

# AUTOMATIC MOVABLE PLATFORM FOR CROSSING RAILWAY TRACKS

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## ABSTRACT

Railways play a major role in transportation. Irrespective of age, everyone prefers to travel in railways because it is safer than other transportation and has an affordable fare of tickets. But while crossing railway tracks we face many issues like missing the train, accidents occurring. And also handicapped people and old aged people are facing many problems while crossing tracks. So, we proposed an Automatic Movable platform for crossing railway tracks to enhance safety and efficiency in railway operations. It is used to overcome the problems which are happening with footbridges, escalators, lifts. This project identifies the status of each train using IR Sensors and that information is displayed in LCD. So, this proposed method is used for not only handicapped people but also normal people.

**Keywords:** IR Sensors, LCD

## I. INTRODUCTION

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, sometimes with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as they control many of the common devices we use. In general, "embedded system" is not an exactly defined term, as many systems have some element of programmability. For example, Hand held computers share some elements with embedded systems such as the operating systems and microprocessors which power them but are not truly embedded systems, because they allow different applications to be loaded and peripherals to be connected.

An embedded system is some combination of computer hardware and software, either fixed in capability or programmable, that is specifically designed for a particular kind of application device. Industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, and toys (as well as the more obvious cellular phone and PDA) are among the

myriad possible hosts of an embedded system. Embedded systems that are programmable are provided with a programming interface, and embedded systems programming is a specialized occupation. Certain operating systems or language platforms are tailored for the embedded market, such as Embedded Java and Windows XP Embedded. However, some low-end consumer products use very inexpensive microprocessors and limited storage, with the application and operating system both part of a single program.

We are living in the Embedded World. You are surrounded with many embedded products and your daily life largely depends on the proper functioning of these gadgets. Television, Radio player of your living room, Washing Machine or Microwave Oven in your kitchen, Card readers, Access Controllers, Palm devices of your work space enable you to do many of your tasks very effectively. Robotics: industrial robots, machine tools, Robocop soccer robots.

- Automotive: cars, trucks, trains
- Aviation: airplanes, helicopters
- Home and Building Automation
- Aerospace: rockets, satellites
- Energy systems: windmills, nuclear plants
- Medical systems: prostheses, revalidation machine

## **II.LITERATURE SURVEY**

Indumathi.G et. al [1] has said, In order to facilitate the passengers in railway stations without disturbing the train activities, staircase and bridges were laid foundation. But during peak hours, it becomes more rush and crowded that becomes very difficult for the elderly persons or handicapped persons to use the bridge. To overcome this circumstance, we propose the idea of closing and opening the mobile platform in railway tracks automatically in this project. Mobile platform is one that connects two platforms together and thus facilitates passengers to use the path efficiently and reach the opposite stage. In this module, we make use of two Sensors on both sides of the track. When the train reaches the stage, the first sensor automatically closes the mobile stage. Once the train leaves the station, the second sensor helps to bridge two platforms mechanically. We make use of infrared sensors along with integration of microcontroller to sense the presence of train and it sends the pulses to stepper motor device that helps in closing the mobile stage. In order to avoid the confusions to the pedestrians regarding the usage of bridge, we implement green and red signal indication. When the signal is green, the pedestrians can use the bridge. If it turns red it indicates that train is arriving and hence bridge is closed and cannot be used until it leaves. The basic block

diagram along with involved hardware and software devices are discussed in detail. Keywords-- Infrared sensors, Stepper motor, Interfacing unit, PIC 16F877 Microcontroller, motor driver circuit.

P. Venkata Sai et.al [2] said this project presents you the detailed explanation about the automatic railway platform. Normally for crossing the railway tracks we use the staircase bridges. In critical times in order to catch our train which is on another platform we go by the bridges. Sometimes we may miss the train by going through it especially elderly people or handicapped people. So, to eradicate that problem we have proposed this system. By sensing the occurrence of the train a moveable platform will connect the platforms. We have used IR sensor and ultrasonic sensor for sensing the occurrence the train. And Wi-Fi module for communication purpose which is connected to the Node Mcu (micro-controller-unit).

Adarsh K S et.al [3] described that this project is used for automatically close or opens the mobile platforms in between the track trains. Normally the mobile platform connects the two platforms through which the passenger can walk on the platform to reach on the next platform. Sensors are placed on the two sides of track. If the train reaches one sensor the mobile platform will automatically close and allows the train to go through the tracks and then when the train leaves the second sensor the mobile platform will automatically open the bridging platforms. The microcontroller will sense the presence of train by using infrared sensor. So on sensing the train on one path controller will give pulses to the stepper motor to close the mobile platform automatically.

