AUTOMATIC TARGET DETECTING & SHOOTING GUN USING PIR SENSOR

Mr. Rodabasannavar Sharanabasappa¹, Ms. Shilpa Patil², Ms. Priti Chandagade³, Ms. Anuja Patil⁴
¹Professor, Electronics & Telecommunication Department
²,³,⁴Student, Electronics & Telecommunication Department
¹,²,³,⁴Sanjay Ghodawat Institute, Atigre – 416118, India

Abstract: In earlier days the border security is totally depending on soldiers. But it was very risky to save the life of soldiers this system will be helpful. Soldiers can be successfully replaced by this system. PIR sensor is the main part of this system which detects the object within the particular range and the ultrasonic sensor calculates the distance between object and the gun. If the object is crossing pre-defined boundaries then and only then the gun will shoot that object. For controlling these automotive actions we are using arduino. Combination of PIR and Ultrasonic gives perfect trigger action to the gun.

I. INTRODUCTION
Automatic target detection and shooting gun is applicable to detect and target any living object or any movement within the sensor range. Automation totally depends on PIR sensor, Ultrasonic sensor and Arduino controller and processor. Arduino satisfies all necessary requirements of automation. Arduino controls, gives commands and instructions to sensors and gun. PIR sensor detects the motion of the objects. If object tries to cross the boundary, then PIR generates signal and gives to arduino and it produces alert message. If object continues to go further then arduino gives command to shoot that object.

II. SYSTEM CONFIGURATION
a. Block Diagram:
Automatic target detection and shooting gun is totally wireless. This is one of the best advantage of this system. For controlling all the actions in the system we are using Arduino Uno. Arduino is the heart of this system.
b. Control system:
1. Arduino:
Arduino Uno is a microcontroller based on the AT mega 328. Uno means one in Italian and was chosen to mark the release of arduino software (IDE) 1.0. Arduino Uno has ICSP header and a reset button. It contains everything needed to support the microcontroller. We can connect arduino with computer using USB cables. It has number of facilities for communicating with microcontroller, other arduino. The arduino provides UART TTL (5V) serial communication. Arduino Uno is designed in such a way that it will reset software running on a connected computer. The Arduino Uno has a resettable poly-fuse that protects your computer's USB ports from shorts and overcurrent. Arduino Uno has length and widths are 2.7 and 2.1 inches respectively. In this system arduino controls all sensors and gun. arduino gives alert message to crossing object through voice module. It gives commands to motors. There are two motors used, one for rotate the gun and another for pressing the trigger of gun. Using PIR sensor, Ultrasonic sensors, voice module, and gun this system will detect and shoot the object.

Specifications:
Microcontroller- ATmega328
Operating Voltage -5V Input Voltage (recommended) 7-12V
Input Voltage (limits) -6-20V
Digital I/O Pins -14 (of which 6 provide PWM output)
Analog Input Pins- 6
DC Current per I/O Pin- 40 mA
DC Current for 3.3V Pin -50 mA
Flash Memory -32 KB of which 0.5 KB used by bootloader
SRAM- 2 KB
EEPROM -1 KB
Clock Speed 16 MHz

b. Object detecting system:
1. PIR Sensor:
PIR sensors used to sense motion, always used to detect a human has moved in sensor range. PIR also referred as "Passive Infrared", "Pyroelectric", or "IR motion" sensors. PIRs are basically made of a pyro-electric sensor, which can detect objects using infrared radiations. Motion sensor detector split into two halves. If one half sees more or less IR radiation than the other, the output will swing high or low. In this system that needed to detect person or object entered or crossing the boundary for this approach PIR is great. PIR sensor has two slots of operation, these are sensitive to IR. Both slots detect the same amount of IR if the sensor is idle. When the human or animals passes from its range then first intercepts one half of the PIR sensor that causes positive differential change between the two halves. If that object leaves the sensing area then it generates negative differential change. That both changes give what exactly detected.

In this automatic gun, PIR detects the objects. If the object entering in the sensing range then it will send message to the arduino. depending on the PIR output arduino gives commands to other equipments used in this system.
Specifications:
Size: Rectangular
Output: Digital pulse high -3V (motion detected)  
digital low (no motion detected).
Sensitivity range: up to 20 feet (6 meters) 110° x 70° detection range.
Power supply: 5V-12 V

2. Ultrasonic sensor:
   In this system the ultrasonic sensor is used for non-contact distance measurement purpose.
   distance measurements from about 2 cm (0.8 inches) to 3 meters (3.3 yards) can be possible using this sensor. It is very easy to connect this sensor with microcontroller like arduino, it requires only one I/O pin. This sensor transmits ultrasonic burst and providing a output pulse which is corresponds to the time required for the burst echo signal returns to the sensor. By measuring the echo pulse width, the distance between the target and sensor can be easily calculated. If more than one object will tries to cross the boundary then the sensor will calculate distances of all the objects and gives that to arduino, then arduino gives command that which object is near to the system that will shoot by the gun.

Specifications:
Supply voltage: +5 VDC
Supply current: 30 mA typ; 35 mA max
Communication: Positive TTL pulse
Package: 3-pin SIP.
Operating temperature: 0 – 70° C.
Size: 22 mm H x 46 mm W x 16 mm D (0.84 in x 1.8 in x 0.6 in)
Weight: 9 g (0.32 oz)

3. Voice Module:
   In this project voice module is also very important part as it is used for giving warning message to the offender. When an offender comes in range of PIR sensor it will detects the motion after that the ultrasonic sensor will measure the distance of the offender. If the distance is less than pre-defined boundaries then the signal is generated and given to the arduino then it will generate the triggering action and the gun will shoot the target.

III. CONCLUSION

Thus, the automatic gun targeting system is feasible for highly secure area such as border. This system will save the life of soldier. This system consist of microcontroller, voice module, ultrasonic sensor and targeting gun. Automatic targeting system totally depends on PIR sensor. To increase the security level on the border this system is introduced.

Automatic Gun targeting System will not fully remove the responsibility from their soldiers, but shares the maximum responsibility and will reduce human mistake on the border. This system further implemented by using image processing like face recognition system. This system also used for home security. This is shows better results in highly secured areas.
REFERENCE


II. https://learn.adafruit.com/PIR-passive-infrared...motionsensor/overview
