

Solar Operated Automatic Railway Gate control

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Abstract -The main aim of our project is to operate and control the unmanned Railway Gate in the proper manner in order to avoid the accidents in the unmanned railway crossing. In a country like ours where there are many unmanned railway crossings, Accidents are increasing day by day. The railway gate can be operated to prevent the accidents at the level crossing in terms of speed of the train. Automatic Railway Gate control System is an innovative circuit which automatically controls the operation of Railway Gates detecting the arrival and departure of train at the Gate. This system uses ATmega16A microcontroller with the help of obstacle sensors. It has six obstacle sensors which is used to detect arrival and departure of the train. The system is concern on the hardware development where all Electronic components have included. Obstacle sensors are the input components while buzzer, DC motor and LCD display are the output components. These are controlled by the controller circuit. The microcontroller forms the main unit of the system. It receives input signal from the sensors and sends information to the gate motor driver for opening and closing the gate. Besides, the output signal microcontroller will activate alarm. The first obstacle sensor is fixed at a certain distance from the gate and the second sensor is fixed at the same certain distance after the gate. The gate is closed, when the train crosses the first and the gate is opened, when the train crosses the second obstacle sensor. This system deals about one of the efficient methods to avoid train accidents. In this system we have shown four gates and eight obstacle sensors, two for each gate.

Key Words: Automatic Railway Gate, Level Crossing, Sensors, ATmega16A microcontroller, DC motor, LCD display.

1. INTRODUCTION

Railroad is 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 accident 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 ATmega16A 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 sensor 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. This signal is used to trigger the microcontroller for operating the gate motor, alarm system. 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.

1.1 Concept

At the present, India having world's largest railway network which having manned gate control system. Over hundreds of railways running on track every day. It is definitely impossible to stop the running train at immediate in some critical situation or emergency arises. Train accidents having serious drawbacks in terms of loss of human life, injury, damage to Railway property. This model uses automatic control or operation of gate and reduces the human labors. The concept of the model is to control the railway gate using microcontroller ATmega16A.

1.2 Objective

To avoid an unwanted accident, happening at the railway level crossing due to less awareness of drivers and poor work of gate keeper and also time saving.

2. OVERVIEW OF THE SYSTEM

2.1 Block Diagram

The above block diagram represents the architecture of the proposed system “Automatic Railway Gate Control”. The microcontroller that has been used for this project is ATMEGA16A. It is used as the brain of this project. The function of this section is to collect the information from various parts of the system. Then it makes decision as per the program. Railway Sensors: They are placed at two sides of each gate. It is used to sense arrival and departure of the train. The main control unit of this system is ATmega16A microcontroller and it can manage the control process of all input and output units. Obstacle sensor circuit is applied to sense the train on the railway track. L293D motor driver is to drive the DC motor for gate open and close control. Alarm unit is utilized for warning the road users.

Figure above shows the proposed model of the system. The gate control system consists of two obstacle sensors. The sensors are fixed at the certain distance on both sides of each gate, that is before the train arrive and after the train departure. In this system we have used 8 sensors for 4 gates. When the obstacle sensor1 senses the train, sensors are on state. Then obstacle sensor1 senses the train, microcontroller can control the drive of the gate control motor. A buzzer gets activated when the train is crossing the gate and the railway gate is closed. When the train passes through the obstacle sensor2, the railway gate is opened. In this time, obstacle sensors are off state. The timing condition for the railway gate control system must be set base on the speed and length of the train into the background algorithm for microcontroller. For the gate control state, the gate will be closed when the motor move forward direction at certain time until the train has crossed the gate otherwise the gate is opened.