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Laser Based Border Security System Using Automatic Gun Fire

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ABSTRACT: Laser-Based Border Security System with Automatic Gunfire (LBSAG) integrates cutting-edge laser technology with automated firearms to bolster border protection. Upon detecting an intrusion, the system initiates a series of automated actions. Firstly, high-resolution cameras and sensors capture real-time images and data, providing comprehensive situational awareness to security personnel. Simultaneously, an advanced algorithm analyse the data to determine the nature and severity of the threat, distinguishing between humans, animals, or false positives. To prevent accidental or unauthorized firing, the LBSAG employs a multi-layered authentication system that requires multiple security clearances and ensures that only authorized personnel can access and control the system. Additionally, strict guidelines and protocols are in place to prevent any misuse or false alarms. The LBSAG offers several advantages over conventional border security systems. The laser-based technology provides an invisible barrier, minimizing visual obstruction and preserving the aesthetic of the surrounding environment. The automated gunfire mechanism reduces response time, enhances accuracy, and improves overall security effectiveness.
In conclusion, the Laser-Based Border Security System with Automatic Gunfire (LBSAG) is a cutting-edge solution that combines laser technology and automated firearms to enhance border security. By providing an invisible barrier and swift response to intrusions, this system aims to improve border protection, safeguarding national borders from potential threats

KEYWORDS: Ultrasonic Sensor, Arduino Uno and LCD display.

I. INTRODUCTION

Laser-based border security system ensures effective monitoring and detection of unauthorized border crossings in a mini project scenario. The system should employ laser technology to create a reliable and robust barrier to detect and prevent unauthorized individuals from breaching the border. It is a technology designed to enhance border protection and control by utilizing lasers and automated firearms. This system combines advanced sensors, surveillance equipment, and computerized targeting to detect and respond to potential threats along a border or perimeter.
Traditional border security systems often face challenges in effectively detecting and responding to unauthorized border crossings. To address these challenges, an advanced laser border security system equipped with automatic gun fire has emerged as a robust solution. This system combines cutting-edge laser technology with intelligent automation to provide enhanced situational awareness, rapid threat detection, and immediate response capabilities.

II. METHODOLOGY

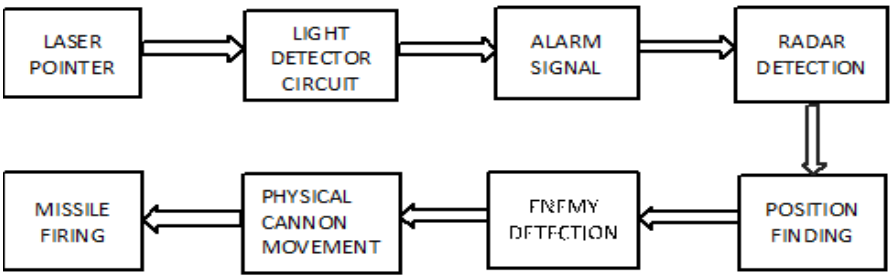

Fig.1: Block Diagram

Block diagram shown in fig.1 consists of two parts:
1) Laser detection 2) Radar position detection

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- Laser pointer acts like transmitter, light detector circuit acts like receiver and from alarm signal up to missile firing acts like control unit.
- Laser light falls on LDR, an object/enemy is not detected execution is stopped. When an object/enemy passes through that fencing area then alarm signal is detected, radar finds the position of that in the control room and the cannon is physically moved and then missile is fired.

Fig 3 shows the schematic diagram and Fig.4 sows the model of RADAR with servo motor that can rotate up to 180 degrees and can range up to 35centimeters

