International Journal of Innovative Research in Science and Engineering
Volume 08, Issue 04, 2022
www.ijirse.com
ISSN: 2454-9665

Automatic Railway Gate Control System

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ABSTRACT

The objective of this paper is to provide an automatic railway gate at a level crossing replacing the gates operated by the gatekeeper. It deals with two things. Firstly, it deals with the reduction of time for which the gate is being kept closed, and secondly, it provides safety to the road users by reducing accidents. By the presently existing system, once the train leaves the station, the stationmaster informs the gatekeeper about the arrival of the train through the telephone. Once the gatekeeper receives the information, the closes the gate depending on the time at which the train arrives. Hence, if the train is late due to certain reasons, then the gate remains closed for a long time causing traffic near the gates. By employing the automatic railway gate control at the level crossing the arrival of the train is detected by the sensor placed near the gate. Hence, the time for which it is closed is less compared to the manually operated gates and also reduces human labor. This type of gate 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 a highly economical microcontroller-based arrangement, designed for use in almost all the unmanned level crossings in the country..

Keywords: *IR Sensor, AVR Microcontroller(ATmega328), LED Signal, Embedded System, LCD 16X2 Display, Transformer, Servo Motor, Regulator, Rectifier& filter.*

2. INTRODUCTION

This paper deals with a topic of much contemporary relevance. It proposes a unique and economical method for improving the safety of our level crossings. Road accidents at railway gate is a leading cause of death and injury worldwide. Surveys conducted by Indian Railway found that about 17% of total railway accidents in India are crossing accidents of which the majority occur at passive railway crossings. The operation of railway gates at level crossings is not so reliable nowadays. Primarily the road users have to wait a very long time before the arrival of the train and even after the train is left.

ISSN: 2454-9665

And secondly, the chances of accidents that are usually made by the carelessness of the road users or due to the time errors made by the gatekeepers is more. Here comes the importance of an automatic railway gate control system. In this project, we detect the arrival of trains and warn the road users about the arrival of trains. If no obstacle is found a green signal is given for the train to pass, otherwise a red signal is given to slow down. After the obstacles are cleared, the gate is closed and the train is passed. We will make sure that the train is passed and reopen the gate. The system 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. In the automatic railway gate control system, at the level crossing the arrival of the train is detected by the sensor placed near to the gate. Hence, the time for which it is closed is less compared to the manually operated gates and also reduces human labor.

3. LITERATURE SURVEY/BACKGROUND

1. Greene R.J. (2006) anticipated an intelligent railway crossing control system for multiple tracks that features a controller which receives messages from incoming and outgoing trains by sensors. These messages contain detailed information including the direction and identity of a train. Depending on those messages the controller device decides whenever the railroad crossing gate will close or open. But this technique has the issue of high maintenance cost.
2. Kawshik Shikder (2014) projected the automatic operation of railway gates using RF technology. The major issue of this technique was every train could be provided with RF technology
3. Fred Coleman III, Young J. Moon (2010) Design of Gate Delay and Gate Interval Time for Four-Quadrant Gate System at Railroad-Highway Grade Crossings Transportation Research Record.
4. The 8051 Microcontroller and Embedded Systems By Muhammad Ali Mazidi
5. Fundamentals Of Embedded Software By Daniel W Lewis.

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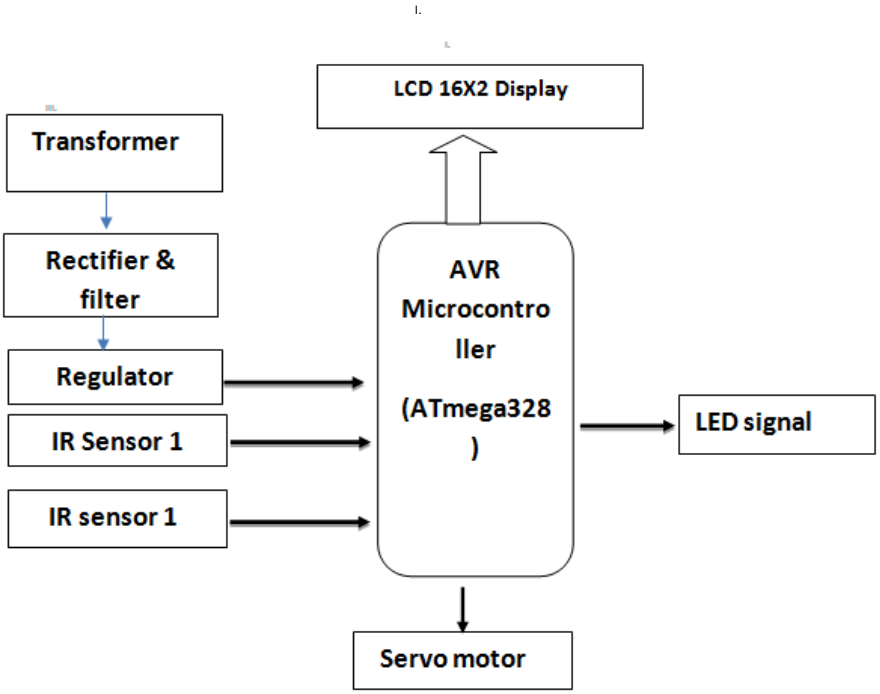
4. PROPOSED WORK/SYSTEM

