MICROCONTROLLER BASED RAILWAY CROSSING SYSTEM

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ABSTRACT

In rapidly developing countries, accidents at unmanned railway crossings are increasing day by day. To meet the present requirements in the modern word, a microcontroller based system is designed as a project which can be implemented in automated railway crossing where no manual intervention is required, this project aims to control the unmanned railway, crossing barrier automatically and avoid accident if 2 trains are approaching towards each other on the same track.

In this project, arrival of the train is detected by a Magnetic Switch placed at each side of the crossing whereares departure is sensed using RFID (radio frequency identification) technology. When the train passes either of the magnetic switches, a signal is sent to the microcontroller (PIC16F877A) indicating train's arrival. Once the train is detected, a wireless signal is sent to the train approaching from the opposite direction to 'Stop' using RF transmitter and receiver. Buzzer and Red LED turn on to notify roadside users and station master about the approaching train. Servo Motor rotates immediately after the detection for closing the gate and rail track is switched in the direction of approaching train. On the other hand when a signal form RFID reader is received, microcontroller displays the information about the train on the LCD module and after a delay of 3 seconds the alarm goes off and a green signal appears for the motorists. Gate is reopened and a 'Start' signal is sent to the stopped train.

The prototype designed is tested to analyze the reliability and validity of the system and the results depict that system is able to achieve the aim of this project. This system can be implemented in manned or unmanned railway crossings as manual errors can be eliminated by automation. Furthermore this design can be improved by using battery rechargeable unit charger by solar and for accident avoidance GPS technology can be implemented.

Keywords: Magnetic-Switch, Microcontroller, RF-Transmitter/Receiver, RFID, LED, Buzzer, LCD, Servo-Motor, GPS