

Project Report
On
Automatic Railway Gate Control System Using IR

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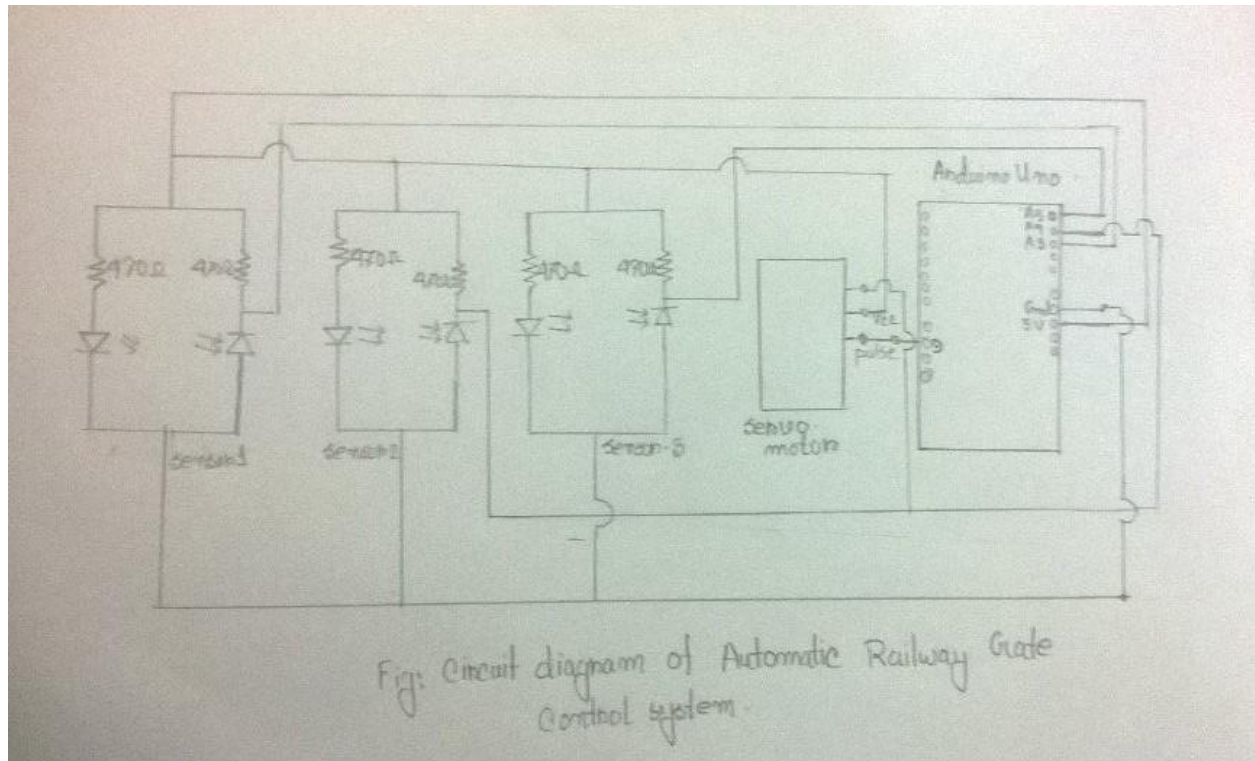
Objective:

The objective of this project is to create an automatic railway gate control system which can be implemented easily in roads. Generally there are manual gate control system which are maintained by person. As vehicles are increasing day by day it has become more difficult to control the gate manually. As a result often accident occurs and many people become injured badly and sometimes it become very serious when people died due to this type of accidents. This project can help us to reduce accidents in our country by introducing automatic railway gate control system.

Equipments :

- ❖ *Arduino Uno*
- ❖ *IR Pair(3 pieces)*
- ❖ *Servo Motor*
- ❖ *Resistances (470 Ohm)*
- ❖ *Pot (10K)*
- ❖ *Connecting Wires*
- ❖ *Jumping Wires (Male-to-Male, Male-to-Female)*

Circuit Diagram:



Description of Equipments:

1.Arduino Uno:

The arduino uno is a microcontroller. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform.

