AUTOMATIC RAILWAY GATE CONTROL USING ARDUINO

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ABSTRACT
It has been noticed that a lot of fatalities of lives occur every day due to manually operated rail gates . These happen mainly at places where the rail road passes through a city, locality or unmanned gates of the crossing zones. Currently, gatemen mainly operate on the assumption of a train departure schedule from the station to reach a crossing zone. Accidents are more likely to happen in such cases, causing severe damage to human lives and properties near the rail crossings. This project presents the development and implementation of automatic rail gate control system as well as real time monitoring of train and obstacle detection . This project also suggests the effectiveness of real time information of train position.

The main objective of the proposed humanitarian project is to ensure the efficiency, quality, time management, and most importantly public safety, using wireless based communication network for the development of the railway industry.

KEYWORDS:*Arduino Uno,Ultrasonic Sensor,LCD Display,Servo Motor*

INTRODUCTION

In today's scenario Railway safety becomes the most important aspect of railways all over the world. Due to manual operation, accidents are likely to happen. The suggest system helps in achieving the safety and to prevent accidents at the level crossings that are non-man handled. Since, the proposed model suggests an automatic system, it helps in reducing the error which is in manual operation and it will be used as highly reliable source.The design is to control a railway level-crossing by servo motor/ DC motors using Arduino controller.

ARDUINO UNO

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects.

The Arduino UNO includes 6 analog pin inputs, 14 digital pins, a USB connector, a power jack, and an ICSP (In-Circuit Serial Programming) header. It is programmed based on IDE.

Arduino Uno can detect the surroundings from the input. Here the input is a variety of sensors and these can affect its surroundings through controlling motors, lights, other actuators, etc. The ATmega328 microcontroller on the Arduino board can be programmed with the help of an Arduino programming language and the IDE (Integrated Development Environment).

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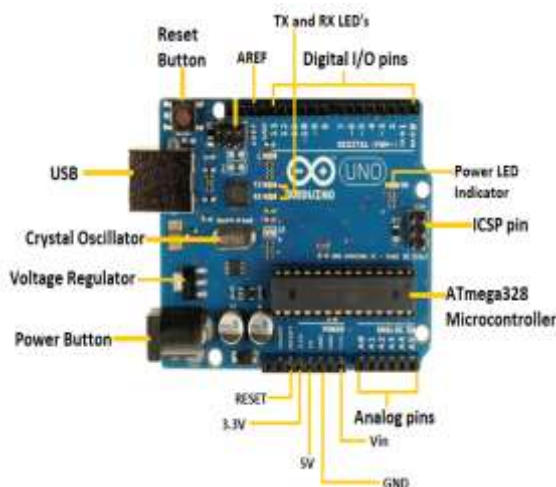
ULTRASONIC SENSOR

An ultrasonic sensor is a type of electronic equipment that emits ultrasonic sound waves and converts the reflected sound into an electrical signal to determine the distance of a target item. Ultrasonic waves travel quicker than audible sound (i.e. the sound that humans can hear). The transmitter, which generates sound using piezoelectric crystals and the receiver, which encounters the sound after it has traveled to and from the target, are the two primary components of ultrasonic sensors.

Ultrasonic sensors operate by emitting a sound wave at a frequency that is above the range of human hearing. To receive and transmit ultrasonic sound, the sensor's transducer functions as a microphone. Like many others, our ultrasonic sensors use a single transducer to send a pulse and receive the echo. The sensor calculates the distance to a target by measuring the time elapsed between delivering and receiving the ultrasonic pulse.

