

RADAR VISION BASED CONTROLLING ALERTS AND WEAPON ACTIVATION FOR BORDER DEFENSE

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ABSTRACT

In this project of Radar vision-based controlling alerts and weapon activation, we are developing a system that could be a great help in enhancing the security of our border regions especially, the areas facing extreme climatic or terrain conditions where human deployment is a major peril. To curb such happenings the least we can do is to constantly monitor across the border and detect intrusions. It takes a lot of manpower to stretch over the border and constantly keep an eye, hence the need of the hour is to build such automated border surveillance which can eliminate manpower. Moreover, if something suspicious is detected by the system, it must be able to perform necessary actions by issuing an alarm alert and weapon activation system.

Keywords: 24/7 Border surveillance, Automatic intrusion detection, alarm alert, Weapon Activation.

1. INTRODUCTION

Today our major concern is the nation's border security. These borders are guided by our soldiers. These soldiers encounter threats to their lives due to cross-border terrorism, drug peddlers, etc. Due to these malicious elements, the soldier's life is a huge risk, and many lose their life. If we could have saved even half of the soldier's life, we would have an even more brave force. These may not have been possible in past times, but today the scenarios are changing. This border surveillance system can not only assist the defense forces to enhance the security of border areas but also, can help save a considerable amount of labor and assets. It involves the use of advanced technology keeping in mind the cost-effectiveness of the constituent modules of the system with a goal that any infiltration recognized at the border can instantly be transmitted and results in a necessary move. Appropriate utilization of the system may help our border security forces to control those unwanted and suspicious exercises in a better and more accurate way.

2. METHODOLOGY

The objective of the system is to build an implanted intruder identification framework in the border by utilizing an IR sensor and an Ultrasonic sensor using IoT. Numerous IR sensors are being used today however the sensor that is utilized will identify the Infrared beams that are transmitted from the human body. It can provide round-the-clock video surveillance at places where human deployment is not possible due to geographical, climatic, or other reasons. Multiple pyroelectric infrared sensors (PIR) are disguisedly installed on the border fencing which monitors the border area for any intrusion. To testify to the working of this system, after its designing, construction, and programming we placed a few objects in front of the ultrasonic sensor. As the servo motor started to rotate, our monitor started to display the output through processing IDE. Hence, when the sensor crossed over the object it showed a red segment with the distance and angle where the object is placed. The first object was placed at a distance of 29.5cm measured through a ruler and the system measured the distance at 31cm. While the second object was placed at a distance of 15 cm and the system measured it as 16cm. Hence the calculated efficiency turned out to be 95%.

2.1 Existing System

The existing system will not fully remove the responsibility of soldiers but shares the maximum responsibility and will reduce human efforts on the border. Using this system, we can identify how many strangers or terrorists are entering the border. The main objective of this existing system is to alert the soldiers about the number of terrorists entering or crossing the border. The main concept behind this existing system is known as "Visitor Counter" which measures the number of terrorists entering the border or crossing the border. This function is implemented using a pair of IR sensors.

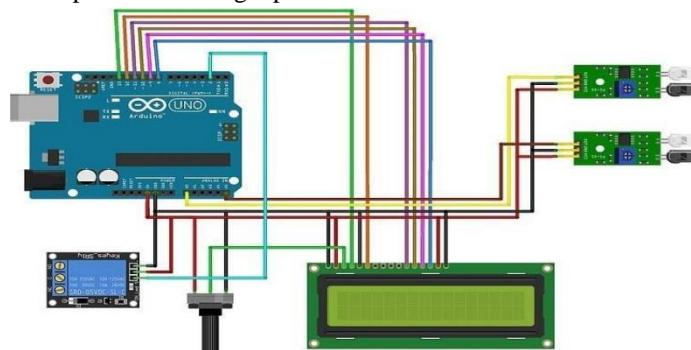


Fig. 2.1 Visitor counter

2.2 Proposed System

The proposed system, which is an automatic border security system uses Arduino, ultrasonic sensor, IR sensor, and IOT as a border intrusion detection technique that uses IoT to alert the controller room. This system is fully automated and needs only one or two persons for maintenance purposes. This system has ultrasonic sensors which are responsible for the detection of intrusion. As they are mounted over the section pillars. The sensors continuously rotate back & forth in the range of certain degrees (30-160) & show the intrusion over the radar with its location. Another set of sensors senses the intrusion & shows over the LEDs & activation of the alarm. As the sensors detect the intrusion RF transmitter sends a signal to the receiver. Once the control station gets an alert, the laser gun will fire toward the intruder & eliminate it.

