AUTONOMOUS THREAT INTERCEPTION SYSTEM

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Abstract: The purpose of this project is to design and construct automatic missile detection and destroying system. This system is designed to detect the target (missile) and any other objects moving in multiple directions. The target destroying system moves automatically in the direction of missile or object and fires it upon fixing the target. This system consists of an intelligent sonar-based object tracking system that continuously monitors the target. Upon detecting the target it checks for temperature and sends the target's location to a Central Control System. The Central Control System takes the action of moving the firing mechanism in the direction of object target (missile). Upon fixing the direction, it sends the control command to firing system for attacking the target. This project comes with two modes such as Automatic mode and Manual mode in former mode detecting and firing is done automatically and in latter everything will be done by humans. In this project we are making use of ultrasonic radar system and a DC geared motor driven firing unit interfaced with a Microcontroller based control unit. We prefer ultrasonic sensor to because the Ultrasonic sensors covers larger sensing distance and it can detect the target in all the lighting conditions (day or night).And this system is also covered with Accelerometer sensor for gesture controlled firing system. The system is also enabled with live stream camera and IOT communicator.

Keywords: Machine learning, Internet of things

I. INTRODUCTION

The purpose of this project is to design and construct automatic object or missile detection and destroying system. This system is designed to detect the target (missile/object) moving in multiple directions. The target destroying system moves automatically in the direction of missile and fires it upon fixing the target. This system consists of an intelligent sonar based object tracking system that continuously monitors the target. Continuous Live streaming can be seen by Central Control System using esp32 camera. . Upon detecting the target it checks for temperature of object to check for human presence and if found danger sends the target's location to a Central Control System. The Central Control System takes the action of moving the firing mechanism in the direction of target (missile).

Upon fixing the direction, it sends the control command to firing system for attacking the target. In this project we are making use of ultrasonic radar system and a dc motor driven firing unit interfaced with a Microcontroller based control unit. We prefer ultrasonic sensor to IR sensor, because the Ultrasonic sensors covers larger sensing distance and it can detect the target in all the lighting conditions (day or night).

II. LITERATURESURVEY

[1] "Army to deploy remote controlled guns at LoC to take on infiltrators HINDUSTAN TIMES(DATE ON 5th OCT,2015)":

The locally-developed integrated contraption uses a mix of infrared sensors radiating a grid of beams to detect any movement up to a distance of 80 meters ahead of the border fence. The distance between the fence and the LoC can vary from 50 meters to over 2km depending on the terrain. The sensors are linked to automatic guns mounted on rotors and mated to night-vision cameras providing live images to commanders manning workstations. A buzzer is sounded if the grid is broken, swiveling the weapon in the direction of the intrusion site.

[2] "video capture system using Arduino Uno". By D. Jeevanand:

The proposed system works on capturing video and distributing with networked systems. And besides alerting the administration person via SMS alarm as required by the client. Their system was designed to work in a real-time situations and based on Arduino Uno SBC. Contrasting to other embedded systems their real-time application offers client video monitor with the help of alerting module and SBC platform.

[3] "Eye Tracking System with Blink Detection", by S. Naveed and B. Sikander:

The goal is to implement the system (model) for a particular face. And distinguish it from a large number of stored faces with some real-time variations as well. It gives us efficient way to find the lower dimensional space. Further this algorithm can be extended to recognize the gender of a person or to interpret the facial expression of a person.

[4] "Design and Implementation of e-Surveillance Robot for Video Monitoring and Living Body Detection". by Dr. Shantanu, Mr. S. B. Dhayagonde:

This system that consists of a mobile robot, controlled by Internet, which has camera mounted and a PIR sensor for detecting the living bodies. User will be able to control the robot through internet, thus, providing the wireless control of robot. Also information regarding the detection of living bodies will be given to the user on the webpage from the PIR sensor. Simultaneously user will be able to access the video transmission from the robot.

[5] "Android Based Autonomous Intelligent Robot for Border Security", by C. M. Naveen Kumar:

An autonomous intelligent robot which identifies trespasser using PIR motion sensor, alerts security personnel. It captures image of the trespasser using camera. And mails this image to specified e-mail id using Arduino Uno processor.

[6] Dr. Shantanu K. Dixit, Mr. S. B. Dhayagonde, "Design and Implementation of e- Surveillance Robot for Video Monitoring and Living Body Detection,":

A paper proposed a system that is designed to develop a video International Journal of Pure and Applied Mathematics Special Issue 68 monitoring, capturing the image and to store video frames in SD (Secure Digital) memory mounted on the robot for further verification. A mobile application has been developed that interfaces smart phone with the security system over Wi-Fi (Wireless Fidelity) network.

