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AUTOMATIC MOVABLE RAILWAY PLATFORM WITH TRAIN ARRIVAL DETECTION AND MONITORING

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Abstract- The main aim of this project is to automate railway track pedestrian crossing without using staircase & announce the position of the arrival of train for platform users. This project is used for automatically close or open the mobile platforms in between the railway track. Normally the movable platform connects the two platforms through which the passenger can walk on the platform to reach on the other platform. Sensors are placed on the both sides of track. If the train reaches first 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 LPC2148 will sense the existence of train by using infrared sensor. This system is also used to avoid train collision problems, because now a days train accidents are occurring frequently in India. This project is used to avoid the train accident, thus we save the valuable human lives and losses. So this project is useful for railway departments. Our another aim is to design a system or device which will be able to transfer the handicapped people from one platform to another, within the given constraint and should also fulfill with the societies existing conditions.

Keywords- 1.PIC Controller, 2.Railway,3. DC Motor,4.Mobile Platform

I. INTRODUCTION

The recent survey from the social analytics were said that the most difficulty in Indian railway is climbing up the overhead steps for the physically challenged people. Earlier and even now they are transferred by many methods like on wheelchairs or with the help of sticks. But all these methods are time consuming and slow and also don't have any condition for carrying the luggage. Our proposed system mainly deals with the removal of this difficulty. Here we are introducing the new concept of movable railway platform. For the successful approach we are using two sensors and for the execution we are using DC motor and for the controlling operations we are using PIC LPC2148. The present railway systems in India are not automated which are fully manmade. In railway stations normally we use bridges to cross from one platform to another. It is very difficult for the elder persons or handicapped persons to use the bridge. Here the tracking of a train is sensed by sensor, this is used for automatically close/open the mobile platform. Sensors are placed on both the sides of track to sense the movement of train. The LPC2148

will sense the existence of trains by using infrared sensors. So on sensing the train on one path, the controller will give signal to the motor to close the mobile platform automatically. The problem to transfer handicapped or old people is as old as the transportation system itself. The system may be semi-manually driven or semi-automatic or may be fully automatic.

1.1 EXISTING SYSTEM

On viewing the platform crossing, it is difficult for the physically challenged people. Normally manual braking system is used to avoid accidents. The problem to transfer handicapped or old people is as old as the transportation system. Earlier and even now they are transferred by various methods such as on wheelchairs or with the help of sticks. But all these methods are time consuming and also do not have any provision for moving the luggage. These methods are good in general use, but on platforms these cannot be used as these methods will make complicated transportation and will disturb the free movement of the people on platforms.

1.2 DRAWBACKS IN EXISTING SYSTEM

- Chances of accidents are more.
- While crossing the track passengers may fall.
- Difficult for handicap peoples.

1.3 PROPOSAL SYSTEM

This system identifies the status of every train using IR transceivers and informs it to LPC2148. If the sensor identifies both train in same track means LPC2148 automatically trip the supply of the trains, which is enough to avoid collision. An automatic pedestrian crossing bridge to decrease the distance travelled between platforms which works depends on train movement.

1.4 ADVANTAGES OF PROPOSAL SYSTEM

- Reduces train accidents.
- Time efficient.
- Highly helpful to physically challenged people.

II. COMPONENTS USED

• HARDWARE USED

LPC2148, PIR Sensors ,IR Sensors ,Speaker ,Power Supply ,LCD Display, VibrationSensor, ,SolarPanel, Buzzer, DC motor, L293D

• SOFTWARE USED

PROGRAMMING LANGUAGES: Embedded C

COMPILERS: Kiel 4.0uv

DUMPING SOFTWARE: Using Micro controller flash magic/ preload Software we are dumping our HEX Code into LPC2148

A. ARM7 (LPC2148)

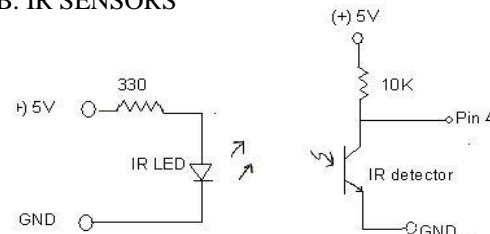


Fig.2.1 Pic microcontroller

LPC2148 is the heart of the distribution system. ARM7 is 32 bit LPC2148. High Performance system, with 32-bit instruction interface. LPC2148 (ARM7) has 4 to 40 on chip static memory. A 128-

bit wide memory interface and unique accelerator architecture enable 32-bit code implementation at the maximum clock rate. On-chip integrated oscillator operates with an external crystal in range from 1 MHz to 30 MHz and with an external oscillator up to 50 MHz Power saving modes include Idle and Power-down.

