

Spy Sharp Shooter Sensor to Position Military Guns After Intrusion Detection

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Abstract - In this paper, Pyroelectric Infrared (PIR) Sensors detect the direction of human motion/movement. Tracking whole-body of human pose in physical human machine interactions is challenging because of highly dimensional human motions and lack of inexpensive and non-intrusive motion sensors in outdoor environment. Security concerns arise right from individuals to military forces especially when threats are from neighboring countries as a solution we have designed an effective intelligent security system which can monitor sensitive areas (No Man's Land).

Key Words: Pyroelectric Infrared Sensor (PIR), Servo Motor, Arduino, Movement Detection, Pyroelectricity

1. INTRODUCTION

Passive Infrared Radiation (PIR) sensor detects the change in infrared radiation of warm blooded moving object in its detection range. According to the change in infrared radiation, there will be a change in the voltages generated which is used by micro controller to continuously monitor the output from the sensor module. An algorithm is implemented for positioning of servo motor to move military guns in particular direction so that when an intruder comes in the detection range of the PIR sensors, it actuates firing of bullets, attacking them in all possible angles. The database at backend maintains timestamps of these instances of shooting attack. The objective of this project is to develop a motion sensor security system based on a Passive Infra-Red (PIR) sensor module for military applications.

2. LITERATURE SURVEY

1] Whole-Body Pose Estimation in Human Bicycle Riding Using a Small Set of Wearable Sensors :

Yizhai Zhang, Member, IEEE, Kuo Chen, Student Member, IEEE, Jingang Yi, Senior Member, IEEE, Tao Liu, Member, IEEE, and Quan Pan presented in IEEE/ASME TRANSACTIONS ON MECHATRON-ICS, VOL. 21, NO. 1, FEBRUARY 2016 elaborated a computational scheme to estimate the human whole-body pose with application to bicycle riding using a small set of wearable sensors.

2] Detecting Direction of Movement Using Pyroelectric Infrared Sensors :

By Jaeseok Yun, Member, IEEE, and Min-Hwan Song in IEEE SENSORS JOURNAL, VOL. 14, NO. 5, MAY 2014 presented a novel method of detecting a relative direction of human movement with two pairs of PIR sensors whose sensing elements are orthogonally aligned.

3] PIR Sensor-Based Applications in Smart Environments :

Han et al. presented an occupancy and indoor environment quality sensing method based on a suite of sensors, including PIR sensors, CO2 sensors, humidity sensors and concentration sensors.

4] Human Movement Detection with PIR Digital Outputs:

Hashimoto et al. presented a people counting system composed of a one-dimensional eight element custom-fabricated array detector, an IR transparent lens and an oscillating mechanical chopper.

5] Human Identification with PIR Sensors :

Fang et al. presented a human identification system using a PIR sensor whose visibility is modulated by a Fresnel lens array and a principal components regression method.

3. PROPOSED SYSTEM

3.1 SYSTEM ARCHITECTURE

In that system architecture there are 2 PIR sensors which are connected to Arduino Uno Micro-controller. There are bidirectional connection in between Micro-controller and Servo Motor. Again this Micro-controller is connected to VB .NET application through USB cable. In that VB .NET application Timestamp will be stored.

3.2 PIR Sensor Module

The PIR sensor is the core part of the system. The system function is based on infrared radiation, which is emitted from human body. PIR sensor is widely used in security system to detect the motion of human. Infrared (IR) light is electromagnetic radiation with a wavelength between 0.7 and 300 micrometers. Human

beings are the source of infrared radiation. It was found that the normal human body temperature radiate IR at wavelengths of 10 micrometer to 12 micrometer. PIR sensors are passive electronic devices which detect motion by sensing infrared fluctuation. After it has detected IR radiation difference, a high is sent to the signal pin.

3.3 Arduino Board Uno

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a micro-controller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board you can simply use a USB cable.

3.4 Internal structure of Servo Motor

The servo circuitry is built right inside the motor unit and has a positional shaft, which usually is fitted with a gear. The motor is controlled with an electric signal which determines the amount of movement of the shaft. The motor is attached by gears to the control wheel. As the motor rotates, the potentiometer's resistance changes, so the control circuit can precisely regulate how much movement there is and in which direction. When the shaft of the motor is at the desired position, power supplied to the motor is stopped. If not, the motor is turned in the appropriate direction. The desired position is sent via electrical pulses through the signal wire. The motor's speed is proportional to the difference between its actual position and desired position. A servo motor can usually only turn 90 degrees in either direction for a total of 180 degree movement.

