

## International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 12, December 2018

# Automated Railway Mobile Platform for Physically Challenged and Aged Persons

Sagar Sandip Karmarkar

UG Student, Dept. of EXTC, Vivekanand Education Society's Institute of Technology, Mumbai, Maharashtra, India

**ABSTRACT:** Today the cheapest mode of transportation is railway but nowadays the number of accidents on railway tracks are increasing due to careless railway crossing. Careless in operation and lack of knowledge in workers are main reasons for this, therefore we are trying to find solution for this situation. A study shows that as many as 3014 commuters died on the tracks on the western, central and harbour railway lines. The reason for this is to avoid the use of foot-over bridges which people avoid using due to congestion and slow transport. Also, it is very difficult for the physically challenged and aged people to use these foot-over bridges without the help of someone. To combat these problems this prototype gives new smart railway mobile platforms especially for helping physically challenged and aged persons. The mobile platform is functioned to be working automatically. Two sensors are placed on both sides of the track at some pre-defined distance from the platform. IR sensors are used to automatically control the mobile platforms. When the train is approaching the platform (via first sensor) the mobile platform automatically closes so the train can pass and halt on the platform. On the contrary, when the train departs from the platform (via the second sensor) the mobile platform opens, so passengers can walk on it. Simultaneously, a buzzer produces a sound while opening/closing the platform. Due to this, there will not be a need to use the foot-over bridges especially for handicapped and aged people. This will also be a time saver for the passengers and people will not use the tracks for crossing.

**KEYWORDS:** Arduino UNO R3, IR Sensors, CD drive, Buzzer

### I. INTRODUCTION

In India, majority of the public transportation is being carried out by the railway and therefore any problem occurred during transportation brings the transportation to a halt. Railways is considered to be the most reliable medium of transport in India as lakhs of commuter's travel by it on a daily basis. So, the safety and management are a challenge. Uncontrollable railway crossing is one of the major problems faced by the Indian Railways, and the highest contributors to the death count per year. Despite the strict measures taken by the Railway authorities, the platform crossing death continues to occur frequently. Railway crossing deaths occur because people want to avoid the confusion and congestion on the foot-over bridges. [1]



Fig 1 Existing System

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 12, December 2018

These shortcomings are eliminated by this mobile platform. The arriving/departing train is sensed by IR sensor and it automatically closes/opens the platform. For sensing the train IR sensors are placed at both sides of track. With the help of sensors, the Arduino UNO R3 will sense the presence of train. As soon as train is sensed, the Arduino will give pulses to the motor to close/open the platform. The main objective of the Mobile Platform is to help the physically handicapped people to move from one platform to another. At the time when there is no train arriving on the station, the Mobile Platform will be opened and all the time. The physically handicapped people and aged persons will utilize the Platform to pass between platforms. The train entry signal will be given in a voice signal via buzzer. The proposed framework gives a superior answer for exchanging of physically handicapped people and aged persons without utilizing foot-over bridges. The above proposed prototype works on Arduino based technique, sensor and motor mechanism which is employed to operate the Mobile Platform.

## A) OBJECTIVE:

- The main objective of the project is to reduce more electricity consumption and to avoid unwanted accidents caused by railway crossings.
- To save the travel time of people by making them to avoid using the foot-over bridges employed in the existing system to move from one platform to another.

## II. PROPOSED METHODOLOGY

This prototype incorporates Arduino UNO R3, IR sensors, CD Drive, L293D Motor driver IC and buzzer. It is used to automatically close/open the mobile platform in between the tracks. In this prototype, the two distant platforms are connected by using a horizontal platform on which the passengers can walk on. Sensors are placed at some pre-defined distance on both ends of the railway track. When the train passes the first IR sensor the mobile platform will automatically close allowing the train to pass. And when the train leaves the second IR sensor the mobile platform will move bridging the gap between two platforms. On sensing the train, the Arduino will give commands to the CD drive to close/open the mobile platform through DC motors in the CD drive. A buzzer will start buzzing as soon as the mobile platform is opened or closed. To avoid discrepancies the IR sensors are placed at some pre-defined distance on either side of the platform, so the bridge can open when the last compartment of the train passes and closes when the first compartment approaches the platform. The proposed prototype can be beneficial for physically handicapped, aged people, patients, etc. Their time will be saved by using the mobile platform instead of foot-over bridges. The figure below shows the block diagram of the proposed system

