

Review on Automatic Railway Gate Control

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Abstract- The objective of this paper to control the railway gate crossing with automation. The need of automation at railway gate crossing is required due to fact that, so many accidents occurred while crossing the railway gate. In everywhere at level crossing between railroad and highway there are so many railway accidents happening due to the carelessness in manual operations or lack of workers. When we go through the daily newspapers we come across many railway accidents occurring at unmanned railway crossings. So, this paper describes the automatic railway gate control system using PIC microcontroller for saving precious human lives and preventing major disasters in railway track. Railway gate may be saved for the road users to prevent accidents in terms of train speed at level crossing. This paper is focused on sensor technique.

Index Terms- Microcontroller, Seven segment display, Automatic gated Motor track switching.

1. INTRODUCTION

Railroad is one of transition mode, which has an important role in moving passengers and freights. However, railroad-related accidents are more dangerous than other transportation accidents. Therefore more efforts are necessary for improving its safety. This system is to manage the control system of railway gate using the microcontroller. The main purpose of this system is about railway gate control system and level crossing between railroad and highway for decreasing railroad-related accident and increasing safety. In addition, it also provides safety road users by reducing the accidents that usually occur due to carelessness of road users and errors made by the gatekeepers. Railways preferred the cheapest mode of transportation over all the other means. This system is designed using PIC 16F877A microcontroller to avoid railway accidents happening at railway gates where the level crossings. Microcontroller performs the complete operation i.e., sensing, gate closing and opening. 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 controls the operation of the gate. This system was operated after signal received from the sensors.

To avoid the 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 the previous station. Also reliability is high, as it is not subjected to manual errors. Early level

crossing had a flagman in a nearly booth who hold , on the approach of a train , wave a red flag or lantern to stop all traffic and clear the tracks, manual or electrical closable gates that barricaded the road way were later introduced. The gates were intended to be a complete barrier against intrusion of any road traffic onto the railway. In the early days of the railways much road traffic was horsedrawn or included livestock, it was thus necessary to provide a rail barrier, thus crossing gates, when closed to road traffic, crossed the entire width of the road, gate opened to allow road users to cross the line, the gates were swung across the width of the railway, preventing any pedestrians or animals getting onto the line with the appearance of motor vehicles thus barrier became less effective and the need for a barrier to livestock diminished dramatically. Many countries therefore substituted the gated crossing with weaker but more highly visible barriers and relied upon road user following the associated warning signals to stop.

In many countries, level crossing on less important roads and railway line are often "open" & "uncontrolled" sometimes with warning lights or bells to warn of approaching trains, ungated crossing represent a safety concern many accident have occurred due to failure to notice or obey the warning .

2. LITERATURE REVIEW

2.1. Working of Gate Control System

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 have 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 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.

2.2. Working methodology

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.

2.3. Automatic Railway Gate Control

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

3. CONCEPT INVOLVE IN TRAIN SAFETY

3.1 Automatic Track Switching

It displays monitoring of the two trains on one track. If the two trains are on one track then one train stop immediate due to red light and second train changes its path automatically.

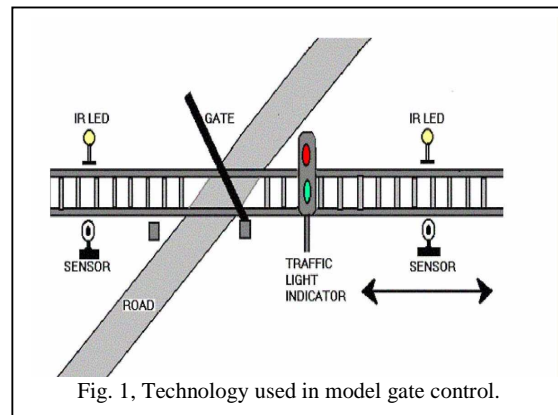
3.2 Anti-Collision Device

ACDs have knowledge fixed intelligence. They take inputs from GPS satellite system for position updates and take decisions for timely auto-application of brakes to prevent dangerous 'collisions'.

