ISSN: 0975-766X
CODEN: IJPTFI
Available Online through *Research Article*
www.ijptonline.com

AUTOMATIC CONTROL OF RAILWAY GATES

D.Krishnan*, P. Edreena
Dept of Computer Science and Engineering, Saveetha School of Engineering, Saveetha University.

Received on 10-08-2016 *Accepted on 06-09-2016*

Abstract:

The present work endeavours to computerize the opening and shutting of doors at a railroad level intersection. As a rule, level intersection doors are worked physically by a guard. The guardian gets the Krishna, Shashi Yadavand Nidhi, "Automatic Railway Gate Control Using Microcontroller", Oriental Journal of Computer Science & Technology, Vol.6, No.4, December 2013. data about the train entry from a close station. At the point when the train begins to leave the station, the station in-control conveys this data to the nearest guard to get prepared. This human mediation can be maintained a strategic distance from via computerizing the procedure. In circumstances where the train is late because of some reason, the doors stay shut for long lengths bringing about thick congested driving conditions close to the entryways. This also can be forestalled via robotization. The proposed framework utilizes infra red sensors to recognize the landing and flight of trains at the railroad level intersection and Arduino to control the opening/shutting of doors. The framework utilizes two IR sensors to recognize the entry of the train and a third IR sensor to distinguish the flight of the train. At the point when the landing of the train is detected, signs are given to the movement showing the entry of the train on the track. At the point when the second sensor identifies the Krishna.

Keywords: Automation, Obstacle recognition, Railway entryway, Sensor.

1. Introduction:

The railroad framework is the most generally utilized transportation mode as a part of India. It is additionally one of those methods of transport that faces a great deal of difficulties because of human blunders, for example, level cross mishaps, impacts, and so on. A level cross, a convergence of a street and a railroad line, requires human coordination, the absence of which prompts mischances. Level crosses are controlled by physically worked doors. With a specific end goal to maintain a strategic distance from the human blunders that could happen amid the operation of doors, the proposed

paper presents the idea of railroad entryway mechanization. Level intersections are overseen by the watchman and the guardian is told my method for phone at a large portion of the level cross from the control room. Yet, the rate of manual mistake that could happen at these level crosses are high since they are dangerous to perform without real learning about the train time table. Delay in the opening and shutting of the door could prompt railroad mischances. The present work endeavors to build up a framework which robotizes door operations (opening and shutting) at the level cross utilizing miniaturized scale controllers and identify impacts at the railway operation by the guards in light of the signs got from the control room. The human mistakes, for example, delay in advising the watchman about the entry of the train, delay in the entryway operation by the guardian, impediment stuck in the level cross and so on prompts the expanding rate of mishaps at the level cross. Hence the railroad door mechanization framework plans to manage two things. It decreases the aggregate time taken for the entryway operation at the level cross furthermore guarantees the wellbeing of the travellers at the level cross amid when the train passes. The decrease in the immediate human mediation amid the entryway operation thusly lessens the crash and mishaps at the level cross.

Since the door operations are robotized taking into account the sensors, the ideal opportunity for which the entryway is shut is less. The paper in this manner plans to build up a programmed railroad entryway control framework which is dependable and secured than the current manual frameworks. Whatever remains of the paper is composed as takes after. Segment II gives a survey of the past papers that identify with our work. Area III portrays the diagram of the railroad door robotization framework. Segment IV depicts the framework engineering, the door operations at the level cross and strategy. The exploratory results are talked about in Section V and the finish of the work is examined in Section VI.

2. Related Work

Past related works are [1], [2], [3] and [4]. Xishi [2] talked about the propelled train security framework. They characterized that during the time spent creating ATSS, an adaptation to non-critical failure technique is connected for both the equipment and the product segments. The railroad entryway robotization framework is progressively actualized following 2000 in Korea.