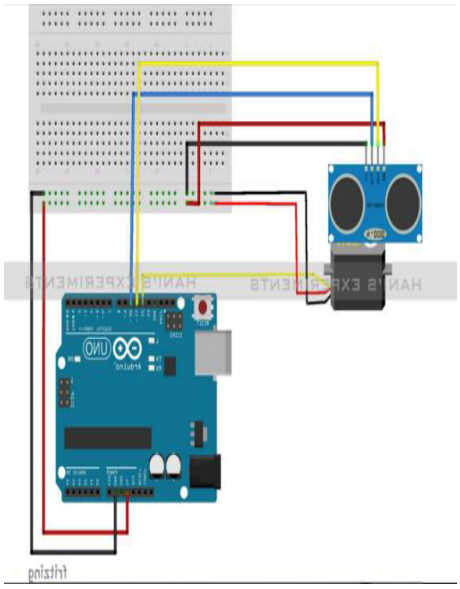

Fig2: Schematic diagram

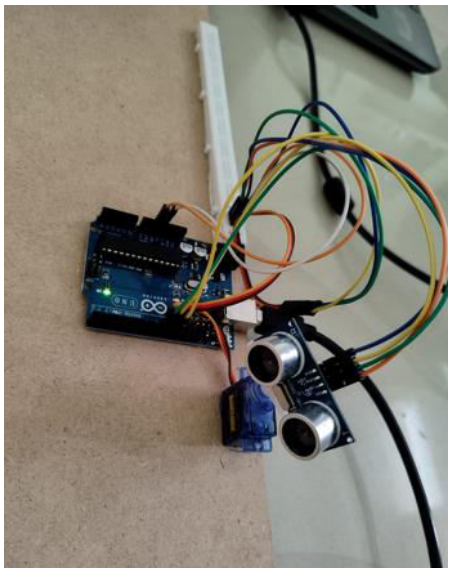

Fig 3: Model of RADAR with servo motor.

III. IMPLEMENTATION

ALGORITHM

Include the Servo library for controlling the servo motor.
Define the trig Pin and echo Pin for the ultrasonic sensor.
Declare variables for duration and distance.
Create a Servo object called my Servo to control the servo motor.
In the setup () function:
Set the trig Pin as an output pin.
Set the echo Pin as an input pin.
Initialize the serial communication.
Attach the servo motor to pin 12.
In the loop () function:
Rotate the servo motor from 15 to 165 degrees in increments of 1 degree.
For each degree, call the calculate Distance () function to measure the distance using the ultrasonic sensor.
Send the degree and distance values to the Serial Port for monitoring.
Delay for 30 milliseconds before the next iteration.
Repeat the above steps from 165 degrees to 15 degrees (in reverse order).
The calculate Distance () function:
Set the trig Pin to LOW for a short duration.
Set the trig Pin to HIGH for 10 microseconds to send an ultrasonic pulse.
Set the trig Pin back to LOW.
Measure the duration it takes for the echo to return using pulseIn() function.
Calculate the distance based on the duration using the speed of sound.
Return the calculated distance.

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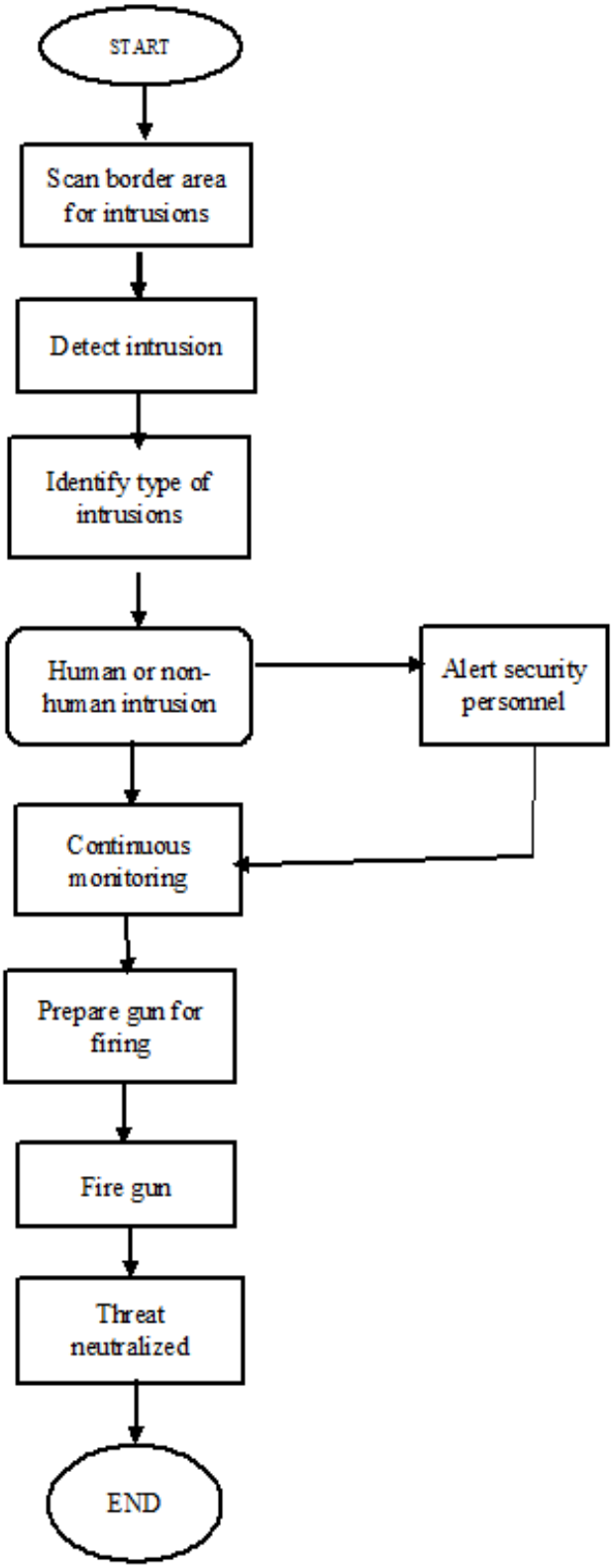
FLOWCHART