B. IR SENSORS



IR emitter/detector hookup

Fig.2.2 IR sensor

IR Photodiode is used as sensor. Photodiodes are PN junction diodes designed specifically to connect the photoelectric effect. This means the device exposes the junction region of the PN diode to incoming photons which results in conducting .

C.SOLAR SYSTEM

Sunlight is composed of miniscule particles called photons, which radiate from the sun. As these hit the silicon atoms of the solar cell, they transfer their energy to loose electrons, knocking them clean off the atoms. The photons could be compared to the white ball in a game of pool, which passes on its energy to the coloured balls it strikes. Freeing up electrons is however only half the work of a solar cell, it then needs to herd these stray electrons into an electric current. This involves creating an electrical imbalance within the cell, which acts a bit like a slope down which the electrons will flow in the same direction this field drives them along in an orderly manner, providing the electric current to power calculators, satellites and everything in between.

D. PIR SENSOR

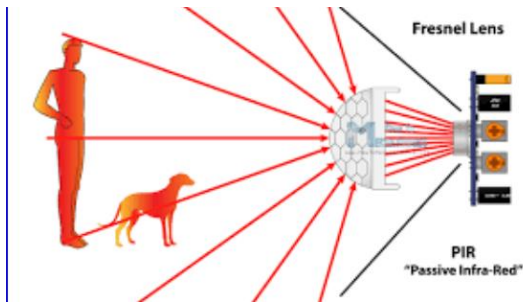


Fig 2.3 PIR Sensor

Whenever, human being (even a warm body or object with some temperature) passes through the field of view of PIR sensor, then it detects the infrared radiation emitted by a hot body motion. Thus, the infrared radiation detected by the sensor generates an electrical signal that can be used to activate an alert system or buzzer or alarm sound .

E.VIBRATION SENSOR

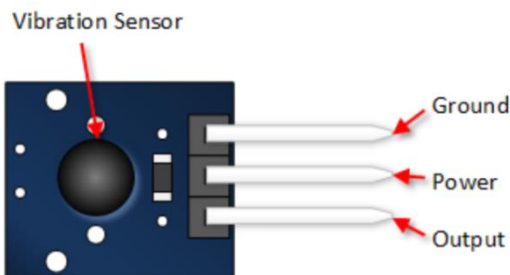


Fig 2.4 Vibration Sensor

Vibration sensor circuit is made very simple and it is possible to use a battery as a source of electrical power. In addition to a very simple design, this circuit is very small also uses an electrical current sensor is only a speaker with a 2-inch diameter. Working principle is very simple reverse the process of working regular speakers work process.

F. Audio Visual Alerts

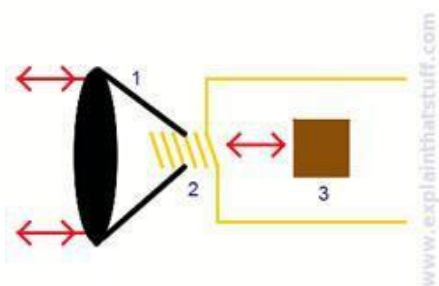


Fig. 2.5 Speaker

For audio visual alerts we have used speakers. In which we can record announcements and can announce whenever the train arrives or depart also for various application.

G.LED

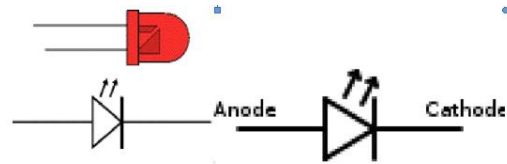


Fig 2.6 LED

A light-emitting diode (LED) is an electronic light source. LEDs are based on the semiconductor diode. When the diode is forward biased (switched on), electrons are able to recombine with holes and energy is released in the form of light.

