

Raliway Gate Control System Using Buzzer

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Abstract

In this developing countries accidents in the unmanned level crossings and due to obstacle on track are increasing day by day. Our project deals with automatic railway gate control at a level crossing replacing the gatekeepers and detection of obstacle on track. By implementing the system at the level crossing the arrival of the train is detected by the sensors placed in the side of the tracks. Hence, the time taken to close the gate manually is less. Detection of obstacle on railway track deals with two things, first it senses the objects on the track by using sensors which is placed on front end of train. Our system uses sensors to detect the arrival and departure of trains at the railway level crossing, IR sensor to detect the obstacle and Arduino control the opening/closing of gates and train speed as well. They are many incidents that take place at level crossing many lose their lives, people injured for life time This motivates us to work on this project.

Keywords: countries accidents, crossings and due to obstacle on track are increasing day by day.

1. Introduction

Railways is important means of transport there are millions of people travelling on day by day basis and it is very important to be careful with the lives of human they are so many people working to prevent the incidents causing by trains or at the areas of level crossing. We have gone through previous paper works that convey and desire to lower down the rate % of accident. However, train a is machine made by humans its functionality depends on human. From starting the engine to slowing down the speed of train at certain point and closing gates at the level crossing, as a human we tend to forget things due to our own issues this might affect the work as well. Basically talking about the person at the level crossing "The gate keeper" who plays a very important role responsible for closing the gates at level crossing. His carelessness may lead to massive damage. When the train starts moving from its platform the station in-charge sends a message or an alert saying train is going to approach or cross from particular place and

then the gate keeper is on this way put down the gates on either side of the road. First he gives the loud alert as indication to peoples passing through roads then he starts pulling down the gates which consumes a lot of time and land up with traffic as well. Here's the disadvantages of manual level crossing.

1. Time consumption is more.
2. Chances while pulling down the gate and object /vehicle which may get stuck in between gates.

In the above case [1]. TIME: The gate keeper may also fail to inform the local pilot if the object is being stuck.

In the next case [2]. The train might be unaware of the object present on the track and then accident takes place.

In 21st century where the world is modern improving with technology We can also improve our daily system considering safety for generations. So keeping such cases in mind making use of technology we got our idea.

Our idea is to deal with level crossing replacing the gate keeper. We are using sensors which are

placed on the tracks at certain distance. These sensors sense the approach or arrival of train and alerts the operation of gates.

2. Literature Survey

The automatic railway gates system has been presented in different methods and with different technology.

Opening and closing gates was completed by operated by the gate keeper.

[1]. This is how it has been explained in the previous research paper of 2019.

Whenever the train leaves the station the station master contacts the gate keeper about the train departure. After receiving this information, the gate keeper closes the gate by some sort of calculation of time.

But the question is how long are the gates to be kept closed sometimes there is a delays in trains leaving the station or moving from place to place issues might occur while the travel itself such as, someone might have pull down the emergency break all of sudden. All this causes the delay which makes peoples wait on either side of the road. Some might wait but not all. There are some peoples try to cross the track to reach to the other side of the road and land up risking their life.

Our proposed system of Automatic railway control system helps to achieve safety of human life in both the ways in avoiding accident on tracks and at level crossing. It is Automatic which means no human error and no risk.

[2]. According to another research paper of 2006 Anju tyagi Worked on the obstacle detection he divided his system into 4 parts (1). Train module (2) Control center (3). Signaling module and (4). Level crossing. He worked considering 1 km after applying the emergency break. But he failed to control the speed of the train from 1 km.

In our system we are placing the sensors and pulling down train speed from 8 km itself as it detects the object.

3. Objectives

In the previous reference paper we went through a lot of technologies called IRF sensors, Microcontroller which they made used for detection of train arriving at level crossing and some did found solution and then they had questions and idea for obstacle detection which lead to success but they issue raised was it detected everything when train pass but they didn't focus on the obstacle detection on the track. There are many measurements taken to avoid accidents on level crossing and obstacle detection but had no plans for slowing down the train speed when the trains detect the object and still we are open to the world for innovations.

Our design of automatic railway gate control system with buzzer has come up with solutions of above discussed papers where we are able

1. detect object and once the object is detected we are able to slow down the speed of our train.
2. At level crossing we are just replacing the gate keeper with automatic feature of closing and opening the gates.

