

Automatic Railway Bridge for Disabled Persons

Shivendra Kaura, Md Moti Urr Rahman, Md Tanvir Khan, Md Hamid Ansari, Md Nikhar Waris

Abstract : Nowadays railway transportation is the cheapest mode of transportation, but due to careless railway crossing and lack of knowledge of workers the number of accidents is increasing day by day, therefore we are trying to find a better solution of railway crossing without any casualties. Railway crossing is very difficult inside the platform, but it is more difficult for physically disable person to cross to cross it without any help. The main objective of automatic railway bridge system is to provide an automatic path specially for handicapped and aged person through which they can easily cross the Platform [1], also they can save their time. In this system we are using two IR sensor to detect the arrival and departure of train and Arduino to opening or closing of gates. The detection of train will be automatic. As train crosses the platform a path will create by which disable\handicapped person can easily cross the platform. When train will arrive then bridge will be remains in previous stage and people will wait until the train cross, so in this way we can easily develop an automatic railway bridge which will not only reduces the time of people, but also reduces their effort to cross the platform.

Keywords: IR Sensor, Stepper motor, Microcontroller, Disable person, Railway track, Bridge, platform.

I. INTRODUCTION

India is the second most populous and is a fast-growing economic country in the world. We as a nation are developing in almost all the spheres. India's railway network come on fourth place by area in the world. Present scenario gives the information of 7549 station across the India, here average speed of train is 50-55km/hrs. By 2017 total 1.308 million employees serving for railway.

If we talk about metro in India the first metro run in 1984 in Kolkata. As of March 2019 there are 13 operational rapid metro system in 18 cities, in addition there are 638.91km of operational metro lines and 496 stations. Despite of huge railway network there are still millions of handicapped and aged persons are facing problem during crossing the platform. India's platform is equipped with abundant facilities like here there is accelerator, lift available to climb on the floor, but these facilities are more beneficial for healthy person, because a handicapped person can't easily use lift and accelerator. They cross the platform either with the support of person or by wheel chair. But there are no such facilities available which can cross them automatically. Our project deals about such facilities by which handicapped person can easily cross the platform. In this project we are using 2IR module, LM358 operational amplifier, L293DNE

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motor driver IC, 1DVD rider, 1MDF (medium density fibre) board, railway track, one train and PCB comprises with capacitor (1000 micro farad and 10 micro farad), ceramic capacitor (0.1 micro farad), resistor (330 ohm and 220 ohm), voltage regulator (7805), led (for supply indicator), variable resistor, diode (convert ac to dc), switch, crystal oscillator (16 MHz provide clock frequency to microcontroller) besides it we are using two IR sensor one for transmission and other for receiver. Crossing the railway platform is difficult inside the station. It is more difficult for handicapped and aged person. The main objective of this project to make such type of technology which can reduce the problem of railway crossing for aged and handicapped person. It will also helpful in

- Employment generation
- Increasing the chances of journey for handicapped
- Reducing the congestion on platform
- Reducing the platform crossing time
-

II. LITERATURE REVIEW

Information system on railway platform are variously referred to passenger Information system and passenger display. Rapid or heavy, rail transit is the highest capacity urban transit mode [2]. In existed automatic system indication of train arrival is not available. There is no voice announcement in the system. Stations are frequently complex pieces developed through well mechanism, through which thousands of people frequently move day to day. Because many subways and elevated transit stations have been in service for decades, they occasionally must accommodate in the same physical space more than they designed to handle. Transit station designer and operator not only must devise strategies to provide a comfortable movement of passenger, also they have developed such type of system which constraints the negligence and provide a better way to cross the platform specially for physical disabled person and aged person. This project used to develop an automatic railway bridge for disabled person, In this system a mobile bridge connects the two platform through which the handicapped person can walk on the platform to reach on the next platform. Sensor are placed on the two sides of the track