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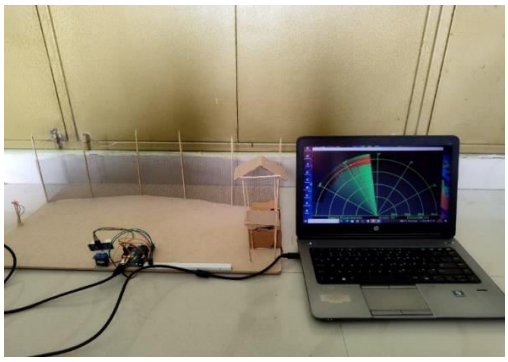
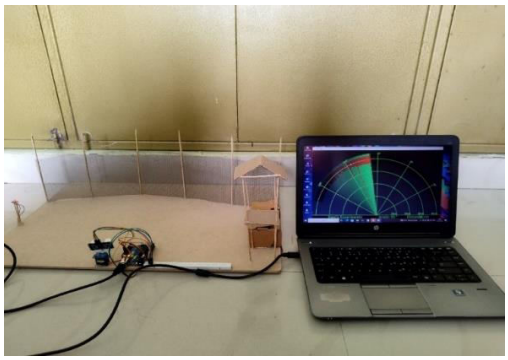
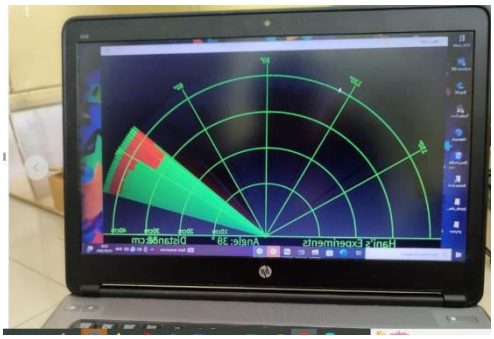
IV. EXPERIMENTATION



Step 1: Invisible LASER light will be present .if it gets interrupted then the signal will be send to the buzzer



Step 2: Once the buzzer starts to blow ,the radar activates and the interrupted area starts to be red in the system



Step 3: Radar is able to range based on the requirement. .It continuously monitors the desired range as seen in the image

Result description:
The model of RADAR with servo motor can rotate up to 180 degrees and can range up to 35centimeters.
Laser light falls on the LDR, when an object/human crossing the laser border, alarm signal is detected and then radar is finding the position in the control room, when position is detected then we can move the cannon physically and fire the missile.

V. CONCLUSION AND FUTURE SCOPE

Laser security systems have the potentials to be effective tools for border security, but they also come with certain limitations. While they offer advantages such as accuracy, sensitivity, and invisibility.
The decision to use laser security systems for border security should be based on through assessment of the specific requirements, budget constraints and environmental factors. A holistic approach that combines various security measures can help to create a robust and reliable border security system.

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Future scope

Enhanced Precision: Laser-based border security systems can provide a high level of accuracy and precision in identifying and engaging targets. Laser beams can be precisely focused and controlled, allowing for targeted disabling or immobilization of unauthorized vehicles or individuals, while minimizing collateral damage.
Increased Range and Speed: Advanced laser technologies could provide extended range capabilities, allowing border security systems to cover larger areas with fewer physical installations. Moreover, lasers can travel at the speed of light, enabling rapid response times and swift engagements, making it challenging for intruders to evade or overcome the system.

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