



# Movable Railway Platform Using Sensors

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*Abstract—This project identifies the status of each train using IR transceivers and informs it to microcontroller. So this project is useful for railway departments. The recent survey from the social analytics was said that the most disadvantages in Indian railway is climbing up the overhead steps for the physically challenged people. Our proposed system mainly deals with the rectification of this disadvantage. Here we introducing the new concept of artificial railway platform. For the successful approach we are using two sensors and for the execution we are using H-bridge and for the controlling operations we are using microcontroller which you can type your own text.*

*Keywords— IR transceivers, microcontroller, artificial railway platform, H-bridge.*

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## I. INTRODUCTION

This A railway platform is an area alongside a railway track providing convenient access to trains. Almost all stations have some form of platform, with larger stations having multiple platforms.

The world's longest station platform is at Gorakhpur Junction in India at 1,355.40 metres. The Appalachian Trail station in the United States, at the other extreme, has a platform which is only long enough for a single bench.[2]

Among some United States train conductors the word "platform" has entered usage as a verb meaning "to berth at a station", as in the announcement: "The last two cars of this train will not platform at East Rockaway". A tram stop is often in the middle of the street; usually it has as a platform a refuge area of a similar height to that of the sidewalk (e.g. 100 mm (3.9 in)), and sometimes has no platform. The latter requires extra care by passengers and other traffic to avoid accidents. Both types of tram stops can be seen in the tram networks of Melbourne and Toronto. Sometimes a tram stop is served by ordinary trams with rather low floors and metro-like light rail vehicles with higher floors, and the tram stop has a dual-height platform, as in Amstelveen, Netherlands. A train station may be served by heavy-rail and light-rail vehicles with lower floors and have a dual- height platform, as on the RijnGouweLijn in the Netherlands

## II. HARDWARE REQUIREMENTS

### A. ARDUINO BOARD

An Arduino microcontroller board can be thought of as a user-friendly, open-source input-output system. An input can range from anything from a finger pressing a button to a change in light intensity, and outputs can range from lighting up a simple LED light to sending out a Twitter esmsage

### B. Working Of The Project

In this project we are using IR sensors for detecting the train arrival before platform and we are moving portable platform little bit away from connected platforms and once the train passes the railway platform then again these platform will get joined with help of small portable mechanism.

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The moving of the railway platform is done with help of servo motors which is connected to arduino board when it receives the pulse from arduino the portable mechanism will be moving little bit away so that train can move in the platform. The entire project we are using 12V adaptor to power up the circuits.

Arduino uno has inbuilt voltage regulator circuit with can power the servo motor and microcontroller. And other ir sensors