III. EXISTING MODEL

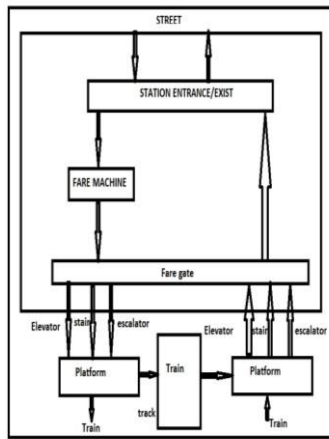


FIGURE 1 EXISTING MODEL

The present railway platform in India is not automatic. It is fully manmade. In railway platform people mostly use bridge to cross it. Physically fit or younger persons easily cross it, but for physically disabled person or handicapped person it is very difficult to cross it without any help. This paper finds a good solution. The tracking of train is mainly sense by the IR sensor, used for automatic open/close of platform. The sensors are placed on two side of platform which sense the motion of the train [3]. The microcontroller by using infrared sensor will sense the presence of the train. After that sensing the platform on one side, the controller will give pulse to the stepper motor to close the bridge automatically. The platform will operate according to the signal provided by the infrared sensor. Once signal is provided than platform will operate and it will open and close, however it will not work in present of the train on the platform.

IV. PROPOSED MODEL

4.A BLOCK DIAGRAM OF PLATFORM BRIDGE

This block diagram is all about how platform work. In this system IR sensor sense the arrival of train and voice declaration will announce to leave the station. The IR sensor paly an important role in this system, since it detect the arrival and departure of train and alert the public on station. The microcontroller takes the information from sensor and operate the bridge and finally outcomes display on the lcd display.

After Train detection IR Sensor send the signal to the motor driver motor driver drive the motor along with buzzer on by which people alert and then finally bridge open. After departure of train IR Sensor again comes into work and this time bridge comes in the original condition means a path is create by which any disable person or aged person can easily cross the platform. The platform will operate according to the signal provided by the infrared sensor. Once signal is provided than platform will operate and it will open and close, however it will not work in present of the train on the platform. This process continue till the last train cross or station master give the signal to stop the operation. To cross the platform a security person will available to help the disable person they will not only help in crossing the railway platform also delivered instruction about terms and condition of railway crossing.

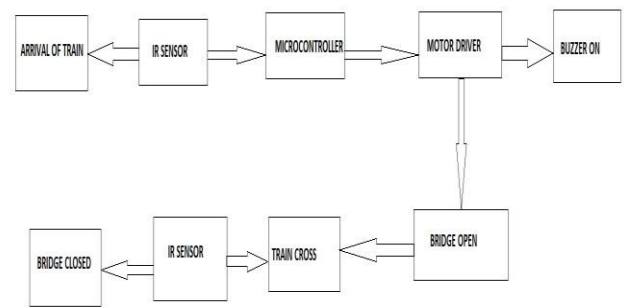


Figure 2 Block Diagram of Bridge System

4.B. COMPONENTS USED & THEIR SPECIFICATION

Our project deals about such facilities by which handicapped person can easily cross the platform. In this project we are using 2IR module, LM358operational amplifier, L293DNE motor driver IC, 1DVD rider, 1MDF(medium density fibre) board, railway track, one train and PCB comprises with capacitor(1000micro farad and 10 micro farad), ceramic capacitor(0.1micro farad), resistor (330ohm and 220ohm), voltage regulator(7805), led(for supply indicator), variable resistor, diode(convert ac to dc), switch, crystal oscillator (16MHZ provide clock frequency to microcontroller) besides it we are using two IR sensor one for transmission and receiver.

Power supply(battery)- 12v

Electrolytic capacitor – 450-1500micro farad & 9-12micro farad

Ceramic capacitor- 0.1-0.3 micro farad

Resistor -10k also we can use 12k and 9k.....1

Resistor – 330 ohm we can also use 220-470ohm.....2

Voltage regulator 7805- terminal1-12v, terminal2-GND, terminal3-5v Led for supply indication

Variable resistor for desired resistance

Switch for on/off

Crystal oscillator (16MHZ fixed) provide clock frequency to microcontroller

Ceramics capacitor (red) - 22pf we can also use 33pf

Microcontroller Atmega328

Drives L2930 motor driver IC electrical/electronic components which control another circuit.eg LCD display

