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Automated Unmanned Railway Gate

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Abstract: *— The aim of this project is control the unmanned rail gate automatically using embedded platform. Today often we see newspapers very often about the railway accidents happening at un-attended railway gates. Present project is designed to avoid such accidents if implemented in spirit. This project utilizes two powerful IR transmitter and two receivers, one pair of transmitter and receiver is fixed at upside (from the train comes) at a level higher than human being in exact alignment and similarly other pair is fixed at down side of the train direction sensor activation time is so adjusted by calculating the time taken at a certain speed to cross at least one compartment of standard minimum size of the Indian railway, normally 5 seconds.*
If there is any problem in the gate means it will operate red signal on both side from the driver indication. Train arrival and departure sensing can be achieved by means of Relay techniques. When the wheels of the train moves over, both tracks are shorted to ground and this acts as a signal to microcontroller (89C51) indicating train arrival. RED signal appears for the road user, once the train cuts the relay sensor placed before the 5Kms before the gate .A buzzer is made on as a pre cautionary measure for the road users.

Keywords—*8051microcontroller, IR Transmitter, IR Receiver, DC motor*

1. INTRODUCTION

The objective of this project is to manage the control system of railway gate using the microcontroller. When train arrives at the sensing point alarm is triggered at the railway crossing point so that the people get intimation that gate is going to be closed. Then the control system activates and closes the gate on either side of the track. Once the train crosses the other end control system automatically lifts the gate. For mechanical operation of the gates geared motors are employed. Here we are using embedded controller built around the 8051 family (AT89C52) for the control according to the data pattern produced at the input port of the micro controller, the appropriate selected action will be taken. The logic is produced by the program written in Embedded C language. The software program is written, by using the KEIL micro vision environment. The program written is then converted in HEX code after simulation and burned on to microcontroller using FLASH micro vision.

2. BLOCK DIAGRAM AND CIRCUIT DIAGRAM DESCRIPTION

Figure-1 shows the proposed blocks of the total project. In figure-2 shows the circuit diagram of the project. The arrival of train is detected by the sensing element placed on either side of the gate at about 5km from the level crossing. Once the arrival is detected, the detected signal is distributed to the microcontroller. Subsequently, buzzer indication and light signals on either side are provided to the road users indicating the closure of gates.
The departure of the train is detected by sensors placed at about 1km from the gate. The signal concerning the departure is distributed to the microcontrollers that successively operates the motor and open the gates.

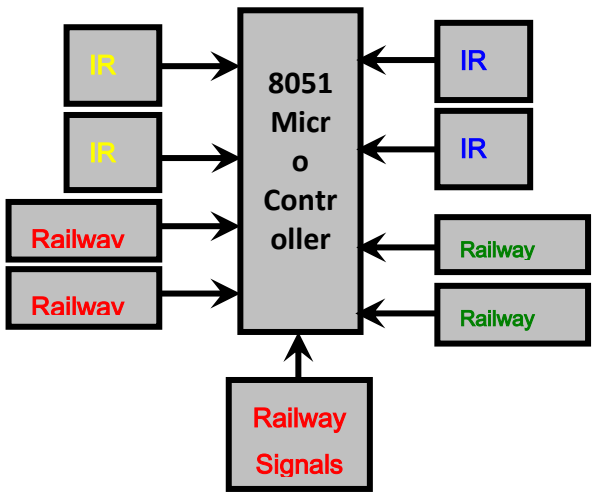

Figure 1:-Block Diagram of the system

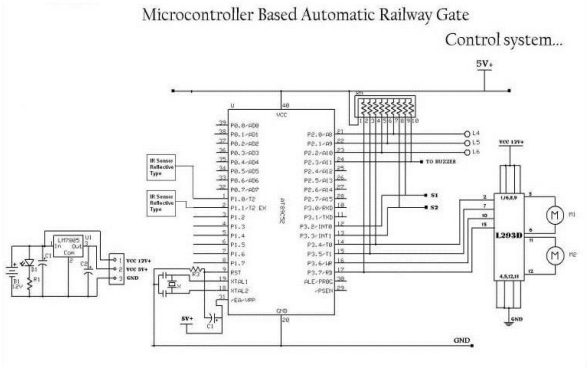

Figure:-Circuit diagram of the system

III. METHEDOLOGY

Present project is designed using 8051 microcontroller to avoid railway accidents happening at unattended railway gates, if implemented in spirit. This project utilizes two powerful IR transmitters and two receivers; one pair of transmitter and receiver is fixed at upside (from where the train comes) at a level higher than a human being in exact alignment and similarly the other pair is fixed at down side of the train direction. Sensor activation time is so adjusted by calculating the time taken at a certain speed to cross at least one compartment of standard minimum size of the Indian railway. We have considered 5 seconds for this project. Sensors are fixed at 1km on both sides of the gate. We call the sensor along the train direction as 'foreside sensor' and the other as 'after side sensor'. When foreside receiver gets activated, the gate motor is turned on in one direction and the gate is closed and stays closed until the train crosses the gate and reaches aft side sensors. When aft side receiver gets activated motor turns in opposite direction and gate opens and motor stops. Buzzer will immediately sound at the fore side receiver activation and gate will close after 5 seconds, so giving time to drivers to clear gate area in order to avoid trapping between the gates and stop sound after the train has crossed.

GATE CONTROL

Railways being the cheapest mode of transportation are preferred over all the other means .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. We, in this project has come up with a solution for the same. Using simple electronic components we have tried to automate the control of railway gates. As a train approaches the railway crossing from either side, the sensors placed 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.

IV. RESULTS AND DISCUSSIONS

Figure-3 shows the final result of the project. The red signal changes to a green one once the obstacle is moved away from the rail. The sensor placed at 2km away from the rail cross detects the departure of the train. Once the train is left, the sensed signal is sent to the microcontroller and the motor is activated and the gate is reopened. The above mentioned steps repeat for the arrival of the train from either direction. The figure 3 shows the small scale prototype of the model.

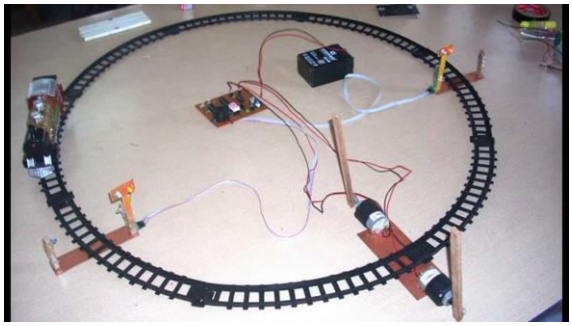

Figure:-Result of the project

V.CONCLUSION AND FUTURE APPLICATIONS

The circuit for our project was designed. It is found to be very reliable and stable. The circuit was able to control the railway gate precisely. The circuit was tested in both direction and worked perfectly. By using 8051 Microcontroller we were able to achieve a fast response. Our project is a necessary tool for today's railway crossings due to the increased number of accidents and also due to the problems occurring to the road passenger's while waiting a longer time during the passage of train unnecessarily.

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