Automated Footbridge Across Platform At Railway Station

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Abstract—**The current railway systems in India are not automated and are fully man-made. In railway stations generally we use bridges. It is very difficult for the elderly persons or handicapped persons to use the bridge. This project finds a good solution. Mainly the motion of a train is checked by sensor, this is used for automatically close/open the platform. We made this device with the help of IR Sensors and Microcontroller. The objective of our project is to reduce the power consumption taking place due to installation of escalators and elevators. This also time saving much more than the other remaining techniques. as per the overall old system which is given below (escalators &bridges) are used for crossing platforms from one to another platform.**

Keywords:- Footbridge, Traffic Signals, IR sensors, RFID Reader

I. INTRODUCTION

Indian railway network is the one of the biggest trail networks in the world. Railways are recognized as a one of the safest modes of mass transportation and safety has been recognized as the key issue for the railway network. To make it a safe and reliable System is an enormous challenge. One of the few drawbacks are the unavoidable Platform crossings and the chances of mishap of the Indian Railways and the one of the Major issues of deaths occurring due to accidents. The proposed system uses sensor for opening and closing of bridges. It also confirms the presence of the train using a sensor which is placed at a certain distance away from the platform. When persons try to cross platform by avoiding the over bridge there is chance for the accidents. This can be avoided by using this technique and very helpful for disabled person also.

II. LITERATURE REVIEW

By design the Railway Track Pedestrian Crossing between Platforms we can reduce the difficulty of the senior residents or handicapped persons to use the bridge. Nowadays bridges are used for crossing the platform.

This project is used for automatically close or opens the mobile platforms in the 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 [1].

It has introduced in big cities many trains are travels on tracks and speed of this trains are very fast. Sometime two trains are on same track in opposite direction or collision of train is occurred it caused accidents so that's why to avoid this types of accidents This project identifies the status of each train using IR transceivers and informs it to microcontroller after that microcontroller automatically trip the supply of train and train will stop. They have also implied the bridge over track by means easy for edged persons and disabled peoples [2].

It has introduced automatically close or open the mobile platforms in between the track trains. In current scenario the platform connects the two platforms through which the passenger can walk on the platform to reach on the next platform. The main objective of this paper is to avoid accidents mainly caused by crossing the railway track to go to other platform also makes physically disabled persons to also cross the platform easier. This system can be modified as fully automated instead of climbing the staircase, this efficient method will be more compact for reaching the particular destination at exact time and also for crossing the suitable platform. The opening and closing of the mobile bridge is will operated by the microcontroller with the help of stepper motor, the microcontroller will sense the presence of train by using sensor mainly the tracking of a train is sensed by sensor, this is used for automatically close/open the platform[3].

Today the cheapest mode of transportation is railway but now no. of accident of railway are increasing due to careless railway crossing. Careless in operations and lack of knowledge of workers are main reason of this, therefore we are trying to find solution of this problem. This paper gives new smart railway track mainly for helping physically disabled and aged persons. This railway track is automatically works in railway platform. Normally two platforms are connected by mobile platforms through which passenger can walk. We placed two sensors at both sides of track. With the help of sensors, we are trying to automatic control of railway gates. When train arrive first sensor the mobile platform will be automatically close and train go through track and when train leaving second sensor the mobile platform will automatically get open. To sense the presence of train we are using microcontroller. By sensing the train on one path we are giving pulses to the stepper motor to open or close the platform [4].

In the existing method railway platforms are not well developed. Present we are using stairs to move from one platform to other platform. It is difficult for physically challenged people to use the stairs from one platform to other platform. Sometimes people crosses the railway track directly without using stairs. So, it is risky for their lives. Many time people will be moving from one platform to another through the trains present on opposite side which may be life threat [5].