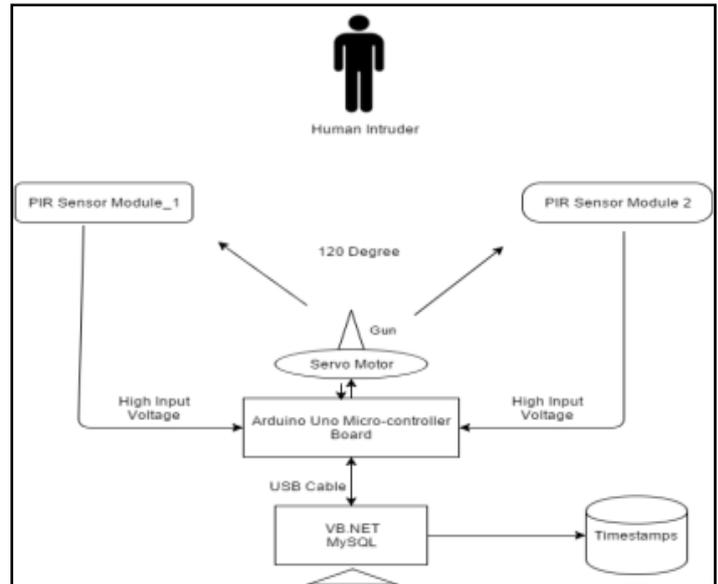


Fig -1. SYSTEM ARCHITECTURE

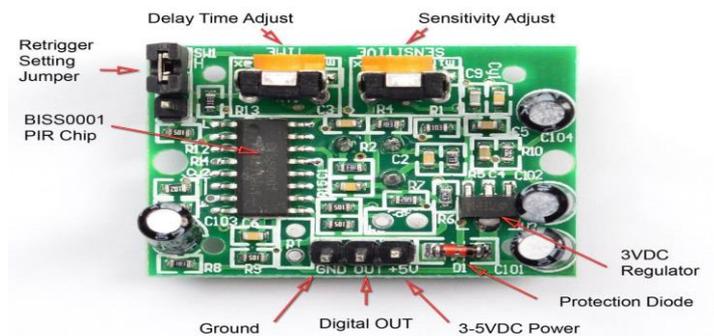


Fig -2. PIR Sensor Module

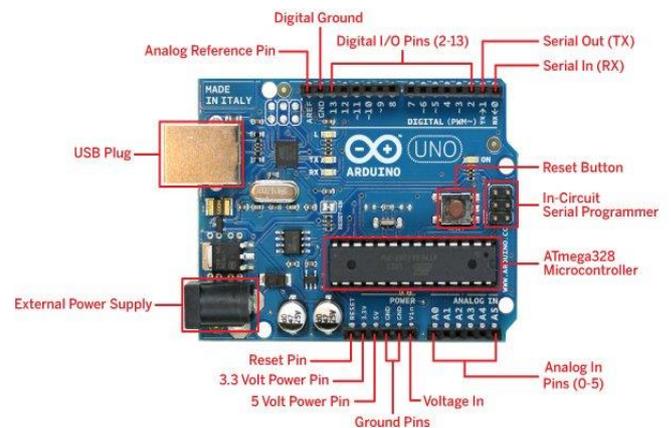


Fig-3. Arduino Board Uno

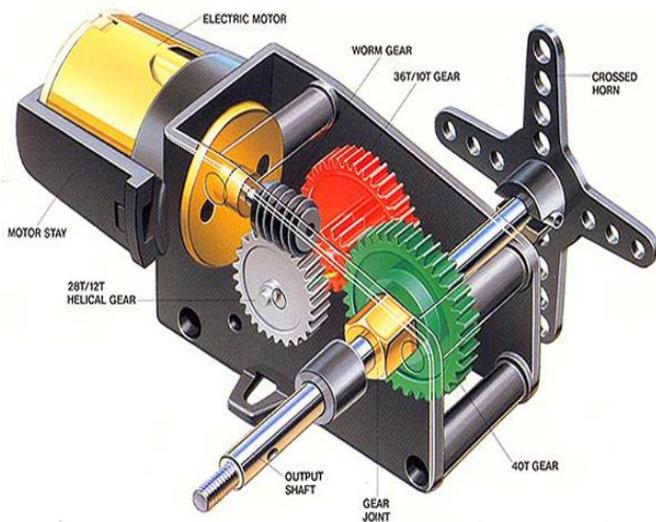


Fig-4. Internal structure of Servo Motor

4. CONCLUSIONS

Thus we have proposed an embedded security system of sensor networks and working principle of servo motor. The human movement is detected using the PIR sensors monitored by micro controller which then triggers the military guns by detecting the presence of person at specific instance of time and simultaneously maintains a database with respective timestamps of intruders.

REFERENCES

[1] www.google.com

[2] "Whole-Body Pose Estimation in Human Bi-cycle Riding Using a Small Set of Wearable Sensors", Yizhai Zhang, Member, IEEE, Kuo Chen, Student Member, IEEE, Jingang Yi, Senior Member, IEEE, Tao Liu, Member, IEEE, and Quan Pan

[3] "Detecting Direction of Movement Using Pyroelectric Infrared Sensors", Jaeseok Yun, Member, IEEE, and Min-Hwan Song

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