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AUTOMATIC RAILWAY GATE CONTROLLER BY USING MICROCONTROLLER

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ABSTRACT

The aim of this paper is to develop a automatic railway gate controller by supplanting the entryways worked physically by watchman in the level crossing by using the 89C51microcontroller. There many railway accidents are happening due to the manual operation of railway gate. By using this concept major disasters in railway track can be prevented and human lives can be saved. This can also save the passers by preventing the accidents occurring because of train speed at level crossing. This concept is divided into two divisions. The first division is the hardware development and in this microcontroller acts as a main unit of the system. The second division is the software programming which operates the hardware structure of the system.

Keywords: *Automatic railway gate controller, Level crossing, 89C51Microcontroller.*

I. INTRODUCTION

The rail route is one of the major and an important mode of transport. Even though it is an important transportation, the accidents which occurs are more dangerous compared to other mode of transport. This system is safe for both rail route users and road route users. This system reduces the accidents and increases the safety for both rail and road users. The accident occurs due the mistakes made by gate keepers and the road users. This system has two main purpose, the first thing is to give safety to the people by decreasing the accidents and the second thing is to reduce the time for which gate has to be opened or closed manually by gate keepers. In this system we use microcontroller which performs complete operation of this railway gate controller. The operations which are performed by microcontroller are warning alarms, light indicators, opening and closing gates, sensing.

The sensors are used in this system which is kept at a particular distance from the gate and detects the distance of arriving train and then controls the operation of the gate. This signal activates the microcontroller to operate the operations such alarms, lights, gates. The sensors should be fixed at 500m on both sides of the gate. The two sides of the gates are the fore side and the after side.

The fore side sensors are towards the train going to the gate and the posterior sensors are after the train crosses the entryway. At the time train crosses the fore side sensor it gives the flag to the gate recipient and by which the entryway is shut. The alert is enacted to clear the entryway region for driver for few seconds.

The entryway engine is exchanged on the fore side sensors and the gate is shut. It stays shut till the entryway achieves the behind side sensors and when toward the back side beneficiary gets initiated the engine exchanged inverse way and the gate opens which stops the engine. The alert is utilized as an alert measure for the rail and street users.

II. HARDWARE IMPLEMENTATION

The materials and components that are to be used in programmed railway door control system will be discussed in the chasing. As with normal control design, system can be approximately divided as suggestions, final result and processing areas. The key pieces of system are:

1. Microcontroller:
89C51 microcontroller can be used as a main control unit to control the process of the full system.

2. Railway Receptors:
They are really put at two sides of gate. You can use it to sense the arrival and departure of the teach.

3. Engine new driver:
The H-Bridge uses the four diffusion motor driver rounds that are being used to turn forward or invert course of DC motor unit for opening and final the gate.

4. CRISTAL LIQUID Screen:
It displays the train gate open or close section and alert concept for motorists.

5. Buzzer and light indication.
That they are being utilized to caution the street client about the approach of train by Power Supply.

III. OVERVIEW OF THE SYSTEM

This figure shows over all block diagrams for train gate control system by utilizing microcontroller. In this manner, 89C51microcontroller is utilized to work the accompanying capacity of the railway gate control system .

- To sense the entry and leaving of the train.
- To open and close the railway gate automatically by using two power motor.
- Buzzer and lightweight signal for caution the street users.
- Screen the status of the railway gate system with LCD (Liquid Crystal Display) modules

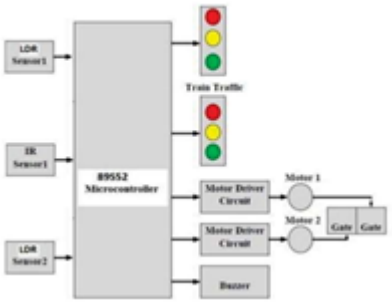

Fig 1: Block Diagram Description

A motor unit driver circuit is employed to drive the gate motor unit for buying and selling gate. This kind of system uses buzzer and light signal for alert the road users. The PIC (Peripheral Interface Controller) microcontroller controls all machine. The main program of the railway gateway control system is written in 89C51 microcontroller and which is created by PIC Basic Expert Programming Language.

A. Beginning Sign Show
Indicators I1, I2, I3 and I4 are found adjacent the gate each at a specific separation. I1 and I4 are put at 3Km on either part of the entryway in spite of the fact that I2 and I3 are put at 150m from the gate. The general population might approach the gate in either way. So each of the four alarms are made Blood red to start with to demonstrate that entryway is open and vehicles are going through the gate. The street client signals are made GREEN with the goal that they can promptly under take the entryway bell is done 'OFF' since there is no approach of train and street clients require not be forewarned.

