



Automatic Railway Gate Control System Using Android

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ABSTRACT

The project is designed to control over the railway level crossing gate using Android mobile phone by the gate keeper. Opening and closing of railway level crossing gate involves manpower, which could be often causes incorrect leading to accidents. This system prevents the need of any human involvement at the railway level crossing. This system involves opening and closing of the level crossing gate by using an Android app. This Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a Graphical User Interface based touch screen operation. A Bluetooth device is interfaced with the system. When the gate keeper sent command to close from the Android application device (when the train is approaching at the level crossing) to the Bluetooth device which while supply to the microcontroller, sends an output signal which activates a mechanism to switch on the motor to close the gate. To open the gate, another command needs to be sent for the microcontroller to open the gate using motor driver integrated circuit. In this project we use a microcontroller of 8051 families, and the input to its Bluetooth device which takes command from the user Android application. The output to microcontroller is given to a motor by using a motor driver integrated circuit for some required operation. The status, whether the gate is open or close is displayed on an LCD (liquefied crystal display) interfaced to the microcontroller.

Keyword: LCD, OS, GUI

1. INTRODUCTION

Indian railways have been in operation for 160 years and more. India is having the world's biggest railway network. The whole of nation is connected by

railways. Over 100 of railway trains are running every day all over the country. Railways are one of the most consistent modes of transportation which has a very important role in day today life. Hence safety and reliability are very critical parameters of the Indian railways. However, railway related accidents are very dangerous compared with other accidents in terms of death rate, severity etc. We know that it is not possible for a running train to stop at an instant in some critical condition or when any emergency condition arises. Train accidents are having a serious impact on loss of human life, damage to railway property, injury, and etc.

Considerable factors which lead to railway accidents are collision derailments, fire in trains, and Collision of trains at the level crossing. When vehicles or pedestrians are passing the level crossing there are chances for an accident to happen. The reasons for accidents are not easy to predict given all possibilities. If the train drivers solely depend on their own eyes or on some kind of warning signals which are given by the detecting drivers, then they usually don't have much time to react to any such massacre happening. Also train drivers don't have enough time to take necessary measures or precautions, thereby leading to accidents at the level crossing. So in order to avoid all harsh things there arises a need for some independent system to overcome the problems faced at the level crossing. There are two types of level crossing namely manned and unmanned.

The entire railway route includes nearly 14896 unmanned and 17839 manned level crossings. Railways being the cheapest and easy affordable modes of transportation for long travelling are mostly

preferred all over the country over other means. When we take a glance over our daily newspaper we come to know across many types of accidents occurring at the railway level crossing. The reason is mostly because of lack of genuine workers, or may be due to carelessness nature in manual operations. Hence in order to make this accident undone at the railway crossing we are making use of simple electronic system and introducing android platform along with electronic components in order to control the operation performed at the railway gate crossing.

The project is designed to achieve control on the railway level crossing gate through Android Application by the gate keeper. Opening and closing of railway level crossing gate involves manpower, which could be often incorrect leading to the accidents. The proposed system prevents the need of any human involvement at the railway level crossing. This system consists opening and closing of the level crossing gate with help of an Android Application Device.

2. LITERATURE REVIEW:

2.1 The author namely Krishnapriya K B1 , Sreelakshmi K U 2 , Vivek John (International Journal of Innovative Research in Science, Engineering and Technology (An International Organization for Standardization 3297: 2007 Certified Organization) Vol. 5, Issue 9, September 2016) describes the paper "Railway Level Crossing Gate Control & Measurement System for Railway Track Condition Monitoring"

At present people choose various modes of transportation such as by buses, flights, motor cycles, cycle, car, train etc. Out of this majority depend upon railway; people use this because they always seek for the service with more comfort with cheaper rates. As a demand for travel by trains increases, railway sector has followed a lot of safety standards in order to ensure life's of travellers any problems in the same have the capacity to induce major damage to the economy factor. In spite of this safety measures followed by people, everyone could see a lot of accidents took happened in this sector; knowingly or unknowingly it may take away lives of many ones. The occurrences of these accidents are mainly because of defects of rails. Now railways are performing various fault detection by means of manual inspection by human beings, so it will be better if go for an advanced system where Railway

track damage status is monitored by using sensors and transfer related information through wireless modules. Because majority of railway accident prime reason is fault within the track such as occurrence of crack etc. As there need to ensure safety at all related aspects, unmanned railway crossing also need to be taken to account. This problem can be solved by introducing a fully automated system controlling railway level crossing gate more effectively.