It has planned to make the mobile platform in Indian railway station mainly for physically challenged peoples. In this paper they introduced replaced the platform instead of existing system to move from one station to another station in railway station. This whole system will operate through the ATmega8 microcontroller, DC Motor, Infrared (IR) sensor, voice module, light emitting diodes (LED). This framework avoids the troublesome peoples of flyovers that's why this is convenient system for humans. When the train is arrived on track then sensors sense the train entry the voice declaration caution the people to leave and don't utilize the portable Platform and the LED signal sign is utilized to show the train arriving and departure in the railway station and same way When the platform is empty then the mobile platform will open to moves the peoples [6].
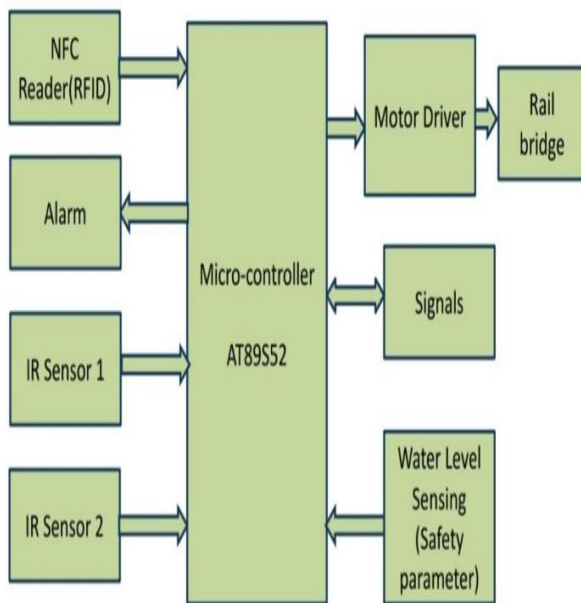
III. PROPOSED SYSTEM

Fig.1.Proposed System Block Diagram

Above Fig.1. Shows System block diagram for Automated Foot Bridge across plat-Form at railway station. Microcontroller controls all the operations through designed logic and program. Proposed system reads the NFC (Near field communication readers) for the request to Open and authorize the using of bridge.

Here the disabled and senior citizens are already provided with the smart cards to Access automatic bridge. IR sensors are connected at either ends of both the platforms and it detects whether there is any person present on the bridge and if there is, it Indicates an emergency situation. Based on the signals, the bridge automatically closes When it turns green which means at rain in inbound on the platform. Motor driver along With DC motor is used to demonstrate the working of the bridge. Water level sensing is Used to check the level before bridge operation to a band on operation if the water level Is comparatively high to a level where it can damage the system and put human life on Risk.

Whenever the train arrives the transmitter sensor gets disturbed due to interruption of the train thus the micro-controller senses the arriving of the train. Before making the platform move backward the micro-controller gives siren to alert the people who are on the platform. After a certain time the controller moves the platform by rotating the DC motor in clockwise direction. For making the bridge move forward the controller should know whether the train has left or not. For this the second sensor pair is used. Whenever the second sensor senses the train. I.e. when the transmitter is disturbed then the controller waits for the last compartment to leave. Then the controller output is given to the DC motor, which makes the DC motor move in anticlockwise direction, making the temporary bridge move forward thereby making a way for the pedestrians to move.
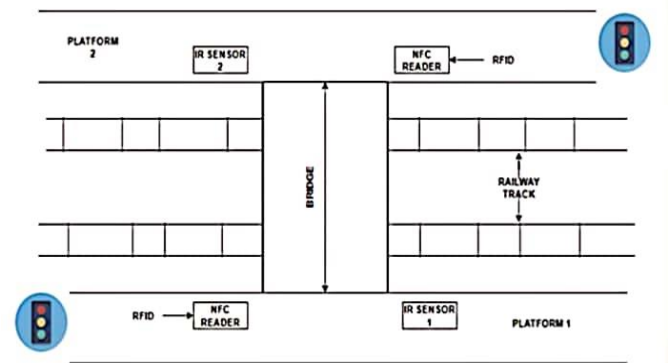
A. Design

Fig.2.Proposed System Flow Diagram

After our study we finally settled on the above model, wherein we will have a Footbridge and Microcontroller 890S52 at the very core. If you look at Fig.4.1. You will we see that our model consists of two IR sensor, two NFC reader/RFID and Traffic signals.

