

AUTOMATIC RAILWAY GATE CONTROL SYSTEM

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Abstract— The objective of the project is to provide an automatic railway gate control .It replace the gate operated by the gatekeeper. The road users have to wait for a long time before arrival of time and even after the train left. Accidents also increased due to manual timing error of the gate keeper. This project will overcome those problems. The automatic railway gate control system will reduces the accident happen due to the manual error of the gate keeper. This type of gates can be employed in an unmanned level crossing where the chances of accident are higher and reliable operation is required.

Keywords— Arduino UNO; Ultrasonic Sensor; Servo Motor; LED

1. INTRODUCTION

An automatic railway gate control at unmanned level crossing replace the gates operated by gate keeper . It deals with two things .Firstly; it deals with the reduction of time for which the gate is being kept closed. And secondly, to provide safety to the road users by reducing the accidents that usually occur due to carelessness of road users and at time error made by the gate keepers.

2. EXISTING METHOD

A. WORKING METHODOLOGY

By employing the automatic railway gate control at the level crossing the arrival of train is detected by IR sensor placed on either side of the gate from level crossing . Once the arrival is sensed, the sensed signal is sent to the microcontroller and it checks for possible presence of vehicle between the gate., again using the sensor. Subsequently, the buzzer indication and light signals on either side are provided to the road users indicating the closure of the gates. Once , no vehicle is sensed in between the gate the motor is activated and the gate are closed.

B. AT89551 Microcontroller

The Microcontroller (AT89551) is a low power; high performance CMOS 8-bit micro controller with 8k bytes of Flash programmable and crasable read only memory to be reprogrammed in system or by conventional non volatile memory programmer. B combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89551 is a powerful microcomputer, which provides high flexible and cost effective solution to many embedded control applications.



Figure 1: AT89551 Microcontroller

C. Infrared Circuit

IR CIRCUITS: This circuit has two stages : a transmitter unit and a receiver unit. The transmitter unit consists of an infrared LED and its associated circuitry.

IR TRANSMITTER: The IR LED emitting infrared light is put on in the transmitting unit. To generate IR signal, LM358 IC based opertional amplifier is used.

IR RECEIVER: The receiver nit consists of a sensor and its associated circuitry. In receiver section, the first part is a sensor , whcih detect the IR pulses transmitted b IR-LED.

D. Stepper Motor

Stepper motor converts electrical energy into mechanical motion. These motor rotate a specific incremental distance by each step. The speed of step execution controls the rate.



Figure2: Stepper motor

3. PROPOSED METHOD

A. Working Methodology

In this paper we are concerned of providing automatic railway gate control at unmanned level crossing replacing the gates operated b gate keeper. It deals with two things: Firstly, it deals with the reduction of time for which the gate is being kept closed. And secondly, to provide safety to road users by reducing the accidents that usually occur due to carelessness of operator.

By employing this system at the level crossing the arrival of the train is detected using Ultrasonic sensor placed on the either side of the gate . Subsequently, LED indication on

either side are provided to the road users indicating the closure and open of the gates.

B. Ultrasonic Sensor

An ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound waves to bounce back. The sound waves of the train is sensed and detected by this ultrasonic sensor which is placed on either side of the gate.



Figure 3: Ultrasonic sensor

C. Arduino UNO

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHZ quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contain everything needed to support microcontroller. Simply connected to the computer through USB cable or battery to get started. It is used to control the whole system.



Figure 4: Arduino UNO

D. LED

A light emitting diode(LED) is a two lead semiconductor light source. It is a pn junction diode that emits light when activated. When the suitable voltage applied to the leads, electrons recombine with electron holes within the device, releasing the energy in the form of photons. In this project when the gate is closed, LED will be in on state and when the gate is open, the LED will be in off state.



Figure 5: LED

E. Jumper Wires

Jumper wires is use to connect the pin of ultrasonic sensor to the arduino UNO. In this project male to male jumper wires are used to connect arduino and ultrasonic sensor. Jumper wires is use to connect the pin of ultrasonic sensor to the arduino UNO. In this project male to male jumper wires are used to connect arduino and ultrasonic sensor.



Figure 6: Jumper wire

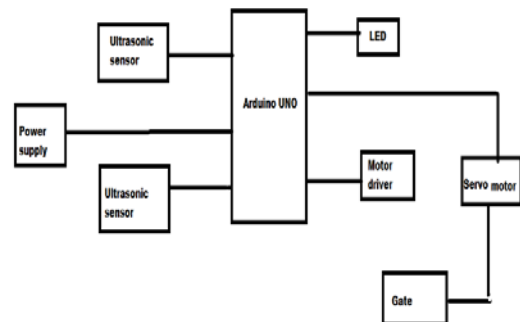
F. Servo Motor

A servo motor is a rotary actuator or linear actuator that allows for precise control of angular or linear positions , velocity and acceleration consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller.



Figure 7: Servo motor

G. Block Diagram:



4. RESULT

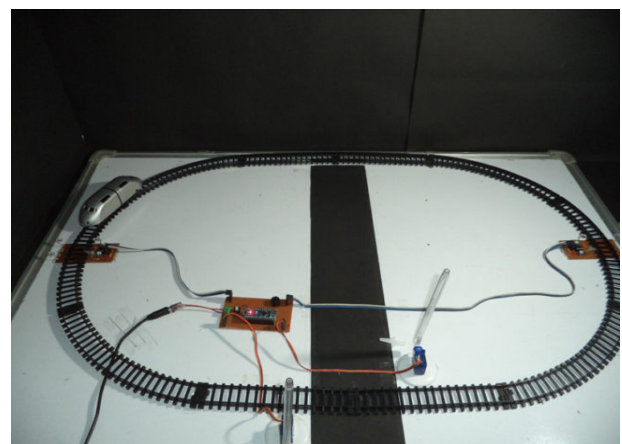


Figure 8: Output of the project

The major component used in the model are 2 ultrasonic sensor, Arduino UNO board, 1 LED , servo motor.

Gate Operation: an ultrasonic sensor is placed on the either side of gate. when the train is arrived, it was sensed through an ultrasonic sensor and LED will be in on state when the gate is closed and LED will be in off state when the gate is open.

5. CONCLUSION

Automatic railway gate control system is centered on the idea of reducing human involvement for closing and opening the railway gate which allows and prevent accidents near level crossing. The railway gate is cause of many death and accidents. The accidents are avoided at place where there is no person to manage the railway crossing gates.

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