Mobile Railway Platform over Railway Track

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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 mobile platform. We made this device with the help of IR Sensors and Microcontroller. Normally the mobile platform connects the two platforms through which the passenger can walk on the platform to reach on the next platform.The main aim of this project is to construct a movable railway platform above the tracks with same platform height. This helps the passengers to easily move from one platform to another platform. The system also uses PIR sensor and LDR sensor for presence of human being detection, day or night light detection and controls the devices like lights and fans.

Keywords: Regulated Power Supply, Microcontroller, Limit switches, IR sensors, PIR sensor, LDR sensor, Relay with driver, Buzzer with driver, DC motor with driver.

1. Introduction.

In India, majority of the public transportation is being carried out by the railway and therefore any problem occurred during transportation brings the transportation to a halt. Railways is considered to be the most reliable medium of transport in India as lakhs of commuter's travel by it on a daily basis. So, the safety and management are a challenge. Uncontrollable railway crossing is one of the major problems faced by the Indian Railways, and the highest contributors to the death count per year. Despite the strict measures taken by the Railway authorities, the platform crossing death continue to occur frequently. Railway crossing deaths occur because people want to avoid the confusion and congestion on the foot-over bridges. [1]

This project makes use of an onboard computer, which is commonly termed as microcontroller. It acts as heart of the project. This onboard computer can efficiently communicate with the sensors being used. The controller is provided with some internal memory to hold the code. This memory is used to dump some set of assembly instructions into the controller. And the functioning of the controller is dependent on these assembly instructions.

2. LITERATURE SURVEY

The purpose of this project is to design a Smart cross walk system to construct a movable railway platform above the tracks with same platform height. This helps the passengers to easily move from one platform to another platform. The proposed system is capable of identifying train arrival and departure and there by intelligent controlling the movable platform. The system also uses PIR sensor and LDR sensor for presence of human being detection, day or night light detection and controls the devices like lights and fans. This project consists of sensors like PIR, IR, LDR, and also modules like Dc motors, buzzer and limit switches along with relay circuits etc. The project implemented by using electronic compoenents understands by the standard books of Electronic digital circuits, interfacing and system design by Rajkamal.

In day-to-day life Automation has created a bigger hype in the electronics. The major reason for this hype is automation provides greater advantages like accuracy, energy conversation, reliability and more over the announcement systems do not require any human attention. Any one of the requirements stated above demands for the design of an automation system at smart cross walk near railway platform systems.

Several works have been done in recent years regarding motion detection for surveillance in both residential and industrial areas. In recent years, image and video processing technique have been incorporated with modern surveillance system. In a recent research authors used absolute difference motion detection for visual surveillance. They devised the technique of tracking and recognition moving object using OpenCV, which is a popular library of Python and C++. After that, the captured pictures of detected objects are stored in HDD. The drawback of this system is it requires a certain time delay for detecting motion and storing it in HDD which will not be fast enough to catch the intruder in real time.

3. Implementation:
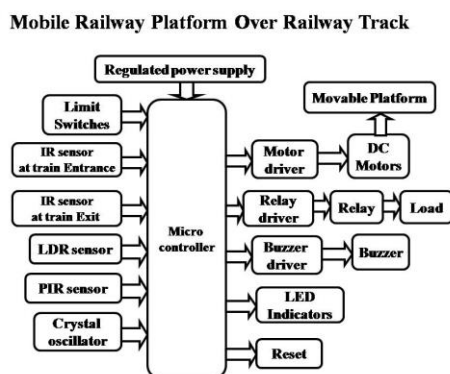
The main controlling device of the whole system is a microcontroller. IR sensors, DC motors, limit switches and buzzer are interfaced to the microcontroller. IR sensors input will help the microcontroller to assess the train arrival and departure conditions. When there is no train on the tracks, the microcontroller will move the dc motors to which movable platform setup is connected. When there is train arrival, the microcontroller alerts through buzzer and clears off the movable platform. Limit switches helps the microcontroller to assess the platform movement. The system detects any presence of human beings and controls the devices like lights. The system uses LDR sensor for day or night sunlight sensing and also controls the electrical devices like lights, fans etc using relay switches. To perform the intelligent task, microcontroller is loaded with a program written using embedded 'C' language,

4. Related Work:

The brief introduction of different modules used in this project is discussed below:

PIC Microcontroller(16F877A):

This powerful (200 nanosecond instruction execution) yet easy-to-program (only 35 single word instructions) CMOS FLASH-based 8-bit microcontroller packs Microchip's powerful PIC® architecture into an 40 package and is upwards compatible with the PIC16C5X, PIC12CXXX and PIC16C7X devices. The PIC16F877A features 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, the synchronous serial port can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit (I²C™) bus and a Universal Asynchronous Receiver Transmitter (USART).

