INTRODUCTION

This experiment is to create a unmanned railway gate system without using Arduino Uno. The “unmanned Railway Gate system ” is basically a smart automatic barrier that allows the traffic to cross the railway track when there is no train and blocks the traffic when a train passes through tracks. This is how the unmanned railway gate system works.

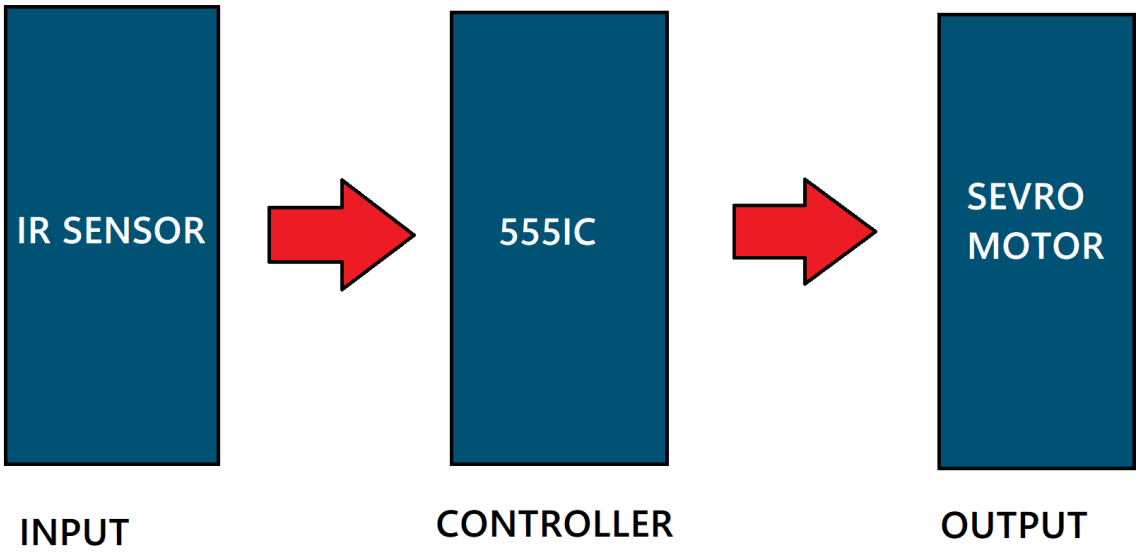
Required components :

- SG90 servo motor
- 555 IC
- IR sensor
- Battery
- Resistor and diode
- Capacitor
- 5v relay module
- Hooked up wires
- Bread board

OBJECTIVES

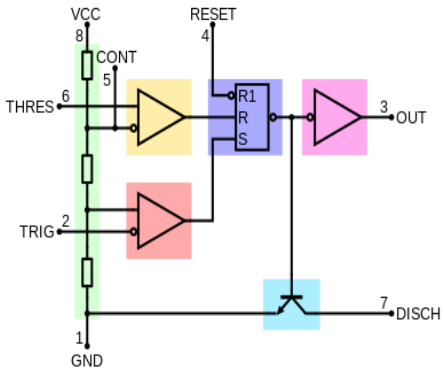
The advantages are accident avoidance, less human intervention, safety, and quality of services, accurate gate open/close. The prototype is accordingly made to avoid the accidents at the unmanned crossing after its effective use at the unmanned crossing we can propose this project/prototype at the manned crossing which could reduce the accidents that take place near the crossings.

BLOCK DIAGRAM & EXPLANATION



555 IC

The 555 timer acts as an SR flip-flop. The trigger and reset inputs are held high via pull-up resistors while the threshold input is grounded. Thus configured, pulling the trigger momentarily to ground acts as a "set" and transitions the output pin to VCC (high state).