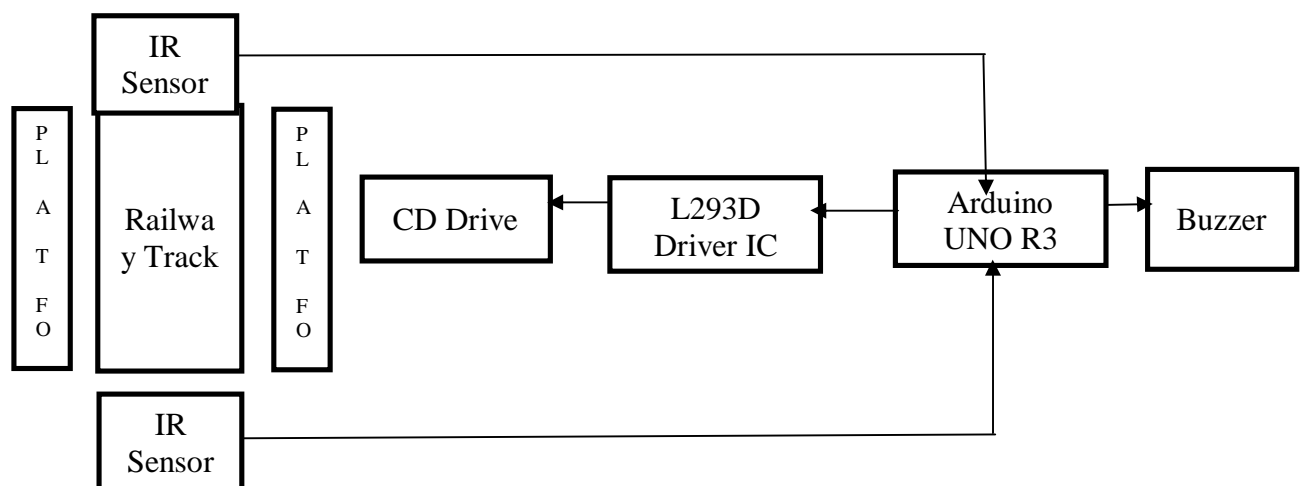


Fig 2 Block Diagram of prototype

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 12, December 2018

## III. HARDWARE IMPLEMENTATION

### A) Arduino UNO R3:

The Arduino Uno R3 is a microcontroller board based on Atmega 328. It operates at a voltage of +5V. It consists of 14 digital I/O pins of which 6 provide PWM output, an operating clock frequency of 16 MHz, a USB connection, 6 analog inputs, a power jack and a reset button. The Arduino can be programmed using C or C++ through the Arduino IDE software. [2]

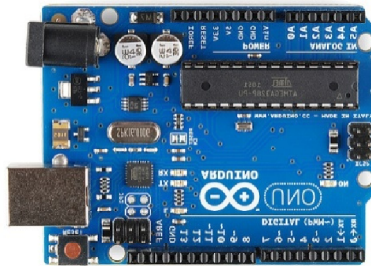


Fig 3 Arduino UNO R3

### B) IR Sensors:

An Infrared sensor [3] is an electronic device which emits in order to sense objects in the surrounding. The emitter is an IR LED and the detector is an IR photodiode that is sensitive to IR light of the same wavelength as that emitted by the IR LED. It is a popular circuitry used in many electronic devices. The radiations produced are not visible to the human eye since it emits in infrared range. The sensors usually have wavelengths between 0.75 and 1000µm. The region between 0.75 to 3µm is known as the near infrared regions. The region between 3 and 6µm is known as the mid-infrared and infrared radiation which has a wavelength greater higher than 6µm is known as far infrared.

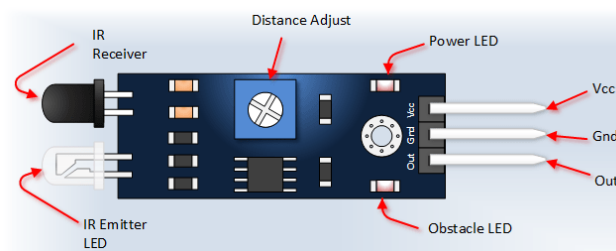


Fig 4 Pin diagram of IR Sensor

In this project the sensors are placed at some distance from the platform. When the light emitted from the IR LED encounters an object (in this case train) it reflects the light which is picked up by the IR Receiver. The desired operation is performed when the light reflects from the object (in this case opening/closing the mobile platform).