We desire a secure system that helps in slowing down the accidents rate and saving the lives of humans.

4. Proposed System

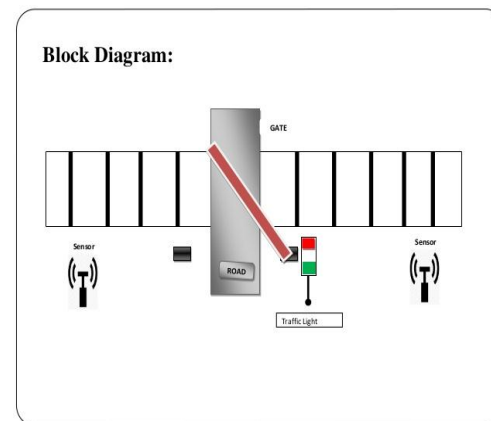


Figure 1: Block Diagram

We have 3 IR sensors(IRS) and 2 Arduino UNO(AU) IRS 1 connected to AU1 and IRS 2 connected to AU2. We have indicated gates opening and closing using LED's GREEN and RED.

When the gate is closed while train is arriving the level crossing or on the track its shows RED, Once the train passes through a certain distance the gates get open and LED turns GREEN.

In real time we have distance of 8 km to detect the train for demonstration we have 8cm.

When the IRS1 senses the train the buzzer is alerted and then IRS2 sensor activates the obstacle detection scheme and the gates are pulled down/ closed on level crossing. Then the gates are kept closed until the IRS3 sense the train and then the gates are opened.



Figure 2: Working Model

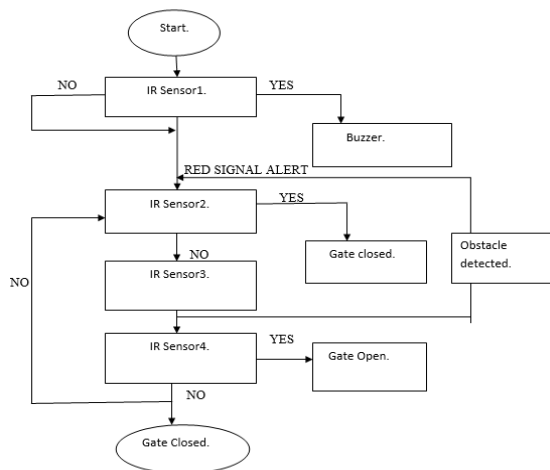


Figure 3: Data Flow Diagram

5. Methodology

IR sensors are placed on the tracks to detect the arriving of trains the flow chart refers IR sensor1. IR sensor senses the arrival of train and this sensor is switched to HIGH and activates the buzzers with LED's as indication for the people. Servo motor helps to pull down the gates.

The sensor 2 which is placed on the front end of the train is used to detect the object on the track when it is switched to HIGH.

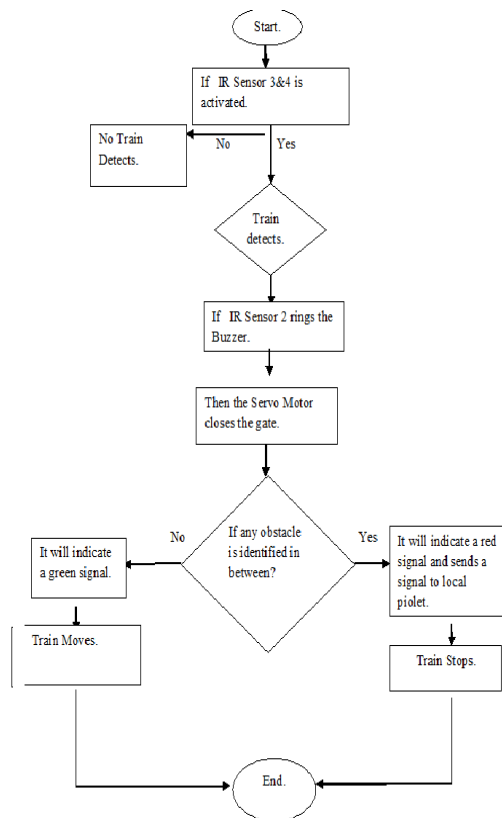


Figure 4: Flow Chart for the obstacle detection and level crossing system

6. Implementation

1. Arduino UNO



Figure 1.1: Arduino UNO

- The Arduino Uno is a microcontroller. It has 20 digital input/output pins, a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button.
- Arduino supports and can be worked in both ways as only hardware or both the hardware part as well as the software part with some lines of codes and with the help of some software tools.

