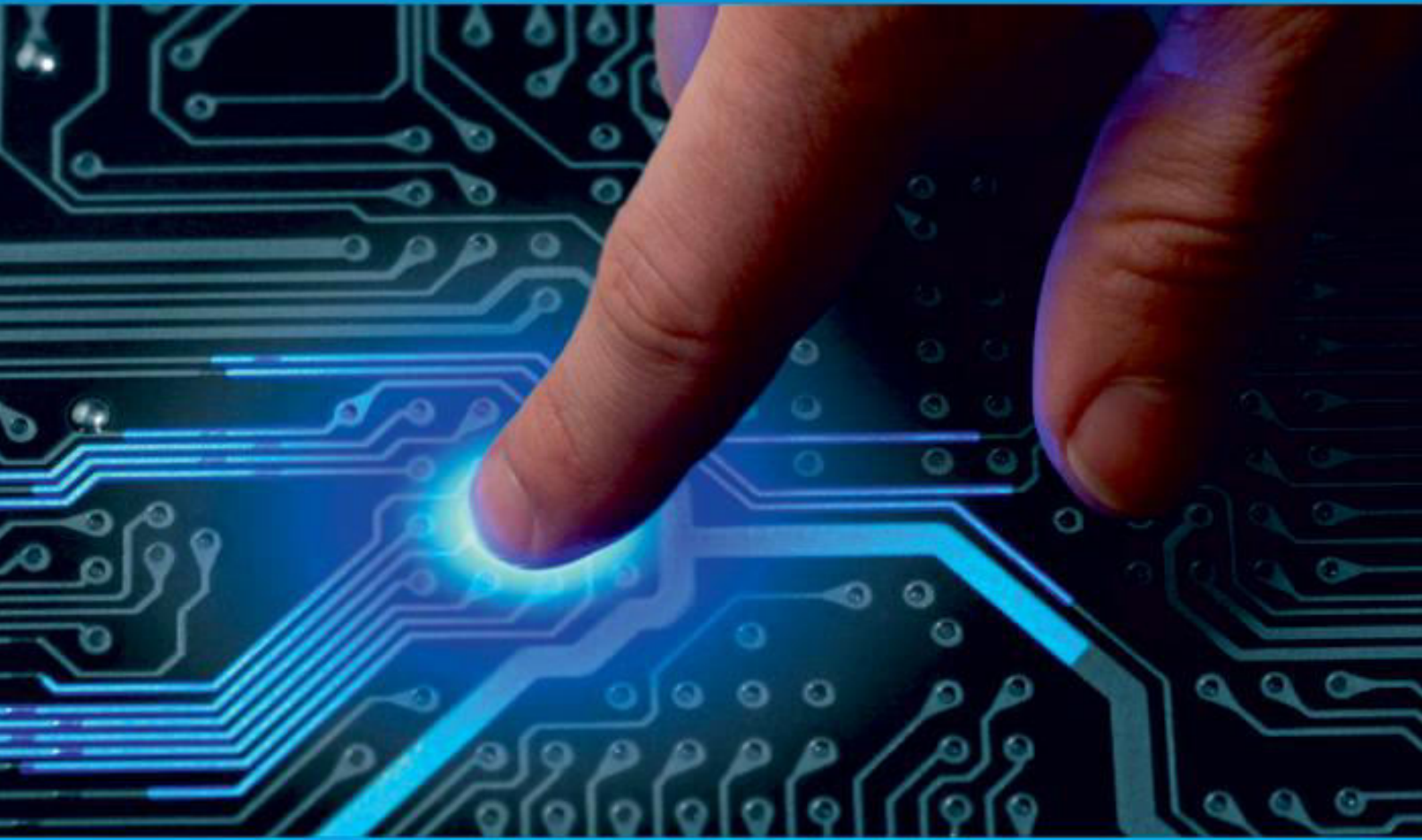




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Automatic Railway Gate Control Using Microcontroller

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ABSTRACT-The objective of this paper is to control the railway tracks by using anti-collision techniques. The model of railway track controller is designed by using 8051 microcontroller to avoid railway accident. When we go through the daily newspapers we come across many railway accidents occurring at unmanned railway crossings. This is mainly due to the carelessness in manual operations or lack of workers. And also the collision of two trains due to the same track. This model is implemented using sensor technique. We placed the sensors at a certain distance from the gate detects the approaching train and accordingly controls the operation of the gate. Also an indicator light has been provided to alert the motorists about the approaching train.

