
SENSOR BASED AUTOMATIC RAILWAY GATE OPERATION

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ABSTRACT: The objective of this paper is to provide an automatic railway toll gate operation replacing the manually operated gates at level crossings. This type of gate can be employed at manned level crossing; where the chances of accidents are higher and a reliable operation is required. This system reduces the time for which the gate remains closed because we use a pair of sensors to detect the arrival and departure of train. Since, the operation is automatic, errors due to manual operation are avoided. We demonstrate the operation of track gate control by using Reed Sensors, control room, LCD Display, Motor Driver, LEDs to indicate Red and Green signals. All the information is sent to CAN (control area network) through wireless technology and displayed on LCD. When train approaches the gate system, pair of sensors placed at an approximate distance to detect the arrival and departure of train send signal to the control room and information is displayed on the LCD along with LED signals and the gate closes and open automatically after train pass these sensors. If any vehicle/person is stuck on this track system, a signal is sent to the control room and the train stops automatically. The proposed system also features of anti-collision technique used to prevent head on collisions between trains by predefining a certain distance at which the train will come to know about the information of some other train on the same track.

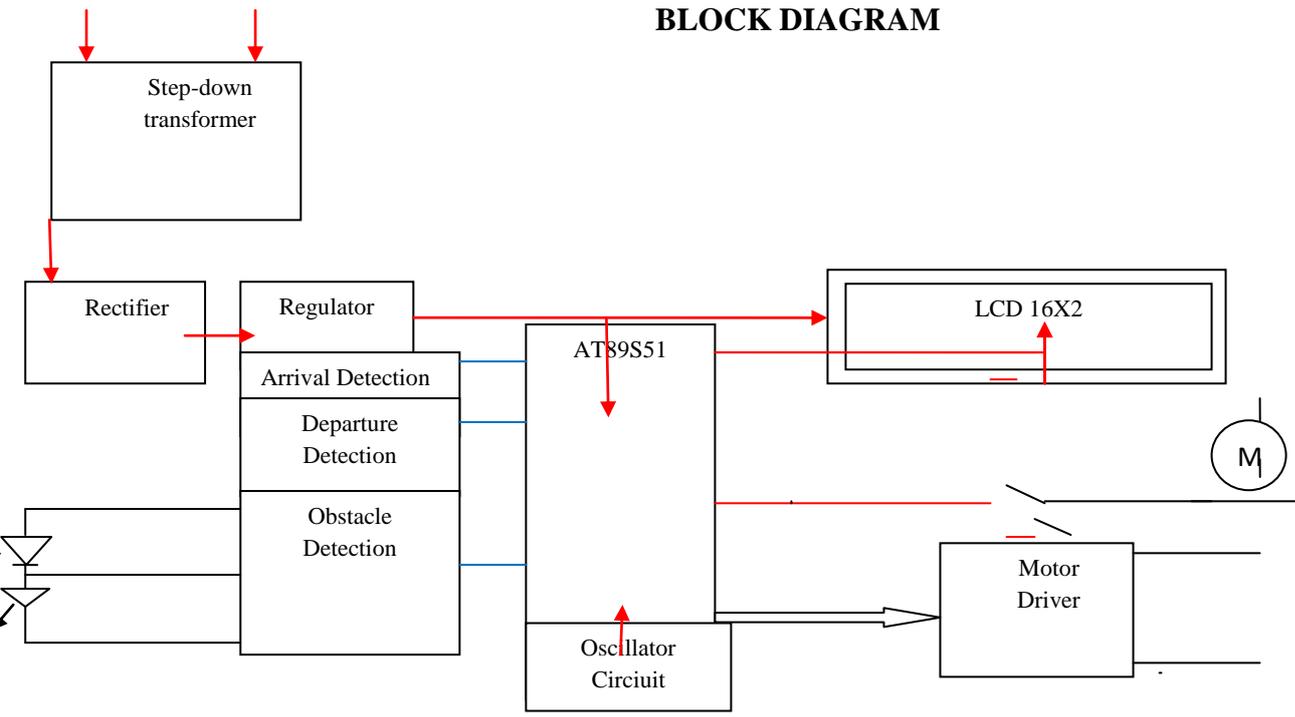
KEYWORDS: Liquid Crystal Display (LCD), Light Emitting Diodes (LED), Control Area Network, Sensors, Motor Driver.