H. Buzzer

Buzzer is used as an audio alarm and is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave ovens, or game shows. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise).

I.Power Supply



Fig 2.7 Power Supply

Supply required is 5V. The regulator IC here used is 7805. It provides regulated 5V to the controller.

K. Driver Section

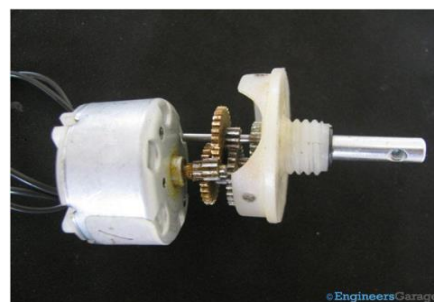


Fig 2.8 DC motor

Two DC gear motor are used to open or close the bridge. For the controlling of DC motor an L293 IC is used. DC motor works over a fair range of voltage .The higher the input voltage more is the RPM of the motor .if the motor works in the rangeof 6-12V ,it will have the least RPM at 6V and maximum at 12V. DC gear motors are used to open or close the bridge.

L. Bidirectional Motor Drive

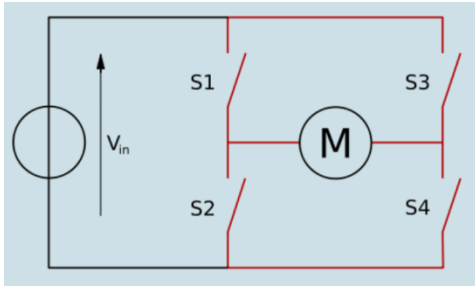


Fig 2.9 H-Bridge IC

L293D is used to drive the motor. L293 Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads. The L293D is assembled in a 16 lead plastic package which has 4 center pins connected together and used for heat sinking. The term H bridge is derived from the typical graphical representation of such a circuit. An H bridge is built with four switches (solid-state or mechanical). When the switches S1 and S4 (according to the first figure) are closed (and S2 and S3 are open) a positive voltage will be applied across the motor. By opening S1 and S4 switches and closing S2 and S3 switches, this voltage is reversed, allowing reverse operation of the motor.

III. BLOCK DIAGRAM

In our project we use IR sensor to detect the position of the train.we use two sensor for safety purpose to avoid mechanical problem. The sensor gives two output. If train is near to platform, else far away from platform.

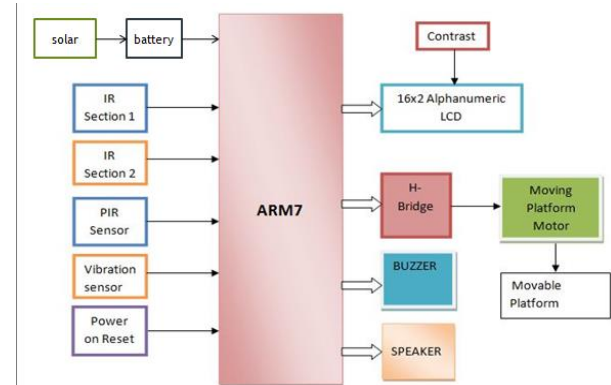


Fig 3.1 Block Diagram

Whenever the train is arriving the transmitter sensor gets disturbed due to the disturbance of the train .Thus the LPC2148 detects the arriving of the train . Before making the platform move backward the LPC2148 gives siren to alert the public who are on the track . After certain time the controller moves the platform backward by rotating the dc motor in clockwise direction . For making the bridge move forward the LPC2148 should know whether the train has left . For this the second sensor pair is used. Whenever the second sensors detects the train i.e When the transmitter is disturbed then the LPC2148 waits for the last section to leave . Then the LPC2148 output is given to the dc motor which makes the dc motor move in anti-clockwise direction making the bridge move forward thereby making a way for the pedestrians to move.

The second IR pair identifies the train since the IR signal gets disturbed when it comes in between TX and RX. The LPC2148 will wait till the last compartment and when it left the IR pair, the receiver again gets IR signal. Hence the LPC2148 knows that thetrain left the platform. Till this time the platform is closed. Now, after the train left the crossing, the LPC2148 will open the platform by rotating the DC motor. LCD displays the status of the train.