As soon as NFC detects the card it checks the status of railway signal and if the signal is RED on both the sides then it initiates the forming operation. When the bridge is form completely then person is allow to cross the Bridge and then person is sense by the IR sensor 1. When the person crosses the Bridge then the IR sensor 2 will sense the person so that the Exit of particular person crossing the Bridge is confirmed.

The Microcontroller 890S52 it will keep and check on the status of both the signals i.e. when both the signals are turned RED it will allow the Bridge to form. Both IR sensors i.e. IR Sensor 1 and IR Sensor 2 are in Synchronization with each other. IR Sensor 1 Senses number of people entering the Bridge and keeps counts of same, then this count is synchronized with IR sensor 2. Then IR sensor 2 ensures Whether every person has taken Exit from Bridge while sensing the persons and referring the count.

B. Microcontroller

The AT89S52 is a low-power, high-performance CMOS 8-bit microcomputer with 8K bytes of Flash Programmable and Erasable Read Only Memory (PEROM). The device is manufactured using Atmel's high-density non-volatile memory technology. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcomputer, which provides a highly flexible and cost-effective solution to many embedded control applications.
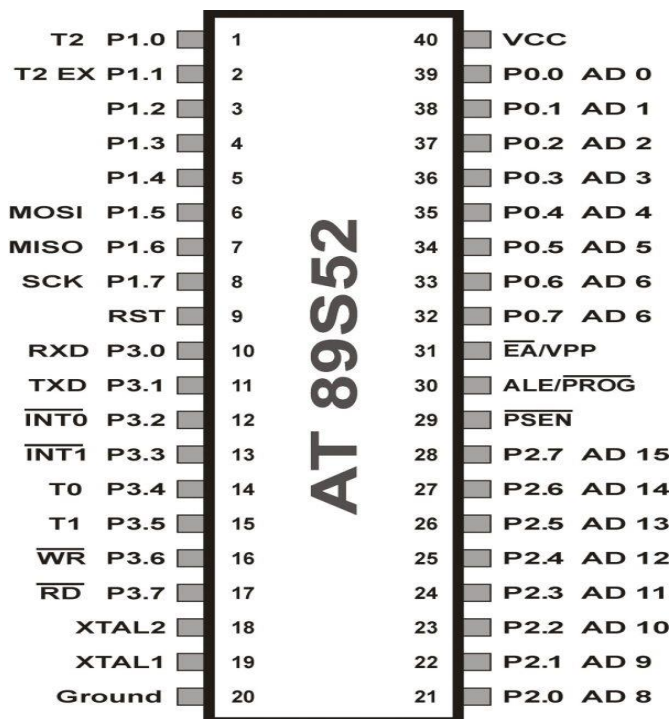

Fig.3.Microcontroller

C. IR Sensor

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. Sensors are placed on both sides of track to sense the motion of the train. The microcontroller will sense the presence of trains by using infrared sensors. So by sensing the train on one

path, the controller will give pulses to the stepper motor to close the platform automatically.
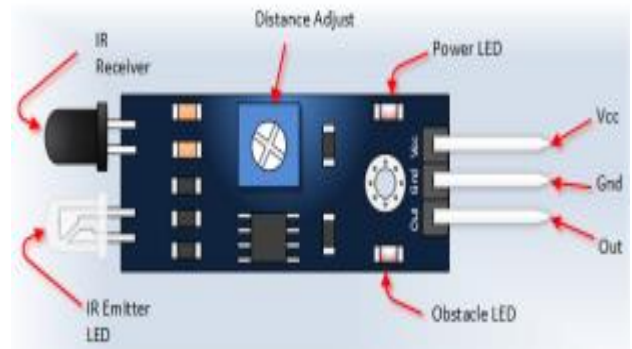

Fig.4.IR Sensor Diagram

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).

D.NFC Reader

Radio frequency Identification (RFID) is a wireless identification technology that uses radio waves to identify the presence of RFID tags. Just like Bar code reader, RFID technology is used for identification of people, object etc. presence. RFID is used in many applications like attendance system in which every person will have their separate RFID tag which will help identify person and their attendance. It is also helpful to keep track of goods and in automated toll collection system on highway by embedding Tag (having unique ID) on them.

