM2837B0, Cortex-A53 64-bit SoC @ 1.4 GHz
- Memory: 512MB LPDDR2 SDRAM
- Storage: 16 GB MicroSD card

2. **I2C :**



An I2C serial interface LCD adapter module, also known as an I2C LCD module or I2C LCD backpack. It isa convenient device that allows you to connect an LCD display to an I2C bus using fewer pins compared to traditional parallel connections. The I2C LCD adapter module communicates with the any device on the I2Cbus through the I2C protocol. It has an I2C interface, usually consisting of SDA and SCL pins, to connect to the I2C bus

3. **LCD Display :**

A 16x1 LCD display is a type of alphanumeric display that can show 16 characters in a single row and 1 row of characters. A 16x1 LCD display consists of a single row of 16 characters, where each character occupies a specific position on the display. The LCD display module may have various interface options, including parallel and serial interfaces. The most common parallel interface is the HD44780-compatible interface, which requires multiple GPIO pins to control the display. The I2C acts as ADC i.e. it converts analog signals came from raspberry pi into digital signal on LCD display.

4. **5 volt Relay :**

A single-phase 5-volt relay is an electromagnetic device used to control the flow of electrical current in a circuit. A relay is an electrical switch that uses an electromagnet to open or close its contacts. Relays havetwo sets of contacts—normally open (NO) and normally closed (NC).

5. **Web camera :**

A web camera, also known as a webcam, is a digital camera that captures video and audio and allows users to transmit or stream it over the internet or a computer network. In this project, we are using this webcam for persondetection.

Future scope :

- With the use of raspberry pi and Infrared camera interfacing it can be used in Smart Surveillance Monitoring security system which any type of public security is using Living body detection or spying.
- So, we have developed a smart, lightweight, cost effective monitoring device capable of capturing video /image and transmitting it over the internet
  In this project, confidence in privacy and protection on both sides are ensure one. Changes can be made in the future if appropriate, so that it can also be used in drone, international boarder surveillance or some other military applications. In thi0s we may build this same framework for different applications.
- There are also some remote applications that can be realized using Raspberry Pi's interface and Arduino's sensor applications, UNO cards (such as smart card exchange), agricultural areas (land, fingerprint, counti ng).alcohol intake detection , Temperature sensing using web server, humidity sensing, etc.

Conclusion :

In conclusion a face detection smart security system using CCTV surveillance is been developed using Raspberry Pi. The system was programmed using python programming language and its open source software and libraries made it very convenient. Form analysis it is revealed that this system is been updated to such a extent that we can get more accurate and better performance and even poor quality images can be used for person detection. Using Raspberry pi we have made this project smaller in size, lighter in weight and low power consumption as compared to a full size computer.

Referance :

[1] Z. Sundas, “Motion Detecting Camera Security System with Email Notifications and Live Streaming UsingRaspberry Pi.”

[2] M. Peter and H. David, “Learn Raspberry Pi with Linux,” Apress, 2012.

[3] P. Sanjana, J. S. Clement, and S. R., “Smart Surveillance Monitoring System Using Raspberry PI and PIRSensor.,” 2014.

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