IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Automatic Platform Bridge In Railway Station

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Abstract – The primary aim of the Automatic Railway Bridge System is to assist physically challenged passengers in moving from one platform to another. Crossing the railway track within the station premises poses significant challenges, especially for the handicapped and elderly individuals, who often require assistance from others. In this study, the agents utilize various resources such as train characteristics, driving regulations, and information pertaining to other trains to formulate their action plan. Many elderly individuals suffer from ailments such as leg cramps, walking difficulties, vein issues, and chronic foot pains, making it imperative to address this issue. To tackle this problem, we propose a project involving the implementation of a horizontally adjusted platform connecting both station platforms. This innovation eliminates the need for both adults and children to climb bridges, thereby saving time for passengers and ensuring smoother operations for all.

Keywords- Railway Systems, Platform Bridge, IR SENSOR (E18-D80NK Infrared Proximity Sensor), DC Motor.

I. INTRODUCTION

Indian railway network is the one of the biggest rail network in the Asia. Railways are recognized as a one of the safest mode of mass transportation and Safety has been recognized as the key issue for the railways networks. To make it a safe and reliable system is an enormous challenge. Unmanageable platform crossings are one of the problem areas for the Indian Railways, and one of the major issues of death. In spite of various measures taken by the Indian Railways, platform crossing deaths have continued to occur, that too frequently. The short horizontal platform will be attached to both end of the two platforms by which we can adjust it after and before coming of train by moving or sliding them horizontally by the sensors and motor. The one part of the bar or platform is connected from first platform to second part of the bar will be moved or slide to the second platform very smoothly according to presence or absence of train. That will maintain the comfort ability of the peoples which will going to suffer from them.

II. LITERATURE REVIEW

By implementing the Railway Track Pedestrian Crossing between Platforms, we aim to alleviate the challenges faced by senior residents or handicapped individuals when using bridges. Presently, bridges serve as the primary means of platform crossing. This project focuses on automating the opening and closing of mobile platforms within trains. Typically, these mobile

platforms connect two platforms, enabling passengers to traverse from one to the next. Sensors positioned on both sides of the track facilitate this process [1].

This system has been introduced to automatically close or open the mobile platforms between tracks. Currently, these platforms serve as a connection between two platforms, enabling passengers to move from one to the other. The primary objective of this project is to prevent accidents commonly caused by crossing railway tracks to reach another platform, while also making platform access easier for physically disabled individuals. This system can be further developed into a fully automated solution, eliminating the need for stair climbing. Such an efficient method would not only save time in reaching destinations but also enhance safety when crossing platforms. The operation of the mobile bridge involves a microcontroller and a stepper motor. The microcontroller detects the presence of trains using sensors, enabling the automatic opening or closing of the platform [2].

The current scenario highlights railways as the most cost-effective mode of transportation. However, the increasing number of railway accidents can be attributed to careless crossings. Operational negligence and insufficient worker knowledge exacerbate these risks, prompting the search for solutions. This paper proposes a novel smart railway track system primarily designed to aid physically disabled and elderly individuals. This system operates automatically within railway platforms, where two platforms are typically linked by mobile platforms for passenger movement. Sensors placed on both sides of the track enable automatic control of railway gates. Upon the arrival of a train at the first sensor, the mobile platform automatically closes, facilitating safe passage for the train. Subsequently, upon the train's departure detected by the second sensor, the mobile platform opens. The detection of train presence is achieved through a microcontroller, which in turn regulates pulses to the stepper motor, facilitating the opening or closing of the platform [3].

In the existing railway platform infrastructure, significant shortcomings are observed. Currently, staircases serve as the primary means of inter-platform movement. However, this setup presents challenges for physically challenged individuals, rendering it difficult for them to navigate between platforms. Furthermore, some individuals resort to directly crossing the railway track, bypassing the stairs altogether. This practice poses grave risks to their safety and well-being. Additionally, there are instances where individuals opt to traverse from one platform to another by crossing through trains located on the opposite side, exposing themselves to potential life-threatening situations [4].

The initiative to introduce mobile platforms in Indian railway stations primarily aims to enhance accessibility for physically challenged individuals. This paper proposes the replacement of existing systems with mobile platforms to facilitate movement between stations. The operation of this system is facilitated by the integration of various components, including the ATmega8 microcontroller, DC Motor, Infrared (IR) sensor, voice module, and light emitting diodes (LED). By adopting this framework, the challenges associated with conventional flyovers are circumvented, making it a more convenient system for passengers. Upon the arrival of a train, sensors detect its presence and issue voice warnings cautioning people against using the portable platform. Additionally, LED signals indicate train arrival and departure, ensuring passenger safety. Conversely, when the platform is vacant, the mobile platform opens, enabling passenger movement [5].