4.C. FLOW CHART

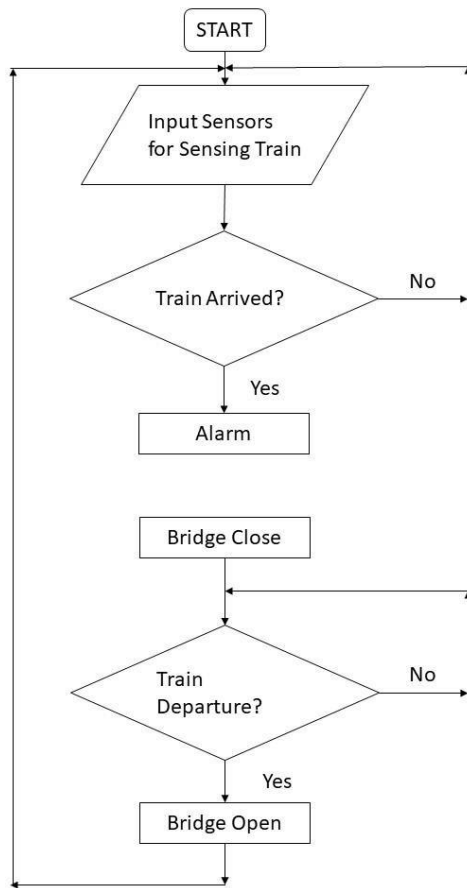


Figure 3 Flow Chart of Railway Bridge

A. Algorithm

The algorithm used in the flow chart in figure 4 are described in steps

STEP 1: Start

STEP2: Set the input sensor for sensing train.

STEP3: Check for arrival of train by the sensors. If the train is sensed go to step 4 and step 5 otherwise step3.

STEP4: Make the warning system for the railway crossing users.

STEP5: Close the bridge.

STEP6: Check for the train departure by the sensors. If the train sensed go to next step. Otherwise repeat STEP6.

FINAL CODES FOR WHOLE OPERATIONS

```
#include <Liquid Crystal. h>
```

```
Liquid Crystal lcd(13, 12, 11, 10, 9, 8);
```

```
const int
```

```
Mplatform_1 = 2;
```

```
const int
```

```
Mplatform_2 = 3;
```

```
const int
```

```
IRSensor1=A0;
```

```
const int
```

```
IRSensor2=A1;
```

```
const int
```

```
buzzer=
```

```
4; int
```

```
i=0; int
```

```
buttonst
```

```

ate1=0;
int
buttonst
ate2=0;
void setup()
{
Serial.begin(9600);
pinMode(IRSensor1, INPUT);
pinMode(IRSensor2, INPUT);
pinMode(buzzer, OUTPUT);
digitalWrite(buzzer,LOW);
pinMode(Mplatform_1,
OUTPUT);
digitalWrite(Mplatform_1,LOW
);
pinMode(Mplatform_2,
OUTPUT);
digitalWrite(Mplatform_2,LOW
);
}
void right()
{
digitalWrite(Mplatform_1,LOW
);
digitalWrite(Mplatform_2,HIGH
);
}
v
o
i
d
l
e
f
t
(
)
{
digitalWrite(Mplatform_1,HIGH
);
digitalWrite(Mplatform_2,LOW
);
}
void mstop()
{
digitalWrite(Mplatform_1,LOW
);
digitalWrite(Mplatform_2,LOW
);
}
void loop()
{

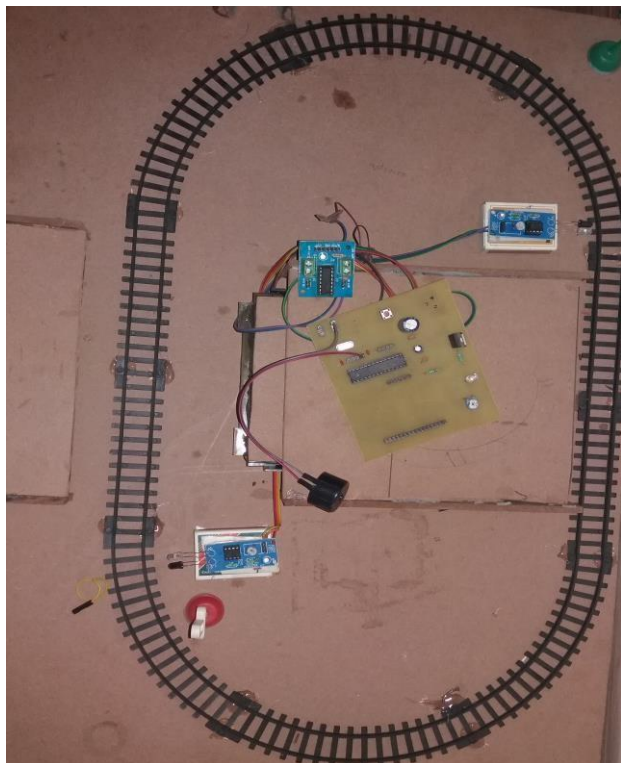
```

```

buttonstate1=analogRead(IRS
ensor1);
buttonstate2=analogRead(IRS
ensor2);
//Serial.println(buttonstate2);
//Serial.println(buttonstate1);
if(buttonstate1>500)
{
for(i=0; i<=2; i++)
{
delay(400);
mstop();
//delay(100);
}
}
else if(buttonstate2>500)
{
for(i=0; i<=2; i++)
{
digitalWrite(buzzer, HIGH);
right();      delay(400);
mstop();
digitalWrite(buzzer, LOW);
//delay(100);
}
}
}
}

