

Pyrometric Human Intruder Detection System

Vaibhav Khairnar, Tejaswini Khandare, Kalyani Khapare
Sandip Foundation's SITRC, Nashik, Maharashtra, India

Abstract— In this paper to shows the model of human presence sensing of pyrometric sensor. Security is main purpose of this system. This system used to secure human life, this system fixed on movable object. The sensor detect the IR radiations which is emitted by human body. It is the inputs of pyrometric sensor and it generate the high pulse and generate the high pulse at the output so that any object can be detected. The main advantage of this system is to be alert with the help of the object so that we can take the preventive action towards it.

Keywords—Pyrometric sensor, Scanning, Detector

I. INTRODUCTION

Pyrometric sensor is used for sensing human body. This system is used for security purpose. It is beneficial to human because it provide real time information about human presence. It is time consuming system and gives the result fastly. It is the low cost and easy to interface system ,it is user friendly technique

Pyrometric sensor has main property to sense the motion. The sensor used to detect the human has moved in sensor range.

A. Properties of Pyrometric Sensor:

1. Small in size
2. Low cost
3. Enexpensive
4. Easy to handle
5. Low power required

Pyrometric sensor also called passive infrared IR ideal sensor because while they operate ,this presence can not be detected as in active sensor cases. They detect different temperature ,thermal radiation ,in the environment caused by Human body or animal .PIR sensor mostly used in integrated circuit. Parallax PIR motion sensor will operate as human motion detector, and convert the detected infrared signal to electrical output signal to use integrated circuit. PIR sensor with large detection range come out.

PIR sensor operates with radiation of the body heat of the intruder as it changes room temperature equilibrium within its detection area. The hotter the detected object is more emission occurs in Passive Infrared sensor.

II. Pulse IR Detection

High and Low duty cycles will prevent ambient light effect on the sensors reading .The design will be used in seeing the obstacles within the detection range. It oriented to motion detection, robotics, alarm system ,auto light switch and space application.

III. OPERATION OF PIR SENSOR

1.Passive Infrared Imaging

Infrared sensor is modulated inside of a thermal imaging device that detects the thermal radiation of the object with the great accuracy and generates the image of the received infrared radiation .The difference in the temperature will be seen on the image in the various color .Thermal imaging is used in security service as Airport customs control fire department ,industrial machine control for heat leakage.

2. Infrared Homing

This application take place in the missile guidance system. The tracking system works with the emitted electromagnetic radiation from the target. Target tracking is connected to heat radiation detection.

3.Human Body Detection

when moving human body enter detection zone the sensor generate a high pulse signal. The emitted infrared radiation sent from human body is to the PIR sensor receiver. Human detection system are in demand for various application such as automatic doors, security system ,medical purpose and civil application.

4. Flame Detection:

Passive Infrared sensors detect the emitted light from the flames by observing the flame. Since emitted light of the flames will be varying within the entire electromagnetic spectrum, several other detectors will be involved for UV region, as well. PIR sensors are seen as the better option compared to point smoke and fire detector due to their wide detection range.

