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DESIGN OF USER FRIENDLY HUMAN ALIVE DETECTION ROBOT TO AVOID FALSE ALARM AND TO TACKLE CRISIS SITUATION

B VENKATADRI[1], K. ASWINI[2]

1. PG Scholar, SIETK, Puttur, Andhra Pradesh, India
2. Assistance Professor M.Tech, SIETK, Puttur, Andhra Pradesh, India.

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Abstract: - Infrared radiation exists in the electromagnetic spectrum at a wavelength that is longer than visible light. Infrared radiation cannot be seen but it can be detected. Objects that generate heat also generate infrared radiation and those objects include animals and the human body whose radiation is strongest at a wavelength of 9.4µm. The pyro electric sensor (PIR) is made of a crystalline material that generates a surface electric charge when exposed to heat in the form of infrared radiation. When the amount of radiation striking the crystal changes, the amount of charge also changes and can then be measured with a sensitive FET device built into the sensor. The main aim of this project is to avoid the false detection alarm in high security applications by passing non-living body. And also it is applicable to larger regions. It can avoid the main problem of previous security system that cannot detect presence of intruder jumping the fence. If any obstacle is found then it generates an alarm signal to operator to check whether it is real obstacle or not. If it is a obstacle like a ball etc. then the operator will can consider that one. If it is a robot type that it is able to theft anything then operator can switched on the main alarm.

Keywords: PIR sensor, Ultraviolet sensor, ARM, KEIL compiler

Corresponding Author: MR. B VENKATADRI

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INTRODUCTION

Infrared radiation exists in the electromagnetic spectrum at a wavelength that is longer than visible light. Infrared radiation cannot be seen but it can be detected. Objects that generate heat also generate infrared radiation and those objects include animals and the human body whose radiation is strongest at a wavelength of 9.4µm.

The pyro electric sensor (PIR) is made of a crystalline material that generates a surface electric charge when exposed to heat in the form of infrared radiation. When the amount of radiation striking the crystal changes, the amount of charge also changes and can then be measured with a sensitive FET device built into the sensor.

The main aim of this project is to avoid the false detection alarm in high security applications by passing non-living body or any animals. And also it is applicable to larger regions. It can avoid the main problem of previous security system that cannot detect presence of intruder jumping the fence. If any obstacle is found then it generates an alarm signal to operator to check whether it is real obstacle or not. If it is an obstacle like a ball etc then the operator will can consider that one. If it is a robot type that it is able to theft anything then operator can switched on the main alarm.

2. LITERATURE REVIEW

Objects that generate heat also generate infrared radiation and those objects include animals and the human body whose radiation is strongest at a wavelength of 9.4µm.

Infrared radiation exists in the electromagnetic spectrum at a wavelength that is longer than visible light. Infrared radiation cannot be seen but it can be detected.

Figure 1: IR sensor

Unlike current IR transmitter and receiver based projects in which the intruder has to pass through a certain region where IR radiation from transmitter is interrupted which in turn is detected as an intruder presence; this approach has following major drawbacks

- Any non-living body or animals which passes through this setup will trigger the alarm which is totally undesirable (we want only human intruder to detect)

- It is confined to very small region i.e. you can only attach this mechanism to a passage or gate or door .You cannot detect presence of intruder jumping the fence with one sensor or big open spaces like your garden etc.

Figure2: IR sensor capturing

2.1 Drawbacks in Existing system:

In present system the main disadvantage is that false alarm detection. The existing system if finds any obstacle related things then also it can activate the alarm which is called as false alarm detection. In some situations like detecting a person in crisis situation that may be the child fall in bore well it is unnecessary to having false alarm for the non-living things. In such cases we need to have alarm only in such a way that is detecting the person or living things.

Figure 3: False alarm detection

Another drawback of the present system is it is confined to smaller region. We can only attach this mechanism to a passage or gate or door .You cannot detect presence of intruder jumping the fence with one sensor or big open spaces like your garden etc.

3. PROPOSED METHOD

To overcome the problems of existing system we are going use PIR sensors in the proposed system. PIR sensor is pyro electric sensor which detects motion of the human based on ir radiation levels.

