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Automatic Gate Operation Software Using Arduino UNO

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ABSTRACT:

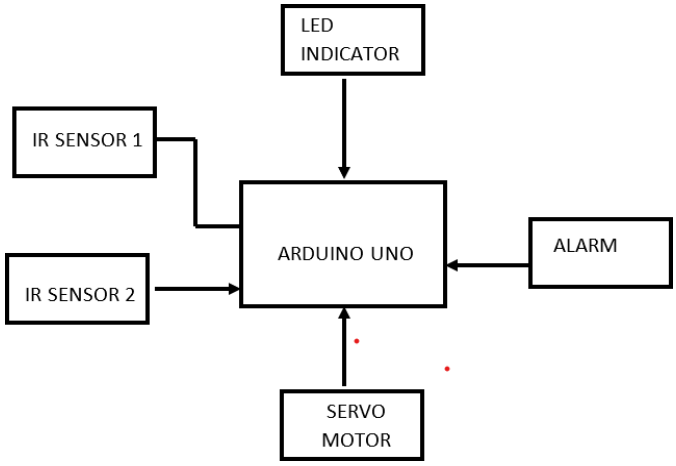
The purpose of this article is to provide an automatic rail gate at a level crossing to replace guard-operated gates. It holds two things. The first involves reducing the time the doors are closed, and the second, ensuring the safety of road users by reducing accidents. According to the current system, when the train leaves the station, the station chief informs the guard by phone that the train is coming. When the guard receives the information, the gate will be closed according to the train's arrival time. so if the train is late for any reason, the doors stay closed for a long time, causing traffic jams near the door. Thanks to automatic rail gate control at level crossings, the arrival of trains is detected by sensors placed near the gate. As a result, it takes less time to close and requires fewer workers than manual doors. These turnstiles can be used at pedestrian crossings where the collision rate is high and reliable operation is required. Because work is not automatic; Errors caused by manual operation are avoided. Rail Door Control is an excellent business micro control it is designed for almost all non-rail drivers in countries.

1. INTRODUCTION

A level crossing occurs when the train line crosses the road or road at the same level without the aid of a bridge or tunnel. This is an intersection. The term also applies to train lines crossing the same route, which have a separate right of way on the separate route. Other names include railroad crossing, railroad crossing, railroad crossing, railroad crossing, or level crossing. At first pass, there was a merchant at a nearby kiosk waving a red flag or waving a light to stop and clear the way as the train approached. Manual or electronic closing gates were introduced to close the road behind. The gates are designed as a complete barrier to prevent all rails from entering the rail. In the early days of the railroad, many trains were pulled by horses or cattle were included. Therefore, it is necessary to provide a real barrier. Therefore, when the road is closed, the door cuts all the way. When opened to allow road users to cross the road, the gates swing across the width of the track to prevent pedestrians or animals from entering the road. With the advent of motor vehicles, such problems became less common and the need for cattle had a significant impact. As a result, many countries have replaced closed intersections with weaker but more visible intersections and rely on road users to follow warning signs to stop. The current project is designed to use an Arduino microcontroller to avoid collisions at pedestrian-free gates on the railway if using a brain. This article uses two powerful IR emitters and two receivers; one pair of transmitters and receiver above (where the train arrives), higher than a human, perfectly aligned and similarly fixed, the other pair fixed in the direction of the train below. Thus the engine activation time is adjusted by calculating the time it takes to pass at least one standard minimum vehicle of Indian Railways at a given speed. We have an automatic rail control gate, it is covered in this article for 5 seconds. The sensors are fixed at 1 km on both sides of the door. We will call the sensor in the direction of the train the "front sensor" and the other the "rear sensor". When the front receiver is turned on, the door motor opens in one direction, the door closes and closes until the train passes through the door and reaches the rear cordon. When the receiver is turned on, the motor rotates in the opposite direction, the door opens and the motor stops. When the front receiver is activated, the buzzer will sound immediately and the door will close after 5 seconds, so to avoid the knock on the door, please give the driver time to lift the door and stop the sound after the train has passed.

