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Automatic railway gate control using Arduino

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Abstract
The mini-project work undertaken by us involves the design & development of an automatic railway gate control and alarm system using Arduino. It has been noticed that a lot of fatalities of lives occur everyday due to manually operated rail gates. These happen mainly at places where the rail road passes through a city, locality or unmanned gates of the crossing zones. Currently, gatemen mainly operate on the assumption of a train departure schedule from the station to reach a crossing zone Accidents are more likely to happen in such cases, causing severe damage to human lives and properties near the rail crossings. The Programmed Railroad Entryway Control Framework utilizing IR Sensor and Arduino centres around orderly traffic signal of railroad entryways that are both monitored and automated system.
Keywords: Arduino IDE, IR Sensor, Motor driver, Power supply, LCD display, Gate.

1. Introduction & Literature Survey

In today's scenario Railway safety becomes the most important aspect of railways all over the world. Due to manual operation, accidents are likely to happen. The suggest system helps in achieving the safety and to prevent accidents at the level crossings that are non-man handled. Since, the proposed model suggests an automatic system, it helps in reducing the error which is in manual operation and it will be used as highly reliable source. The design is to control a railway level crossing by servo motor/ DC motors using Arduino controller [1]-[5].
In this section, the review on the various applications that could be used for a host of image processing applications is presented in a nut shell. "Design and Development of Arduino based Automatic Railway Gate Control System" by A. Gaurav, S. Roy, and S. Mishra was published in the International Journal of Recent Technology and Engineering (2019). "Smart Railway Gate Control and Alerting System using IoT" by R. Anitha and G. Bhavani 2017. "Design and Implementation of Automatic Railway Gate Control System using Arduino" by Arindam Bhadra and Arijit Saha (2017) [6]-[10] as shown in Fig. 1.

2. Proposed Methodology

- Four sensors are utilized in the undertaking as two sets of two sensors; these sensors are kept in the both side of level intersections entryway as displayed in F All the sensors are associated with Arduino.
- At the point when train shows up from any side, it first cross the sensor1 after that cross the sensor2, thusly Arduino close the door by conveying the message to servomotor. Whenever train takeoff from any side it first cross the sensor2 after that cross the sensors, in this way Arduino open the entryway.
- Servomotors are utilized in the entryway since it is exceptionally simple to utilize and requires no driver IC or on the other hand circuit. Servo engine has three pins. The primary pin is PWM, second

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is Vcc and third is GND. Servo engine gets the PWM signal from Arduino and pivots the engine at fixed point as per obligation pattern of sign.

- These pins are associated with the two servo engines and afterward the servo will cover a precise distance of 90o and subsequently the door will get shut to impede the way for vehicles. Whenever the train will disappear from the other sensor it will get the Arduino told about takeoff of the train and servo Yet again engines will accomplish its past situation to open the door as shown in Fig. 2.

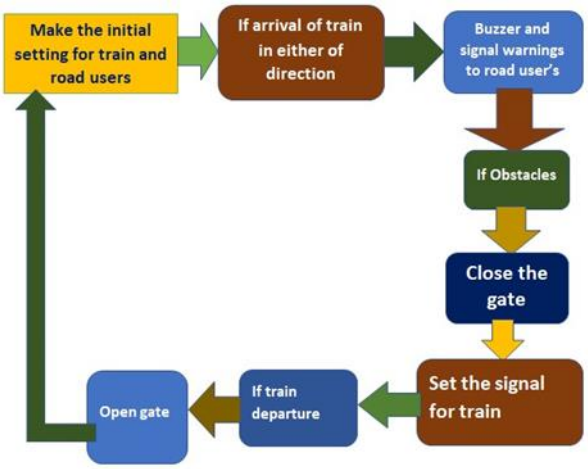

Fig. 1 : Proposed Block Diagram

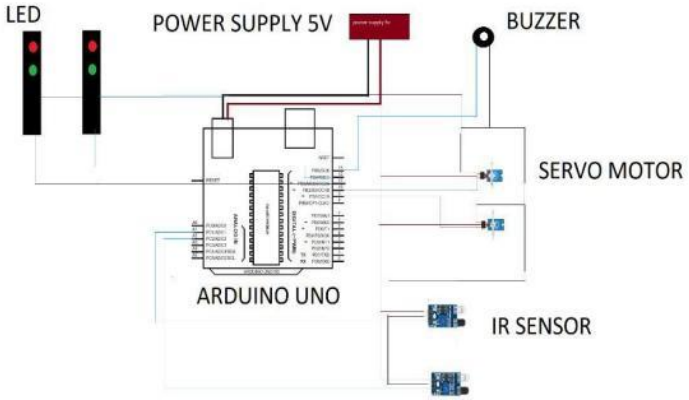

Fig. 2 : Proposed Circuit Diagram

3. Description of the software program steps

1) Start Initialize the framework as shown in Fig. 3.

2) Check section sensors on the two sides to identify train appearance Entry sensors comprise of an ultrasonic sensor and an infrared beneficiary which is available on the two sides of the track.

3) If section sensors on either side set off, actuate advance notice framework and following 5 seconds begin entryway shutting activity; in any case go to stage 2 For the door shutting activity to begin, both the IR recipient and the ultrasonic sensor needs to get the fitting sign. If both the sensors are set off, the advance notice framework involving laser diodes and LDR is initiated. Subsequent to sitting tight 5 seconds for the traffic reaction the door begins shutting down. If no sign accessible or only one sign is set off, the framework continues to really take a look at the passage sensors.

4) Check relating middle sensor Two other ultrasonic sensors are put on either side of the intersection to give the takeoff sign to the MCU. The middle of the road sensor would be the second sensor that the train runs over from any course which is before the crossing

5) transitional sensor set off, deactivate advance notice framework and actually look at comparing exit sensor; in any case go to stage 4 Once the middle sensor is set off, the advance notice framework is deactivated. The following sensor in line which is after the intersection is checked to approve train flight.

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6) If leave sensor set off, resume entryways; in any case go to stage 5 The leave sensors are set off when the train moves past them totally. At the point when the sensor gets that signal it sends this data to the MCU. The MCU then, at that point, begins the door resuming process.
7) End Prepare the framework for appearance of another train as shown in Fig. 4.

4. ARDUINO UNO

Fig. 3 : Arduino Board

Fig. 4 : Sensor

1. The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects.
2. The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE..
3. ASERVO MOTOR:A servomotor (or servo motor) is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity, and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. By using these motor the gate will be down as well as up.
4. LCD-LCD stands for liquid crystal display. LCD used is 16 by 2. It contains the 16 pin. 8 pin is used for data communication, read, write, enable, Brightness control and 4 pins for power supply. It is used to display data as shown in Fig. 5.

Fig. 5 : LCD Display

5. Results & Discussions

This project represents the Automatic gate control system offer an effective way to reduce the occurrence of railway accidents. Since the design is completely automated it can be used in remote villages where no station master or line man is present [15]--[16].

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