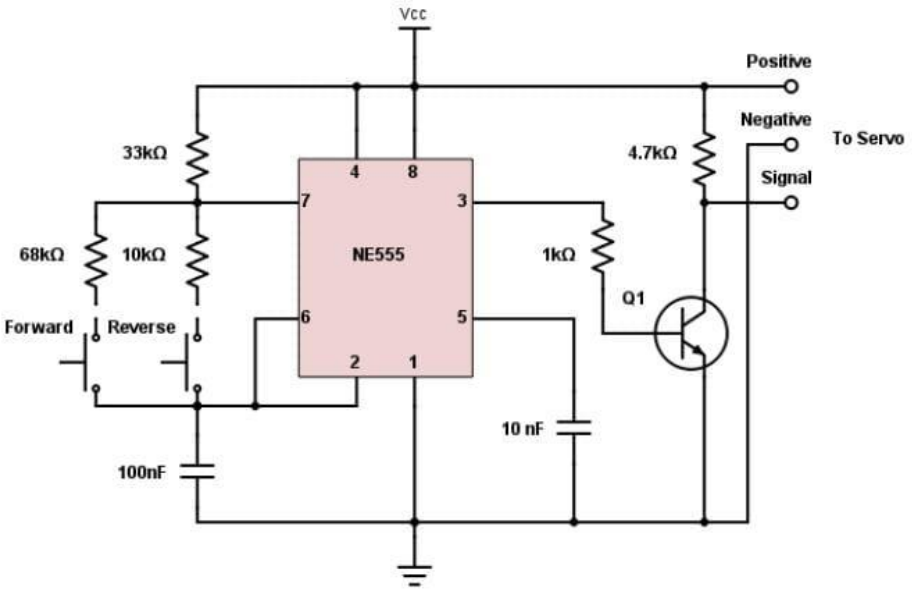
The 555 timer above is configured as a monostable circuit. This means that the output voltage becomes high for a set duration (T) when a falling edge is detected on pin 2 (trigger). The circuit above is also called a one-shot circuit. This calculator is designed to compute for the output pulse width of a 555 timer monostable circuit.

This 555 monostable circuit can generate pulses from a few microseconds to several hours depending on the values of resistor R and capacitor C. Note, however, that the use of very large capacitor (usually electrolytic-type) values are discouraged. This is because of their wide tolerance limits, which means their actual value is far from their marked value. Another issue with such a capacitor is its high leakage current, which may affect the timing accuracy. If a large capacitance is needed, choose a type with a lower leakage current such as tantalum.

Problems may also occur when using small value capacitors for producing very short delays. Stray circuit capacitance can.

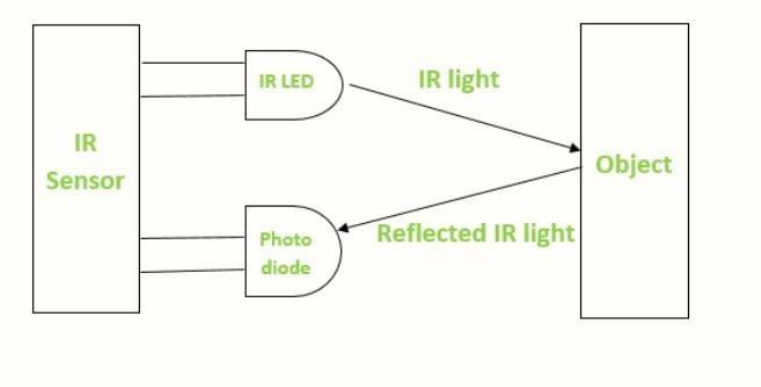
555IC WITH SERVO MOTOR:

A servo motor works by accepting pulses with widths from 1 ms to 2 ms. Monostable circuits can be used to a servo motor by carefully selecting the R and C values to produce the said pulse widths. An example is shown below