Hiroto Takeuchi et.al [4] said ,this paper, the concept of novel obstacle-detecting methods for railway level crossings, which are capable of detecting pedestrians and bicycles besides motorcars based on both the laser range scanner technologies and digital signal processing techniques, has been proposed. The mathematical models for pedestrian tracking by using Kalman filter have been investigated. The performances of both the obstacle detection and pedestrian- tracking algorithm have been verified through field tests at an operating level crossing. The obstacle-characterisation-based countermeasures against level crossing accidents have been discussed. The test result shows that this method is promising from the points of views of preventing accidents and reducing operational cost.

Sudhakar Memula et.al [5] described the objective of this project 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, to provide safety to road users by reducing the 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, he closes the gate depending on the timing at which the train arrives. Hence, if the train is late due to certain reasons, then gate remain 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 to the gate. Hence, the time for which it is closed is less compared to the manually operated gates and also reduces the human labor. This type 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 Automatic railway gate control is highly economical microcontroller based arrangement, designed for use in almost all the unmanned level crossings in the country.

Anila Satish et.al [6] describes an improvising system for Indian Railways that can be utilized to account for the problems with the level crossing gates operated manually by a gate keeper. Over 43.6% of railway accidents were held at level crossings in our country. No fruitful steps have been taken so far. In the proposed system the arrival or departure of the train near level crossing determines the opening or closing of the level crossing gate automatically with the help of IR sensor and warning signal (i.e. Buzzer sound) at level crossings. But there may be a chance that during this automation process, a vehicle may be locked between the crossing gates. At this situation, the obstacle between the crossing gates could be detected with the help of ultrasonic sensor and it will be intimated to the train through GSM module. Thus, the man power could be reduced and at the same time accidents at level crossings can be avoided into maximum extent.

G.Prabhavathi et.al [7] describes the project is used for automatically close or open the mobile platforms in between the track trains. Normally the mobile platform connects the two platforms through which the passenger can walk on the platform to reach on the next platform Sensors are placed on the two sides of track. if the train reaches one sensor the mobile platform will automatically close and allows the train to go through the tracks and then when the train leaves the second sensor the mobile platform will automatically open the bridging platforms. The microcontroller will sense the presence of train by using infrared sensor. so on sensing the train on one path controller will give pulses to the stepper motor to close the mobile platform automatically.

### **III. EXISTING AND PROPOSED SYSTEM**

#### **EXISTING SYSTEM**

The existing method for crossing railway tracks typically involves the use of level crossings, footbridges, or pedestrian gates, as we discussed earlier. These methods have been implemented to ensure the safety of pedestrians and vehicles when crossing railway tracks. However, if there is a proposing new method like an automatic movable platform, it would be interesting to explore how it could potentially enhance safety and convenience. Innovation in railway track crossing methods is

always exciting. A footbridge in a railway station is a bridge that allows pedestrians to safely cross over the railway tracks. It's typically located above the tracks and provides a designated path for people to walk across. Footbridges are an essential part of railway stations as they ensure the safety of pedestrians and help prevent accidents. They often have stairs or ramps for easy access and are designed to accommodate a large number of people. Footbridges also provide a great vantage point to observe trains and enjoy the view of the station.

We use two IR sensors in the project. First IR sensor is placed nearly 1KM before the platform. Second IR sensor is placed at the end of the platform. Initially the IR sensors will be in low conditions and the bridge will be open for the passengers to pass through it.

### **DRAWBACKS IN EXISTING SYSTEM**

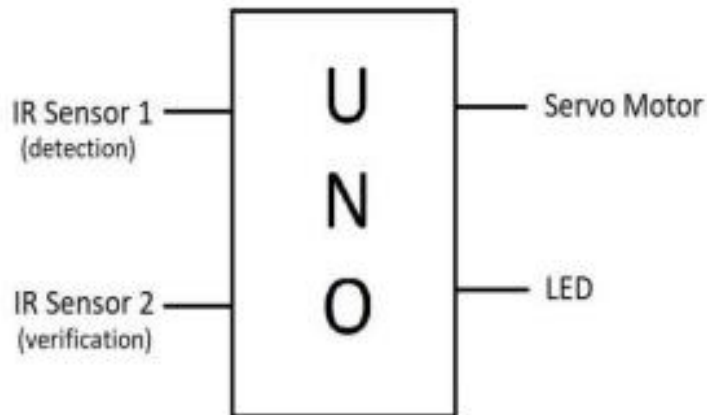
- Accidents may occurs.
- During platform passengers may fall in tracks.
- We cannot change the tracks immediately.
- Trains also cannot stopped immediately.