[7] Sarath Chandran.C and Anjaly k, "Real time video controlled traction for surveillance robots in coal mine,":

Sarath Chandran.C and Anjaly presented a novel video based coal mine rescue robot. If the coal mine disaster occurs, the situation will be unknown and it is very dangerous to go to the mine without knowing any environment situation. The first mission of the rescuers is to detect the mine situations by considering various parameters.

[8] Aji Joy, Ajith P Somaraj, Amal Joe, Muhammed Shafi, Nidheesh T M "Ball Tracking Robot Using Image Processing and Range Detection,":

A paper proposed a working in which a video moving object-tracking method is proposed. The segmentation of the video is done by contextual clustering. Clustering is an important method in data analysis because of its ability to „discover" the inherent features in the data. The fundamental concept in clustering techniques is to group a given set of objects into subsets according to properties associated with each object, so that the members in each individual subset share some similar properly defined features. Hence, a multitarget human tracking is attempted.

[9] "Implementation of spy robot for a surveillance system using Internet protocol of Arduino Uno. Date Added to IEEE:15 January 2018":

At present the surveillance of International border areas is a difficult task. The border guarding forces are patrolling the border seriously, but it is not possible to watch the border at each and every moment.

[10] "Aframework forinteractive teaching of virtual borders to mobile robots. Date Added to IEEE: 14":

The increasing number of robots in home environments leads to an emerging coexistence between humans and robots. Robots undertake common tasks and support the residents in their everyday life. People appreciate the presence of robots in their environment as long as they keep the control over them.

[11] "Work in progress - Using robot in developing the concept of angle for elementary school children. Date Added to IEEE: 04 January 2008":

In our work-in-progress project that integrates educational robot technology into elementary school classroom, Digi-Robot is brought into children's learning of angle. In this paper, a real time tracking system by vision is presented. Thanks to it, the interaction between the human and the robot is simplified for example, in the case of the remote control of mobile robot.

[12] **"Realtime tracking system by vision simplifying the interaction between human and robot for remote control of mobile robot Date Added to IEEE: 10 November 2009":**

In our work-in-progress project that integrates educational robot technology into elementary school classroom, Digi-Robot is brought into children's learning of angle. In this paper, a real time tracking system by vision is presented. Thanks to it, the interaction between the human and the robot is simplified for example, in the case of the remote control of mobile robot.
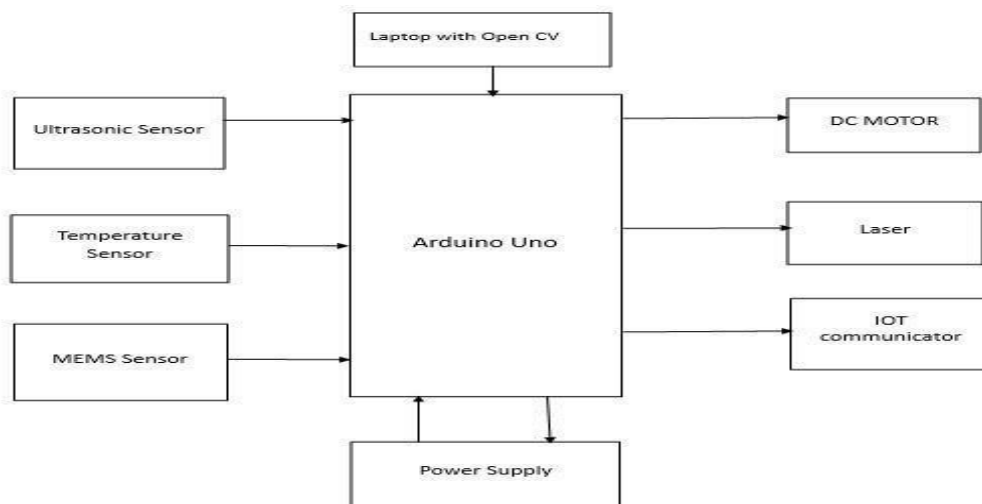
III. METHODOLOGY

Fig 1 Block Diagram

☐ **Laser Module:**

Depending on the input received from camera if face recognition fails then immediately Pi initiates Motor and initializes the laser to shoot the unauthorized entered person. In the circuit diagram the gun firing control mechanism is replaced with LED. When the LED will not glow, means no object sensed by the sensor, so the gun will not fire means the LED is off.

When the port will be high on the object detection by the sensor, the transistor LED on means the object completely destroyed by targeting gun. a device that generates an intense beam of coherent monochromatic light (or other electromagnetic radiation) by stimulated emission of photons from excited atoms or molecules. Lasers are used in drilling and cutting, alignment and guidance, and in surgery; the optical properties are exploited in holography, reading barcodes, and in recording and playing compact discs.