III. METHODOLOGY

A. Block Diagram

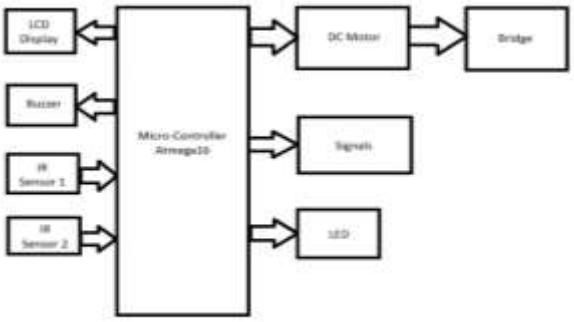

Fig. 1- System Block Diagram

The block diagram illustrates a system comprising two IR sensors, a microcontroller (ATmega16), LEDs, an LCD display, a DC motor, and a buzzer. The IR sensors detect objects, providing input to the microcontroller, which orchestrates the system's functionality. LEDs offer visual cues, while the LCD display presents relevant information to users. The DC motor, controlled by the microcontroller, actuates the sliding platform's movement, with the buzzer emitting auditory alerts as needed. Through interconnected components, this system enables efficient and user-friendly operation, enhancing accessibility and functionality for railway station users.

IV. DESIGN & WORKING

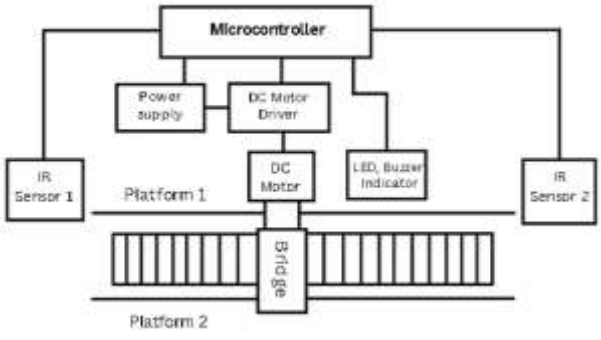

Fig. 2 – Design of a System

The design of our project involves integrating several key components to automate the movement of a platform bridge at railway stations.

IR Sensors: These sensors are strategically placed to detect the presence of trains approaching or departing from the station. When a train is detected, the sensors send signals to the microcontroller.

Microcontroller (ATmega16): Acting as the brain of the system, the microcontroller processes the signals from the IR sensors and controls the operation of the platform bridge. It coordinates the timing and movement of the bridge based on the detected train activity. (The operating voltage ranges from 4.5V- 5.5V)

DC Motor: The DC motor is responsible for actuating the sliding movement of the platform bridge. Upon receiving commands from the microcontroller, the motor engages to extend or retract the bridge as needed.

Bridge Mechanism: The platform bridge is designed to slide horizontally between two main platforms at the railway station. It is equipped with mechanisms that allow it to extend outward when a train approaches and retract inward when the train departs.

Power Supply: The entire system is powered by a suitable power supply, providing the necessary electrical energy to operate the components reliably.(5V-12V)

Overall, the design ensures that the platform bridge moves seamlessly in response to train activity, providing safe and convenient passage for passengers between platforms. Through careful integration and coordination of the components, the design enhances accessibility and improves the overall travel experience at railway stations.

Working

- The bridge initially extends from inside the platform, forming a connection between the two platforms.
- Upon detection of an oncoming train by the first IR sensor, it sends a signal to the microcontroller.
- The microcontroller then directs the DC motor to initiate the sliding movement of the bridge, retracting it back inside the platform.

- As the train passes through the second IR sensor, signaling clearance, the microcontroller commands the DC motor to extend the bridge towards the platform's edge, reconnecting the platforms.
- This extended position is maintained until the first IR sensor detects another oncoming train, prompting the need for retraction.
- The cycle repeats continuously, with the bridge extending to connect the platforms when a train approaches and retracting when no train is detected.
- This automated process ensures efficient and timely platform access, specifically tailored for train arrivals and departures.
- It enhances accessibility and convenience for users, particularly elderly and handicapped individuals, during railway operations.

V. SUMMARY

The experimentation in this project focuses on the automatic opening and closing of the mobile platform. Through continuous sensing, the system detects the arrival and passage of trains, ensuring timely operations. This not only saves time for passengers in crossing to the next platform but also enhances safety, particularly for physically disabled and elderly individuals. By streamlining platform access and minimizing manual intervention, the project aims to provide a more efficient and secure railway environment for all passengers.

Fig. 3 - When Platform is Open

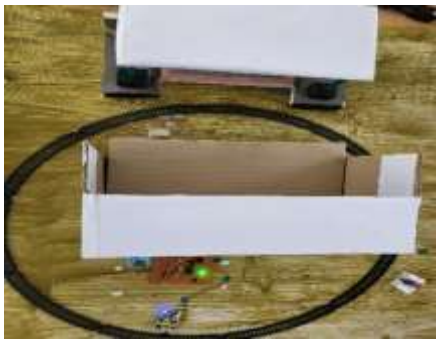

Fig. 4 - When platform is Closed

VI. CONCLUSION

The implementation of our project, integrating IR sensors, a microcontroller, and a DC motor to automate platform bridge movement at railway stations, offers significant utility by enhancing accessibility for passengers, particularly elderly and handicapped individuals. This innovative solution streamlines platform access, mitigates safety risks, and promotes inclusivity in public transportation, ultimately improving the overall travel experience and ensuring equitable access for all railway passengers.

Advantages

- Less power is used.
- The system is Simple, economic and compact.
- No need to climb bridges over platform to cross
  the track.
- There is no need of lift, elevator.
- Time saving.
- Less costly.
- If there is any fault in the system, then the system
  can be operating manually.

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