B. Prepare Landing Location
Disclosure of a train moving closer the gateway can be recognized by strategy for sensors S1, S2, S3 and S4 set on either side of the entryway. In a particular course of system, S1 is used to detect the section while S3 resources the flight of train. Correspondingly, S4 resources the system and S2 the take off separately in the other direction of

prepare landing. In light of the vibration of the track as to train approaches the sensor works. The sensor contains an IR (Infrared) transmitter, IR collector.

A comparator and a transistor switch. IR transmitter gives IR shafts whose wavelength depends on the vibration of track that analyzes to the information repeat. If repeat constructs its wavelength increases and consequently diminishes the protection of the IR recipient. It reduces voltage drop over the beneficiary. Its yield voltage is the differentiation between this voltage drop and information voltage to the sensor. This is sustained to the comparator whose reference voltage relies upon the edge repeat which is minimum repeat realized by a direct train. In this way, the comparator produces -10V inundation when it identifies a train and +10V if not. Alternatively, transistor switch produces +3V and 0V exclusively. This is transmitted using FM (Recurrence modulator) to the microcontroller.

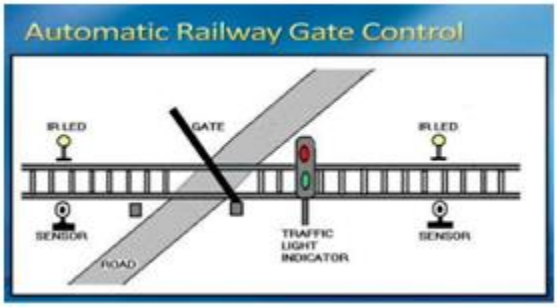

Fig 2: Proposed model

C. Warning for road user

At the present time the train passage is identified on either side of the gateway, road customers are forewarned about the train approach by RED signs set to caution the road customers experiencing the entryway. RED sign appears for the road customer once the train cuts the exchange sensor set 3Km going before the portal. A ringer is made ON as a reasonable advance for the road customer and that nobody should enter the entryway without a moment's pause.

D. Detecting for road Vehicles

Laser light can be utilized as a source and LDR (Light Dependent Resistors) as an instrument for acknowledging reason. When light strokes on LDR its measure of protection diminishments and when light does not strike LDR its protection remains at customary quality. This difference in protection of LDR can be used for identifying by the scaled down scale controller 89C51 by the use of compensation. Right when there is no vehicle amidst or underneath the portals, at that point the laser light from the source falls on the LDR in light of the fact that there is no tangle. Since there is no vehicle or obstacle, sign is made GREEN to teach the way. The same is associated for in the other course and I3 and I4 are made Natural and gateways are settled.

In some conditions, the occasion that you have a pause down of a vehicle between the entryway, at that point the light from laser will not fall on LDR. This demonstrates the occasion of vehicle and the sign for train should be conveyed RED with a particular ultimate objective to move down and train to keep up a key separation from accident. By then the obstacle should recognize to make room for vehicle.

E. Entryway shutting activity

After the microcontroller faculties that there are no vehicles inside, at that point it naturally creates the flag to control the engine through transfer routine and consequently shut the door for the verse of train. At the point when any event of hindrance is detected, 89C51 gives transmission for impediment to clear the way and once the way is wiped out, engine is worked to close the gate. Truth to be told rotational movement happens in an engine. This rotating movement is changed over to straight movement of the gate by utilizing an apparatus.

F. Gate Opening

Right when to train departure is distinguished by the sensors, sign is given to the Microcontroller that works on the motor in inverse bearing and the gate are opened. Once the entryway is open sign for road customers that are made GREEN with the goal that the vehicles can experience the portal.

Advantages as follows

- Human error can be reduced.
- Time saving system.
- Manual work will be replaced.
- People will find it safer to use.
- Less chances of accidents.

IV. CONCLUSION

The automatic railway gate controller is a useful way to reduce the railway accidents. This system is useful for both remote areas also where there are no gate keepers and stations. By using sensors we can detect the arrival and road and rail route users and also for railway management. This system is fully automated so it can be used in rural and departure of the trains. In this system motors are used to open and close the gates in level crossing. This railway gate controller is controlled by many operations like alarms, lights, sensors. Our project is a latest approach to get rid of the problems faced by the people. By using this concept we can reduce the increased number of accidents and problems faced by the people waiting a long time in level crossing. The automatic system plays a very important role in all the fields and also has many applications.

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