☐ **Getting Location:**

GPS module is connected to the Arduino Uno in order to find the current location of the bot. The GPS statement is being sent as a set of packets of data so that it can be decoded to find International Journal of Pure and Applied Mathematics Special Issue 70 required data (i.e.) direction, timing, location and lot more. Each electric panel contains switches that redirect electricity. An electrical switchboard is a single large panel or can be a combination of electrical panels on which switches and other power control equipment are mounted.

The main purpose of the board is to control the flow of power. It divides the main current supplied to it into several smaller chunks and distributes it to the devices. In precise, switchboards supply power to transformers, panels, and other equipment and from there power further gets distributed. The GPS statement we receive should be sent by at least three or more satellite such that it becomes valid.

☐ **Rover Movement:**

Arduino Uno is used for two mode of action. The Remote-Control mode, where the rover is controlled manually from remote International Journal of Pure and Applied Mathematics Special Issue 69 device through the web server connecting it with an internet connection. This is done when the signal is passed from the Arduino Uno and being the master controls the movement of the rover. The movement of the robot is controlled with keys for all four directions besides with start and stop function in the web server. During autonomous mode the rover is programmed through the Arduino Uno while the ultrasonic sensor detects in case of any obstacle and changes its direction accordingly.

IV. FLOW CHART
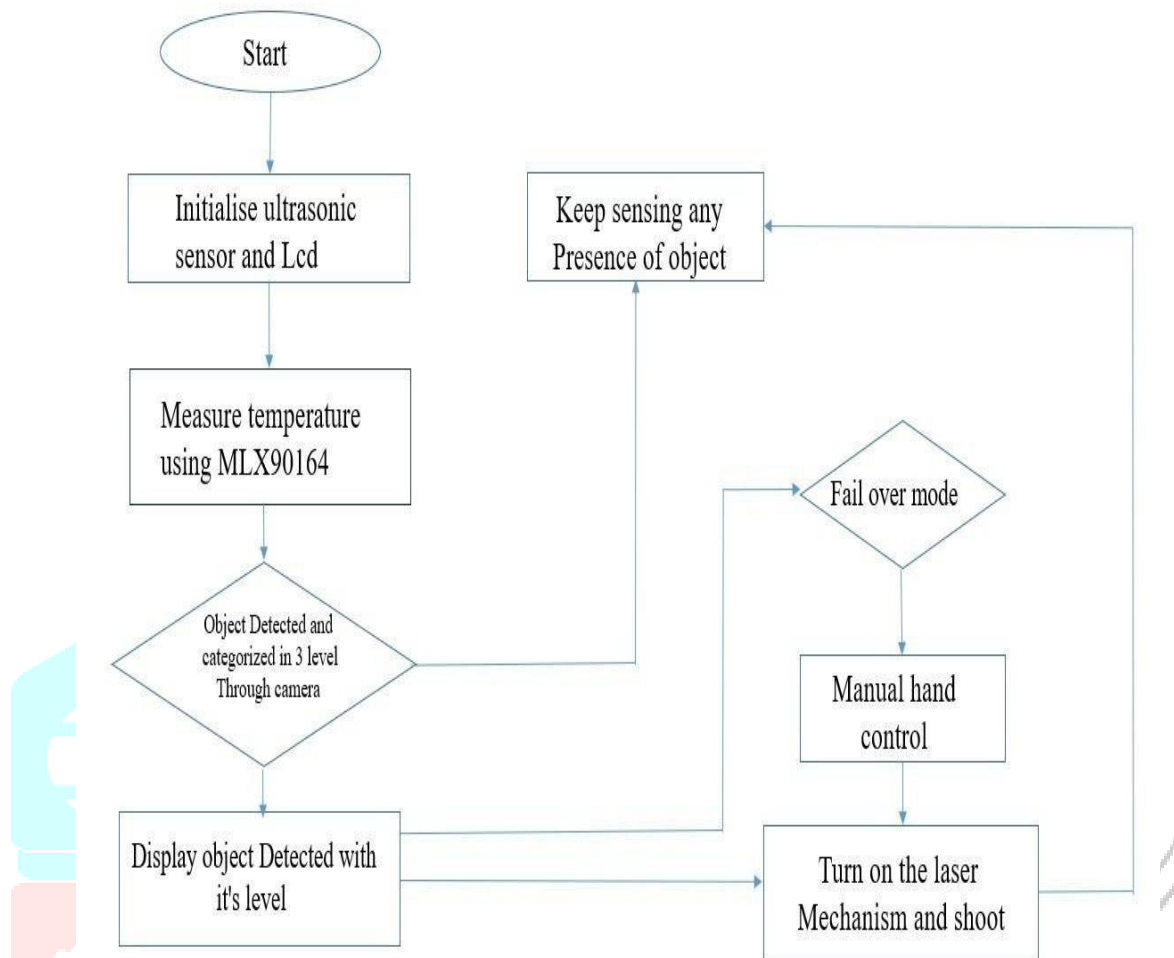
V. ADVANTAGES

1. Communication is possible in any language.
2. Small in size: Due to small size we can place its hardware on our hand easily.
3. Flexible to users.
4. Easy to define gestures: we can add or define our own gestures

VI. DISADVANTAGES

1. Ethical and legal considerations.
2. Adaptation by threat actors.

VII. APPLICATIONS

1. Border Security.
2. Military Operations.
3. Critical Infrastructure Protection.
4. Emergency Response.
5. Event Security.
6. Customs and Border Protection.
7. Search and Rescue Operations.
8. Surveillance in Unmanned Areas.

IX. RESULT

The expected outcome is an integrated system that can detect missile threats, assess their trajectories, and automatically initiate interception or destruction measures. The system will also provide user-friendly hand-gestured control. The research aims to improve response times and accuracy in countering missile attacks while enhancing the human-machine interface .Fig 2 shows the unknown person detection which is classified as unknown based on soldiers face datasets. Fig 3 shows the laser light target on unknown person.

Fig 2 Detection of unknown person

Fig 3 laser shot on detection of unknown person

IX. CONCLUSION AND FUTURE WORK