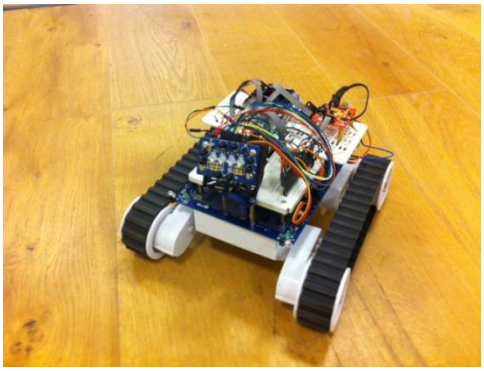


Figure 4: Proposed system

The main aim of this project is to avoid the false alarm detection that can be generated while detecting the non-living things also which is undesirable in some cases. In some cases like Security application we may have need to detect the non-living things like robots etc. to avoid theft by using robots.

4. TECHNOLOGY

The block representation of our project is shown below. It contains several blocks such as Microcontroller, power supply, DTMF, wireless camera, PIR sensor, Fire sensor, Obstacle sensor, LCD, motors.

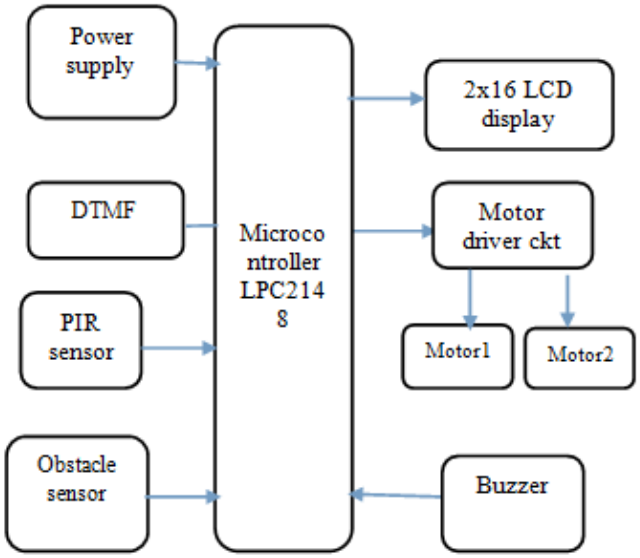


Figure 5: Block diagram of proposed system

Power supply unit is used to provide the power supply for the controller that organizes all the components in this project.

Here we are using two types of sensors

1. PIR sensor

2. Ultrasonic sensor

4.1 PIR Sensor

The PIR (Passive Infra-Red) Sensor is a pyro electric device that detects motion by measuring changes in the infrared levels emitted by surrounding objects. This motion can be detected by checking for a high signal on a single I/O pin.

PIR sensor features include:

• Single bit output

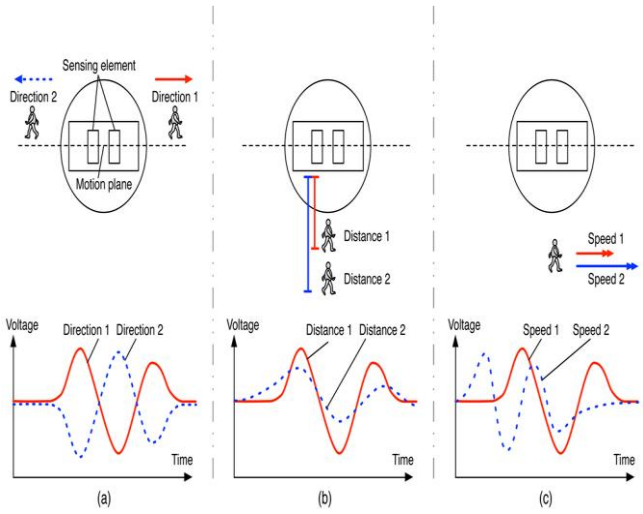
• Small size makes it easy to conceal

• Compatible with all types of microcontrollers

• 5V till 20V operation with <100uA current draw

Figure 6: PIR sensor

Pyro electric devices, such as the PIR sensor, have elements made of a crystalline material that generates an electric charge when exposed to infrared radiation.