The modern railway structures in India aren't device managed which are absolutely synthetic. In railroad track station usually we use bridges. It's a long way very hard for the senior residents or handicapped humans to use the bridge. Automatic Movable Railway Platform 4 In the Indian Railways system, foot over bridges (FOBs) are important infrastructure elements designed to provide safe passage for pedestrians over railway tracks at stations. They are crucial for ensuring the safety and convenience of passengers. The existing system of foot over bridges in Indian Railways varies across different stations and depends on factors such as the station's size, passenger footfall, and infrastructure. Different types of foot over bridges include: 1) Conventional FOB's 2) Sky Walks 3) Subways 3. **PROBLEM STATEMENT** It is a time taking process to cross the platform using the traditional method of foot over bridges.

### **PROPOSED SYSTEM**

Two IR Sensors are placed at the both sides of the platform .These two IR sensors are working as inputs .The first IR sensor senses when the train is arriving the transmitter sensor gets disturbed due to the interruption of the train. Thus the microcontroller senses the arriving of the train. Before making the platform move backward and the microcontroller give the alert to the people who are on the track. This alert information is giving through the cloud network via blink app.

After certain time the controller moves the platform backward by rotating the DC gear motor rotates clockwise direction .Another IR sensor senses the train dispatching ,it gives the information to the microcontroller and give alert message to the LCD .when the train is dispatching the dc gear motor rotates anticlockwise direction the platform moves forward direction.



**Fig 1.1 Block Diagram of Automatic Movable Platform**

The IR sensor at two points on the either side of railway crossing gate is used. The IR sensor transmitter transmit the signal which placed in engine and gard, and IR receiver is placed on track which received a data and complete the circuit when railway will pass through it and the gate will be closed and similarly when the rail will pass through the another receiver which is mounted on the other side of gate, the receiver take a signal to controller and get operated. Hence the motor will operate and with help of gear, and the gate will open. The project is designed to control over the railway level crossing platform using Android mobile phone by the platform keeper. Opening and closing of railway level crossing platform involves manpower, which could be often causes incorrect leading to accidents. This system prevents the need of any human involvement at the railway level crossing.

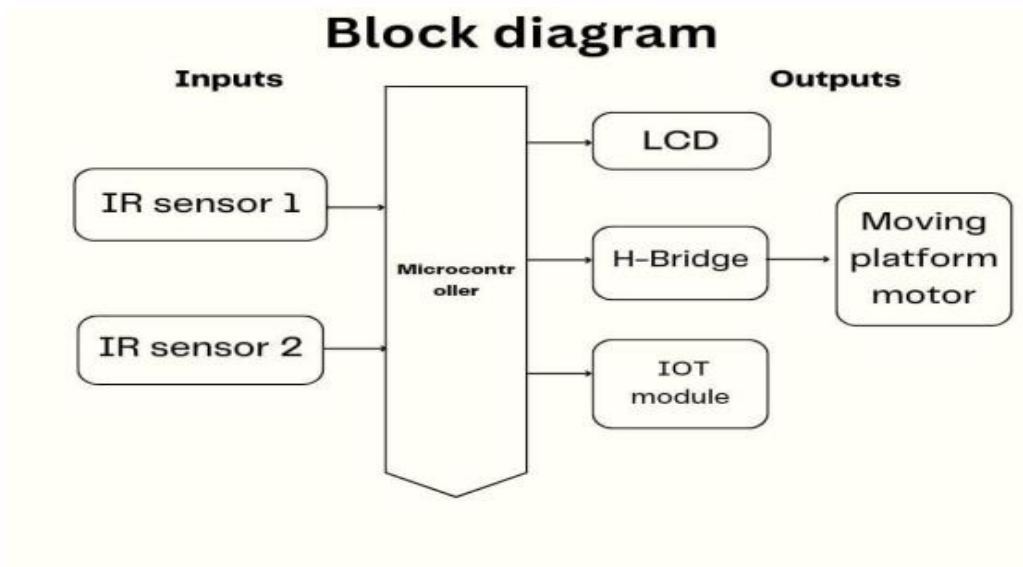


Fig. Block diagram of proposed system

### III.RESULT&DISCUSSION

The result of an automatic movable platform for crossing railway tracks is to provide a safe and convenient way for pedestrians to cross the tracks. It allows for efficient movement and reduces the risk of accidents. The platform can be automatically activated when a train approaches and retracts once the train passes. This ensures the safety of pedestrians while maintaining the flow of train operations. It's a great solution to enhance accessibility and improve safety at railway stations.





