INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact Factor: 6.078
(Volume 8, Issue 3 - V8I3-1342)
Available online at: https://www.ijariit.com

Gun mechanism for border security

Shweta Ganpat Rathod
shwetar450@gmail.com
Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra

Pranav Srinivas Macha
pranavmacha14@gmail.com
Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra

Shrutika Shripat Bhosale
bhosalesshrutika1996@gmail.com
Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra

Mayank Prashant Pawar
mayankpawar52@gmail.com
Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra

Jagdish Mandhare
jagdish.mandhare@bvcoenm.edu.in
Bharati Vidyapeeth College of Engineering, Navi Mumbai, Maharashtra

ABSTRACT

The aim of this project is to develop and design semi-automated sentry gun security system in order to detect, track and shoot the target for surveillance operations. This project is of sentry gun which will be semi-automatic using Arduino controller. It is a global issue that everyone wants to protect themselves and their beloved nation fromvarious threats and dangers and keep their surrounding safe. This is a Bluetooth based targeting gun system as the name suggests, it is based on digitally controlled gun mechanism. This mechanism is built for good performance in the field with high sum accuracy, self-reloading gun and ultimately used for soldier's assistance. The gun mechanism used here is called as sentry-gun because it has a gun mounted on a wall or stand and an operator can operate it from a control room via remote.It uses IP camera to scan the area under surveillance and motion in that area is detected by PIR sensor. It can definitely perform better in the area where human presence is prohibited. It will bring positive outcomes and reduced number of death toll, if installed at every border and lawenforcement agencies, to stop undesirable & illegal intrusion.

Keywords *—Sentry Gun, Bluetooth, Arduino, Security, Camera.*

1. INTRODUCTION

These days security is that the major issue for everywhere the planet. Security is incredibly vital so as to safeguard vulnerable and valuable assets like someone, dwelling, community and nation from any damage. International security problems are important, particularly border and coast security to any country. Secure border is one amongst the bigger responsibilities of one's nation that is completed by the troopers however still troopers square measure kinsmen and that they have limitations conjointly which might cause a hole in security particularly this happens in areas of high- altitude pressure and vasoconstrictor. during this epoch, computer-based security instrumentality is incredibly widespread among forces as a result of their additional advance and safer. for instance, drone technologythe "unmanned aerial vehicle" that is controlled mechanically by laptop is incredibly widespread of late.during this technology, the target is chosen and hit by victimization computer-based algorithms as well as image process techniques.

Real time image and video process for object detection and trailing has several vital applications within the field oflaptop vision (B. Coifmanet al., 1998), like video police investigation, military functions etc. the supply of prime quality and cheap video cameras and also the increasing want for machine-controlled video analysis has generated an excellent deal of interest within the areas of motion detection, object trailing and object targeted. Thus, it's attainable to spot 3 key steps in video analysis: detection of attention-grabbing moving objects, trailing of the detected objects from frame to border, and analysis of the article tracks to acknowledge their behavior and target the article consequently.

This system not solely detects intrusion however conjointly provides with automatic firing strategies that should be wont to mechanically find and hearth at the target. Hence, many kilometers of the borders, which might have otherwise needed many personnel, will be monitored with less effort during this system, with solely some personnel. Since, the firing specifically happens solely once authoritative personnel have doubly confirmed the presence of a foreigner, probabilities of firing at people square measure reduced. As thermal imaging or infrared square measure used for viewing, this technique is resistant to changes in appropriate conditions, and thus, is equally suited to operation throughout the night. This project conjointly throws lightweight on the example of this technique, that has been with success developed.