IV. BLOCK DIAGRAM

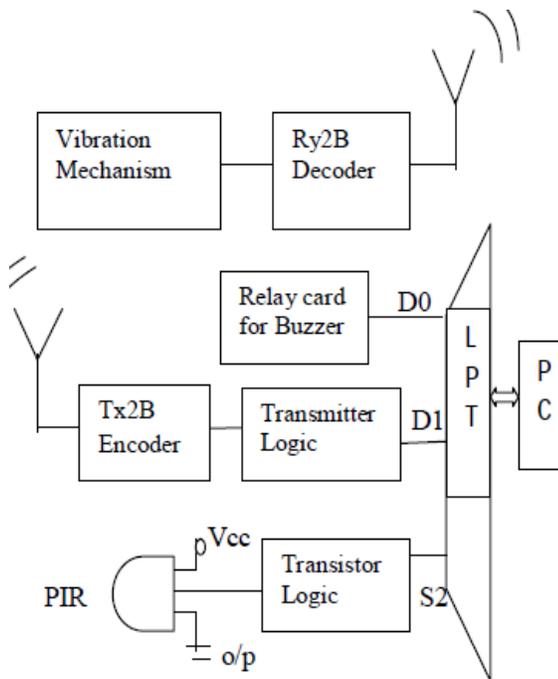


Fig.1: Block Diagram of System

Detection of human body can be done any situation fast well as extremely slow motion. Slow motion range is half meter per second and fast motion range is 3 m/s or 5m/s (18km/hrs.). The output of IR detector signal always responds in particular frequency ranges which can be lies on focus of optical system for moving the speed of human body, which is measured by any electronic circuitry. Thumb rule can be used for relation between velocities, focus and frequency. The range for signals will be 0.08 HZ to 8 HZ with typical Fresnel lens of 25mm focal length. Low frequency range is calculated if the movement of human body is having far distance from the detector.

As human movement is almost near to the detector because of high frequency ranges, the human body mostly emits the heat in terms of infrared rays. If human body enter and sense the area of sensor, IR infrared rays varies the temperature between environment and human body. Also sensor catch these changes in infrared rays cause by human body.

V. CIRCUIT DIAGRAM

In this system two circuit are their one is the transmitter and receiver .In transmission section to used PIR sensor this sensor sense IR radiation human body .to gives high pulse to the transistor the transistor acts as switch .The transistor send to the pulse to the encoder .the encoder encode the

signal and this signal send to the receiver .The receiver to gives the signal to the transistor .the transistor send to the signal decoder the decoder decode the signal it gives the high pulse to the mobile vibrator to vibrate the mobile vibrator it is the output of the circuit. when the human is come onto the sensor the sensor sense the IR radiation of human body and send signal to the receiver and mobile vibrator will vibrate. It is used for the security purpose .It very needful to the human.

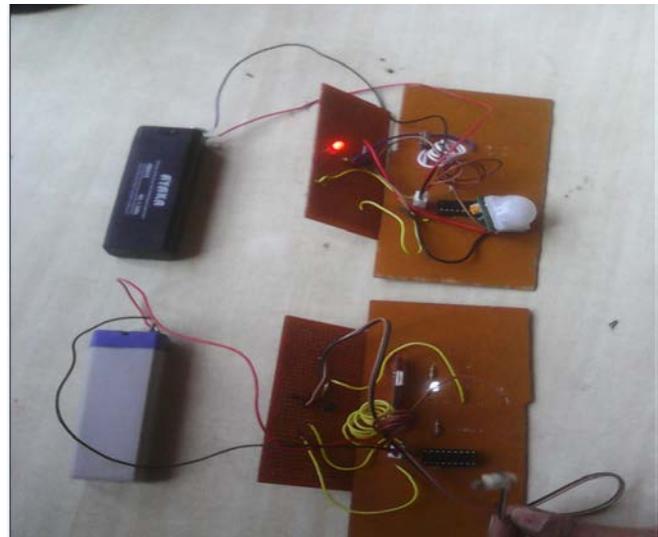


Fig.2: Circuit Diagram of human intruder detection system

VI. PIR SENSOR SPECIFICATION

Parameter	Symbol	Rating
Supply Voltage	V_{CC}	3.3 to 5 VDC at 100 μ A
Output terminal voltage	V_O	~ 3.3 VDC at 5VDC
Detection Distance	ΔL	20 feet
Operating Temperature	T_{opr}	+32 to +158 °F (0 to +70 °C)
Output type		Analog
Typical start up delay	t_r	10 – 60 sec

Table 1: Specification

VII. PIR SENSOR CONTROLLING

1. Wire the PIR sensor to the microcontroller making sure hat Ground goes to the – pin, Power to the + pin, and OUT pin of the PIR sensor to the I/O pin of the microcontroller.
2. Power up the microcontroller with +5V and connect its ground pin to ground of the power supply.

- Mark several spots within the detection range and at various angle and distances, and the detection capability of the PIR sensor.
- The microcontroller enables the PIR sensor have a digital output by its ADC feature. When the trigger is left in the high position, the sensor will be retriggered every time there is a change in the PIR beam detection range. Thanks to the microcontroller, the duration of the retriggering could be modified.