IR SENSOR

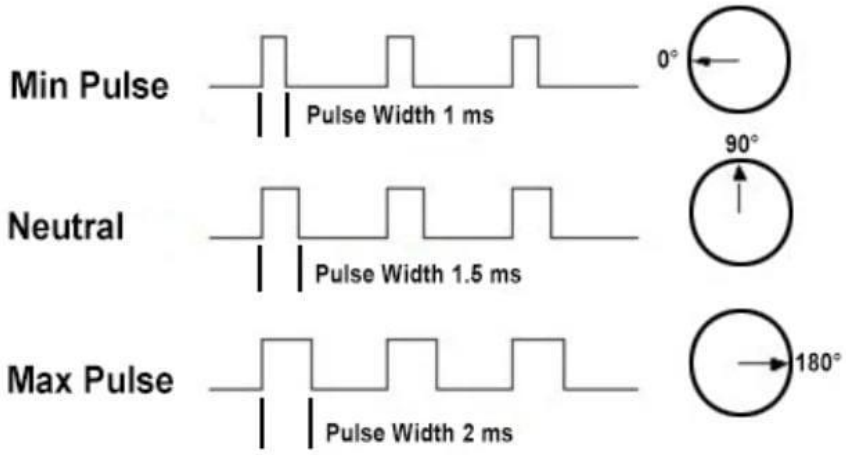
The IR transmitter continuously emits the IR light and the IR receiver keeps on checking for the reflected light. If the light gets reflected back by hitting any object in front it, the IR receiver receives this light. This way the object is detected in the case of the IR sensor. When the IR transmitter emits radiation, it reaches the object and some of the radiation reflects back to the IR receiver. Based on the intensity of the reception by the IR receiver, the output of the sensor defines.



SERVO MOTOR

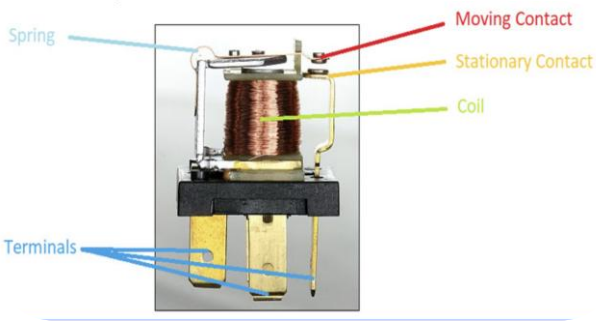
The desired position is sent via electrical pulses through the signal wire. The motor's speed is proportional to the difference between its actual position and desired position. So if the motor is near the desired position, it will turn slowly, otherwise it will turn fast. This is called proportional control. This means the motor will only run as hard as necessary to accomplish the task.

Servos are controlled by sending an electrical pulse of variable width, or pulse width modulation (PWM), through the control wire. There is a minimum pulse, a maximum pulse, and a repetition rate. A servo motor can usually only turn 90° in either direction for a total of 180° movement. The motor's neutral position is defined as the position where the servo has the same amount of potential rotation in the both the clockwise or counter-clockwise direction. The PWM sent to the motor determines position of the shaft, and based on the duration of the pulse sent via the control wire; the rotor will turn to the desired position. The servo motor expects to see a pulse every 20 milliseconds (ms) and the length of the pulse will determine how far the motor turns. For example, a 1.5ms pulse will make the motor turn to the 90° position. Shorter than 1.5ms moves it in the counter clockwise direction toward the 0° position, and any longer than 1.5ms will turn the servo in a clockwise direction toward the 180° position.