I. INTRODUCTION

Railway safety is a actual aspect of rail operation over the world. Railways being the cheapest mode of transportation are preferred over all the other means. When we read newspaper, we come across many railway accidents occurring at unmanned railway crossings. This is mainly due to the carelessness in manual operations or lack of workers. And also collision of two trains due to the same track. This models deals with two things. Firstly, it deals with the reduction of time for which the gate being kept closed. And secondly, to provide safety to the road users by reducing the accidents that usually occurs due to carelessness of road users and at times errors made by the gatekeepers. To avoid accidents, sensors placed at some distance from the gate detect the departure of the train. The signal about the departure is sent to the microcontroller, which in turn operates the motor and opens the gate. Thus, the time for which the gate is closed is less compared to the manually operated gates since the gate is closed depending upon the telephone call from previous station. Also reliability is high, as it is not subjected to manual errors.

II. LITERATURE SURVEY

The automatic railway gates operation has been projected using various methods. As proposed by Xishi Wang (1992), the process of developing fault tolerance method has been applied for both the hardware and the software components. Magnetic sensors placed underground to detect the train are less affected by environmental changes and recognizes the direction of movement of vehicles. Jeong Y (2008) defined the railway auto control system using OSGi and JESS. The state of railway cross has been estimated using JESS in the technique. The issues in the technique are the insufficient inline citations and also multiple issues related to OSGi. The different methods used by locomotive pilots which can avoid the accidents and the safety measures while crossing the level crossings are also discussed. Atul Kumar Dewangan (2012) gave a detailed introduction about the present railway technology and also discussed the disadvantages of manually activated railway signals and the railway warnings at the level cross. The train detectors act as the major component in the train automation system. Banuchander J (2012) developed a method to concentrate on anti-collision system to identify the collision points and to report these error cases to main control room, nearby station as well as grid control stations. Efficient Zig-Bee based Train Anti-Collision using Zig-Bee technology for railways is implemented. Greene R.J. (2006) anticipated an intelligent railway crossing control system for multiple tracks that features a controller which receives messages from incoming and outgoing trains by sensors. These messages contain detail information including the direction and identity of a train. Depending on those messages the controller device decides whenever the railroad crossing gate will close or open. But this technique has the issue of high maintenance cost.

III. 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.

IV.BLOCK DIAGRAM

This circuit is a small 5V power supply, which is useful when experimenting with digital electronics, and easy to build. Small inexpensive wall transformers with variable output voltage are available them any electronics and supermarket. Those transformers are easily available, but usually their voltage regulation is very poor, which makes then not very usable for digital circuit experimenter unless a better regulation can be achieved in some way. The following circuit is the answer to the problem. This circuit can give +5V output at about 150 mA current, but it can be increased to 1 A when good cooling is added to 7805 regulator chip. The circuit has over overload and terminal protection.

