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#### Abstract:

At the train station, we usually use the bridge to walk to another platform. Sometimes it is difficult for old or disabled people to use that bridge. The project created here seeks a solution to this problem. This function is used to turn off/on the moving platform of the train. Generally, a mobile platform connects (connects) two platforms where passengers can walk from one platform to another. The role of the train station mobile platform is huge, currently there is no such system, and people do not know about these machines. Today, train passengers face incredible problems crossing the railway line on foot with heavy loads across bridges. Most busy train stations will have multiple platforms where passengers rush from platform to platform to catch the train on time. Therefore, the project was completed and it was decided to create a prototype to demonstrate the concept. Sensors are placed on both sides of the track when the train arrives, if the train reaches a sensor, the moving platform will automatically close, allowing the train to cross the track, then the platform will move when the train leaves the second sensor, just open to bridge the two platforms. The microcontroller will detect the presence of the train using an infrared sensor. Thus, when it detects that the train is on the track, the controller will send a signal to the DC motor to stop the movement of the platform. The moving platform has red and green indicators to let pedestrians know if they can use the bridge. Red light when the train enters the station, green light when it leaves the station.

### **1. INTRODUCTION:**

This automatic railway project is used to turn off or on the movement of trains. Usually the mobile platform connects the two platforms and passengers can walk on the platform from the mobile platform to reach the next platform. It is difficult for people with reduced mobility and the elderly to use the stairs on the rail. For passengers traveling on the tracks often traffic jams occur due to rush hour trains, this project is designed to assist Indian Railways. The project uses mobile platforms on railway tracks. This will help the disabled and the elderly. The main purpose of this project is to develop a model and software to simulate the movement of bridges between two platforms; this is useful for people passing through iron train stations. The 89C51 single chip microcomputer is used to control the mobile bridge. The system's software measures the train entering and leaving the station and controls all movement and its algorithm. According to the hardware model, it is used to simulate the bridge system, using DC motors to control the movement of the bridge and its movement in the horizontal direction. Infrared sensors on either side of the train station act as a bridge for passenger feedback requests from one side to the other. Using variable parameters, they adjust various points of the mechanical model to determine the position of the mobile bridge. The entire system is designed to operate at 12 V DC; power should come from solar panel. The idea behind Harnessing Solar is to exploit nonrenewable energy sources. The heart of the process is the microcontroller unit; Built with 89C51/52 ATMEL chips. ATMEL 89C51 is an 8-bit controller with the same internal structure as the 8031 Core. The most popular and most used architecture is Intel's 8031. The market acceptance of this particular family has led many semiconductor manufacturers to develop new products based on this particular design.

The 8031 comes in many configurations; Even after 25 years of life, semiconductor manufacturers continue to offer products that use this 8031 core. The microcontroller unit plays an important role in

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this business. Today, with the advancement of technology, all activities in our daily life, especially in the field of microcontrollers, have become a part of information technology output and we can find controllers in all applications. Therefore, the model points to the microcontroller as the project work. Microcontrollers contain CPU, clock circuits, ROM, Ram and I/O circuits in an integrated package. Therefore, a microcontroller is a self-contained device that does not require as many supporting chips as a conventional microprocessor to operate. It has many advantages over modern multi-chip systems. There are costs and benefits in place due to the elimination of the printed circuit boards and connectors required to support multi-chip systems, as well as additional chip costs. Other benefits include cheaper maintenance, reduced hardware, and reduced boards associated with easily controlled devices.

## **2. OBJECTIVE:**

The main purpose of this project is to develop a hardware and software model that will simulate the movement of the metal bridge between two platforms, which is very important for people to cross the railway at the train station.

## **3. LITERATURE REVIEW:**

We usually use the bridge to walk to the other platform at the train station. Sometimes it is difficult for old or disabled people to use that bridge. Today, train passengers face incredible problems crossing the railway line on foot with heavy loads across bridges. Most busy train stations will have multiple platforms where passengers rush from platform to platform to catch the train on time. It is difficult for people with reduced mobility and the elderly to use the stairs on the ral. Many train accidents occur, from train accidents to passengers traveling on the road. The work of this project was designed to assist the railway. The project uses mobile platforms on railway tracks. This will help the disabled and the elderly.