EM18 is a RFID reader which is used to read RFID tags of frequency 125 kHz. After reading tags, it transmits unique ID serially to the PC or microcontroller using UART communication or Wiegand format on respective pins.EM18 RFID reader reads the data from RFID tags which contains stored ID which is of 12 bytes.
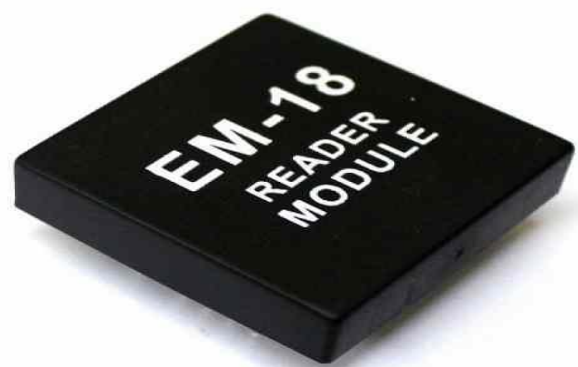

Fig.5.NFC Reader Module

E. Motor Drive

The L293 and L293D are quadruple high current and half H drivers. The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages ranges from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents

of up to 600-mA at voltages ranges from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as solenoids, relays, DC and bipolar stepping motors, as well as other high-current / high-voltage loads in positive supply applications. All inputs are TTL compatible. Each output is a complete totem-pole drive circuit, with a Darlington transistor sink and a pseudo Darlington source. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. Automatic Railway Crossing System Page | 34 ¬ When an enable input is high, the associated drivers are enabled, and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled, and their outputs are off and in the high-impedance state. With the proper data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications.
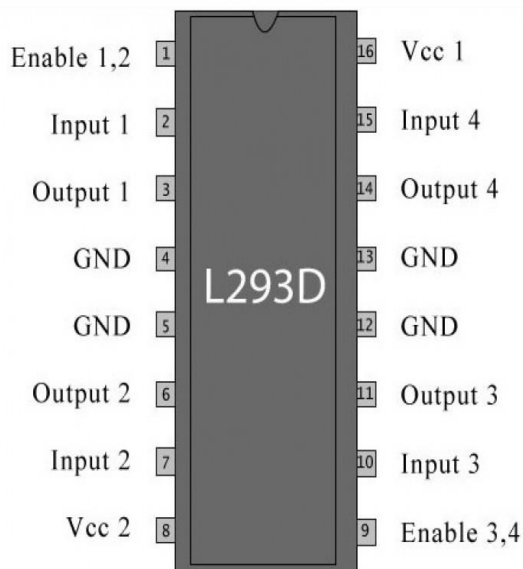

Fig.6.Pin Diagram of L293D

IV. RESULTS AND DISCUSSION

Fig.7.Result of the project

Fig.8. Result of the project

This project experimentation is used for automatically close/open the mobile platform .Thus the sensing continuously when the train arrives and pass through. Thus it saves the time for passengers to cross the next platform and also safe for the physically disabled and aged persons

V. LIMITATIONS

This project cannot be implemented at metro stations.
Cannot be implemented in places where the frequency of trains is more.

VI. CONCLUSION

In this paper, we have proposed system to specified working of the project in which the tracking of train is sensed continuously by using NFC or RFID Reader and Microcontroller 89S52, which automatically close/open the Footbridge .The system can be modified as fully automated instead of climbing the staircase. This efficient method will be more compact for reaching the particular destination at exact time and also for crossing the suitable platforms. The aim of this paper was to develop a system that could help the disabled person to cross the railway platform in far easy manner. The project will save the energy comparatively to elevator, because of this project crossing of platform will be so easy. This project prevents the level of accidents. Peoples who have fractures, leg cramps, chronic foot pains and 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 bridge. The main contributions this study has made were the establishment of driving rules to allow trains to travel economically while giving priority to safety; the inclusion of additional trains travelling in the same direction at a safe distance apart.

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