This project uses regulated 5V, 1A power supply. 7805 three terminal voltage regulator is used for

-voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

3.1 CIRCUIT DIAGRAM

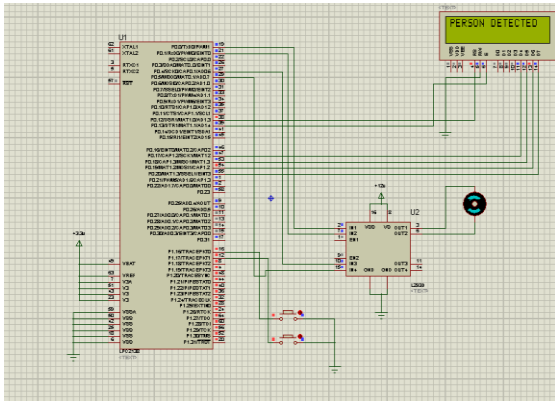


Fig 3.2 Circuit Diagram

The LPC 2148 is heart of the project. A 33pF capacitor is connected across these pins to remove harmonic noises. An RC circuit constituted by C1 and R2 are connected to reset pin (pin 9) to reset LPC2148 on each power on time. Pin number 40&20 are +VCC and GND respectively. The Vcc is connected to the +5V line of power supply. Interrupt of the LPC2148 P0.2 (INT0) and P0.3 (INT1) are used for connecting entry and exit sensor. Entry and exit sensor consists of IR photo diode and IR LED connected in front of each other. When IR light falls on the photodiode it conducts. If there is an obstacle in between these sensor arrangements, Photo diode will be in cutoff mode. Then the LPC2148 closes the mobile bridge. If the train had left, the IR light falls on the photodiode and it conducts. Then the controller opens the mobile bridge for pedestrians. Port0 is used for connecting bidirectional motor drive. This circuit is the essential part for controlling the bridge. A DC motor is used to open or close the mobile bridge upon entry of train. For the controlling of DC motor an L293D IC is used. L293D Device is a monolithic integrated high voltage, high current four channel driver. To make simpler use as two bridges each pair of channels is equipped with an enable input. Two switches connected to P0.0 and P0.1 are the limit switches, which are used for identifying the position of the bridge. Audio visual indicators are connected to P0.2 to P0.6. This circuit consists of four LEDs as visual unit and a piezoelectric crystal for audio indication. This all are connected as active low. So for turning ON an

LED or buzzer, LPC2148 must apply a low at the corresponding pins. The resistors connected to LEDs are the current limiting resistors.

IV. ADVANTAGES AND FUTURE SCOPE

- Automatic platform leads to less time consumption (save time).
- It helps the elderly to reach the next platform without climbing the over bridge.
- Helps the people to move their heavy luggage easily from one platform to the other.

V. FUTURE SCOPE

- Sensing of train can be done by signal system method and thus can work more efficiently making the easy move of passengers from one platform to the other.
- Can add ultrasonic sensors for the detection of the train for the movement of platform before the expected time.
- Railways can be powered with the solar so that the project will not face failure if there is a power loss.
- Unmanned railway gate also can be incurred in this project.

VI. CONCLUSION

The main importance of this study is that, if this system is applied to the railway stations, then the handicap or old people on the station will be self dependent means they can cross the platforms by themselves easily. In this project we have searched for new alternatives to deal with the problem of transferring people from one platform to another. This project is used for automatically close/open the mobile platform. It saves the time for passengers to cross the next platform. The system is fully automated instead of climbing the staircase. This efficient method will be more compact for scheduling the train timings for reaching the particular destination and also for crossing the suitable platforms.

VII. RESULT

Among the various alternatives we have proposed for transferring people from one platform to another. This experiment is used for automatically

close/open the mobile platform .It saves the time for passengers to move to the next platform. Thus the sensing is made regularly whenever the train arrives and pass through.when the train is arriving the sensor will sense the presence of train and show the result on LCD.



Similarly when the train will depart the the platform the LCD show the result as follow.



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