2. RELATED WORK

This circuit is a small 5V power supply that is handy and easy to build when experimenting with digital electronics. Small, inexpensive wall transformers with different output voltages are available at all utilities and supermarkets. These transformers are readily available, but often have poor characteristics, making them of little use for electrical testers unless better specifications can be obtained. The circuit below is the answer to the question. This circuit can output +5V at about 150 mA but can be upgraded to IA after adding good cooling to the 7805voltage regulator chip.



How does it work?

"Automatic Rail Gate Control" is a simple automatic barrier that allows traffic to cross the rail. This is how the railway automatic gate control works. This post provides the connection according to the schematic and sends the Arduino code. Build the toy train, and add tracks and accessories. Place one IR sensor on either side of the track and the other in the opposite direction so that both can see the train's movement in different places. Install the servo so that it can easily move up and down with the attached problem. Powers the Arduino to run the project. When the train arrives, the first IR sensor detects it and the servo barrier blocks the intersection, while the second sensor detects the train leaving the open servo barrier. This way the system can work.

3. COMPONENTS REQUIRED

• Arduino UNO

• Servo motor.

• Two IR Sensor Modules.

• Toy Train.

• DC Adapter to Power the Arduino.

• Jumper Wires.

• USB cable for uploading code into Arduino UNO

PROPOSED SYSTEM

An infrared Sensor is an electronic device that emits infrared light to detect certain things around it. Infrared sensors measure the temperature of objects and detect movement. The type sensors only measure instead of emitting infrared radiation and are called passive infrared sensors. All objects emit some amount of thermal radiation, mostly in the infrared spectrum.
This type of radiation is invisible to our eyes but can be detected by infrared sensors. The detector is an IR photodiode that is only sensitive to IR light at the wavelength emitted by the IR LED. When infrared light falls on the photodiode, the resistance and output voltages change according to the intensity of the received infrared light.

SERVO

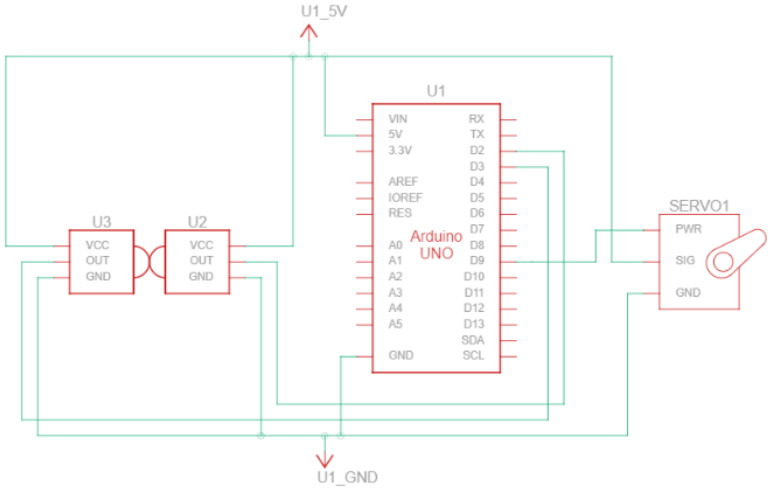
Servo motors, or "servos" as they are known, are delicately mixed electrical and electronic components or electrical cables that rotate and propel motor parts. Servos are often used for angular or linear positions with specific velocities and accelerations.

ARDUINO UNO

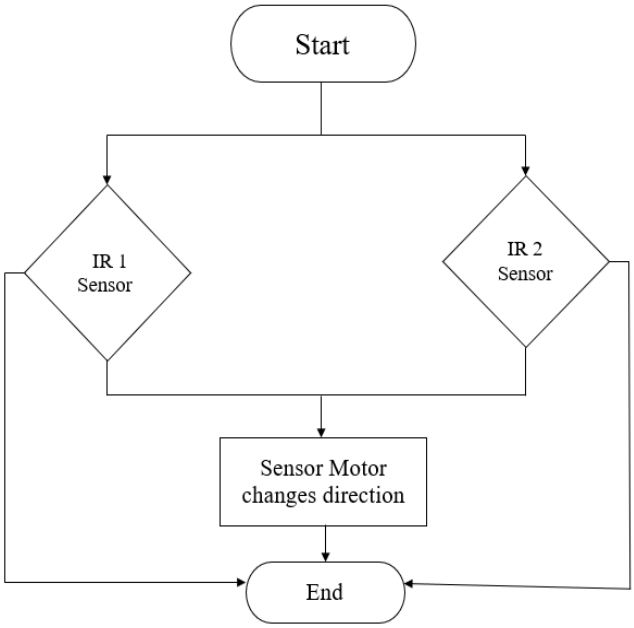
Arduino UNO is an ATmega328P-based microcontroller board. It has 14 input/output pins (6 of which can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, USB connection, power input, ICSP header and reset button.