The usage of the framework successfully diminished the mischance rate at the level cross and the sensors utilized as a part of the Korean railroad entryway robotization framework is attractive sensors. Attractive sensors set underground are less influenced by ecological alters and perceives the course of development of vehicles [2]. Jeong [3] characterized the

railroad auto control framework utilizing OGSi and JESS. The technique by which the condition of railroad cross is evaluated utilizing JESS is portrayed as a part of their paper. The diverse techniques with which the train pilots can keep away from the mishap circumstances and the security measures to be taken in the level intersections are likewise talked about. In [4], a definite presentation about the present railroad innovation is exhibited. It talks about the hindrances of physically initiated railroad signals and the railroad notices at the level cross. The train finders goes about as the significant part in the train robotization framework

3. System Overview:

Sensor based railroad entryway computerization framework is created to computerize the way toward opening and shutting of entryway at the railroad level crosses. The framework recognizes the entry and the takeoff of train for the entryway operation utilizing distinctive sorts of sensors. The proposed framework utilizes three infrared sensors to distinguish the entry and flight of trains. The framework likewise actualizes impediment sensor which distinguishes any deterrent on the track and controls the operation of the train. Sensors and servo engines are customized utilizing Arduino smaller scale controller. The real parts utilized as a part of the computerization of railroad entryway at the level doors are sensors. Sensors that identifies the train can be arranged into various sorts, for example, Henceforth the perfect separation at which the sensors could be put to identify the entry of the train is 5km frond the base speed of a voyager/stock train is 59km/hr. Consequently the ideal detachment at which the sensors could be put to distinguish the passage of the train is 5km and the flight of the train is 1km and thusly the entryway won't be closed for over 8 minutes [1].

Our pattern the level cross and the flight of the level cross using a laser column and Light Dependant Resistor (LDR). The genuine test went up against by the Indian railroad structure is the growing incident rate at the level crosses. The present system incorporates the manual and train is 1km and along these lines the entryway won't be closed for over 8 minutes [1]. Our paper proposes a structure which uses five sensors, four IR Sensors (IR1, IR2, IR3 and IR4), a Light Subordinate Resistor (LDR), a Krishna, Shashi Yadav and Nidhi, “Automatic Railway Gate Control Using Microcontroller”, Oriental Journal of Computer Science & Technology, Vol.6, No.4, December 2013. laser source (L), counter and one sign (B1). Consistently, the IR Sensors are determined to the track at a detachment of 5km and 1km on

both sides of the level convergence. The LDR and laser source is used to perceive the closeness of an obstacle between the railroad entryways.

The structure furthermore uses DC motors to control the operation of the portals. The sign is used to demonstrate the arrival of the train inside a stipulated time [6]. IR1 perceives the section of a train. When it perceives a train, it sends a sign to B1 and C1, and B1 is initiated and C1 starts count down, and yellow LEDs are traded on for the development to know the section of the train. The train then dares to IR2. Right when the train nears IR2, DC motors are controlled on. The DC motors starts and the entryways begin to close. Parallel red LEDs are traded on. After the train passes the entryways and nears IR3, a sign is again sent to the DC motors moreover, the entryways open and green LEDs are traded on for the road development to pass. The proposed system designing is appeared in Fig. 1. The laser source and LDR work at the same time to perceive tangles in the way. The laser source interminably transmits laser bars which go to the LDR. the moment that the pillars don't go to the LDR it suggests that there is some deterrent in the way and the entryways don't close. A sign is moreover sent to the LEDs to hail the trains to stop as an obstacle is accessible.