```

4.E. Final Prototype Model



B. Figure 4 Prototype Model

This is the final fabricated model comprises with all the required components like IR sensor, Motor driver, Buzzer, jumper wire, DVD rider, MDF, Arduino.

V. CONCLUSION

Crossing the railway platform is difficult inside the station. It is more difficult for handicapped and aged person. The main objective of this project to make such type of technology which can reduce the problem of railway crossing for aged and handicapped person. Besides railway crossing this can also useful for,

- Employment generation
- Increasing the chances of journey for handicapped
- Reducing the congestion on platform
- Reducing the platform crossing time

Tracking of train is sensed continuously, which automatically open/close the bridge. The system is fully automated that replaced the staircase. This efficient method will not only reduce the time of crossing, also reduces the chances of casualties [4]. Motor operated motor supply and light signal is disadvantage, so it can be avoided by a battery charged means by solar cell. In future for monitoring the visual videos captured from the track we will also using CCTV system with IP based.

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AUTHORS PROFILE



Shivendra Kaura, A dynamic individual with more than 10 years of teaching experience in Engineering, pursuing Ph.D. in (Electrical Engineering), Utrakhhand University, Dehradun ,M.Tech. (Control System), B.Tech. (Instrumentation and Control Engineering). He is presently working as an Assistant Professor in Electrical and Electronics

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My name is **Md Moti Urr Rahman** I am from Bihar currently I am pursuing B.tech from GI Bajaj Institute Of Technology and management. As per as disable person is Concern,I am working on project that is Automatic railway platform for disabled person. The significance of this project is mentioned above. I have done my high school from gayatri Shiksha Niketan in

2012 and twelve from D.C Inter college in 2014. In my school time I was the captain of my football team and I have gotten award for best defender. In college I have participated in mini marathon, Fashion show& Futsal. As I have worked with team, So I am able to tackle difficult situation this is my strength also.



My name is Nikhar Waris I am from kannauj (U.P) currently I am pursuing B.tech from G I Bajaj Institute Of Technology and Management. As per as disable person is Concern, I am working on project that is Automatic railway platform for disabled person. The significance of this project is mentioned above. I have done my high school

from Sir Syed Public School (Unnao) in 2012 and twelve from Al Barkat Public School(Aligarh) in 2015. In my schooling I have given different quiz competition and won some prizes. In college I got an opportunity as a volunteer. My strength is my attitude, I am an optimistic guy and I always help in the welfare of other.



My name is Mohd Hamid Ansari I am from Azamgarh (U.P) currently I am pursuing B.tech from G I Bajaj Institute Of Technology and Management. As per as disable person is Concern, I am working on project that is Automatic railway platform for disabled person. The significance of this project is mentioned above. I have done my high school from phoolpur Azamgarh (U.P) in 2011 and twelve

from up board in 2014. In my schooling I have given different Audition for mimicry and won some prizes. In college I got an opportunity as a volunteer. My strength is my speaking ability , I am an soft heart guy and I always try to help other.



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DAV school in 2011 and twelve in 2013 from SNS college(Hajipur). In my school time I have participated in quiz competition. In my college time I have participated in sports. My strength is my positive thinking I always be happy due to my positive thinking .