INTRODUCTION

Indian Railways is one of the world's largest rail networks. Railway's being the cheapest and most feasible mode of transportation is preferred over other means. According to a survey almost 17% of railway accidents in India occur at level crossings either due to the carelessness of road users or gatekeepers. The operation of railway gates at level crossings is not so reliable nowadays. To overcome all the problems we have designed an automated railway gate system using electronic components. In this project we detect the arrival of train and warn the road users about the arrival of train. 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 train is passed. We will make sure that the train is passed and reopen the gate. The system deals with two things. Firstly, the road users have to wait a very long time before the arrival of train and departure of train. And secondly the chances of accidents that usually made by the carelessness of the road users or due to the time errors made by the gatekeepers is more. 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 the human labour. This paper lays emphasis on the importance, of an automatic railway barrier gate at level crossing. All the components such as sensors, motor driver, LCD, LED are interfaced with the microcontroller AT89S51. The AT89S51 is a low-power, high-performance CMOS 8-bit microcomputer with 4Kbytes of Flash programmable and erasable read only memory

(PEROM). The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. Microcontroller 89S51 performs the complete operation i.e., sensing, gate closing and opening operation is done by software coding written for the controller. Automation of the closing and opening of the railway gate using the switch circuit reduces the accidents to a greater extent. We use a pair of reed sensors to detect arrival and departure of train. A Reed sensor is an electrical switch operated by magnetic field. The first pair of sensors is placed at an approximate distance it detects the arrival of train, the signal is sent to the control room and red signal appears after the train passes the second pair of sensor the toll gate closes completely by the motor driver operation, after the train passes another pair of sensors the departure is detected and the barrier gate opens and the signal turns Green. If a vehicle is stuck at the level crossing the signal is sent to the train via control room through wireless technology and the train stops. Automatic railway gate control is highly economical microcontroller based arrangement, designed for use in almost all the unmanned level crossings in the country. We also introduce an anti collision technique which is used to prevent any head-on collisions between two trains.

BLOCK DIAGRAM



RESULT AND DISCUSSION

When the train passes the first sensor, it detects the arrival of the train and the buzzer starts. When the train passes the second sensor the barrier starts closing. If by chance a person or object comes in between the track, the green signal changes to red and a signal is sent to the driver of the train through the control room and the train automatically stops. The red signal changes to a green one once the obstacle is moved away from the rail. The sensor placed at 2km away from the rail cross detects the departure of the train. Once the train is left, the sensed signal is sent to the microcontroller and the motor is activated and the gate is reopened. The above mentioned steps repeat for the arrival of the train.

CONCLUSION:

The main aim of the project is centred on the idea of reducing human involvement for closing and opening the railway gate which allows and prevents cars and humans from crossing railway tracks. An automatic system is more reliable than a manual system. That's why this project is very much effective and efficient considering the safety of the human life. The railway gate is a cause of many deaths and accidents. Hence, automating the gate can bring about a ring of surety to controlling the gates. Humans may make errors or mistakes so automating this process will reduce the chances of gate failures. Microcontroller 89S51 performs the complete operation i.e., sensing, gate closing and opening operation

is done by software coding written for the controller Automation of the closing and opening of the railway gate using the switch circuit reduces the accidents to a greater extent. The obstacle detection system implemented reduces the accidents which are usually caused when the railway line passes through the forest. Most of the times greater loss has been caused when animals cross the tracks Automatic gate control system offer an effective way to reduce the occurrence of railway accidents. This system can contribute a lot of benefit either to the road users or to the railway management. The obstacle detection system implemented reduces the accidents which are usually caused when the railway line passes through the forest. Most of the times greater loss has been caused when animals cross the tracks

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