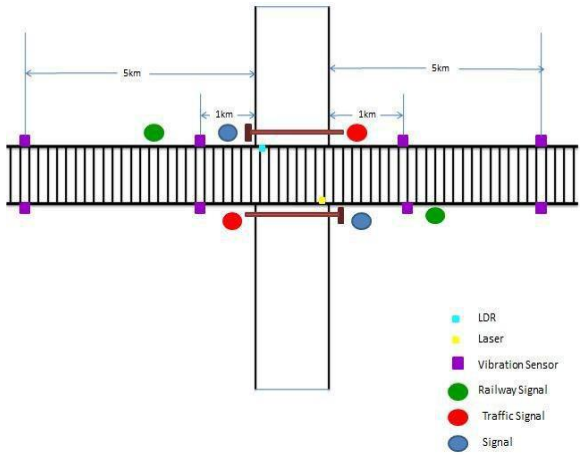


Fig. 1 demonstrates the stream diagram of the entryway shutting operation.

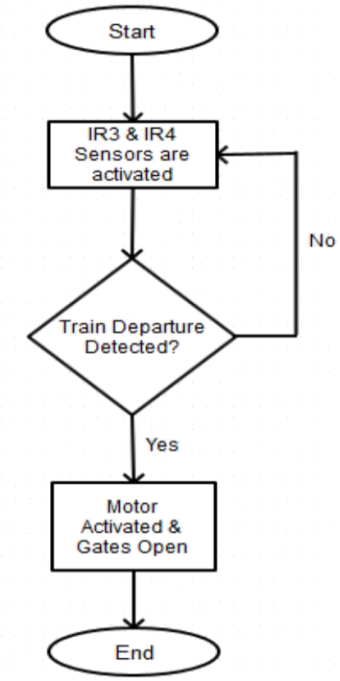
After the train is identified and the door is shut the following prompt operation is to identify the takeoff of the train from the level cross. The sensors IR3 and IR4 recognizes the takeoff of the train and the engine is then worked to open the door. The servo engine is customized to work with the predefined speed train. The yield signal from the vibration sensor is nourished into the smaller scale controller and it computerizes the entryway operations. The real utilization of the vibration sensor is crash recognition.

Vibration Sensor: Sensors utilizes piezoelectric impact to recognize the vibration in the track which identifies the entry and flight of the train. The yield signal from the vibration sensor is nourished into the smaller scale controller and it computerizes the entryway operations. The real utilization of the vibration sensor is crash recognition.

Wheel distinguishing Sensor: Wheel sensors chips away at attractive inductive standard. The DC current which is produced as the yield signal from the wheel indicators are utilized for the identification of train entry.

IR Sensor: IR sensors identify the train utilizing infra-red beneficiary and transmitter. Infra-red sensors are equipped for identifying the nearness of an article by detecting the warmth being radiated by the item. It emanates or recognizes the radiations to identify the movement of an article encompassing it. The most normally utilized sensors for the programmed railroad door framework is vibration sensors and IR sensors [5]., Chennai.

4. System Architecture:



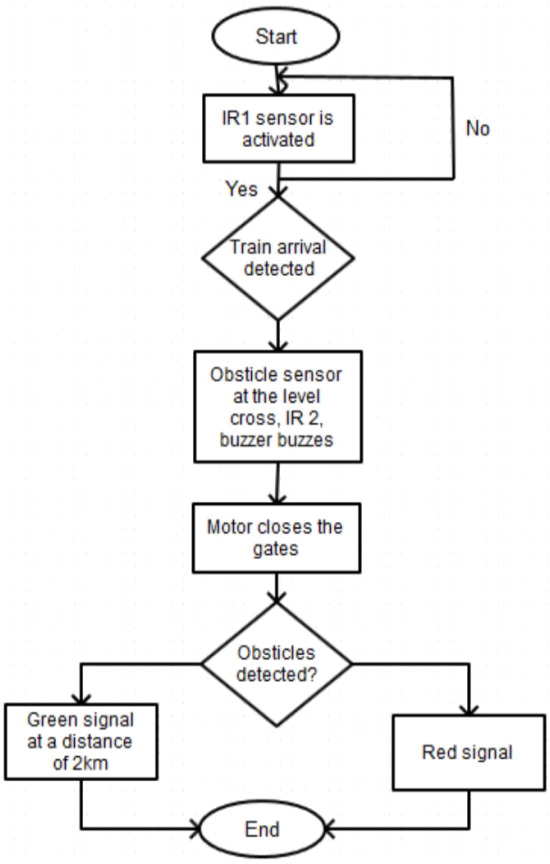


Fig. 2 Flow chats for opening gates (and) Fig .3 Flow chart for closing gates.

