



AUTOMATIC RAILWAY GATE CONTROL USING ARDUNIO

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Abstract: Transportation has become an essential medium in today's life, it has become a daily routine of many people. One among those transportation medium is railways, this project mainly focuses on the automation in the field of railways, and i.e. the automatic railway gate control using Arduino UNO, Buzzer, LED, IR Sensor etc. for further safety purpose a GSM module is used. As the need for transportation increases accidents are also increasing day by day, this project helps in eradicating the railway accidents gradually. An arduino is used to feed a program that works according to the desire of our project, when the gate operates i.e. (opens or closes) a message is sent through GSM to a registered mobile number for safety. Main purpose of this project is to make sure that the accident rate is decreased while crossing a railway gate. This project can also be implemented in real world with some upgraded equipment but the working principle of this project always remain the same. This project aims to provide an automatic railway gate control at the level 1 crossing replacing the manual gate control. The railway gate is to be closed automatically when a train is done by using two IR sensors. The opening and closing of the gate is to be done using stepper motors and this stepper motor is controlled by Arduino. Additionally the status of the gate will be given to the motorman well in advance. This insures more protection from the accident. LCD and alarm are used to indicate the closing of gate for the people who are trying to cross the gate. IR sensor are used for the proper closing of the gate. This system efficiently avoid the accidents at level crossing. Programming is done by Arduino C to operate hardware.

Keywords: Arduino UNO, GSM, DC Motor.

- INTRODUCTION

. Now a days, India is the country which having world's largest railway network. Over hundreds of railways running on track every day. As we know that it is definitely impossible to stop the running train at immediate is some critical situation or emergency arises. Train accidents having serious consequence in terms of loss of human life, injury, damage to Railway property. Railway safety is a crucial aspect of rail operation over the world. Railways being the cheapest mode of transportation are preferred over all the other means. When we read newspaper, we come across many railway accidents occurring at unmanned railway crossings. This is mainly due to the carelessness in manual operations or lack of workers. This model deals with two things. Firstly, it deals with the reduction of time for which the gate is being kept closed. And secondly, to provide safety to the road users by reducing the accidents that usually occur due to carelessness of road users and at times errors made by the gatekeepers. To avoid the accidents, sensors placed at some distance from the gate detect the departure of the train. The signal about the departure is sent to the microcontroller, which in turn operates the motor and opens the gate. Thus, the time for which the gate is closed is less compared to the manually operated gates since the gate is closed depending upon the telephone call from the previous station. Also reliability is high, as it is not subjected to manual errors. The concept of the model is to control the railway gate using microcontroller or anti-collision technique. Railway safety is the most crucial aspect of railways all over the world. The cheapest mode of transportation is railways, and therefore, accidents are likely to happen due to careless manual operations. At present, there are 30348 level crossings on Indian Railways across the country. Out of these, 18785 are manned and 11563 are unmanned level crossings. A total number of 4792 level crossings have been removed on Indian Railways in the last five years to avoid the accidents. These jobs are being done by respective Zonal Railways. The Ministry of Railways has decided to progressively eliminate all level crossings on the availability of funds. The proposed system is enhanced to prevent accidents at the unmanned level crossings and to provide much needed safety. Automatic railway gate system can be employed in an unmanned level crossing where the chances of accidents are higher and reliable operation is required. Since, the operation is automatic, error due to manual operation is prevented. Automatic railway gate control is highly economical Arduino based arrangement, designed for use in almost all the unmanned level crossings in the country. This project is designed to control a railway level crossing by stepper motor using Arduino controller. This system uses a GSM wireless module to update motorman about the status of gate. The railway gate status is displayed on the LCD. A motor is connected to the Arduino with the help of a driver IC for opening and closing the railway gate. Two ultrasonic sensors are placed to detect arrival of the train and both also detect departure of the gate. IR sensors are checking the complete closing of gate

• LITERATURE SURVEY

The automatic railway gates operation has been projected using various methods. As proposed by Xishi Wang (1992), the process of developing fault tolerance method has been applied for both the hardware and the software components. Magnetic sensors placed underground to detect the train are less affected by environmental changes and recognizes the direction of movement of vehicles. Jeong Y (2008) defined the railway auto control system using OSGi (Open Service Gateway Initiative) and JESS. The state of railway cross has been estimate during JESS in the technique. The issues in the technique are the insufficient inline citations and also multiple issues related to OSGi. The different methods used by locomotive pilots which can avoid the accidents and the safety measures while crossing the level crossings are also discussed. Atul Kumar Dewangan (2012) gave a detailed introduction about the present railway technology and also discussed the disadvantages of manually activated railway signals and the railway warnings at the level cross. The train detectors act as the major component in the train automation system. Banuchander J (2012) developed a method to concentrate on anti-collision system to identify the collision points and to report these error cases to main control room, nearby station as well as grid control stations.