3. IR and PIR sensors can use the same type of interface cable with three-pin header since the same circuitry structure could be used for both of the sensors. There is sample circuitry diagram of the Sharp IR sensor. It is the same works basically IR sensor could be removed from the circuitry and replaced with Parallax PIR sensor.

VIII. PIR SENSOR :INTERNAL CIRCUIT ARCHITECTURE

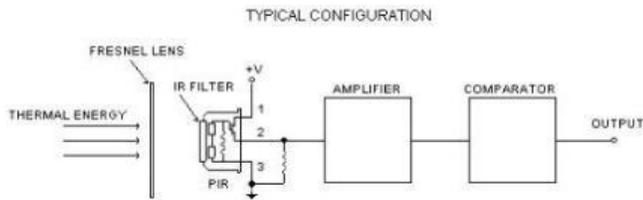


Fig. 3:internal circuit architecture

Red:	Voltage input: (V_{CC})	(+5V)
Yellow:	Voltage output: (V_O)	(< 2.5V)
Black	Ground: (GND)	(0V)

Table 2:Ratings

IX. FEATURES

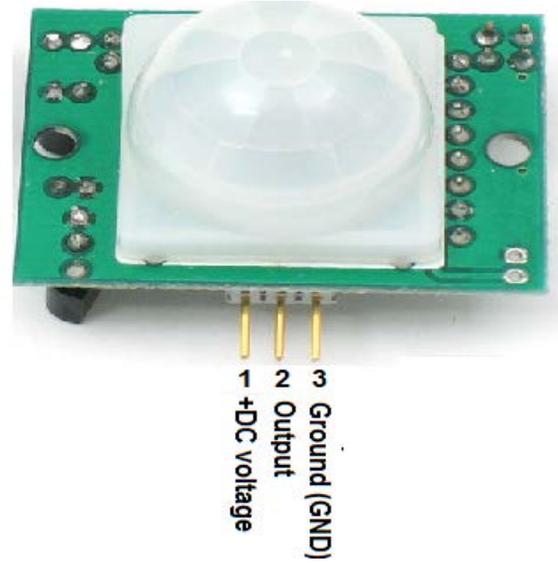
Reliability: Regarding environment condition dry, dusty, wet,cold and hot environment system given accurate result.

Speed: It is fast process system required minimum time.

Accuracy: It gives proper result and minimum false positive.

Economy: System is in and low cost.

X. Image of PIR sensor



3 PIR sensor

Fig.

XI. ADVANTAGES

1. A PIR-based motion detector is used to sense the people, animals, or other objects .
2. They are commonly used buzzer alarm and automatically activated lighting system.
3. Low complexity required.
4. No need of night vision camera.
5. Long range transister simulation.
6. It is low cost.

XII. DISADVANTAGES

- 1.Detection is not possible non-Human objective due to the robo
- 2.Long calibration time
- 3.Specifically sensitive to thermal radiation
- 4.Unequally sensitive to various distances of the detection range
- 5.Insensitive to very slow motions or the object (i.e. a body) in standing mode
- 6.Narrower sensor field view for high temperature range with less sensitivity .

7. Wider sensor field view for lower temperature range with distant object sensitivity.

XIII. APPLICATIONS

1. Security:

Security break is a big problem for human life and expensive things. To overcome this problem we build this system by using pyrometric sensor. It provides real time information about human presence in high risk surrounding. It also uses to secure expensive things from human like museum.

2. Crowd management:

The temperature change due to human presence and human presence sensor found the total crowd properly, giving approximate number of human.

3. Environment quality optimization:

Human presence change environment temperature of human body is changed due to IR radiation emitted by human body the system detect human automatically using pyrometric sensor with added hardware.

4. Risk assessment:

Human presence in risky areas like fire building accident etc. risk assessment become very much easily handle with greater ease by using pyrometric sensor system.

XIV. CONCLUSIONS

The system is developed for present needs. The purpose of high security threats and managing people with better security at all possible place the proposed system is useful. According to present needs circuit is implemented with reliability. Implementation of system is easy and it is fabricate with low cost.

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