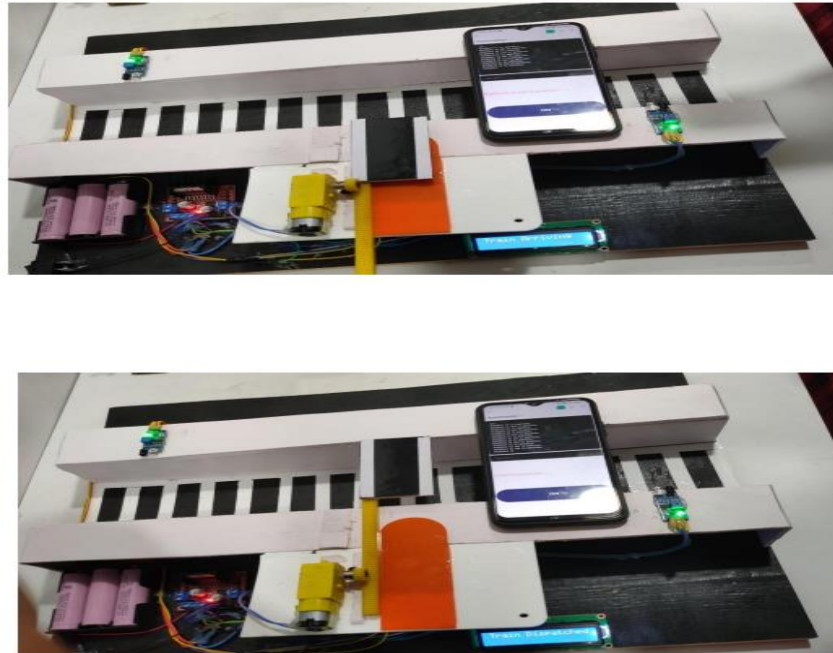


Fig. Automatic movable platform for crossing railway tracks in ON and OFF positions.

Human may make errors or mistakes so automating this process will reduce the chances of platform failures. Automation of the closing and opening of the railway platform using the switch circuit reduces the accidents to a greater extent. So this technique is eco-friendly in nature. It will reduce man power in practical. Thus, by implementing this proposed method, most of the major accidents that occur in unmanned railway level crossing can be controlled. This method is highly secured and safe in which no human presence is needed. Maintenance and operation of the system is easy.

#### **IV.CONCLUSION & FUTURE SCOPE**

##### **CONCLUSION:**

The suggested approach was able to ensure the protection of people in dangerous situations, such as at railway platforms. The motor and mi amigo like IR and Ultrasonic sensor processes are combinable to make a system where a device or train itself is sensed if this passes the gateway and resulting actions are taken by motor to either open or shut the gateway, also the buzzer is used for trying to warn the nearby area about the arrival of carriage which reduces the rate of accidents near the railway crossings. The sensors are placed at an authentic distance from the gates so that there is sufficient warning time for the arrival of the train or its departure, and at that time the



gateway may be closed/opened using a motor.

### **FUTURE SCOPE:**

The future scope of automatic movable platforms for crossing railway tracks looks promising. Here are a few potential advancements: 1. Smart Integration: The platforms could be integrated with smart technologies, such as sensors and cameras, to enhance safety and efficiency. These sensors could detect pedestrian movement and automatically activate the platform when needed. 2. Real-time Data Analysis: By analyzing real-time data, the platforms could optimize their operation based on factors like train schedules, pedestrian flow, and weather conditions. This would ensure a seamless and safe crossing experience. 3. Enhanced Accessibility Features: Future platforms could incorporate advanced accessibility features, such as voice guidance systems, braille signage, and improved wheelchair accessibility. This would further enhance the inclusivity and convenience for individuals with disabilities. 4. Sustainable Solutions: There is a growing focus on sustainability in transportation. Future platforms could be designed using eco-friendly materials and incorporate energy-efficient technologies to minimize their environmental impact. 5. Integration with Mobile Apps: Integration with mobile apps could provide real-time information to users, including platform availability, train schedules, and any service disruptions. This would make it even more convenient for pedestrians to plan their crossings. These are just a few possibilities for the future of automatic movable platforms for crossing railway tracks. As technology advances, we can expect further innovations to improve safety, accessibility, and efficiency.

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