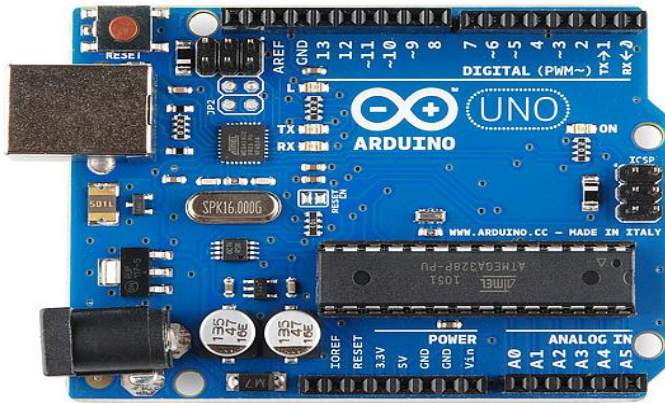


Figure: Arduino Uno

2.IR Pair :

The IR pair has 2 parts which are IR transmitter and IR receiver

IR Transmitter :

The transmitter unit consists of an infrared LED and its associated circuitry .The IR LED emitting infrared light is put on in the transmitting unit in LED is arrived through transistor

IR Receiver:

The receiver unit consists of a sensor and its associated circuitry .In receiver section ,sensor detects IR pulses transmitted by LED.



Figure: IR Pair

3.Servo Motor:

servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servo motors. Servomotors are not a specific class motor although the term servomotor is often used to refer to a motor suitable for use in a closed-loop control system.



Figure: Servo Motor

Working Principle :

3 pairs of IR is used in this project.2 pairs of IR is placed at the rail line in such a distance that these IR pair can send signal to arduino to open or close the

gate by servo motor. The third IR pair is placed under the gate .If there is any obstacle this IR pair check and send signal to microcontroller to read it so that the gate remain close. The gate become close or open by the rotation of servo motor. This is the main operation principle of this project.

Arduino Code:

```
int sensor1 = 3;

int sensor2 = 4;

int sensor3 = 5;

int motor = 9;    // potentiometer wiper (middle terminal) connected to
analog pin 3

                // outside leads to ground and +5V

#include <Servo.h>

Servo myservo;

int e = 0;

int c = 0;        // variable to store the value read

int x = 0;

void setup()

{

    Serial.begin(9600);    // setup serial

    pinMode ( sensor1 , INPUT );

    pinMode ( sensor2 , INPUT );
```

```
pinMode ( sensor3 , INPUT );  
pinMode ( motor , OUTPUT );  
myservo.attach(9);  
}
```

```
void loop()
```

```
{  
e = analogRead(sensor1); // read the input pin  
c = analogRead(sensor2);  
x = analogRead(sensor3);
```

```
Serial.println(e);
```

```
Serial.println(c);
```

```
Serial.println(x);
```

```
int pos = 0;
```

```
if (e>1000 && c<1000)
```