ADAPTER

This means the output is set to 12V and can output more current (1000mA). Voltage input: AC 100-240V. Frequency range: 50/60Hz.



Wiring according to the above diagram. Connect the 5V pin of the Arduino to the VCC pin of the IR sensor and the positive wire of the servo motor. Connect the ground pin of the Arduino to the ground (GND) terminal of the IR sensor and the negative wire of the servo motor. The output (OUT) terminals of the two IR sensors are connected to digital pins 2 and 3 of the Arduino. This is a very simple project. Here we use only two IR sensors. All work done is done with code. The combination of two sensors working at the same time makes the project work perfectly. As you see in the picture. However, the location of the sensor is very important. We have to place the sensors facing each other and perpendicular to the door. So the system works perfectly. Also, check out the Arduino project and the IOT project.



SURVEY

[1] Author name:

AmilaJayathissa

Description:

"Automatic Gate Opener using Arduino" published on Arduino Project Hub: This tutorial provides a step-by-step guide on how to use an Arduino Uno to create an automatic gate opener. The author provides detailed information on the hardware and software components needed, as well as the code required to operate the gate.

[2] Author name:

B.T. Chandrashekar and K. Narayanaswamy,

Description:

"Arduino-Based Automatic Gate Opening System" published in the International Journal of Computer Applications: This paper provides an overview of an automatic gate opening system that uses an Arduino Uno. The authors describe the system architecture, hardware and software components, and the process of designing and implementing the system.

[3] Author name:

Ebenezer Owusu-Boakye and Charles Kwaku Amoako

Description:

"Design and Implementation of an Automatic Gate System using Arduino" by,published in the International Journal of Innovative Research in Computer and Communication Engineering: This paper describes the design and implementation of an automatic gate system using an Arduino Uno. The authors provide a detailed description of the hardware and software components, as well as the testing and validation process.

[4]- Author name:

S.S. Iyer,

Description:

"Automatic Gate Opening and Closing System using Arduino" published on Arduino Project Hub: This tutorial provides a detailed description of an automatic gate openingand closing system using an Arduino Uno. The author provides information on the hardware and software components needed, as well as the code required to operate the gate.

[5] Author name:

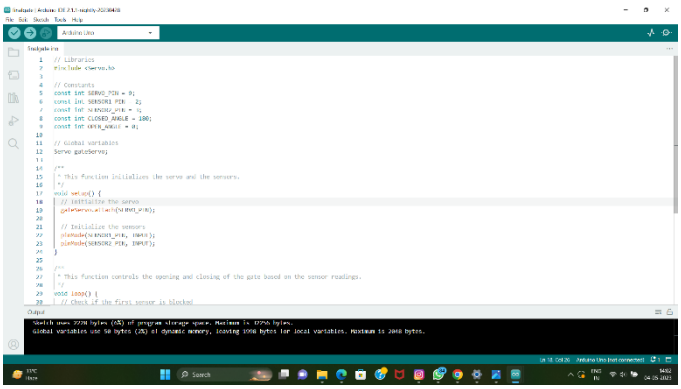
R.B. Wankhade and K.P. Thakre

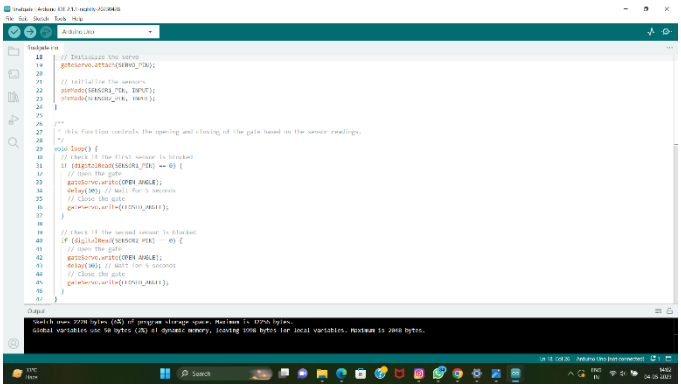
Description:

Design and Implementation of Automatic Gate Control System using Arduino" published in the International Journal of Innovative Research in Science, Engineering, and Technology: This paper describes the design and implementation of an automatic gate control system using an Arduino Uno. The authors provide a detailed description of the hardware and software components, as well as the testing and validation process.

Overall, the literature survey suggests that using an Arduino Uno to create automatic gate operator software is a popular and viable option. The resources available provide detailed instructions on the hardware and software components needed, as well as the process of designing and implementing the system.

PREPROCESSING DATA FIGURE:





CONCLUSION

A business plan has many advantages, at the railway level crossings will reduce accidents, improve accuracy and reduce handling errors. It will reduce the number of train crashes and also manage special trains to avoid delays in reaching their destinations. Trains always arrive on time, without delay. Security can be ensured by placing a tracker on the train to monitor the train's position in case of a problem. By increasing the efficiency of the system, the solar panels can be used to generate electricity for the system there. As the system is fully automatic, it prevents human error and thus provides road users the highest level of safety. With this system, there is no need to have a railing and the door can be made with a motor. Microcontroller 8051 completes functions such as recognition, door closing, and opening, performed by the software code written for the controller. The machine's operation principle is simple and does not require much complexity in the circuit. Thus, automatic rail gate control works efficiently by using an 8051 microcontroller, saving labor and time. In this way, it is easy to control the operation of the railway gate and reduce the probability of failure.

RECOMMENDATIONS FOR FUTURE WORK

If the wagon is in the middle of the door, the GSM module sends a message when there is a break.

- Thus, the train driver stops the wagon early.
- It is done by all rails Various IR modules
- If there is a problem on the route, the GSM module will send the message to the train driver will send a message.

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Automatic Gate Control System using Arduino" by M. R. Hasan et al. (2018)

This article provides a detailed explanation of how to build an automatic gate control system using an Arduino Uno. The authors cover the hardware and software components necessary for the project, including the use of sensors and motor drivers. The article also includes code snippets that can be used to program the Arduino.

"Automated Gate Control System using Arduino" by M. A. Almasri et al. (2019)

This article describes a similar project to the one above, but with additional emphasis on security features. The authors discuss the use of RFID technology to control gate access and provide code samples for implementing this feature.

"Arduino based Automatic Gate Opening System with Camera" by S. R. Mishra et al. (2018)

This article explores the use of a camera in conjunction with an Arduino-based gate control system. The authors describe how the camera can be used to capture images of vehicles or individuals entering the gate and how these images can be stored or transmitted to a remote location.

"Issues and Challenges in Implementing an Arduino-based IoT System" by S. M. Abdullah et al. (2020)

This article discusses some of the challenges that may arise when building an IoT system using an Arduino Uno. The authors cover issues related to hardware, software, and communication protocols and provide recommendations for addressing these challenges.

"Design and Implementation of an Automated Gate System using Arduino" by O. A. Akintobietal. (2020)

"Design of a Smart Automatic Gate Control System Using Arduino Uno" by Adeyemo Ayodeji Adekunle and Abiola Felix Olanrewaju. Issues in Informing Science and Information Technology, 2018.

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"Smart Automatic Gate Control System using Arduino" by Ahmed R. Salem, Ahmed A. Abd El-Aziz, and Ahmed S. Atwa. International Journal of Engineering Trends and Technology, 2018.

"Development of Automatic Gate Control System using Arduino Uno Microcontroller" by AbdulazeezAbdulraheem, Mustapha Abdulhakeem, and OyewaleRazaq. Journal of Electrical and Electronic Engineering, 2016.

This article describes a project to build an automated gate system using an Arduino Uno. The authors provide a step-by-step guide for building the system and include code snippets that can be used to program the Arduino. They also discuss some of the limitations of the system and potential areas for improvement.