3. MODELING

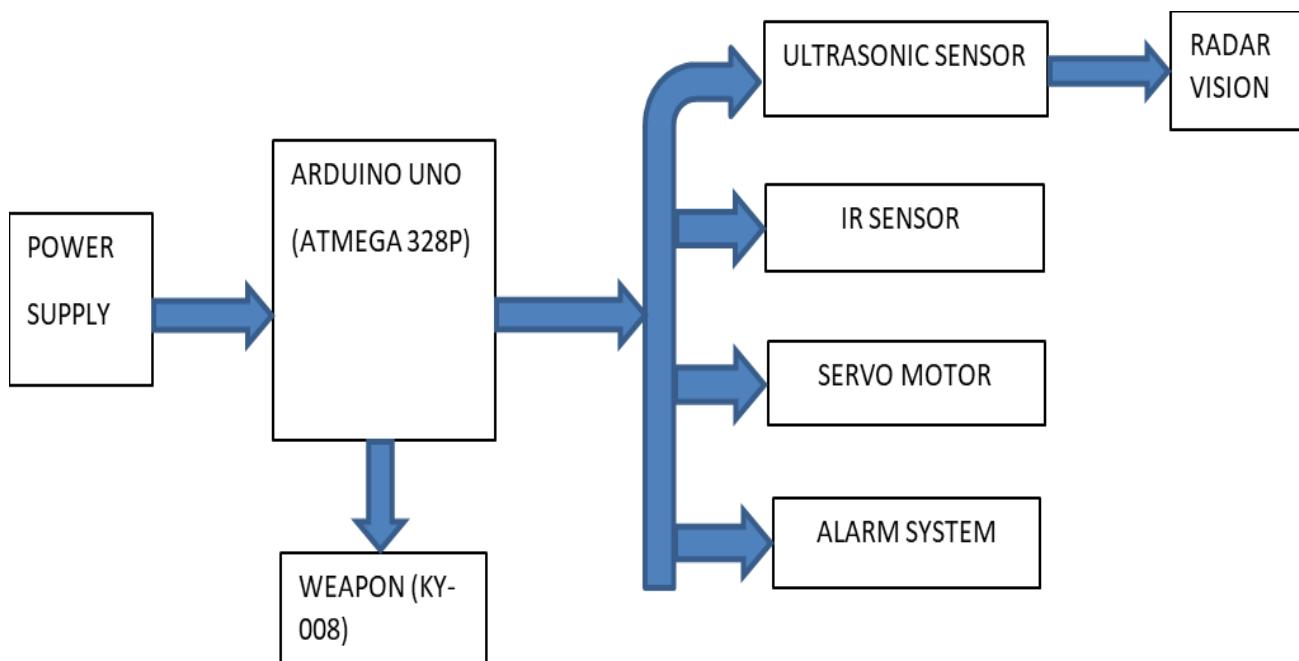


Fig 2.3: Block Diagram of the proposed system

The above fig. shows the Block Diagram of the proposed system. Here we have used Arduino Uno ATMEGA 328 microcontroller which is open source to implement an embedded-based system. ATMEGA 328 microcontroller sends 10-microsecond pulse width to the ultrasonic transmitter and thus echo back signal receives by TX module of ultrasonic. After this is done received pulse width is calculated by the microcontroller. Here we have used a servo motor on which an ultrasonic module is mounted to receive 180 degrees signal.

4. RESULTS AND DISCUSSION



Fig 4.1: Prototype design



Fig 4.2: Radar vision output when intrusion is detected

5. CONCLUSION

Since this project does automatic intrusion sensing and detecting with the help of two sensors installed in the system. Real heroes of any country are their Soldiers. The project also aims at providing peace at the borders and reducing the tensions between the two countries. The Proposed system prevents the entry of intruders or antisocial persons, who are trying to cross the border without prior permission from the military with some bad intentions. Hence this system will reduce the cause of rioting as well as helps to prevent terrorist activities. So, the given proposed system also provides a safe and calm environment for the residents living near to military base and helps to create mutual harmony between military officers and civilians. The system can detect the intruder crossing the border areas, thereby helping the border security forces to monitor hostile zones of border areas efficiently with less manpower.

6. REFERENCES

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