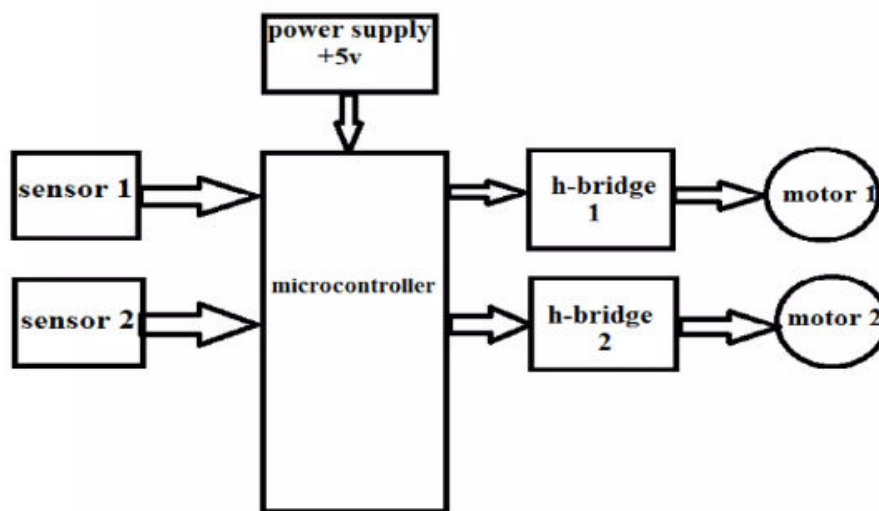


Fig. 1. Block Diagram

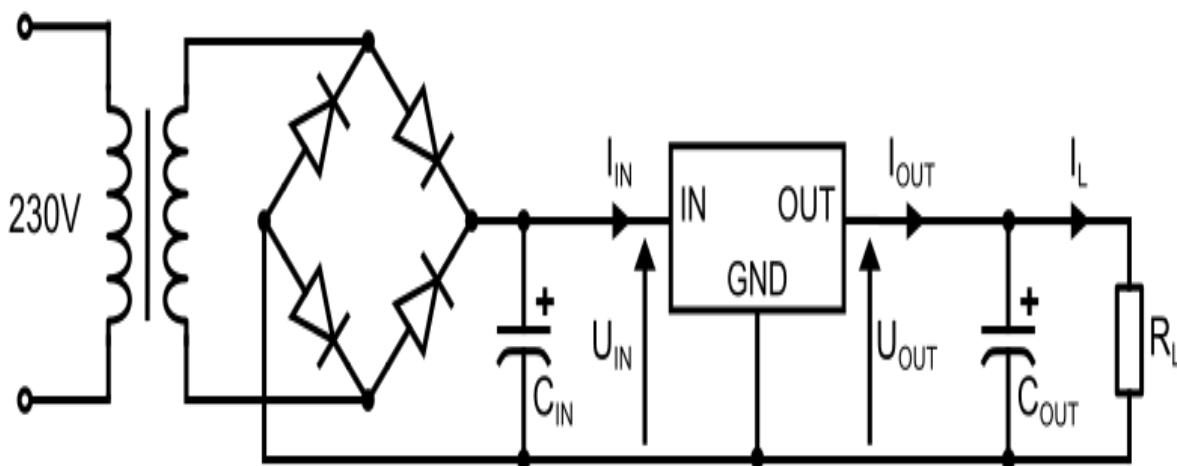
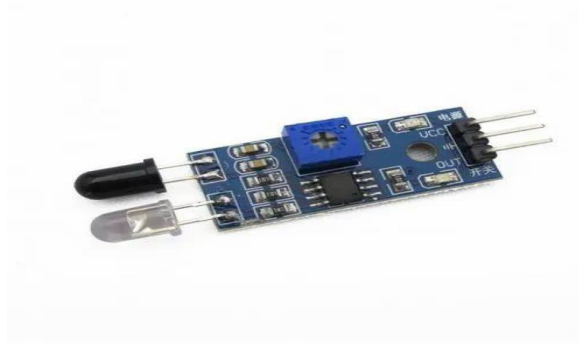


Fig. 2. Power Supply

a)IR MODULE

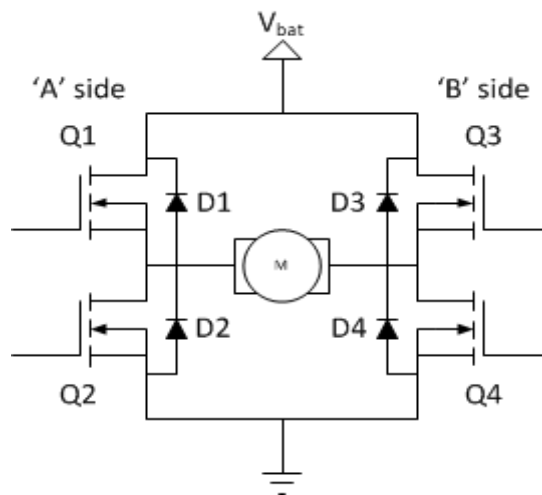
IR Sensor module has great adaptive capability of the ambient light, having a pair of infrared transmitter and the receiver tube, the infrared emitting tube to emit a certain frequency, encounters an obstacle detection direction

(reflecting surface), infrared reflected back to the receiver tube receiving, after a comparator circuit processing, the green LED lights up, while the signal output will output digital signal (a low-level signal), through the potentiometer knob to adjust the detection distance, the effective distance range 2 ~ 10cm working voltage of 3.3V-5V. The detection range of the sensor can be adjusted by the potentiometer, with little interference, easy to assemble, easy to use features, can be widely used robot obstacle avoidance, obstacle avoidance car assembly line count and black-and-white line tracking and many other occasions.