The main objective of this project is to design and build a prototype device that will simulate the movement of the bridge between two platforms, which is crucial for people to cross the line at the train station. This is a new method that is more predictable, more reliable, better products and less maintenance than traditional bridges. The transmission mechanism is designed with a lubricated bearing sliding channel or gear transmission mechanism to allow the bridge to move easily. Quite simply, it will do what no other bridge can do.

# 4. FUNCTIONAL DESCRIPTION:

### 4.1Train sensing circuit designed with LM567IC

A project or the work of a project begins with a chapter. The unit detects the train and tells the controller to turn off the mobile platform to allow the train to derail. Another sensor placed outside the station notifies the controllers that the train has derailed and that the moving platform can open, creating a bridge between the two platforms. The LM567 IC is a general purpose audio decoder designed to provide a saturated ground pass in the presence of an input signal in the passband. The circuit consists of two-stage detector.

For example, the Q and I detectors are driven by voltage-controlled oscillators that determine the frequency setting of the decoder. External components are used to establish the center frequency, bandwidth, and output delay. 567 audio decoder, the third pin of the IC is connected to the infrared receiver (detector), and the fifth pin is connected to the infrared transmitter by triode. The PNP transistor SK 100 is used to drive the infrared transmit LED with variable frequency generated by the IC. A capacitor is connected between the IR receiver and pin 3 of the 567 tone decoder IC to cancel the tone. Thus, the received IR signal is fed to the IC, which compares the received frequency signal with the generated signal. The I-phase detector makes this comparison and the output is activated, for example, when two frequencies match. The transmit frequency is equal to the receive frequency. If the frequencies do not match, the output will not be activated. If the sensors are placed side by side, the IR transmitter will continue to emit IR signals and the receiver will receive the signal when there is a problem. Therefore, until there is no interference, the receiver will not be able to receive the IR

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signal, so the frequency will not match and the output will not be activated. So the output of the 567 tone decoder will be a high logic signal.

If there is a problem in front of the sensor, the IR signal is sent back, the IR receiver looks at the signal and feeds the signal to the audio decoder, the audio decoder checks the generated frequency and when the two match the output. when enabled, the internal will be ON and the power supply will be grounded at the IC. Therefore, the logic low signal will be obtained from the output of the 567-tone decoder IC. An LED is connected to the output pin of the 567-tone decoder IC to indicate whether the detector output is a low signal or a logic high signal. If the output is high, the LED will be ON; if the output is low, the LED will be OFF.

### 4.2 Microcontroller unit

The whole process described here uses a microcontroller unit, which plays an important role in the operation of this project. The main operating unit received the design 89C51, because the controller has 4Kb of memory, the main service is transferred to this chip. Process the data received from the infrared sensor and control the DC motor and mobile platform clockwise and counterclockwise. The controller used here has the 8051 family architecture, commonly known as the MCS-51. The microcontroller has an 8-bit bus. In this family, some controllers can address 64K program memory and allocate 64K data memory. The 8051 has 4K memory used as on-chip read-only memory (ROM). The 8051 has 128 bytes of internal random access memory (RAM). The 8051 has two timers/timers, a serial port, 4 purpose parallel input/output ports, and five interrupt control logic. In addition to the internal RAM, the 8051 has several Special Registers (SFRs) with control and data registers for onchip locations. SFRs also contain a program status word (PSW) containing accumulators, B registers, and CPU flags. Various internal hardware parts of the 8051 can be operated by placing appropriate control words in the corresponding SFRs. The 8051 has two independent reads, RD# and PSEN#. The first is activated when a byte is to be read from external data memory, and the other when read from another program memory. Both signals are called active low signals. That is, they are increased to logic level 0 during operation. All external code is carried by external working memory.