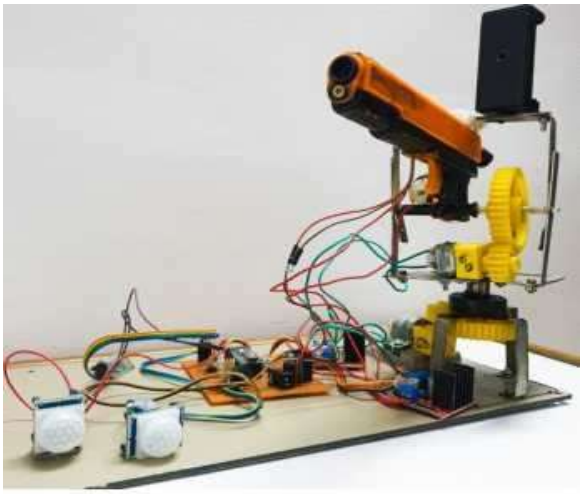

Figure 1: Project Snapshot 1

Figure 1. Project snapshot

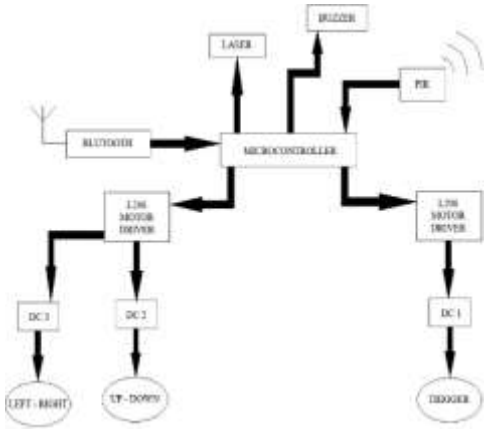

Figure. 2.Block Diagram of the working

2. THE WORKING

The working of the prototype falls into various stages starting from the PIR sensor. As soon as the highly angled PIR Sensor detects a signal incoming from the field the gun system has been deployed, it shall buzz the buzzer via relay to signal and alarm.

As the initial part has been confirmed as a moment in the field, the main gun system is initiated. The system switches on the laser beam and the frame maneuvering DC motors. The gun is now ready to target.

The operator, with the help of live streaming IP camera, observes the movements in the given field very carefully. The in charge of the control room confirms if there is an intruder trying to trespass the given area as per the notification of the operator as seen on the camera. Theoperator controls the gun movement through the Bluetooth based remote to wirelessly through function keys. Once the laser sight aligns with that of the target as observed through the camera, the gun is set to fire. Once it has been confirmedas an instruction to fire, the third de motor is given with a signal to pull the trigger of the machine gun. And thus, shoot firing rounds to the target for ensuring no casualty. Thus, the operation is concluded.

The hardware part of the function involves the following:

1. Initially the PIR sensor is turned on, and it detects asignal.
2. The processed signal of PIR sensor is carried to the microcontroller which further signals the relay 1 to buzz thebuzzer.
3. Once the buzzer goes on, it is reset by the buzzer reset function key. It concludes the use of PIR sensor andthe buzzer to alarm.
4. Once the gun system is initiated, it turns on the laser sight, 3 DC motors namely M1 M2 and M3 and the IP camera.
5. The visuals on the screen by the IP camera is used to point the given laser sight to the target.
6. To complete this movement, the motors M2 and M3 are deployed to work and operate the left-right and up- down movements of the gun point.
7. Once the maneuvering of the gun point is allocatedon the desired point, the aiming job is done.
8. M1 is the prime DC motor which pulls the trigger with a strong polyester string and also releases it as soon as the function key is stopped so that the trigger goes back to the initial position.
9. Overall, this process concludes the hardware operation.

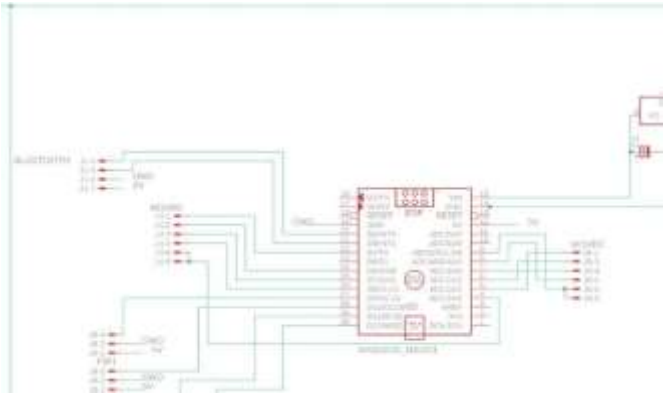

Figure 3. Circuit diagram

3. MODES OF OPERATION

As this project is semi- automatic there are two modes of operation, described as below: -

3.1 Automatic mode

In automatic mode sentry gun system would be mounted on wall or terrain at a fixed location. It initiates to automatically aim and shoot the target detected by PIR sensor in the area under surveillance. This mode of operation is used in area where nobody's presence is prohibited. So, it would shoot anyone who enters the zonedespite the fact whether there is an enemy or an animal oran ally.

3.2 Manual mode

In manual mode the system is controlled by the operatorfor hitting the particular target from a safer location. Asthe PIR sensor detects the motion and its processed signal is carried to microcontroller resulting in sound of buzzer. This sound alerts the operator and operator can view the location under surveillance via IP camera screen and can aim the exact target and shoot it. Thus, this system can be operated without being present on site.