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### III. CIRCUIT DIAGRAM

#### 1) Arduino Uno Schematic Diagram

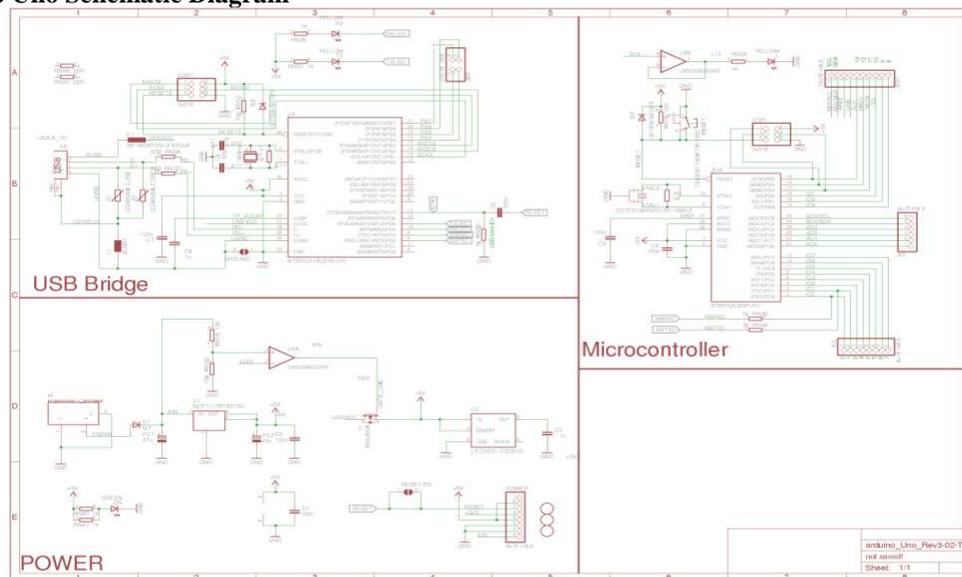


Fig. 3.1 Arduino uno schematic diagram

#### 2) Servo Motor driver

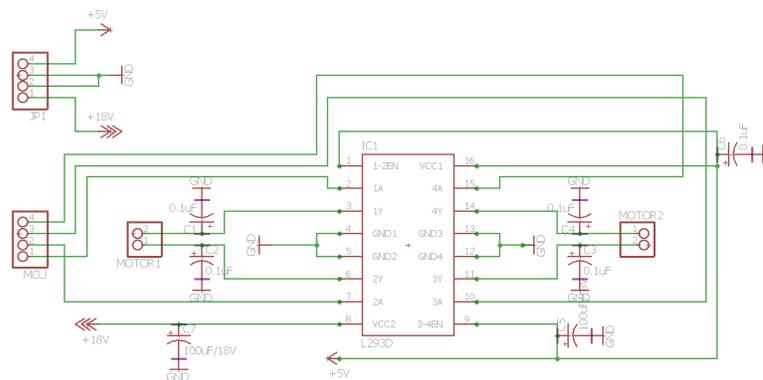


Fig. 3.2 Servo Motor driver

## A. Input/Output

### 1) Digital Input/Output

Digital pins can have one of two values: low or high, where low corresponds to 0 or false and high corresponds to 1 or true. The number of available digital pins is another major difference between the different Arduino boards.

The largest boards have 54 input pins and 15 output pins. These would be the MEGA 2560 and the MEGA ADK (both using the ATmega2650 processor). The next largest is the DUE (with an ATSAM3X8E processor), with 54 input pins and 12 output pins. The smallest is the Gemma (using the ATtiny85 processor) with only 3 input pins and 2 output pins.

14 digital pins on the Uno can be used as an input or output, using `pinMode()`, `digitalWrite()`, and `digitalRead()` functions. They operate at 5 volts. Each pin can provide or receive a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. In addition, some pins have specialized functions:

### 2) Analog Input/Output

Analog is the opposite of digital. Analog involves a continuous electrical signal, while digital focuses on a signal that has a value of either one or zero (binary). Another way that the Arduino boards differs is based on how many analog input and analog output pins they have. An analog input pin can receive an analog signal as input to the processor. An analog output pin can provide an analog signal as output from the processor.

The Uno has 6 analog inputs, each of which provide 10 bits of resolution (i.e. 1024 different values). By default they measure from ground to 5 volts, though it is possible to change the upper end of their range using the AREF pin and the `analogReference()` function. Additionally, some pins have specialized

The processor is what takes computer instructions, figures out what to do with them, and then runs them – or “executes” them, as the classic computer lingo goes. VIN. The input voltage to the Arduino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin. 5V. The regulated power supply used to power the microcontroller and other components on the board. This can come either from VIN via an on-board regulator, or be supplied by USB or another regulated 5V supply.

## B. IR sensor

An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, The resistances and these output voltages, change in proportion to the magnitude of the IR light received.

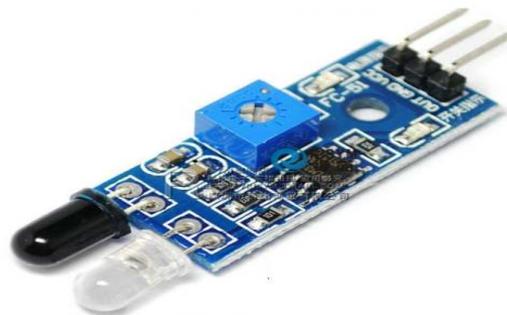


Fig. 3.3 IR sensor

### C. Working operation of IR sensor

An infrared sensor circuit is one of the basic and popular sensor module in an electronic device. This sensor is analogous to human's visionary senses, which can be used to detect obstacles and it is one of the common applications in real time. This circuit comprises of the following components

- LM358 IC 2 IR transmitter and receiver pair
- Resistors of the range of kilo ohms.
- Variable resistors.
- LED (Light Emitting Diode).

In this project, the transmitter section includes an IR sensor, which transmits continuous IR rays to be received by an IR receiver module. An IR output terminal of the receiver varies depending upon its receiving of IR rays. Since this variation cannot be analyzed as such, therefore this output can be fed to a comparator circuit. Here an operational amplifier (op-amp) of LM 339 is used as comparator circuit.