4.1 Hardware Requirements

The hardware components in Fig. 4, 5, 6, 7, 8 and 9 are used in the railway gate automation system:

a) Arduino UNO micro-controller

Fig. 4 Arduino UNO micro-controller.

b) IR Sensor

Fig.5 Circuit of IR sensor.

c) LED

Fig.6. Circuit of LED.

d) Servo Motor

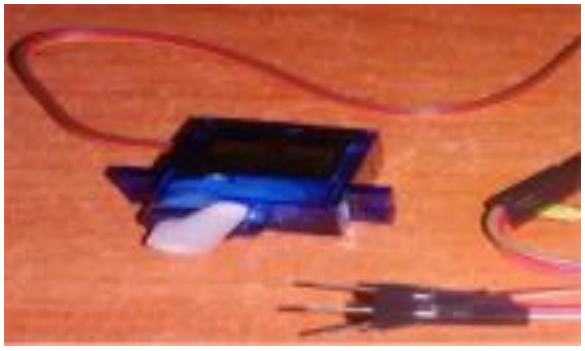


Fig.7 Circuit of Servo motor.

e) Buzzer

Fig.8 Circuit of Buzzer.

f) Resistors Krishna, Shashi Yadav and Nidhi, "Automatic Railway Gate Control Using Microcontroller", Oriental Journal of Computer Science & Technology, Vol.6, No.4, December 2013.

Fig.9 Circuit of Resistors.

4.2 Circuit Diagram

Fig. 10 shows the circuit diagram of the proposed system. An Arduino UNO is the base of this circuit and all the other components are connected to this board. Three IR Sensors, IR1, IR2 and IR3, are connected to pins 3, 5 and 6 of Ardiuno UNO. Three LEDs, red, yellow and green, are connected at pin 11, 12 and 13 respectively. Each of these LEDs are grounded through 1kΩ resistor. A servo motor is connected to pin 9. A buzzer is also connected at pin 3.

When IR1 detects the train coming, it sends a high signal to pin 3. As soon as the Arduino UNO detects a high signal, it raises the signal at pin 11 and the components connected to this pin shows an output i.e. the yellow LED glows and the buzzer buzzes. IR2 sends a high signal to pin 5 when the train is detected by it. This sends a high signal to pin 12 and pin 9. Hence, the red LED glows and servo motor rotates 90 degrees. When IR3 senses, it sends a high signal to pin 9 and pin 13. Thus, the green LED glows and the servo motor moves another 90 degrees. Fig. 11 shows the block diagram of the system.

5. Experimental Results:

The proposed framework is for all intents and purposes tested as a working model of this present reality level cross. The significant parts utilized as a part of the model are a 80cm distance across railroad track appeared in Fig. 12, a toy train, four IR sensors, a stepper engine with which the door works, 4 LEDs as they move signs and ringer to demonstrate the entry of train to the activity.

Door operation: An IR sensor is set at a separation of 30cm and another at 5cm from the level cross. The toy train passes the principal sensor and when it is recognized by the sensor, a yellow LED sparkles at the level cross demonstrating the movement that the door is going to close. At the point when the second sensor put at a separation of 20cm from the level cross distinguishes the train, the ringer is enacted and the engine is totally shut and the sign turns red. The bell rings until they are 80cm distance across railroad track appeared in Fig. 12, a toy train, four IR sensors, a stepper engine with which the door works, 4 LEDs as the move.