A serious problem that has arisen in this century is attacks and smuggling. Due to improper and less security near border area. It is a major challenge on our part to project to detect these smugglers, intruders, terrorists and other illegal activities breaking the security. Since the border area is so large that effective patrolling is not possible and it require a very large amount of manpower, there has to be some kind of security system which can effectively provide more security. A border security system would cease all kind of illegal movements near the border and help BSF in controlling these activities in a better and more precise way. The border area is so large that effective patrolling is not possible and it require a very large amount of manpower, so this kind of security system which can effectively provide more security. In future the system can be implemented using face recognition , so that the system will work more efficiently.

The surveillance robot serves as a security monitoring device which replaces the human security at less critical areas where humans are really not necessary without compromising security. The outcome of this project deals with the recorded evidences of images when an unusual activity occurs and alerts to the remote host immediately. Henceforth, by enhancing the capabilities of these technologies and integrating them, we hope to introduce the 'Motion Detection' system and to contribute to the current security system. This system would be an alternative for expensive security systems being used in the present day.

REFERENCES

[1] SOURCE-Army to deploy remote controlled guns at LoC to take on infiltrators HINDUSTAN TIMES(DATE ON 5TH OCT,2015).

[2] "video capture system using Arduino Uno". By D. Jeevanand[2].

[3] "Eye Tracking System with Blink Detection", by S. Naveed and B. Sikander[3] .

[4] "Design and Implementation of e-Surveillance Robot for Video Monitoring and Living Body Detection". by Dr. Shantanu, Mr. S. B. Dhayagonde[4]

[5] "Android Based Autonomous Intelligent Robot for Border Security", by C. M. Naveen Kumar[5]

[6] Sarath Chandran.C and Anjaly k, "Real time video controlled traction for surveillance robots in coal mine," International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, Vol. 2, Issue 1, January 2014 .

[7] Dr. Shantanu K. Dixit, Mr. S. B. Dhayagonde, "Design and Implementation of e- Surveillance Robot for Video Monitoring and Living Body Detection," International Journal of Scientific and Research Publications, Volume 4, Issue 4, April 2014 1 ISSN 2250-3153.

[8] Aji Joy, Ajith P Somaraj, Amal Joe, Muhammed Shafi, Nidheesh T M "Ball Tracking Robot Using Image Processing and Range Detection," International Journal of Innovative Research in Computer and Communication Engineering Vol. 2, Issue 3, March 2014 ISSN(Online): 2320-9801.

[9] Implementation of spy robot for a surveillance system using Internet protocol of Arduino Uno. Date Added to IEEE:15 January 2018.

[10] A framework for interactive teaching of virtual borders to mobile robots. Date Added to IEEE: 14 December2017.

[11] Work in progress - Using robot in developing the concept of angle for elementary school children. Date Added to IEEE: 04 January 2008.

[12] Real time tracking system by vision simplifying the interaction between human and robot for remote control of mobile robot Date Added to IEEE: 10 November 2009.