RELAY

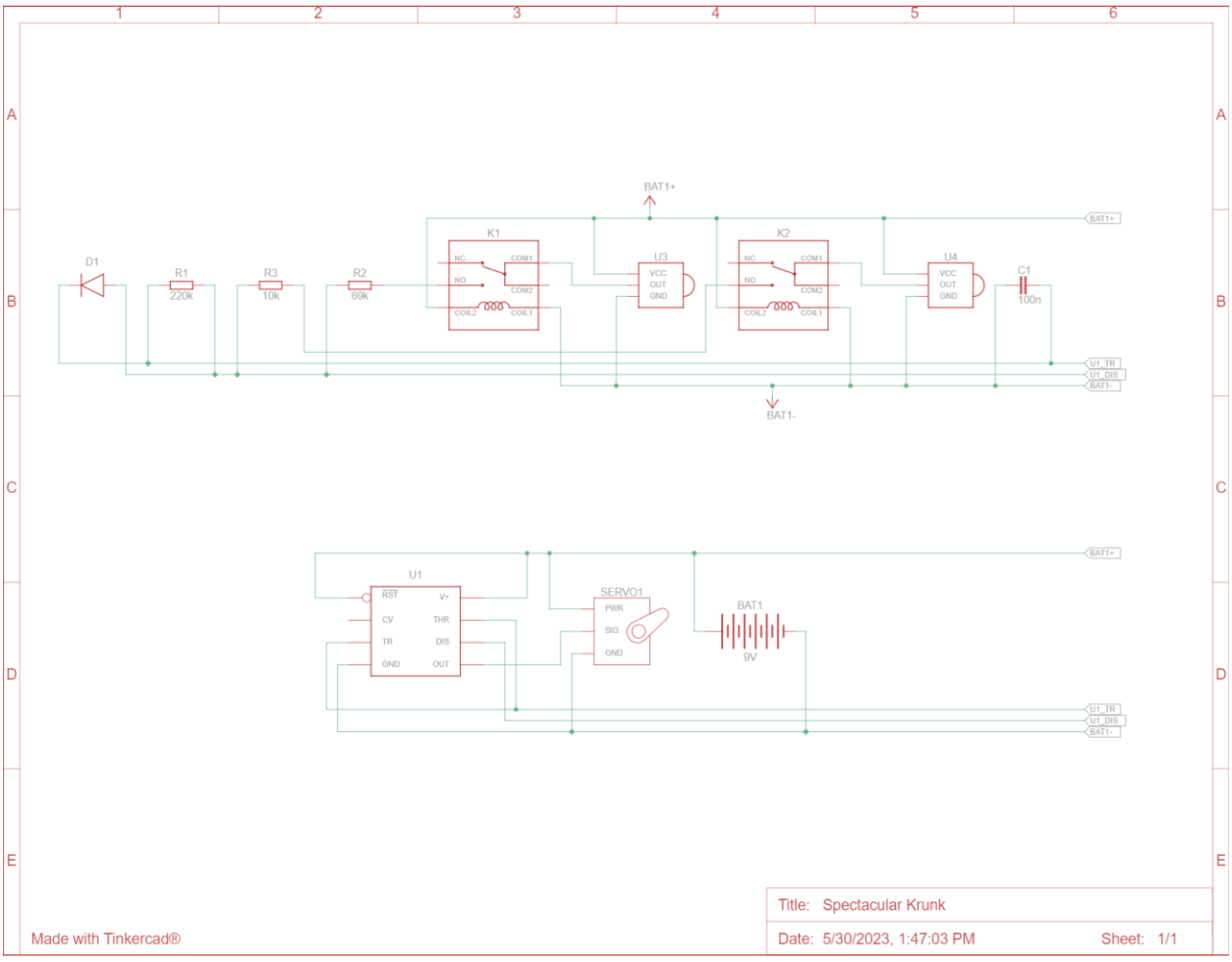
The relay uses an electric current to open or close the contacts of a switch. This is usually done using the help of a coil that attracts the contacts of a switch and pulls them together when activated, and a spring pushes them apart when the coil is not energized.