### 4.3 DC Motor

Only DC motors are used to close or open the mobile platform to make or break the bridge between the two platforms. DC motors are widely used, cheap, small and powerful. It is easy to manage. The DC motor has only two signals to run. They are non-polar, meaning you can reverse the voltage without damaging the motor. DC motors have +ve and -ve terminals. Connecting them to a DC voltage source causes the motor to move in one direction (clockwise), reversing the polarity so the DC motor moves in the opposite direction (counterclockwise). The maximum speed of a DC motor is specified in rpm (revolutions per minute). It has two rpm: empty and loaded. When the load moves, the speed decreases, and when the load increases, the speed decreases. Another characteristic for DC motors is the voltage rating and current rating. The table below shows the characteristics of the engines used in the project. The speed of the motor can be changed by changing the voltage applied to the motor. The DC motor does not have enough power to drive the machine from the direct connection. The motor driver circuit takes the relay design. Relays are defined as automatic devices used to drive small DC motors. To drive the motor independently in both directions, the drive is programmed based on the data collected from thesensors.

Operating Voltage	12V DC
	150 milli
Operating Current	Amps
Speed	30 RPM

DC motor Specifications

### 4.4 RELAY

A relay is an electrical switch that turns on and off under the control of another circuit. The relays used in this project are electromagnetic relays. An electromagnetic relay is a switch (or combination of switches) operated by the magnetic force created by the current flowing through the coil. It basically consists of four parts: an electric motor with coils and magnets, a moving device, a set of contacts and a frame that connects this whole product. However, many types of relays have been developed to meet the needs of the industry. A relay is electromagnetically nothing more than a

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switch. It opens or closes the circuit when the current from the coil starts or stops. When the coil is energized, the armature is attracted by the electromagnet and the people around it. The construction of a typical relay has a code surrounded by a coil of copper wire. The core is mounted on a metal frame. The moving part of the relay is called the armature. When an electric current is applied to the coil terminals, the current through the coil creates a magnetic field in the metal core. In other words, the metal core acts like an electromagnet and attracts the metal armature. A spring attached to the armature returns the armature to its original position when voltage is cut off. In this position, there is a slight difference between the air in the magnet. Therefore, more force is required to pull the armature than to keep it in the desired position.

### **4.5 LIMIT SWITCHES**

The power of the machine is limited by two limit switches and all these limit switches are connected as input signals to the controller. This switch has a long stem and will open automatically when there is little force on the stem. The movable platform's transmission makes these keyboards on the high end of both. To realize the history of the horizontal movement, the transfer limit is initially set; This is the first place to be used. When the relay is disabled and the DC motor is off, the switch remains active as long as the bottom box is in place.



## 4.6 MAGNETIC (REED) SWITCHES

A magnetic (reed) switch is an electrical switch that operates using a magnetic field. Invented in 1936 by W. B. Ellwood at Bell Telephone Laboratories. It has a double contact on a ferrous metal reed in a hermetically sealed box. Contacts can be open, closed when a magnetic field is present, or normally closed or open when magnets are applied. The generator can be activated by bringing a coil, a reed relay, or a magnet close to the switch. When the magnet is pulled from the switch, the reed returns to its original position. The magnetic switch has a pair (or more) of magnetizable flexible metal reeds, the ends of which are separated by a small gap when the switch is open.

The reeds are sealed at both ends of the tubular glass enclosure. A magnetic field (such as an electromagnet or a permanent magnet) will bring the reeds together, completing the circuit. When the magnetic field stops, the voltage between the reeds causes them to separate and open the circuit. Another configuration has a non-ferrous normally closed contact that opens when the ferrous normally open contact is closed. Good electrical protection is provided by covering the contact area of the rod with a thin layer of quality stainless steel; Low quality silver is better for sealing envelopes than heat resistant ones. There are also reed replacement versions with mercury "soaked" contacts. Such switches should be assembled in pairs. Since the contacts of the reed switch are isolated from the air, they are protected from atmospheric corrosion. The hermetic seal of the magnetic switch makes it suitable for use in explosive atmospheres where small sparks from conventional switches can be dangerous. An important characteristic of the switch is its sensitivity, the amount of magnetic field required to actuate it. Sensitivity is measured in amp-turns and corresponds to the current in the coil multiplied by the number of turns. Typical pull sensitivity for the product is in the range of 10 to 60 AT. The lower the AT, the more sensitive it is to reed changes. In addition, small reed switches with small components are very sensitive to magnets, so the smaller the gear of the reed switch, the more sensitive it will be.