3.3 Automatic Gate Control

It deals with two things. Firstly, it deals with the reduction of time for which the gate is being kept closed. And secondly, to provide safety to the road users by reducing the accidents that usually occur due to carelessness of road users and at times errors made by the gatekeeper's. In this paper we are concern about automatic gate control of railway crossing [2].

3.4 Technology Used In Model Gate Control



Using simple electronic device and microcontroller devices we have tried to control the railway gate. A sensor is placed at certain distance of railway gate to detect the train. When a train comes it detects the train and displayed it on the monitor in turn train driver looks for red or green signal given by station master and according to it command the automate gate control system receive the command and correspondingly actuate and then it controls the railway gate and reduces the railway accident

3.5 Circuit Diagram of Gate Control

We use two platforms to make easy model which can make any number of platform. When train reaches at

certain distance from the railway track a set of sensors are placed to detect the train and two pairs of sensor are placed on other side of track to detect the train shown in fig 2.

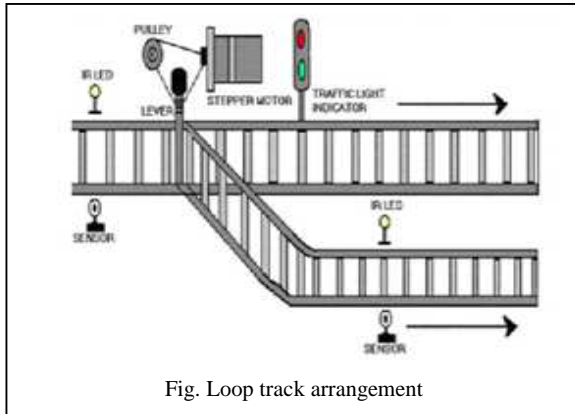


Fig. Loop track arrangement

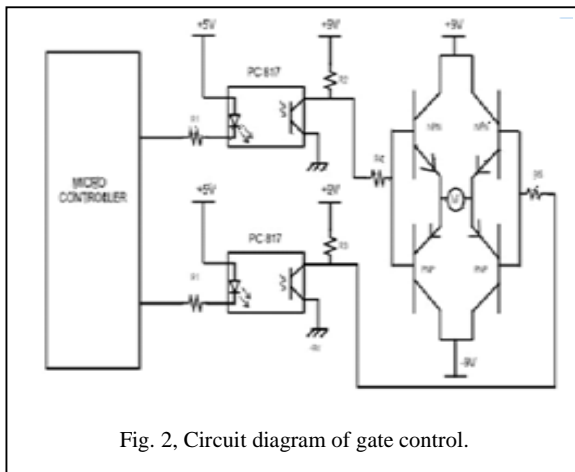


Fig. 2, Circuit diagram of gate control.

When the train is at the first pair of sensors it sends a signal to microcontroller to know the availability of plat form. Hereafter checking availability microcontroller operates stepper motor closes the gate according to the condition given by station master.

4. RAILWAY GATE CONTROL VIA SMS ALERT

Automatic gate control system can be implemented using different technologies such as GSM, Bluetooth, and Android. This article describes two automatic railway gate control project topics involving Android and GSM technologies.

This paper of "Automatic railway gate control via SMS alert", [3] is designed to control railway level-crossing gate through an Android application by the station master. This system uses Android Application device for opening and closing the level-crossing gate, remotely.

Remote operation can also be achieved by any smart phone or tablet with an Android-OS with a Graphical User Interface, based on Touch Screen Operation. This system uses a microcontroller as the heart of the project, and is programmed in such a way that any control signal from the Android phone controls the motor for operating the gate.

5. COMPARISON

By the presently existing system once the train leaves the station, the stationmaster informs the gatekeeper about the arrival of the train through the telephone. Once the gatekeeper receives the information, he closes the gate depending on the timing at which the train arrives. Hence if the train is late due to certain reasons, then gate remain closed for a long time causing traffic near the gates. In some system warning system based on GPS & GSM. The performance come together by positioning of GPS and efficient transmission rate of GSM and computer control technology are used in this system, which in turns provide safety in railway system.

6. 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 tochange manual work to this latest technology (Automatic Railway Gate Control Using Microcontroller), we can avoid maximum number of accidents.

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