The changes in the amount of infrared striking the element change the voltages generated, which are measured by an on-board amplifier.

Figure7: PIR detection

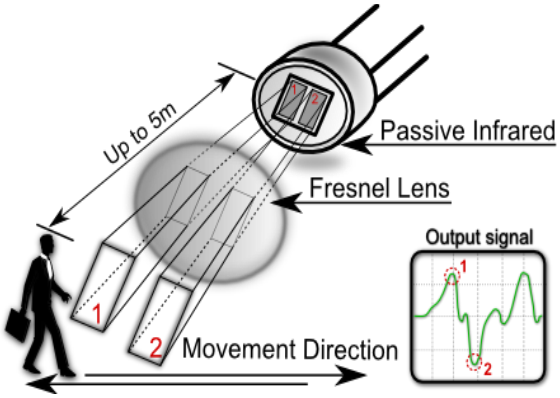


Figure 8: PIR sensor working

The device contains a special filter called a Fresnel lens, which focuses the infrared signals onto the element. As the ambient infrared signals change rapidly, the on-board amplifier trips the output to indicate motion.

5. OPERATION

1. When an intruder is detected PIR sensor output increases.
2. This signal is amplified and converted to TTL logic 0-5v.
3. Amplifier output is connected to the microcontroller, controller detects the transition from 0-5v as the presence of the human
4. Controller then activates the siren (PWM driven from controller)
5. If any obstacle is found through the Obstacle sensor then it sends a message to the controller.
6. The controller has to check the obstacle position and the movement.
7. If controller identifies that obstacle as a threat based then activates the siren or alarm that alerts the security guards.

8. If the detected obstacle is not considered as threat to security system then the controller will take care of alarm activation.

6. CONCLUSION

By this we can solve unnecessary false alarm in high security applications with high security. And we can detect the persons in crisis situations where the persons may not enter like bore wells etc.

We can make user interaction by using pc to check whether it is really obstacle or anything that causes theft in security applications. We can see the complete sensing of the robot by using webcams and we can store the videos for the security purposes.

We can increase the range in detection of humans by using PIR sensors.

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REFERENCES

1. Chou Wusheng. Wang Tianmiao, You Song, "**Sensor-based autonomous Control for telerobotic system**", Proceedings of the 4th World Congress On Intelligent Control and Automation, 2003, vol.3, pp. 2430 – 2434.
2. Miyama, S.; Imai, M.; Anzai, Y.; "Rescue robot under disaster Situation: position acquisition with Omni-directional Intelligent Robots and Systems, 2003.(IROS 2003), 27-31 Oct. 2005, vol.3, pp. 3132 - 3137.
3. Albert Ko and Henry Y. K. Lau, "**Robot Assisted Emergency Search and Rescue System With aWireless Sensor Network**", International Journal of Advanced Science and Technology Vol. 3, February, 2009.
4. Burion, Steve (2004), Casper, J. (2002), Amerada, Yams, Igarashit, &Matsunos, (2004) and Cappello, C., etal (2005) "**Human Detection for Robotic Urban Search and Rescue**" Carnegie Mellon University, Institute of Production Robotique (IPR) LSRO2 – VRAI-Group, Microtechnique, February 2004.
5. Atmel data sheets of controller units http://www.keil.com/dd/docs/datashts/atmel/at89s52_ds.pdf

6. Robert L.Boylestad and Louis Nashelsky, "**Electronic Devices and Circuit Theory**", 8th Edition, 2006

7. Decoder HT-12D, Encoder HT-12E http://robokits.co.in/shop/index.php?main_page=product_info&cPath=14_15&products_id=76 >

8. A. Khamis, M. Pérez Vernet, K. Schilling, "**A Remote Experiment On Motor Control Of Mobile Robots**", 10thMediterranean Conference on Control and Automation – MED2002.

9. Kai-Rui Zhao, Xin-Min Wang, Van Li, and Xiang Yu, "A Life-detection System fo r Special Rescuing Robots"

10. Burion, Steve, Casper, J., Amerada, Yams, Igarashit, & Matsunos, and Cappello, C., etal "Human Detection for Robotic Urban Search and Rescue"