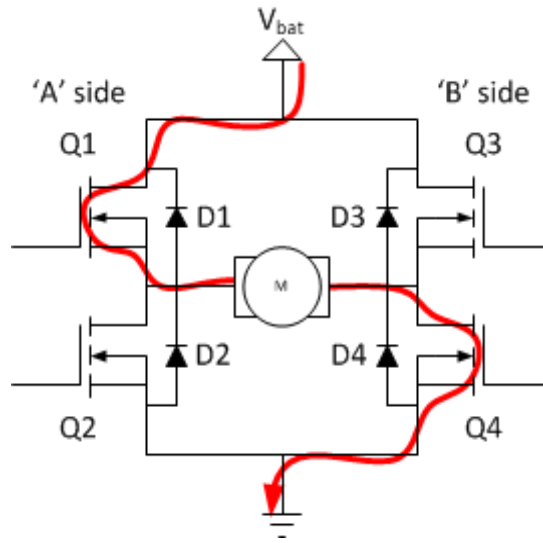


b) H-BRIDGE CIRCUIT

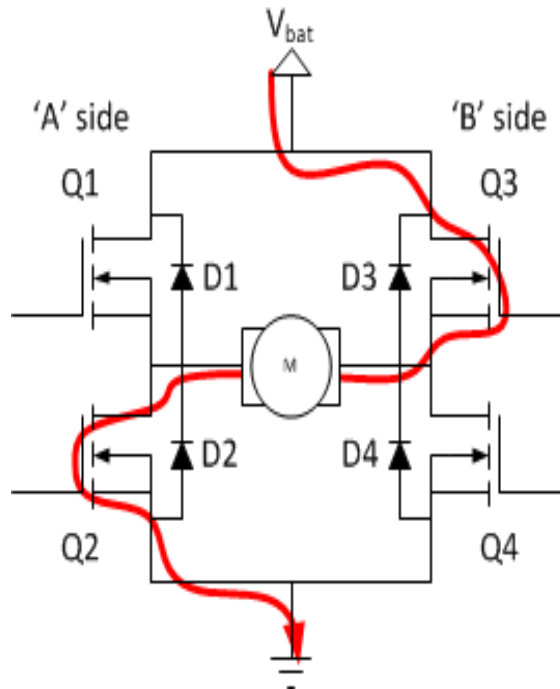
An H-bridge is a simple circuit that lets you control a DC motor to go backward or forward. We normally use it with a microcontroller, such as an Arduino, to control motors. When we can control two motors to go either forward or backward – we can build ourself a robot.



(a)



(b)



(c)

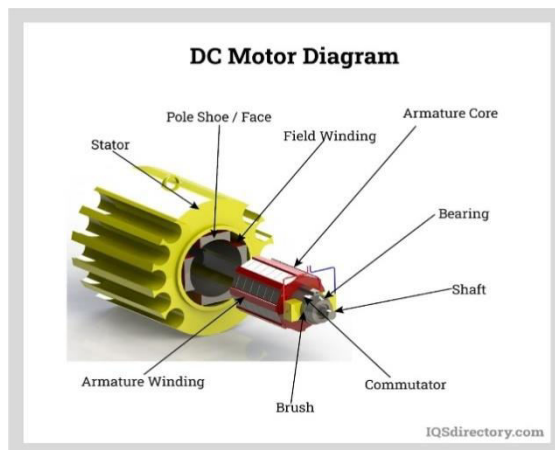
c)BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

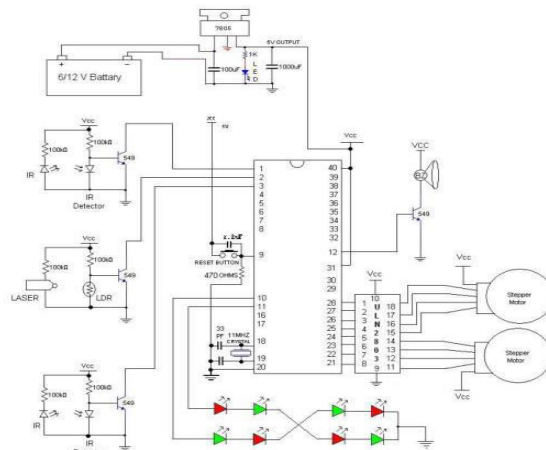


d)DC MOTOR

10RPM, 5V, DC geared motors for robotics applications. Very easy to use and available in standard size. Nut and threads on shaft to easily connect and internal threaded shaft for easily connecting it to wheel.



V.CIRCUIT DIAGRAM



VI.WORKING

A level crossing occurs where a railway line is intersected by a road or path on one level, without recourse to a bridge or tunnel, It is a type of at-grade intersection. The term also applies when a light rail line with separate right-of-way or reserved track crosses a road crossing, railroad crossing, road through railroad, train crossing or gate crossing.

VI.ADVANTAGES

- Prevention of accident inside the gate.
- Reliable machine, which operates the railway gate even without gatekeeper which makes it useful for operation at unmanned crossings.
- Power supply for the motor operation and signal lights is required.
- Battery which is charged by means of a solar cell can be used in remote areas where the power supply cannot be expected.

VII.FUTURE SCOPE

- By using transmitter and receiver we can control the railway gate system.
- We can give voice communication to road users.
- Led displays at railway crossing gates can also be achieved.

VIII.CONCLUSION

The project work “Automatic Railway Gate Control With Safety Features Using Microcontroller”, Now a days so many accidents are happen at railway gate because of manual control. To avoid this severe accidents we have to change manual work to this latest technology (Automatic Railway Gate Control Using Microcontroller), we can avoid maximum number of accidents.

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