When the IR receiver does not receive a signal, the potential at the inverting input goes higher than that non-inverting input of the comparator IC (LM339). Thus the output of the comparator goes low, but the LED does not glow. When the IR receiver module receives signal to the potential at the inverting input goes low. Thus the output of the comparator (LM 339) goes high and the LED starts glowing. Resistor R1 (100  $\Omega$ ), R2 (10k  $\Omega$ ) and R3 (330  $\Omega$ ) are used to ensure that minimum 10 mA current passes through the IR LED Devices like Photodiode and normal LEDs respectively. Resistor VR2 (preset=5k  $\Omega$ ) is used to adjust the output terminals. Resistor VR1 (preset=10k  $\Omega$ ) is used to set the sensitivity of the circuit Diagram. Read more about IR sensor IR sensors are classified into different types depending on the applications. Some of the typical applications of different types of sensors are The speed sensor is used for synchronizing the speed of multiple motors. The temperature sensor is used for industrial temperature control. PIR sensor is used for automatic door opening system and Ultrasonic sensor are used for distance measurement.

## IV. RESULTS

Movable railway platform by using IR sensors which we use power adaptor which take input 240v from the mains and it gives 9v output to Arduino as shown in Fig. 4.1.. The Arduino board take input from the two IR sensors IR sensor 1 and IR sensor 2.why we are using twp IR sensors is one sensor is using to sense the input and one sensor is to sense the output. when a train comes the sensor sense and it gives input to Arduino.

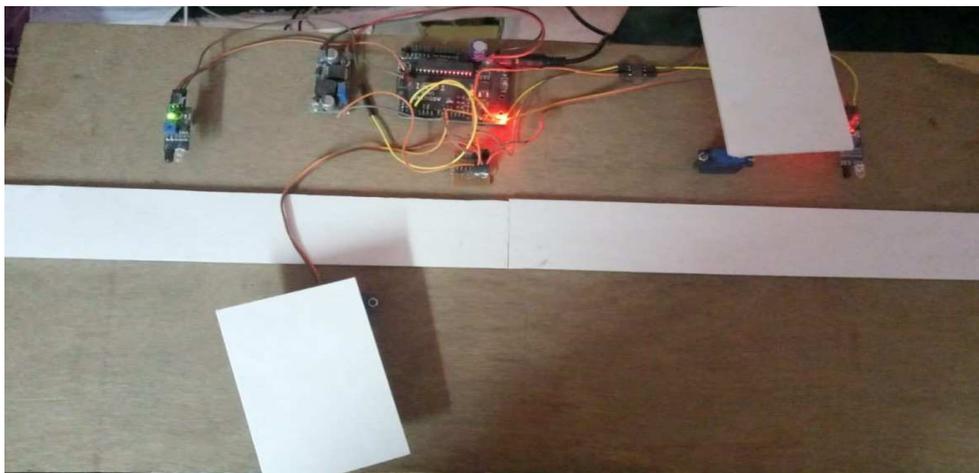


Fig. 4.1 circuit diagram for Movable railway platform

The Arduino gives signal to servo motor driver and servo motor driver gives supply to servo motor saying that opening the platform and servo motor to move 90 degree(it just clears the platform).Again after the train passes it

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gives signal to servo motor and the platform connected. The two IR sensors are the heart of the project for giving the inputs to arduino to process the servo motors. The servo motor using in this project is it has accurate angle to move exactly 90 degrees in this project it has the feedback with help of potentiometer.

#### V. CONCLUSION

The Primary objective of Automatic Railway Bridge System is to help the physically Challenged Passenger to move from one Platform to another. Crossing the railway track inside the railway station is very difficult. But it is quite difficult to the handicapped and aged persons to cross the railway track without the help of others. In this paper the agents make use of a set of resources train characteristics, driving rules and information about other trains to generate their action policy. There are many old peoples suffering from leg cramps walking difficulties leg vein problems and chronic foot pains etc. That's why to solve this problem we are making a solution for that is we are going to make a project on a horizontal adjusted platform which is connected between both stations platform. Because due to this there will be no need to climbing on a bridge by adults as well as children's. This will be time saving for passenger with a smoother operation going to experience by the people or by passengers.

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