IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

360 DEGREE RADAR FOR DEFENSE APPLICATION

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ABSTRACT

The idea behind the project is to develop a system that can provide additional security to our defence system. We are introducing a system that can be used in extreme climatic conditions where it is difficult to deploy our army personnel.

Our project is used for the detection of intruders, identifying them, and stopping them without any human loss. we use the ultrasonic sensor to detect the obstacle using the echo signals and we use cameras to capture the image of the intruders. Then we are using a laser to demonstrate a gun firing toward the intruder. A buzzer is connected to an Arduino microcontroller which can be used to warn the nearby local station. This project makes a huge difference in our defence system by eliminating any human less.

INTRODUCTION

Border security is the most significant part of India we should always update our security policies, and ideas to defend and use new technologies to eradicate human loss. Intruder means any unauthorized person who doesn't have any approval or official permission to enter into the territory. Most of the time these intruders lead to heavy damage to our country. We have encountered many attacks from neighbouring countries for many years. This type of attack has become very common.

This is leading to heavy damage to locals, army people, children, and women. Recently we have encountered at least 20 army personnel life loss due to Chinese intrusion in India this occurred in Himalayan areas. this attack happens in extreme conditions where an army cannot withstand the weather yet our army keeps an eye on those areas.

At borders, the most helpful technology is a radar which can help detect the position or detect any person coming from another side of the border but this is limited to doing a few things like detection and warning nearby stations.

But our project helps to eliminate most of the uncertain possibilities by using simple yet efficient technique. any time intruders enter our border major collateral damage occurs on our side. This happens because our army personnel defends there with their lives. To avoid this in our project we use the ultrasonic sensor to detect the obstacle using the echo signals and also we can install an automatic gun at the border which can be controlled far away from the border and shoot them on-site without causing any collateral damage.

METHODOLOGY

The working principle of the project is categorized into two parts one is Detecting the obstacle and the second part is automatic gun firing.

Part 1: - Detecting The Obstacle:

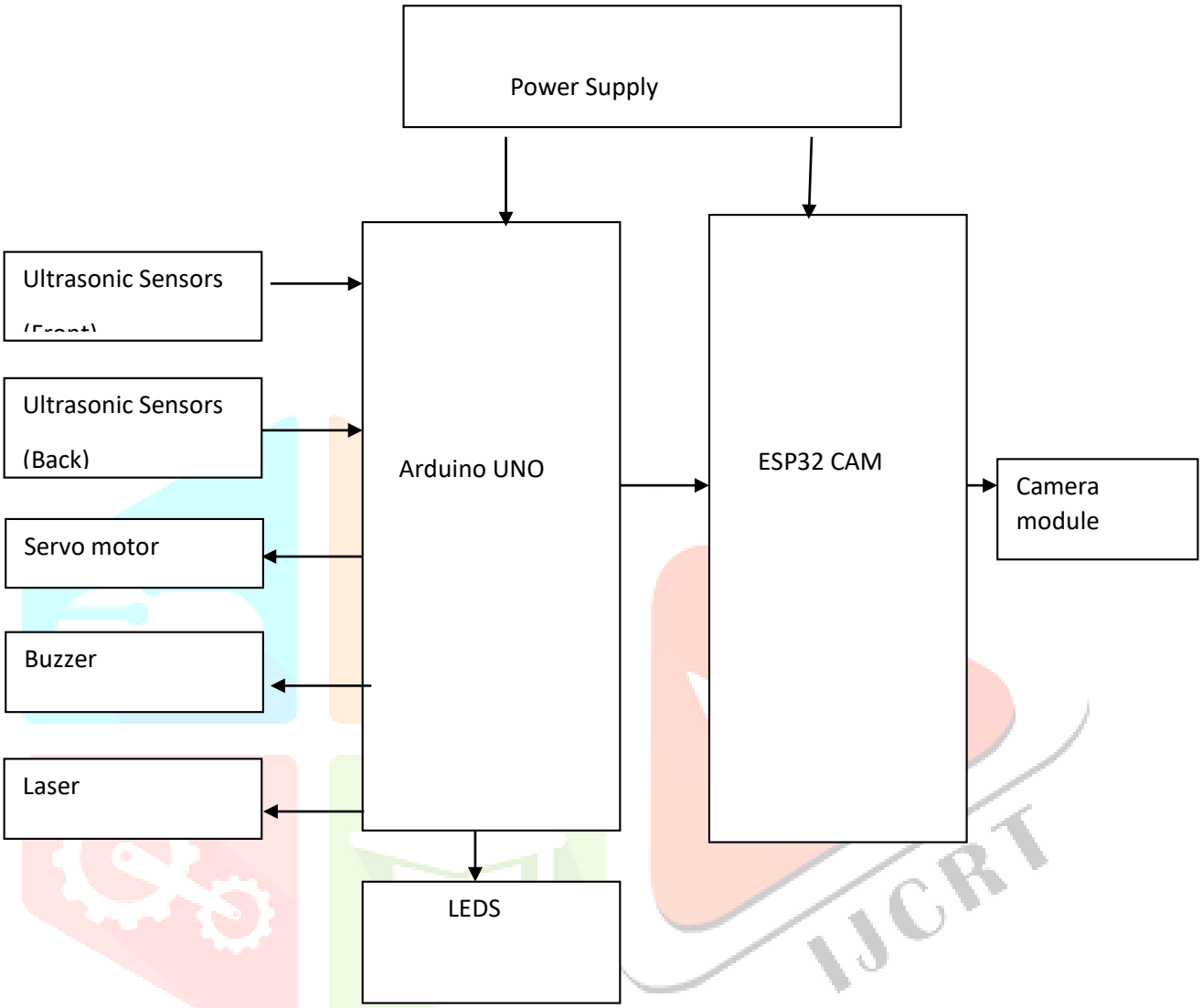
We use two Ultrasonic sensor are used to detect the obstacle around 360. We are using an Esp32 camera module whose spectrum range is 2412 ~ 2484MHz and is connected with a buzzer. The camera module will identify and the intru and a signal is sent to the buzzer using microcontroller, this will inform the officials about the intrusion. All this information can be live-streamed through a webpage. As esp32 camera module has inbuilt Wi-Fi connectivity.

Part 2: - Automatic gun firing unit.

