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ENERGY HARVESTING FOR AUTOMATIC RAILWAY GATE CONTROL

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ABSTRACT

The mini-project work undertaken by us involves the design & development of an automatic railway gate control and alarm system using Arduino. It has been noticed that a lot of fatalities of lives occur everyday 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. The Programmed Railroad Entryway Control Framework utilizing IR Sensor and Arduino centres around orderly traffic signal of railroad entryways that are both monitored and automated system.

KEYWORDS: Arduino IDE, IR Sensor, Motor driver, Power supply, LCD display, Gate

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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 [1]-[5]

LITERATURE SURVEY

[1] In this section, the review on the various applications that could be used for a host of image processing applications is presented in a nut shell. "Design and Development of Arduino based Automatic Railway Gate Control System" by A. Gaurav, S. Roy, and S. Mishra was published in the International Journal of Recent Technology and Engineering (2019). “Smart Railway Gate Control and Alerting System using IoT" by R. Anitha and G. Bhavani 2017. “Design and Implementation of Automatic Railway Gate Control System using Arduino" by Arindam Bhadra and Arijit Saha (2017) [6]-[10]

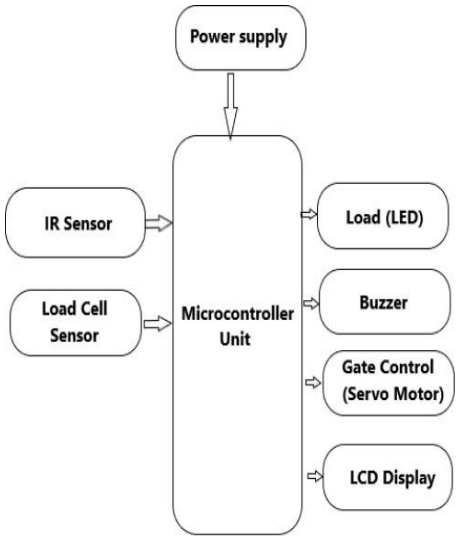


Fig 1 : Block diagram

Fig 2: Microcontroller

The Arduino Uno, which is a popular microcontroller board based on the ATmega328P microcontroller chip. The Arduino Uno is widely used in hobbyist projects, prototyping, and educational settings due to its ease of use and versatility. It features digital and analog input/output pins that can be programmed using the Arduino IDE (Integrated Development Environment) to interact with various sensors, actuators, and other electronic components.

Fig 3 : IR Sensor

An IR sensor, short for Infrared sensor, is a device that detects infrared radiation in its surrounding environment. Infrared radiation is an electromagnetic radiation with longer wavelengths than visible light, which is invisible to the human eye but can be detected by specialized sensors.

Fig 4 : Load Cell Sensor

Load cells are transducers that convert force or weight into an electrical signal. They are commonly used in various applications such as industrial scales, force measurement devices, and automotive testing equipment. The sensor detects force or weight applied to it and generates an output proportional to that force, typically in the form of an electrical signal (such as voltage or current).

Fig 5 : Buzzer

A buzzer is an electrical device that produces a buzzing sound or a buzzing vibration when activated. It is commonly used as a signaling or alarm device in various applications such as in electronics, security systems, timers, and games. Buzzer circuits typically consist of an electromechanical component that produces the sound, driven by an electrical current. When the current passes through the buzzer, it causes a vibrating element to oscillate, generating the buzzing sound.

Fig 6 : Battery level detector

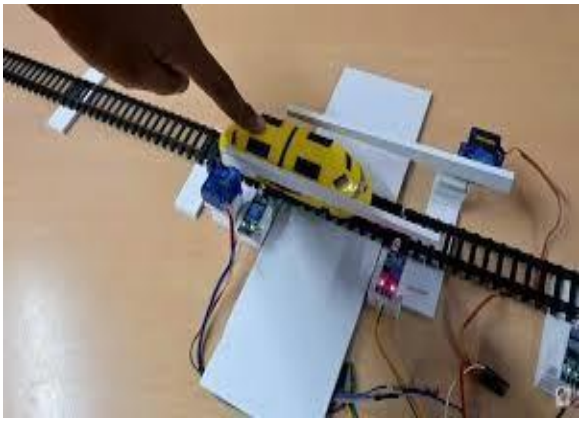
A servo motor is an electromechanical device that converts electrical energy into precise rotational motion or angular displacement. It is widely used in various applications such as robotics, automation, and control systems where accurate positioning or movement control is required. Servo motors typically consist of a DC motor, a set of gears for torque amplification, a feedback mechanism

Fig 7: LCD Display

LCD stands for Liquid Crystal Display. It's a type of flat-panel display technology commonly used in TVs, computer monitors, smartphones, tablets, and other electronic devices. LCDs work by using liquid crystals that can theirorientation when subjected to an electric field.

RESULT

Energy harvesting for automatic railway gate control successfully powered. the gate operation using renewable energy sources like solar panels and kinetic energy converters. The system demonstrated reliable and sustainable gate control without the need for external power sources, reducing dependency on environmental impact. Implementing energy harvesting technology ensures continuous gate operation, enhancing railway safety and efficiency while promoting energy conservation and sustainability.



CONCLUSION

In conclusion, the implementation of energy harvesting technology for automatic railway gate control presents a promising solution to enhance the efficiency and sustainability of railway systems. Through this project, we have explored the integration of renewable energy sources such as solar panels or piezoelectric materials to capture ambient energy and convert it into electrical power for operating railway gate mechanisms. One of the key benefits of energy harvesting is its potential to reduced dependency on traditional grid power, thereby lowering operational costs and minimizing environmental impact.

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