IR SENSOR:

An Infrared sensor [2] is an electronic device which emits in order to sense objects in the surrounding. The emitter is an IR LED and the detector isan 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. The radiations produced are not visible to the human eye since it emits at infrared range.The sensors usually have wavelengths between 0.75 and 1000µm. The region between 0.75 to 3µm is known as the near infrared regions. The region between 3 and 6µm is known as the midinfrared and infrared radiation which has a wavelength greater higher than 6µm is known as far infrared.
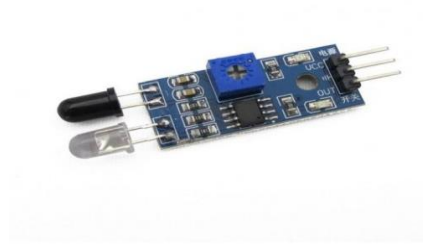
In this project the sensors are placed at some distance from the platform. When the light emitted from the IR LED encounters an object (in this case train) it reflects the light which is picked up by the IR Receiver. The desired operation is performed when the light reflects from the object (in this case opening/closing the mobile platform)
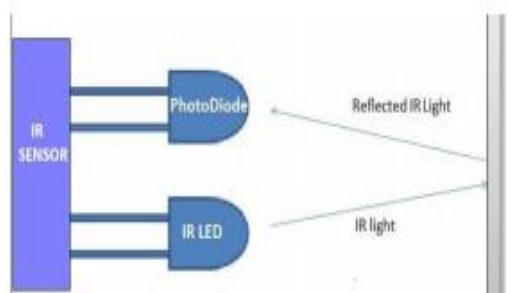
CD Driver:

There are two types motors used. One that is used to open and close the CD Drive is a Stepper motor. The other type is a BLDC (brushless DC) motor that is used to spin the CD. The DC motor in the CD drive converts the electrical energy into mechanical energy, in this case, which opens/closes the CD drive to bridge the gap between the platforms when it opens and un-bridges the gap when the CD drive closes. The motors are driven using a driver IC as shown above.

Limit switch:

The **limit switch** then regulates the electrical circuit that controls the machine and its moving parts. These **switches** can be used as pilot devices for magnetic starter control circuits, allowing them to start, stop, slow down, or accelerate the **functions** of an electric motor.

Buzzer:

A piezoelectric diaphragm consists of a piezoelectric ceramic plate which has electrodes on both sides and a metal plate (brass or stainless steel, etc.). A piezoelectric ceramic plate is attached to a metal plate with adhesives. Applying D.C. voltage between electrodes of a piezoelectric diaphragm causes mechanical distortion due to the piezoelectric effect

Relay:
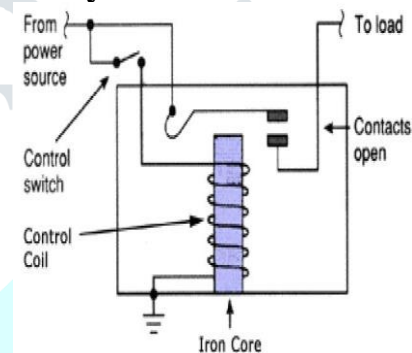
Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications.

LDR Sensor:

An LDR is made of a high-resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance.

PIR sensor:

PIR sensors are more complicated than many of the other sensors explained in these tutorials (like photocells, FSRs and tilt switches) because there are multiple variables that affect the sensors input and output. To begin explaining how a basic sensor works, we'll use the rather nice diagram below The PIR sensor itself has two slots in it, each slot is made of a special material that is sensitive to IR. The lens used here is not really doing much and so we see that the two slots can 'see' out past some distance (basically the sensitivity of the sensor). When the sensor is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors.

CONCLUSION:

The existing model presents an Integrating feature of all the hardware components. The Presence of each and every module has been reasoned out and placed very carefully. Hence the contributing to the best working unit for "**Mobile Railway Platform over Railway Track**" has been designed perfectly. Thus, the project has been successfully designed and tested.

ACKNOWLEDGEMENT

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