BLOCK DIAGRAM :



The present project is designed using an IR sensor and ATmega328 microcontroller. Practically, the two IR sensors are placed at the left and right sides of the railway gate. The distance between the two IR sensors is dependent on the length of the train. In general, we have two consider the longest train in that route. Now we'll see how this circuit actually works in real-time. If sensor one detects the arrival of the train, the microcontroller starts the motor with the help of the motor driver in order to close the gate. The gate remains closed as the train passes the crossing. When the train crosses the gate and reaches the second sensor, it detects the train and the microcontroller opens the gate.

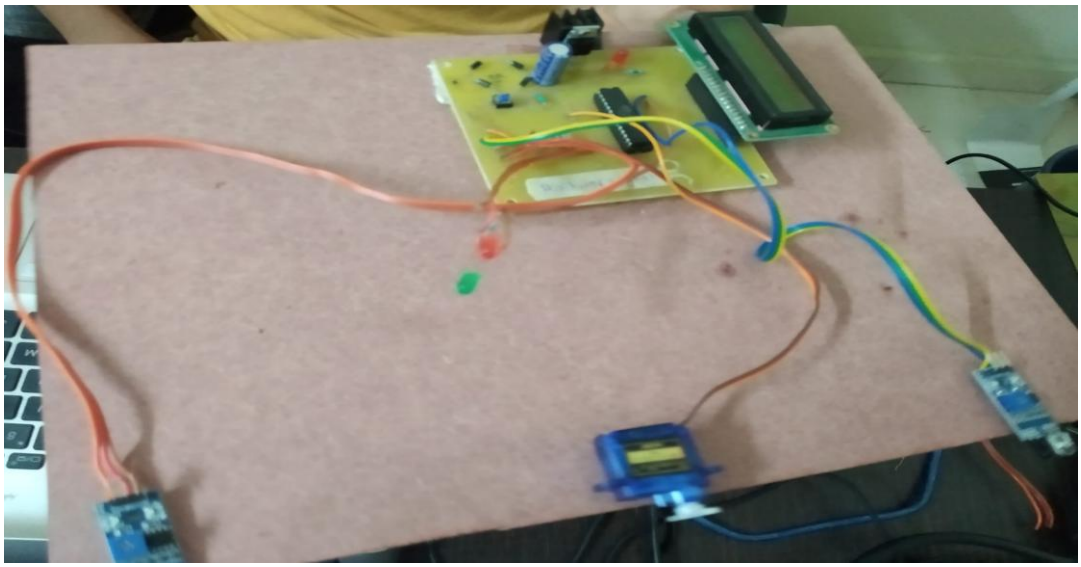
The main aim of this project is to automize the unmanned railway gate. The gate is closed automatically whenever the train comes and is opened after a train leaves the railway road crossing. The introduction of this project is to manage the control system of the railway gate using the microcontroller. When the train arrives at the sensing point alarm is triggered at the railway crossing point so that the people get intimation that the gate is going to be closed.

5. RESULT AND DISCUSSIONS

The present existing m is a manually and human-controlled system, once the train leaves the station, the station master informs the gatekeeper about the arrival of the train through the telephone. Once the gatekeeper receives the information, he closes the depending on the timing at which the train arrives

ISSN: 2454-9665

Hence, if the train is late due to certain reasons, then the gate remains closed for a long-time causing traffic near the gates. No centralized system is available, presently signals are controlled by means of interlocking and warning signs and signal device, which is a totally semiautomatic system. By employing the automatic railway gate control at the level crossing, the time for which it is closed is less compared to the manually operated gates and also reduces the human labour. These types of gates 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. And implementing the work railway system can be centralized which can control the accidents.



6. CONCLUSION

As the system is completely automated, it avoids manual errors and thus provides ultimate safety to road users. By this mechanism, the presence of a gatekeeper is not necessary, and automatic operation of the gate through the motor action is achieved. Microcontroller 8051 performs the complete operation i.e., sensing, gate closing, and opening operation is done by software coding written for the controller. The mechanism works on a simple principle and there is not much complexity needed in the circuit. Thus the automatic railway gate control using Atmega328 microcontrollers is worked efficiently and it reduces human work and time. This is easy to control the railway gate operation and it reduces the occurrence of faults.

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