2. Servo Motor



Figure 2.1: Servo Motor

- A device that can be pushed and rotated at any given angle and distance. It works with an electrical pulse. It consists of a potentiometer, gear assembly, and a controlling circuit. The generated signals from these two sensors are like the output generated by the error signals, which is then given to the input terminal, just like a circular queue where the output is the result of the other input terminal. And this method helps in rotating the object in our project, which is attached to the gate.

3. Buzzer and LED's



Figure 3.1: Buzzer



Figure 3.1.1: LED's

It's a device used for signaling which produces a loud sound as an alert. Uses DC power supply that ranges from 4V to 9V. It is associated with switching circuit to turn ON and turn OFF the buzzer at times intervals.

4. Sensors

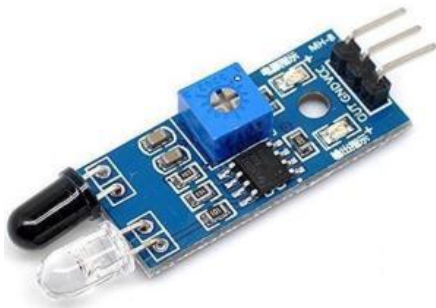


Figure 4.1: IR Sensors

Measure the heat and movement of the object. this emits some infrared spectrum invisible to human eye. For indications of the sensors there are LED's placed which just turn ON and OFF when there is any object sensed

7. Results and Discussion

We present our system for sensing the train and opening and closing the gates with the help of four IR Sensors and Obstacle Detection.

1. If the 1st IR sensor detects the train the buzzer will gets ringing with few seconds until the crossing of buzzer of IR sensor.



Figure 5: Signals

2. If any obstacle stuck in between the crossing level then the loco polite will get the signal from the 3rd IR sensor, after crossing the If any obstacle stuck in between the crossing level then the loco polite will get the signal from the 3rd IR



Figure 6: Signals on Tracks

3. As soon as the train approaches for the 2nd IR sensor then the gate will be closed automatically, with the use of RED LED, the gate will be activated in the mode of closing until the train passes from the 2nd IR sensor to the 4th IR sensor.



Figure 7: Level Crossing when gates are closed

4. If the train approaches 4th IR sensor as soon as the 4TH IR sensor detects the train the gates will be opened automatically with the use of GREEN LED.



Figure 8: level Crossing when gates are opening.

8. Conclusion

As this system is going to be helpful where there is less human involvement and very effective for future use. Our project is based on IOT. We are looking forward to work with train facing issues during heavy rain fall or snow fall were there are blockages. As this system is portable for future use.

References

- [1] Xishi Wang, Ning Bin, and Cheng Yinhang, "A new microprocessor based approach to an automatic control system." International Symposium on Industrial Electronics, pp. 842-843, 1992.
- [2] Jeong Y., Choon-Sung Nam, Hee-Jin Jeong, and Dong Shin, "Train Auto Control System based on OSGI", International Conference on Advanced Communication Technology, pp.276-279, 2008.
- [3] Karthik, Krishnamurthi, Monica Bobby, Vidya V, "Sensor based automatic control of railway gates", International Journal of

- [4] Advanced Research in Computer Engineering & Technology 2015. Automatic Railway Gate Control using Arduino Department of Electronics & Communication Engineering RCC INSTITUT OF INFORMATION TECHNOLOGY Affiliated to Maulana Abul Kalam Azad University of Technology, WestBengal CANAL SOUTH ROAD, BELIAGHATA, KOLKATA - 700015 May,2018.
- [5] 2nd International Conference on Emerging Trends in Engineering, Technology, Science and Management Lakshmi Narnia Collage of Technology, Bhopal 20th May 2017 AUTOMATIC RAILWAY GATE CONTROLLING SYSTEM M. Duraishanmugapriyan Assistant Professor, EIE Department, Kamaraj College of Engineering & Technology, Madurai (India).