SRM Institute of Science and Technology
College of Engineering and Technology
Department of Electronics and Communication Engineering
18ECO109J-Embedded System Design Using Raspberry Pi 2023-2024(ODD SEMESTER)

Mini Project Report

Name   :Yash Kumar

Register Number   :RA2111003011171

Day / Session   : DO-1/ P1-P2

Year & Semester   : III year/ 5th Semester

Venue   : TP 1117 VLSI Simulation Lab

Project Title   : Home Security Using PIR Sensor and Raspberry Pi

Team Members   : 1)Yash Kumar(RA2111031010056)
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Particulars	Max. Marks	Marks Obtained
Objective & Description	05	
Algorithm,Flowchart,Program	20	
Demo verification	10	
Viva	10	
Report	05	
Total	**50**	

REPORT VERIFICATION

Date   : 06/11/2023
Staff Name : Dr. J. Subhashini

<u>Home Security Using PIR Sensor and Raspberry Pi</u>

<u>OBJECTIVE:</u>

Enhancing security through precise motion detection: Leveraging my skills to optimize the functionality of PIR motion detectors for accurate and efficient monitoring in residential and commercial settings.

<u>ABSTRACT:</u>

This project is designed to develop a home security system based on Raspberry Pi which realizes the function of providing residence with security and alarm information through remote sensing. To complete this project, team members use motion sensor and PIR sensor to detect the motion information of a house, and then report any potential unusual or dangerous situations to the owner. In order to ensure that the owner can get the potential unusual or dangerous situations in time, security notifications will be by email, and all information will be by WiFi to a commodity wireless router. The final products are robust, packaged, and powered by mains. The integration of an LCD display provides immediate feedback, enhancing user interaction and experience. With its energy-efficient design, incorporating a power supply, rectifier, and regulator, the system ensures sustained, high-quality performance.

<u>HARDWARE / SOFTWARE REQUIRED:</u>

- Power Supply
- Rectifier
- Regulator
- LCD Display
- Speaker
- Raspberry Pi
- PIR Motion Sensor
- Python 3 Compiler • Programming Language Python
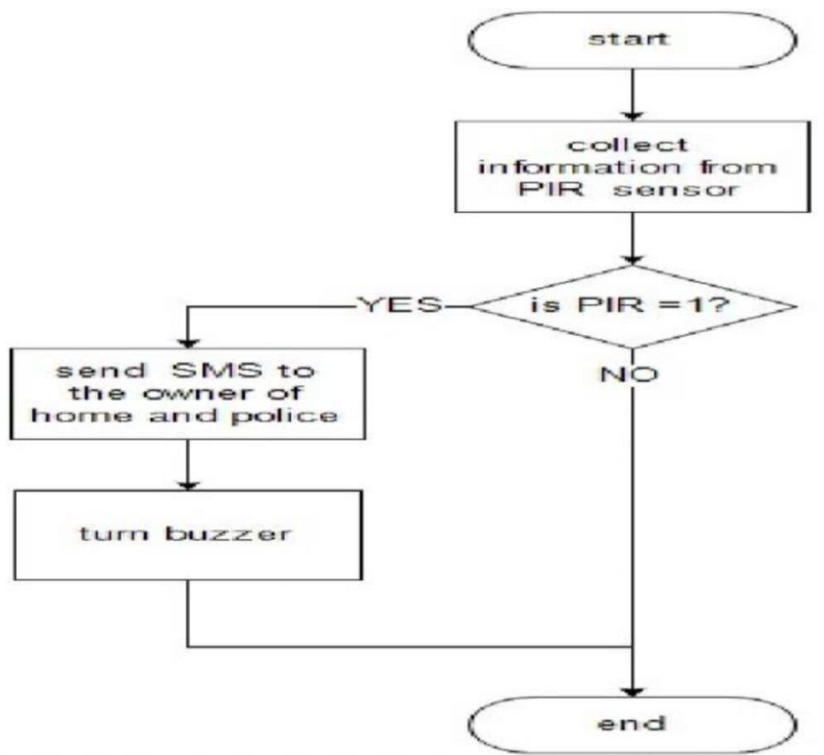
<u>BLOCK DIAGRAM:</u>
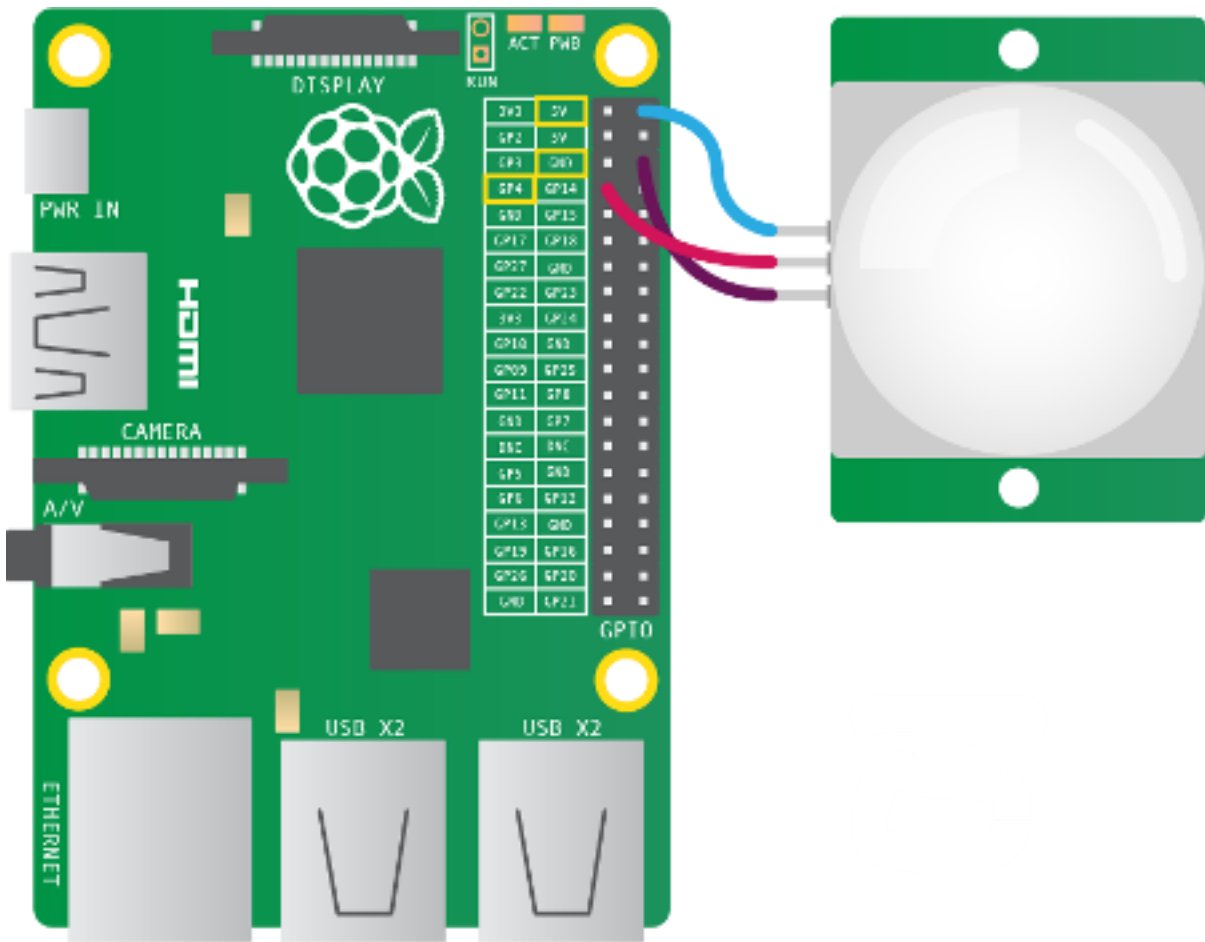
ALGORITHM:

1. Import MotionSensor from gpiozero

2. Initialize MotionSensor instance with pin 4

3. Enter an infinite loop

   a. Wait for motion using wait_for_motion()

   b. Print "Motion Detected"
   c. Wait for no motion using wait_for_no_motion()

4. Repeat from step 3

FLOW CHART:

PROGRAM:

from gpiozero import MotionSensor

pir = MotionSensor(4) while True:

pir.wait_for_motion() print("Motion

Detected")

pir.wait_for_no_motion()

Real-time Applications of the Ultrasonic Music Beats Player:

1.   • **Security Systems:** PIR motion detectors are widely used in home and commercial security sys- tems. They can trigger alarms, lights, or cameras when motion is detected, alerting occupants or security personnel.

2.   • **Automatic Lighting:** PIR sensors are commonly used in lighting systems to automatically turn lights on or off based on motion. This is handy for energy conservation and convenience in areas with fluctuating occupancy.

3.   • **Smart Home Automation:** In smart homes, PIR sensors can be integrated into automation sys- tems to control various devices. For example, they can trigger the heating or cooling system when mo- tion is detected, or turn on music when someone enters a room.

Constraints of the Project:

1. **Limited Range:** Sensors might not detect objects beyond or too close to them.
2. **Single Point Detection:** Only detects movement in one direction.
3. **Physical Barriers:** Obstructions can hinder measurements.
4. **Processing Delay:** Potential lag between movement and led glow.
5. **Calibration:** Periodic calibration might be needed. **6. Power Consumption:** Continuous operation can drain batteries fast.

<u>CONCLUSION:</u>

In conclusion, PIR motion detectors play a crucial role in enhancing security, efficiency, and convenience across a wide range of applications. From safeguarding homes and businesses to optimizing energy usage and providing hands-free automation, the versatility of PIR sensors contributes significantly to the evolving landscape of smart technology. As technology continues to advance, we can expect even more innovative applications for PIR motion detectors, further integrating them into our daily lives for improved safety, energy conservation, and overall functionality.

References: https://www.electronicshub.org/pir-motion-sensor-using-raspberry-pi/