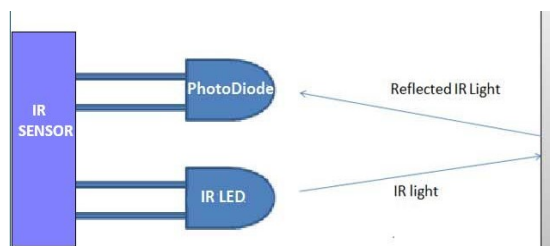


Fig 5 IR Sensor working principle

## International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 12, December 2018

### C) L293D Driver IC:

It is a typical motor driver IC which allows the DC motor to rotate in either direction i.e. clockwise or anti-clockwise. It is a 16 pin IC which is capable of driving small and quiet big motors as well. We need to provide either logic '0' or logic '1' to rotate the motor in the desired direction [4].

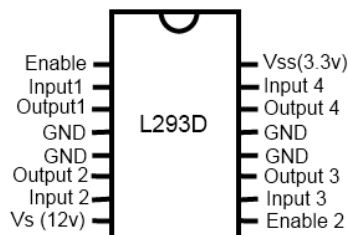


Fig 4 L293D IC pin diagram

- Input 1= Logic 1 and Input 2= Logic 0 we get Clockwise Direction Movement
- Input 1=Logic 0 and Input 2= Logic 1 we get Anti-clockwise Direction Movement

In this prototype, the L293D IC is used to drive the motors in the CD drive so as to open or close the CD drive i.e. the mobile platform.

### D) CD Drive:

There are two types motors used. One that is used to open and close the CD Drive is a Stepper motor. The other type is a BLDC (brushless DC) motor that is used to spin the CD. The DC motor in the CD drive converts the electrical energy into mechanical energy, in this case, which opens/closes the CD drive to bridge the gap between the platforms when it opens and un-bridges the gap when the CD drive closes [5]. The motors are driven using a driver IC as shown above

### E) Buzzer:

It is a device used to produce a sound which gives an indication of opening/closing of the mobile platform. The buzzer is driven via the IR sensor and the Arduino UNO R3. When the IR sensor senses a train, which triggers the Arduino further triggering the buzzer to produce the sound [3]. Following are the steps to interface buzzer with Arduino:

- 1) Place the buzzer into the breadboard, so that the two leads are on two separate rows.
- 2) Using jumper wires, connect Arduino digital pin no. 8 to the positive lead.
- 3) Connect the second lead to the 100-ohm resistor, followed by a ground connection.



Fig 5 Buzzer

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 12, December 2018

## IV. SOFTWARE IMPLEMENTATION

In this project, Arduino UNO R3 is used. So, to code it, ArduinoIDE software is used, and the programming is done in C. The code consists of functions like stating pinout of the motors, checking for the incoming data on serial pin from the IR Sensors, decoding the incoming data, turning the motors and buzzer "ON" as per the logic. It is burnt in the Arduino UNO R3. The mobile platform is opened/closed, and buzzer produces a sound simultaneously. The figure below explains the detailed flow chart of the proposed prototype [6]:

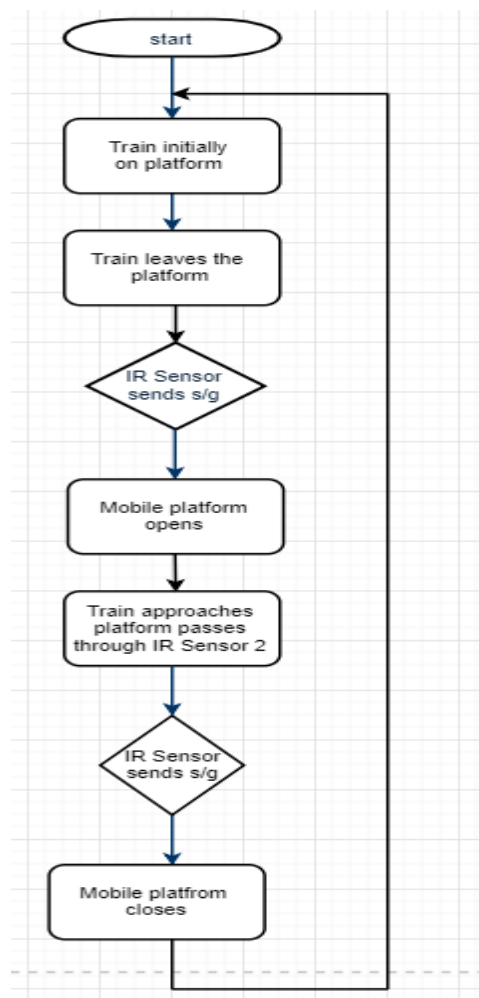


Fig 6 Flowchart

## V. ADVANTAGES

- System is simple, economic and compact.
- It is very useful for handicapped people, patients etc.
- Low cost, less maintenance, and less power is used.

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 12, December 2018

- No need to climb bridges over cross the platforms.
- Prevents people from using the tracks for crossing.
- Time saver for people

## VI. EXPERIMENTAL RESULTS

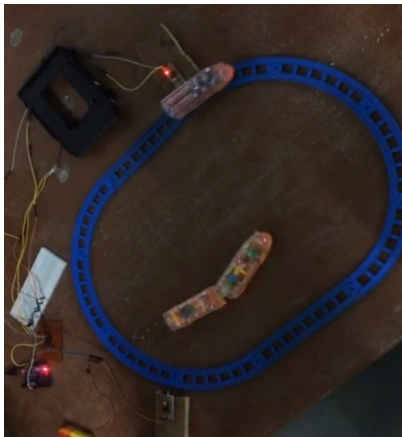


Fig 7 IR Sensor senses the train leaving



Fig 8 Mobile platform opens



Fig 9 IR sensor senses incoming train



Fig 10 Mobile platform closes

## VII. CONCLUSION

The programmed Mobile Platform is a brilliant office to the physically challenged people to cross the platforms without utilizing the foot-over bridges. The motive of this prototype was to help the physically handicapped and aged persons to cross the railway platform in a less tedious manner. Therefore, the train is sensed continuously, which automatically close/open the mobile platform which enables the passengers to cross the platforms preventing them from using foot-over bridges. The project will save the human as well as electrical energy since it will be a substitute to escalators and foot-over bridges. This project also minimizes the level of accidents caused by railway track crossings. People who

# International Journal of Innovative Research in Science, Engineering and Technology

*(A High Impact Factor, Monthly, Peer Reviewed Journal)*

Visit: [www.ijirset.com](http://www.ijirset.com)

Vol. 7, Issue 12, December 2018

have factures, leg cramps, etc. they also can cross the platform easily as well as it is also helpful for the senior citizens who have problem for crossing the platform by using the foot-over bridge.

## VIII. FUTURE SCOPE

In the future, the power supply used to power the Arduino can be replaced by a battery charged by means of Solar cells. The arrival/departure of the trains can also be done by means of Fuzzy Logic. CCTV systems can also be incorporated for means of safety for both passengers and rails. LCD can be interfaced with the Arduino to show the arrival/departure of trains from the platform.

## REFERENCES

- [1] Sandip Avhad, Yogesh Sonar, Suraj Binnar, Pooja Zurale, "Smart Railway Track for Disabled & Aged Persons", International Research Journal of Engineering Technology, Volume 04, Issue 04, Apr-2017
- [2] <https://arduino.cc>
- [3] Dwarakanath S K, Sanjay S B, Soumya G B, Arjun V, Vivek R, "Arduino Based Automatic Railway Gate Control and Obstacle Detection System", International Journal Of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.5, Issue 5, May 2016
- [4] <https://www.rakeshmondal.info/L293D-Motor-Driver>
- [5] <https://www.electricaleasy.com/2014/01/basic-working-of-dc-motor.html>
- [6] Leena G, Chetan Singh Vidawat, Nitesh Jha, "Automatic Railway System", International Journal of Computer Applications, Vol 159, No 8, February 2017