### 4.7 MECHANICAL TRANSMISSION SECTION

Mechanical systems are viewed as motion transducers that can be created using electromechanical methods. The idea is to switch from one form to another using the appropriate mechanical and electrical equipment. In this study, the process of transforming movement into movement was carried out. For this purpose, DC motors are used to create movement to the platform in the

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horizontal direction on the installation. The motor is made by reducing the gear mechanism and is built into the motor.

Since the machine was built as a prototype, the smallest scale hull was used to drive the machine. The advantage of choosing a motor is that a small motor can run heavy loads. There is no torque test as the motor is purchased locally. Only speed (RPM) and operating voltage are specified. Based on this information, the motor is designed to run at 12V DC at 30 RPM motor speed. The ability to drive the engine has been tested in practice. In our tests, we learned that the engine can drive a maximum of 3 Kg. Based on this driving skill, a small machine was built for this project as a demonstration. Rotational motion can be transferred from one frame to another by a pair of rotating gears. According to the ratio of the final shaft speed, several gears are arranged in a group called a gear train. These trains are commonly used to increase or decrease the final shaft speed. As speed increases, torque decreases and as speed decreases, torque increases, i.e. speed (RPM) and torque are inversely proportional to each other. Usually these teeth are joined on both shafts. When two gears engage, the larger gear is usually called a pinion, and the smaller one is called a pinion.

This function will be controlled by the controller based on the input from the strain gauge. The movement of the DC motor used for this operation is limited in both directions by the limit switch. Use a high-power, high-voltage DC motor to drive the moving platform connecting the two platforms, the DC motor rotates clockwise to move the platform in one direction, and the DC motor motor returns to the platform. the other direction, back to the original.

DC motor drive is done by driving using relays. Limit switches are used as input signals for DC motor driver circuits, relays that control the movement or direction of the motor. The motion is produced by the rack and pinion by connecting the pinion/toothed pulley directly to the motor. The platform moves between two horizontal reference points with the help of a DC motor. All systems are built on a structure and it is aimed to move the platform on a straight line with horizontal movement.

#### 5.WORKING: Block Diagram



Sensors are placed on both sides of the track as the train approaches, if the train reaches a sensor the platform motion is interrupted allowing the train to cross the track, then the platform moves when the train leaves the second sensor. appeared. Basically open to connect two platforms. The microcontroller will detect the presence of the train using an infrared sensor. Train induction sensors are located at two points in front of the platform and behind the platform. Sensors at the front of the platform recognize when the train is coming and give the microcontroller an update, which causes the platform to close automatically, warning passengers not to enter. The second sensor is located at the back of the platform and when it detects a train it updates the microcontroller so that the

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platform automatically opens and passengers walk. Thus, when it detects that the train is on the track, the controller will send a signal to the DC motor to stop the movement of the platform. The moving platform has red and green indicators to let pedestrians know if they can use the bridge. The signal automatically turns red when the train enters the station, and turns green when the train leaves the station. Magnetic switches are attached to the automatic machine and are used to determine the movement of the train. Work on this project started with powertrain testing using the LM 567 IC. The unit detects the train and instructs the controller to turn off the mobile platform to allow the train to derail. Another sensor placed outside the station notifies the controllers that the train has derailed and that the moving platform can open, creating a bridge between the two platforms. Microcontroller unit, all systems described here use a microcontroller unit, which plays an important role in this work. The main operating unit received the design 89C51, because the controller has 4Kb of memory, the main service is transferred to this chip. The data received from the infrared sensor is processed, and the mobile platform is controlled by the DC motor clockwise and counterclockwise.