4. HARDWARE & COMPONENTS

- Air soft gun
- Microcontroller
- DC Motors
- PIR sensor
- Motor Driver
- Relay
- IP Camera
- Buzzer
- Laser
- Adapter
- Wires
- PCB board

5. APPLICATION

Not only on the border, this project can be used in many terrains. Consider a radioactive mine say uranium mine, where the workers, the system operators and the team cannot step in directly unless and until they wear radiation protective gears. There can be a possible intrusion within themind where it may take a while for the security operators to reach to the site and take action also where it is mandatory tobe a highly secure zone without an intrusion. Installation of this project in such areas can result in performing immediateaction. In the sites where the human reach is very difficult, which may include climbing and running through rough terrains such as rocky surface, dense woods or probably at anextremely high or low temperature, it becomes very difficultfor the security squad to actively survey over all the risk prone areas. These are the zones which can be highly required for the installation of these sentry guns. It can be possibly mounted on any terrain and can be angled to use in the given area. Apart from that it can be used at very important places which need to have a tight security such ascyber database centres which has stored important information, government vaults or the military basis and theirtraining fields. Nevertheless, it is primely designed to be installed in the areas of national outskirts and boundaries which are prone to be under an intrusion by the terrorist forces or mostly the people with unethical religious or territorial agendas. Every time it is not quite possible for the army troopers to monitor the area 24 by 7. This project shall certainly reduce the efforts of the troopers in such cases. Thus, it would ensure safety as well as reliability of the technological advancement in arms and ammunition.

6. ADVANTAGES

1. This set up not only helps in protecting the soldiersbut also in reducing their efforts.
2. This setup is designed in such a way that it will lastfor many countable years without much wear and tear provided with proper maintenance done periodically.
3. Since the machine gun is manually controlled, there is no chance of fighting our own forces or risking the life off an animal.
4. The most considerable advantage is that, since the gun is attached to a moving plate Connected to servo motor or DC motors for gun moments, it also helps introducing recoil to a great extent so that target remains under focus and not much ammunition is required.

7. SCOPE OF PROJECT

This project design has 3 types as below:

Mark 1: - Manual

In this design operator presence is mandatory in order to keep watch on the area under surveillance.

Mark 2: - Semi automatic

In this design the Pir sensor will detect the motion,carry that signal to microcontroller which will buzz the buzzer alerting the operator at safer location and the operator will initiate gun. He will aim the target and press the trigger to shoot the target.

Mark 3: - Fully automatic

This will include every operation to be automatic.

No human presence will be required. The gun aiming totarget and shooting will be done automatically.

Mark 4: - Drone gun

The system can be attached to drone for betterperformance.

8. CONCLUSION

This paper is intended to safe guard the boundaries at extreme conditions, wherever human intervention is incredibly troublesome and save the valuable live of our troopers. it's accustomed scale back the ability consumption of the microcontroller exploitation OS ideas. The hardware of the system includes mechanical structure principally consists of accessible instrumentation that create it a coffee budget mechanism. It's not the ultimate style it is changed with such a big number of modifications like with image process, 3D camera and face/colour/object recognition. Preferring security purpose we will additionally add voice or code watchword recognition. to enhance gun's performance, we will introduce AI rule during this system. The direction of the optical device is accurately seen by alleging the camera with relevance the stepper motor. This system not solely detects trespasser motion however additionally offer video coverage of the key space, for remote observation, via sensor-based communication involved with the threats to thestate at the border with enemies in blasting the bottom camps, weapons, machinery and heap of warfare materials of high price. This model is made in such how that it's progressing to acquire the info by a camera and method, andso makes a firing doable.

9. REFERENCES

[1] Husnain Ahmad, Syed Mohsin Ali, Usman Ayub Sheikh, Zain Murtaza, Muhammad Rizwan, "Design and Manufacturing ofa Low-Cost 2-DOF Autonomous Sentry Gun" (IEEE Conference, pp.196-201, 2016).

[2] Jean Kumagai, "A Robotic Sentry for Korea's Demilitarized Zone", (IEEE Journals & Magazines, vol.44, pp.16-17, 2017).

[3] Sam Shue, Dr. Claude Hargrove, Dr. James Conrad, "Low Cost Semi-Autonomous Sentry Robot", (IEEE Conference, pp.1-5, 2012)

[4] Et. Karthikrajan, "Multi terrain robotic vehicle with step climbing mechanism", (International Journal of Advanced Research in Basic Engineering Sciences and Technology (IJARBEST)

[5] D. Ramya , V .C. Mahavishnu , Y. Rajkumar , K. Sujatha, S. Mohana Gowri, R.Vidya, "IoT based Frontier Security and Tracking System for Indian Fishermen using a Threshold based Algorithm" International Journal of Pure and Applied Mathematics, Volume 117 No. 22 2017, 271-274

[6] Prajakta S. Joshi, Honrao S. B.," Advance Border Security Using Android Application", IJARIIE-ISSN(O)-2395-4396,Vol-2 Issue-3 2016