• PROBLEM STATEMENT

This project explicitly deals with one of the most common problem that is traffic jams besides a railways crossing.

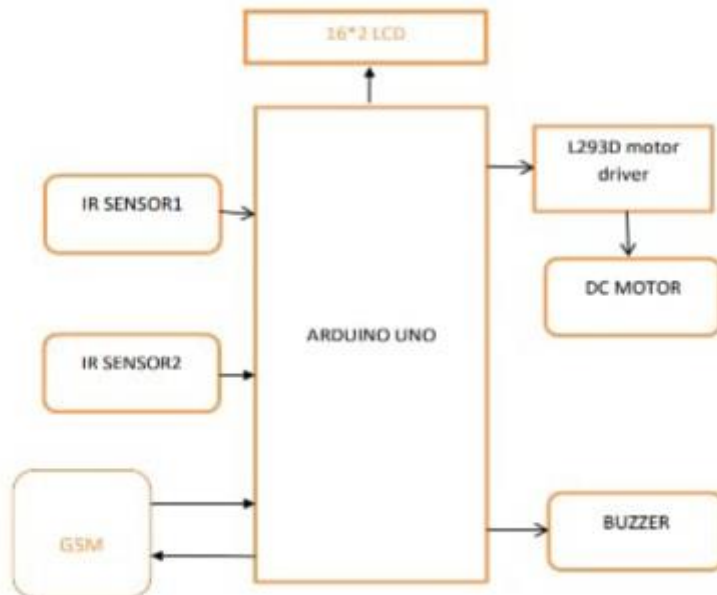
The review of train accidents of the last 5 years (2009-10 to 2013-14) for which the data is available indicates that a large number of accidents happen because of derailments & at level crossing.

NCRB says a total of 2,547 railway crossing accidents led to 2,575 deaths and 126 injuries across the country in 2014

Time for opening and closing the gate manually is more and it requires a separate man power for operation.

➤ METHODOLOGY

The operation of the circuit can be clearly explained as follows. Basically the circuit consists of Two IR sensor (LED Photodiode) pairs arranged on either side of the gate such that IR LED and photodiodes are on either side of the track as shown in the above figure. First IR sensor senses the moving towards the railway level crossing and gives signal to the Arduino UNO and the second IR sensor gives the signal of the train that is moving away. A GSM system is connected to arduino so that the message of the train incoming and outgoing can be conveyed to the registered mobile number. LD-293 motor drive is used to drive the dc motor which is used for the opening and closing of gate based on the signal received by the arduino. A buzzer and is connected for better indicate purpose.



• Result and discussion

Two IR sensors were placed at either ends, one sensor is detecting of entrance of train and other one is for detecting the departure of the train. Once first IR sensor sense means microcontroller will understand train is coming and in 16*2 LCD display show the Train coming. And it immediately alert the people by lighting Red light. And buzzer is glowing the people are aware from the track. At the same time gate will be closed for a while. In other end second IR sensor sensed means microcontroller will understand train has departed and in 16*2 LCD display show the Train Departed. And it immediately alert the people by lighting Green light. Buzzer is glowing the people are aware from the track. And authority will get sms alert as train departed gate will be open for pedestrians.

Advantages

- Prevention of accidents inside the gate.
- Time saving as the gate keeper operates the system through mobile application.
- Easy to operate.
- Avoid man power.
- Reduce the operation .
- Reduction of the time to wait vehicle.
- Performance is high.
- Portable.
- Accuracy is high.
- Low power consumption
- Automatic operation.

Disadvantages

- As the system requires human operator the human error affects the system.
- To establish the entire network is quite costly task.
- Energy requirements are high.
- Involves complex network of connections and require skilled workforce to build it in a good manner.
- Require special equipments.
- The Arduino board is a delicate device so it has to be handled carefully.

Application

- Wireless applications.
- Railway track damage detection applications.
- Industrial and access control.
- Other remote control system.

CONCLUSION

This project is suitably fulfilled the basic things such as avoidance of accidents inside the gate and the avoidable of a gatekeeper. It avoids the railway accidents and provides safety. We have seen little improvement in railway accidents. We also observed stronger safety records in certain areas and believe they are the result of constant efforts to improve safety. We demonstrate that it is possible to improve the overall safety of the railway system in India. We believe that success depends on both the railway industry and the regulator working together to achieve that common goal. The proposed system provide the means for real time inspection, review and data collection for the purpose of maintenance on the movable and fixed facilities for the guarantee of operation safety and maintenance efficiency as well as the safety appraisal decision-making system based on the share of safety data.

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