#### 6. CONCLUSIONS:

The design work was successfully completed and the prototypes were demonstrated with good results. While designing and building this model we consulted some experts experienced in qualification, these experts working in various organizations in Hyderabad assisted us in designing the job. For demonstration purposes, the mobile platform is built for two platforms only. The same technology can be used on any platform with minor changes. There are many types of escalators that can be found in train stations. A few places use elevators or elevators, but they are all designed to get people higher. From there, people have to cross the road and bridge to reach their platform, where they have to take another elevator to get down. This is very painful and takes a long time and this ease of movement is created where one can move to another level so as not to be burdened. Special attention was given to the business process to describe the business process, so the model was created for descriptive purposes. Along with appropriate adjustments to the model and physical measurement, the module based on this technology simulates the real operating system and can be adapted to the real application.

Receiver is the process of converting motion into motion. The system remembers all sanitary measures, but when doing it seriously, it is still necessary to monitor the button to avoid accidents. Tighter controls are the basis for continued implementation and it is important to identify the people in the channel before it is shut down. But beware, security personnel are nearby to alert customers who are on their way.

#### 7. REFERENCES:

[1] Nikita R. Pophalkar, Diksha R. Kharche, Akash R. Tarmale, Shaikh Juned Shaikh Mustafa, Prof M. O. Sharma, "Artificial Railway Platform and Train Doors" International Journal of Research in Advent Technology. Special Issue. Convergence 2019 E-ISSN: 2321-9637 pp.75-78.

#### (UGC Care Group I Listed Journal)

## Vol-13, Issue-06, No.02, June : 2023

- [2] Rahul Wani, DhananjayGite, KaustubhWani, Akshay Fulsundar "Automated Platform Bridge In Railway Station" International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 01 | Jan 2019 p-ISSN: 2395-0072.
- [3] Saravana Kumar, R.Hariharan "DESIGN AND FABRICATION OF EASIEST CROSSING PLATFORM FOR HANDICAPPED PERSON"International Journal of Pure and Applied Mathematic Volume 116 No. 19 2017, 521-527 ISSN: 1311-8080 ; ISSN: 1314-3395.
- [4] Acy M. KottaliJ. Banuchandar, V. Kaliraj, P. Balasubramanian, S. Deepa, N. Thamilarasi "Automated unmanned Railway Level Crossing System", International Journal of Modern Engineering Research (IJMER) Vol.2, Issue.1, Jan-Feb 2015 pp-458-463 ISSN: 2249-6645.
- [5] Adarsh K S, Riya Robert, Kavia E "Railway Track Pedestrian Crossing without using Staircase" International Journal of Emerging Technology and Advanced Engineering, (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 5, Issue 12, December 2015).
- [6] Kajal Hareshwar Bari, Anagha Ajay Raut, Dr.Vikas Gupta, Bhakti Digambar Desai, 2021, Automated Footbridge Across Platform At Railway Station, INTERNATIONAL JOURNAL OF ENGINEERING RESEARCH & TECHNOLOGY (IJERT) NTASU – 2020 (Volume 09 – Issue 03).
- [7] Syed Mohammad Imran Ali, S.Venkateswarlu, Syed Mohammed RuhullahHussainyECE, JNTUA, Smart and Sophisticated Artificial Railway Platform, International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887 Volume 6 Issue IV, April 2018.
- [8] Sudarsan. P, Ram Kumar. S, Surendar.R, UdaySankar. T, Karthik "Artificial railway platform for domestic railway station" proceedings of 21st IRF International Conference, 15th March 2015, Chennai, India, ISBN: 978-93-82702-78-8.
- [9] G.Prabhavathi, B.Sanjana, S.P.Dhivya"Railway track pedestrian crossing between platforms" IOSR Journal of Electronics and Communication Engineering (IOSRJECE) e-ISSN: 2278-2834, p-ISSN: 2278-8735.Volume 9, Issue 2, Ver. III (Mar - Apr. 2014), PP 87-91.
- [10] J. Banuchandar, V. Kaliraj, P. Balasubramanian, S. Deepa, N. Thamilarasi "Automated unmanned Railway Level Crossing System", International Journal of Modern Engineering Research (IJMER) www.ijmer.com Vol.2, Issue.1, Jan-Feb 2012 pp-458-463 ISSN: 2249-6645.