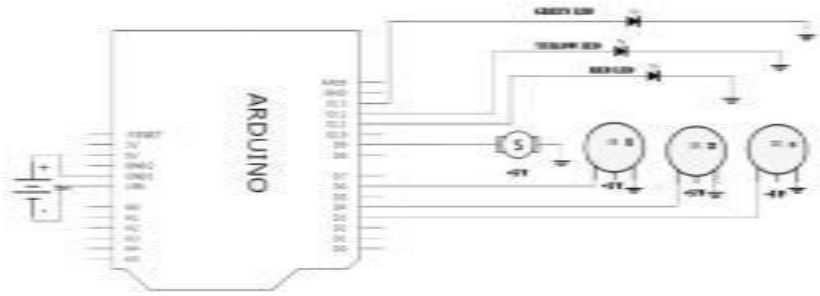


Fig.10 Circuit diagram.

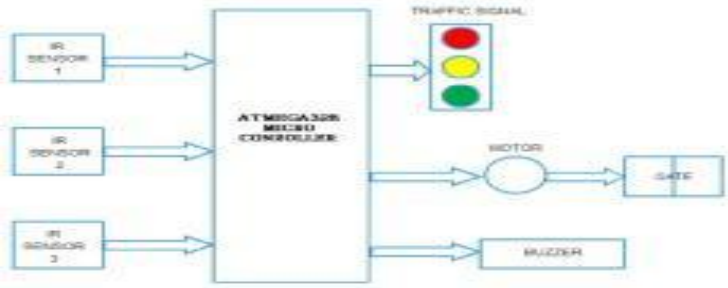


Fig.11. Block diagram of the system.

Deterrent location: Any snag on the track is recognized by setting a RF module on the train and the nearness of *impediment* on the track is told by a sign at the control room. The train development is then controlled taking into account the nearness of the impediment on the track.

6. Conclusion:

Programmed railroad entryway control framework is focused on decreasing human inclusion for shutting and opening the rail line door which permits and keeps autos and people from intersection railroad tracks. The railroad entryway is a reason for some passings and mishaps. Thus, robotizing the entryway can achieve a ring of surety to controlling the doors. Human may commit blunders or errors so mechanizing this procedure will decrease the odds of door disappointments. Robotization of the end and opening of the railroad entryway utilizing the switch circuit decreases the mischances to a more noteworthy augment. The hindrance discovery framework actualized lessens the mischances which are typically brought about when the railroad line goes through the woods. The greater part of the times more prominent misfortune has been brought about when creatures cross the tracks. The constraint of this anticipate is the utilization of IR sensors. Consequently, any impediment in the method for the sensor will be recognized. Another vital restriction is that this anticipate does without a doubt close and open the door yet it can't control the intersection of autos and vehicles. It just controls the entryway. To battle this issue weight sensors can be utilized as augmentation to the present work. We are utilizing IR sensors yet it is ideal to utilize load sensors. We have not utilized burden sensors since it was not monetarily attainable. As a future extent of work, our framework can be executed continuously by settling the present constraints utilizing new advancements.

References:

1. Krishna, Shashi Yadava Nidhi, “Automatic Railway Gate Control Using Microcontroller”, Oriental Journal of Computer Science & Technology, Vol.6, No.4, December 2013.
2. J. Banuchandar, V. Kaliraj, P. Balasubramanian, S.Deepa, N.Thamilarasi,“ Automated Unmanned Railway Level Crossing System”, in Journal of Modern Engineering Research (IJMER).
3. Siti Zaharah, “Transit District Advance Automated Train Detector System Case Study Description”, pp: 115-135.
4. Ahmed Salih Mahdi, Al-Zuhairi, “Automatic Railway Gate and Crossing Control based Sensors & Microcontroller", International Journal of Computer Trendsand Technology (IJCTT), Volume 4, Issue 7, July 2013.
5. International Journal of Engineering Research & Technology (IJERT) Vol.1 Issue 3, May– 2012 ISSN: 2278-0181.
6. International Journal of Modern Engineering Research (IJMER) Vol.2, Issue.1, Jan-Feb2012.