
Safe transportation route design for Indian army in defense zonal areas

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Abstract

In this paper, a safe transportation route design for Indian army in defense zonal areas is presented. Safe Transportation route for Indian Army focusses to deny the entry of any foreign and unidentified vehicles to enter the army camp or the manufacturing plant of dangerous goods (DG) or any high-risk area. This consists of Arduino Uno, Servo Motor, an Ultrasonic Sensor, a 9V Battery and a buzzer. The Arduino has been coded in such a way that when a foreign vehicle tries to enter, the roadway will automatically get blocked. This also focuses on restricting such cases too. To avoid the accidents to a certain extent, this mechanism can be implemented as per required. The work presented here is the mini-project work of the second semester engineering students of electronics & communication engineering department of Dayananda Sagar College of Engg., Bangalore, Karnataka.

Keywords – Attacks, Enemies, Army, Defense, Sensor

1. Introduction to the mini-project work

Safe Transportation route for Indian Army focusses to deny the entry of any foreign and unidentified vehicles to enter the army camp or the manufacturing plant of dangerous goods (DG) or any high-risk area. The project has been made to provide safety to the army bases and the security of military establishments, personnel and their families. This project serves its purpose not only for the armed forces but also at public sectors [1]. More often than not, we always hear about road accidents taking place near the traffic signals. Cars getting T-boned, overtaking near traffic signals, accidents causing human and animal expiry and many more are the cases, and the sad part is this number aren't going down. These can be implemented on zebra crossings which will forbid the vehicles from crossing when the signal glows red [2]. Our Project focusses on idea to deny the entry of any foreign and unidentified vehicles to enter the restricted area [3]. We all are aware of the horrors of the Pulwama attack occurred in 2016 where enemies entered the Indian camp without being inspected. We also tried our best to give this project another perspective ensuring that it can be implemented in multiple areas [4].

2. Problem statement

Cantonments were set up some distance away from townships and cities, in open places to lodge troops, their animals and equipment of the advancing troops before they were sent to battle. Gradually these camps became permanent and were spread all over the country for accommodating and administering the troops as also putting them through the rigors of intensive military training which

required open spaces and privacy [5]. The government’s decision to open cantonment roads for the public has opened a Pandora’s Box. Many families claimed that the soldiers posted in border areas do their duties without any worries about their family back home because they know they are generally safe and secure in the safe accommodations but that sense of security is gone now. They even added that all kinds of papers are doing freely around in the cantonments [6]. They further added that cantonments are now even vulnerable to terror attacks. The project serves it’s purpose by restricting the unidentified vehicles and thus providing a little small-scale protection to both military and civilians [7] [8].

3. Objective of the min-project work

Our objective is to create a prototype which can be implemented in real life which can do the following works, which is of two-folds in nature & iterated as follows.

- The main purpose of this project is to provide safety to the high-risk areas in the nation such army cantonment, manufacturing plant of volatile and hazardous substances.
- This can also serve in public sectors like in malls, near railway tracks, traffic signals etc. to provide safety to both drivers and pedestrians.
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4. Implementation procedures

The test approach is divided into three main phases, viz., module testing, integration testing and system testing. In addition, the system testing includes two sub-phases: functional and usability testing. These planned tests are explained briefly below [15].

5. Module testing

It is performed during coding by using debug messages to check that the written code produces wanted results. An important requirement is that the code will compile with zero bugs.

6. Integration testing

It is performed after finishing module testing in order to validate if each module can work fine with each other. Integration Test proves that system works as integrated unit when all the fixes are complete.

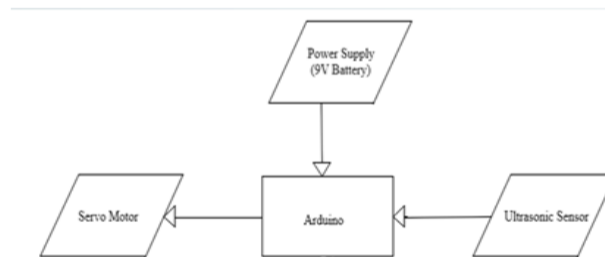


Fig. 1 : Overall block diagram of the mini project work

We have also used Tinkercad for 3D design, connections as shown in Fig 1. Tinkercad is an online collection of software tools from Autodesk that enable complete beginners to create 3D models. This CAD software is based on constructive solid geometry (CSG), which allows users to create complex models by combining simpler objects together. The designed circuit is shown in the Fig. 2.

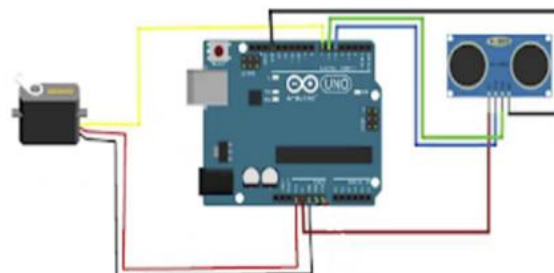


Fig. 2 : Overall circuit design using the thinker CAD software

7. Results & Discussions

Hardware was design for the safe transportation of the arm vehicles and the results are interpreted in this section. The results or the outcome of the mini-project work could be summarized as follows:

- We successfully developed a safe transportation route which provide adequate safety from any miscellaneous object.
- Each and every mechanical part is thoroughly tested.
- The range of the ultrasonic sensor is respectable.
- The servo motor is adequately capable of lifting the barrier to a respectable height in order to ensure the complete blockage of the pathway.
- This can also be used in malls, toll booths for entry and exit of vehicles.
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8. Conclusions

A safe transportation route design for Indian army in defense zonal areas is presented in this paper. Safe Transportation route for Indian Army focusses to deny the entry of any foreign and unidentified vehicles to enter the army camp or the manufacturing plant of dangerous goods (DG) or any high-risk area. This consists of Arduino Uno, Servo Motor, an Ultrasonic Sensor, a 9V Battery and a buzzer. The Arduino has been coded in such a way that when a foreign vehicle tries to enter, the roadway will automatically get blocked.

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