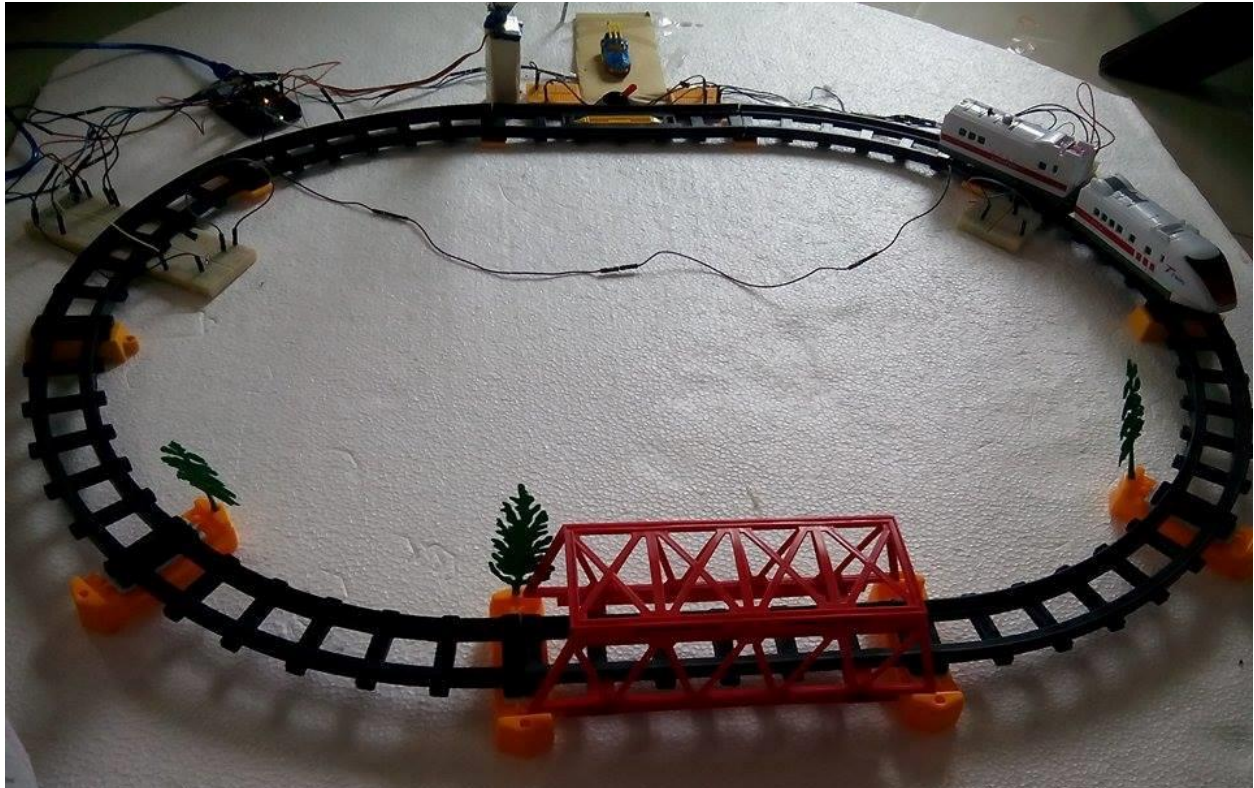
```
{  
for(pos = 0; pos <= 90; pos += 1) // goes from 0 degrees to 90 degrees  
{ // in steps of 1 degree  
myservo.write(pos); // tell servo to go to position in variable 'pos'
```

```
    delay(10);  
    break;           // breaks the loop  
  }  
}
```

```
if (x>1000)  
{  
  for(pos = 90; pos >= 0; pos -= 1) // goes from 90 degrees to 0 degrees  
  {  
    // in steps of 1 degree  
    myservo.write(pos);           // tell servo to go to position in variable 'pos'  
    delay(10);  
    break;           // breaks the loop  
  }  
}
```

```
Serial.println(e);  
Serial.println(c);  
Serial.println(x);  
delay(1000);  
}
```


Photos of our project:





Problems :

Working in this project ,some problems have been faced by us .The problems are given below:

- ❖ First of all, the value of resistances should be changed as the voltage changes with the change of light .It is very difficult to vary the resistance for the perfect operation.*
- ❖ Another problem is IR sensor easily damages so that the operation hampers.*
- ❖ IR sensor is light dependent sensor. It varies with the change of light so it is not applicable for all environment.*

- ❖ *IR sensor works at a certain distance .If the distance is increased the IR will not work which is a drawback of this project.*

Discussion:

This project helps us to know about the operations of IR sensor and arduino uno. Though the project has some limitations for using in practical purpose, its concept is very useful to us. This project can be improved by using LASER and LDR for increasing the distance for real train .A buzzer can be added for safety .This project can be developed in future using the concept which will be preferable for practical use.

References:

- 1.Mr. Hasib Md. Abid Bin Farid, Assistant Professor, Dept. of EEE, AUST.*
- 2.www. automatic railway gate control system project .com*