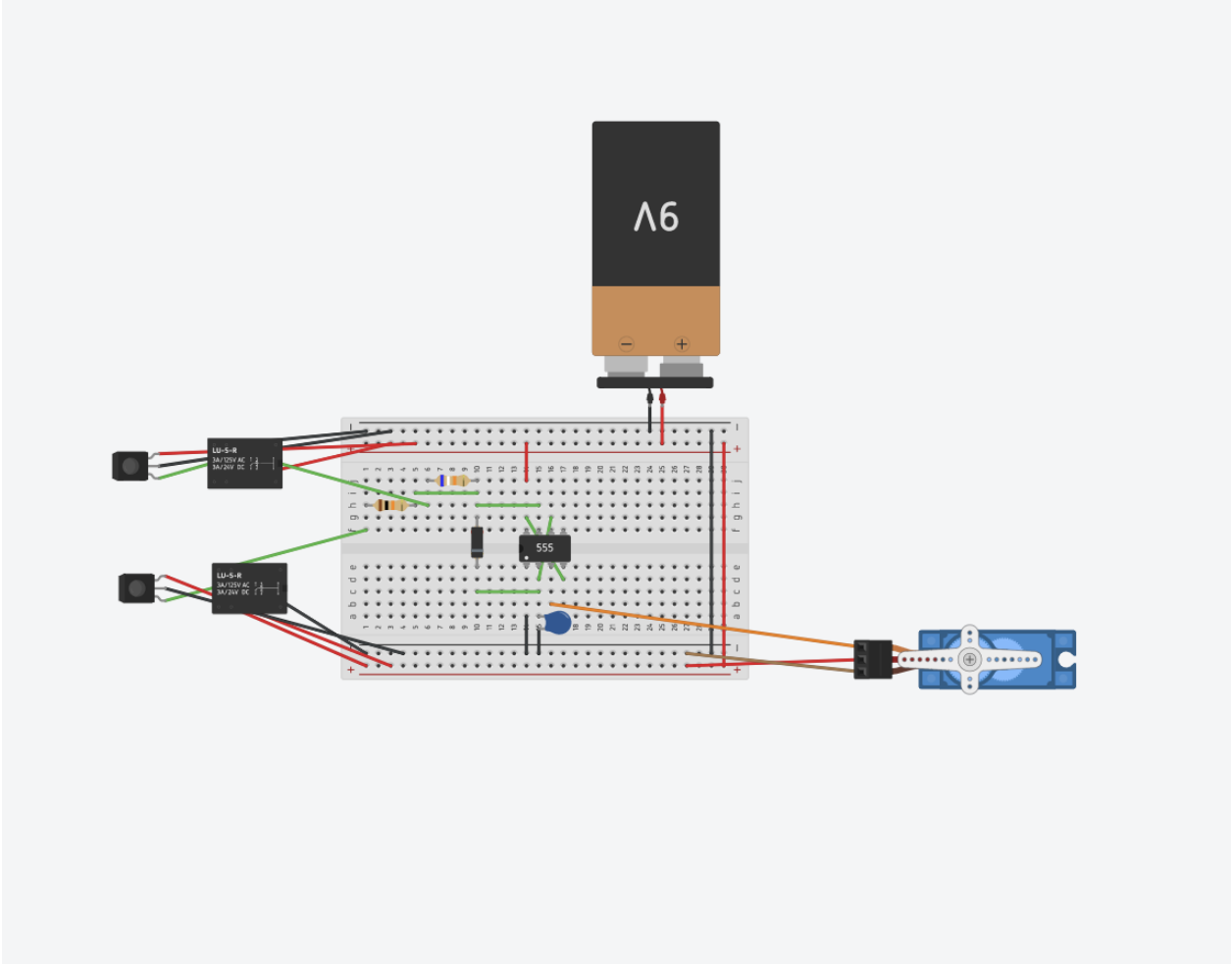


MECHANISM OF UNMANNED RAILWAY GATE:

This experiment is to create a unmanned railway gate without using Arduino Uno. Our main motive of our project is making an unmanned railway gate using sensors. The IR sensor will emit the IR rays and receive it back. We are placing the IR sensor at the two sides of the gate (IR-1 & IR-2). The IR-1 sensor emits radiation on the train (object) and the emitted light received back. During this process the IR-1 sensor gives a signal to the gate, after that the gate receives a signal and the gate will be closed till the sensor detect the object. The IR sensor 2 will repeat the same process and it helps to open the gate. The digital out of the IR sensor is receives by the 555 ic trigger which is in a monostable state. Then the received signal helps to work the servo motor.

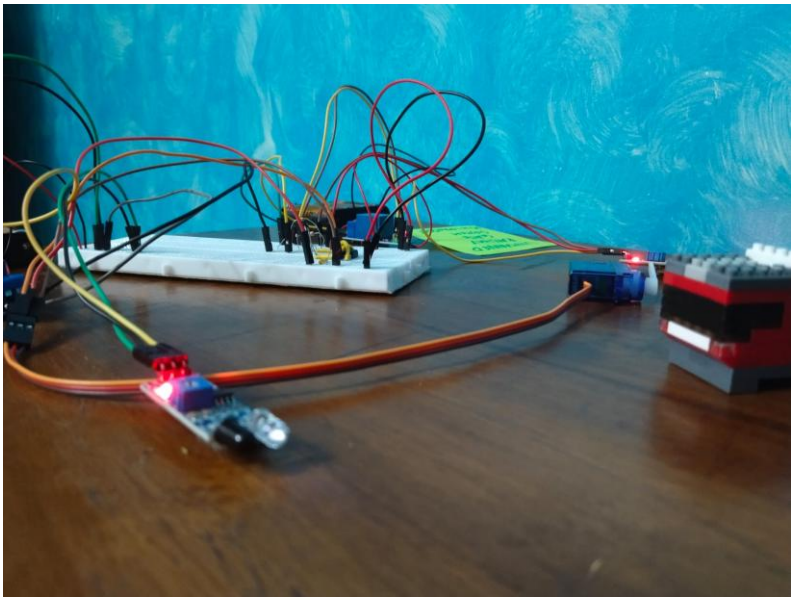
CIRCUIT DIAGRAM & DESIGN:

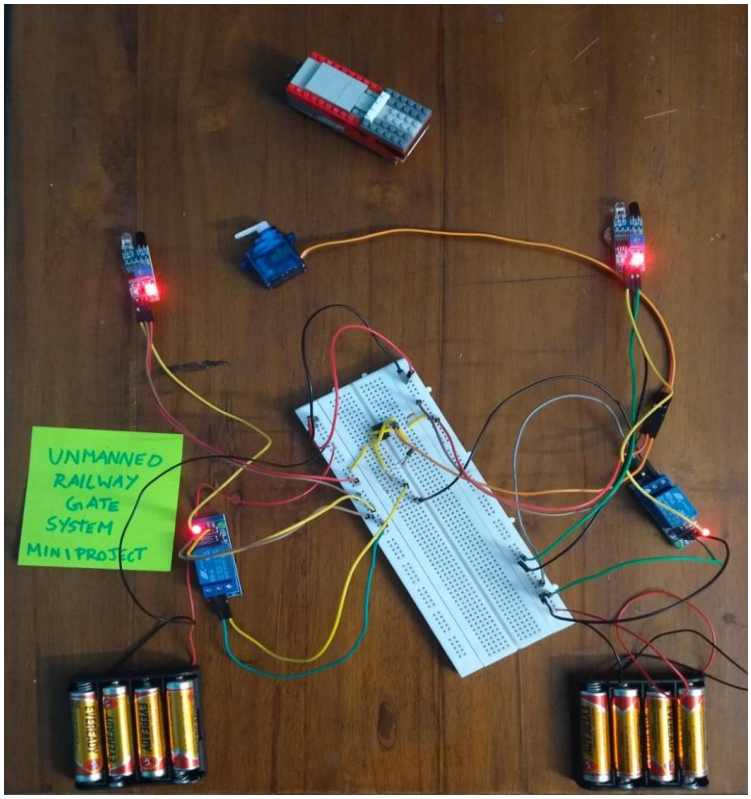



A6
555

RESULT :

PHOTO

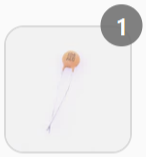
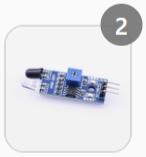




VIDEO LINK:

https://drive.google.com/file/d/1VOxtOgYU9ZJvvKUGnkhy2SGDRUL5MrmB/view?usp=sharing

BILL OF MATERIALS

 1	1N4007 Diode (Pack of 5)	₹9.00
 1	Resistor Combo Kit (30 values, 5 each - 150 resistors)	₹78.00
 1	Tower Pro SG90 Servo Motor - 9 gms Mini/Micro Servo Motor	₹94.00
 1	100000 pF (0.1uF) Ceramic Capacitor (Pack of 5)	₹11.00
 1	555 Timer IC (LM555 / NE555 / SE555)	₹7.00
 2	5V Relay Module for ESP8266 ESP-01S WiFi Module (Without ESP8266)	₹178.00
 2	IR Sensor Module - LM393 Photoelectric Sensor Module	₹56.00

Gift card or discount code | Apply

Subtotal ₹433.00

INDIVIDUAL CONTRIBUTIONS

1.	**THIRISHA .R**	**CIRCUIT DIAGRAM & CIRCUIT IMPLIMENTATION**