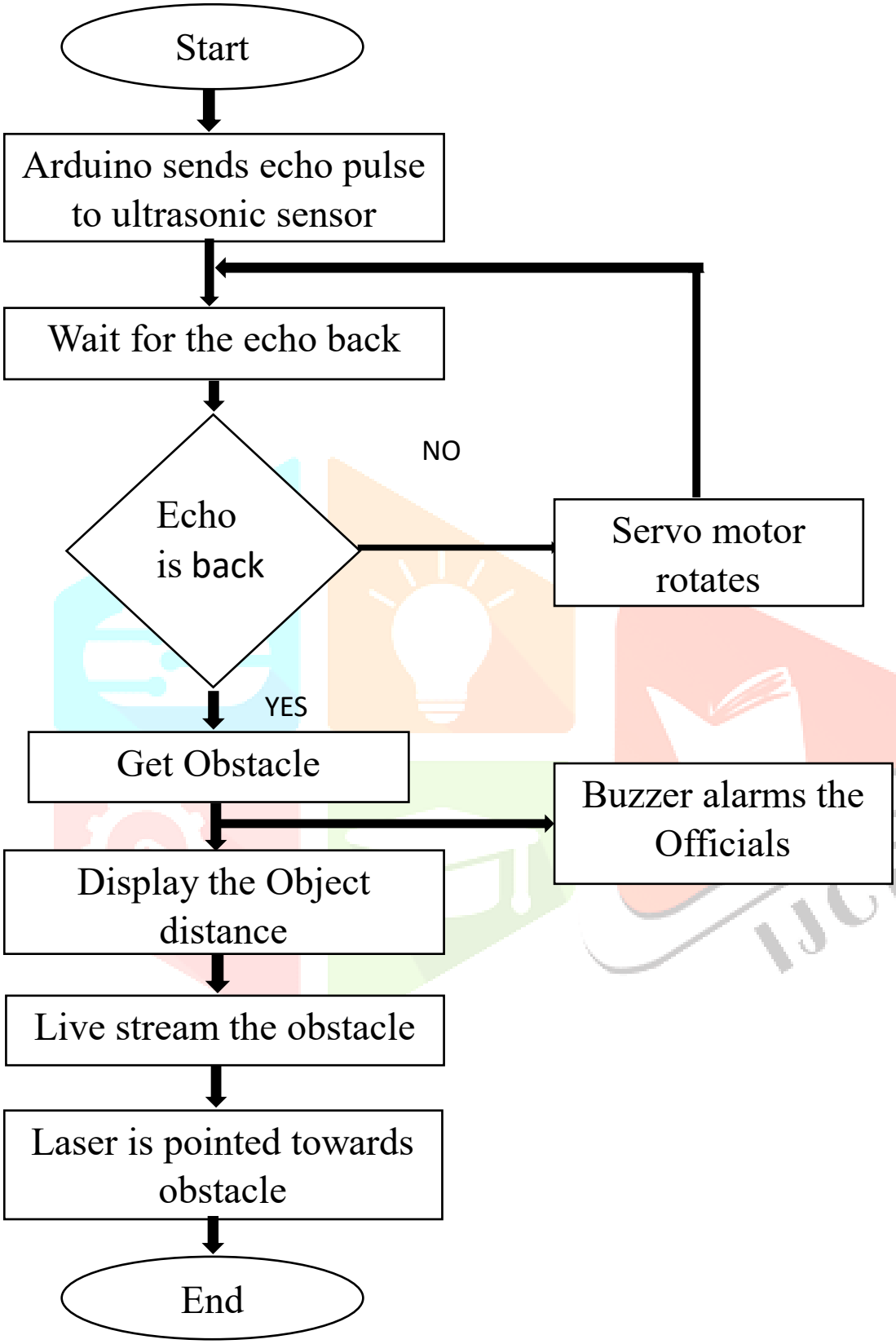
This is the most important part of the project. Here we are using an Arduino UNO board to which two ultrasonic sensors, an LCD, a rotatory motor, and a laser gun are connected. Ultrasonic sensors can detect the object by sending ultrasonic sound waves and converting reflected sound waves into electrical signals also it can measure the distance of that object Whenever an object/intruder comes near the ultrasonic sensors it will send the signal to the microcontroller. This microcontroller will send a signal to the rotatory motor to turn to the side of the ultrasonic sensor which detected the object/intruder. A laser gun connected to the motor will start blinking demonstrating the gun firing. LCD is used to see which side at what distance the intruder is detected.

MODELING AND ANALYSIS

Block diagram: -



FLOW CHART


Start
Arduino sends echo pulse to ultrasonic sensor
Wait for the echo back
Echo is back
NO
Servo motor rotates
YES
Get Obstacle
Buzzer alarms the Officials
Display the Object distance
Live stream the obstacle
Laser is pointed towards obstacle
End

CONCLUSION

This paper presents a novel intruder detection strategy which use ultrasonic sound waves and converting reflected sound waves into electrical signals also it can measure the distance of that object. An ESP32 camera is used to live streaming and laser pointer point towards the intruder, enacting an actual gun pointed toward them. An Arduino-based buzzer has also been provided which triggers in case an intruder is detected, alarming the personnel at a nearby post. The proposed system reduces the number of army personnel required at the border for patrolling and can help significantly reduce human loss due to possible armed altercation with the intruders.