By using this technology we can detect the obstacle.
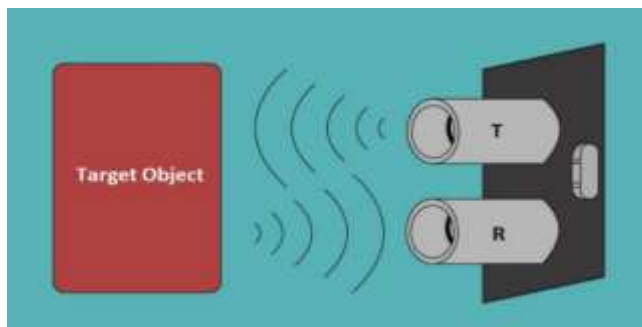
LCD DISPLAY

The LCD is a frequent guest in Arduino projects. But in complex circuits, we may have a lack of Arduino ports due to the need to connect a screen with many pins. which connects the almost standard Arduino 1602 shield to the Uno, Nano, or Mega boards with only four pins. The LCD 1602 Liquid Crystal Display is a good choice for displaying character strings in various projects. It is inexpensive, Connection of a large number of master devices.
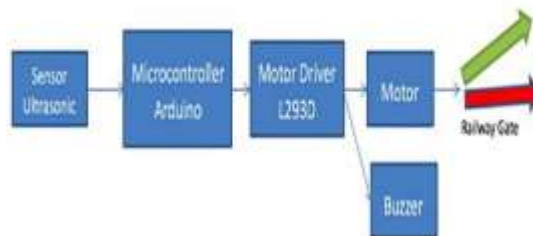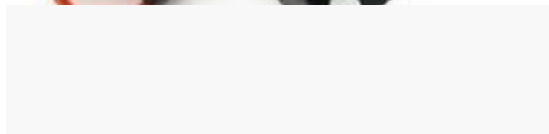

SERVO MOTOR

A servomotor (or servo motor) is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocit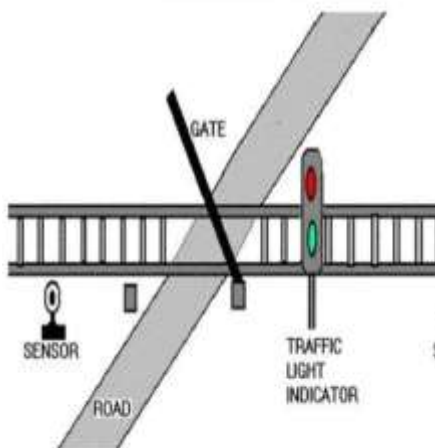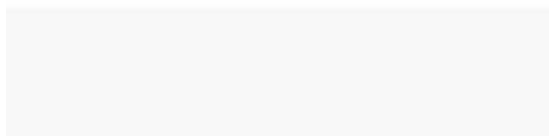y, and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. By using these motor the gate will be down as well as up.

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BLOCK DIAGRAM

WORKING PROCEDURE

In this proposed model we use USB cable to connect the Arduino UNO to the PC that will supply the power Arduino Uno and the sensors are powered by 5v battery. After this Supply is given to ARDUINO the servo motor/DC motor and Ultrasonic sensor are controlled and interfaced through the ARDUINO.

Now the ultrasonic sensor senses the arrival/departure of the Train and accordingly sets up the Buzzer to notify the surrounding/nearby area. After which the servo motor/DC motor which here is used to control the gateway system at the crossing itself takes the corresponding action to whether open or close the gateway accordingly.

CONCLUSION

This project represents the Automatic gate control system offer an effective way to reduce the occurrence of railway accidents. Since the design is completely automated it can be used in remote villages where no station master or line man is present.

PROTOTYPE MODEL
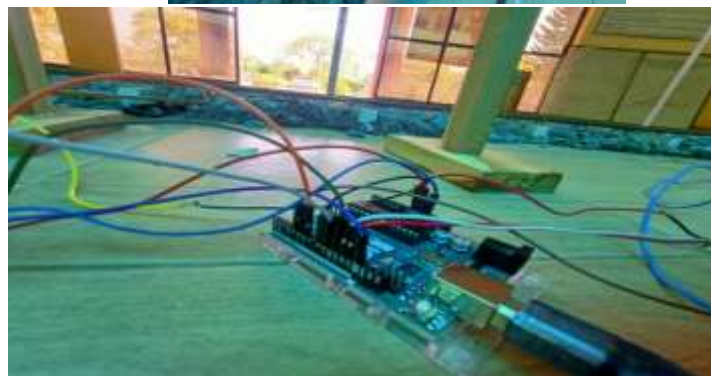
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