2.2 The author namely Pranav Sharma, Rajesh Kumar, Sarika (Journal of Network Communications and Emerging Technologies (JNCET) Volume 5, Special Issue 2, December (2015)) describes "Automatic Railway Gate Control System Based on RFID, pressure sensor and servo motor"

The railway accidents at crossing level are increasing day by day due to unman railway crossings. This paper presents an automatic control gate system to prevent rail accidents. Pressure sensor, RFID card, Servo motor is used to control the open and close status of the railway crossing gate. In this paper we propose a model where pressure sensor is placed on the railway tracks, RFID tag on the engine and the open and close status of the gate is controlled with the help electric device called servo motor.

2.3. The author namely Rohini Jadhav, Harshal Patil, Prof. M. S. Wagh (International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395 - 0056 Volume: 04 Issue: 04 | Apr -2017 www.irjet.net p-ISSN: 2395-0072) describes "Automatic Railway Gate Control System Using RFID with High Alerting System"

The main objective of this paper is to prevent from the railway accidents happening at the level crossings. In India railway is the biggest mode of the transportations and it is the low cost way for travelling. So there are more numbers of railway travellers. And it is not easy to stop railway anywhere to avoid accident or for any other reason. Due to that there are major drawbacks of that. At present manned system is available at level crossings. So, many accidents happens at such crossings level, since there is nobody to take care of the functioning of the railway gate level when a train approaches the crossing. The objective of this paper is to manage the control system of railway gate by using the microcontroller. This model includes IR sensors, RFID, LCD, buzzer, light led, motor driver and

microcontroller PIC16F877A. In the automatic railway gate control system, at the level crossing the arrival of the train is detected by the IR sensor and RFID placed near to the gate. In case of RFID it detects only arrival of train. Hence, the time for which it is closed is less compared to the manually operated gates and reduces the human labor. As the entire system is automated errors occurring due to manual operation are prevented because the accuracy of automated operation is more than the manned operation.

2.4 The author namely Karthik Krishnamurthi, Monica Bobby, Vidya V, Edwin Baby (International Journal of Advanced Research in Computer Engineering & Technology Volume 4 Issue 2, February 2015) describes “ Sensor based automatic control of railway gates”

The present work automate the opening and closing of gates at a railway level crossing. In general, level crossing gates are operated manually by a gate keeper. The gate keeper receives the information about the train arrival from a near station. When the train starts to leave the station, the station in-charge delivers all the information to the nearest station master to get ready. This human action can be avoided by automating the process. In situations where the train is late due to some reason like heavy rain, the gate remain closed for long durations causing dense traffic gets jam near the gate level. This too can be prevented by automation. The proposed system uses infra red sensors to detect the arrival and departure of trains at the railway level crossing and Arduino to control the opening/closing of gates. The system uses two IR(Instruction Register) sensors to detect the arrival of the train and a third IR(instruction Register) sensor to detect the departure of the train. When the approaching of the train is sensed by the sensors, signals are provided to the traffic indicating the arrival of the train on the track. When the second sensor detects the train then the signal turns red and the motor operates to close the gate. The gate remains as it is closed until the train completely moves away from the level cross.

3. OBJECTIVE & SCOPE:

The main objective of this project is to create an automatic railway gate control system by using android which can be implemented easily in roads. Generally, there are manual gate control system which are maintained by person. As vehicles are increasing

day by day it has become more difficult to control the gate manually. As a result, often many accidents occurs and many people become injured badly by accidents and sometimes it become very serious when people died and face many problems due to this type of accidents. This project can help us to reduce accidents in our country by applying automatic railway gate control system at crossing level.

Problem definition:

The present system attempts to automate the opening and closing of gates at a railway level crossing using android application. In general, level crossing gates are operated manually by a gate keeper. The gate keeper receives the information about the train arrival from a near station. When the train starts to leave the railway station, the station in-charge or gate keeper delivers this information to the closest gatekeeper to get ready for arriving of train. This human action can be avoided by automating the process. In some situations where the train is late due to some reasons or heavy rain, the gates remain closed for long durations causing dense traffic jam near the crossing gates. This too can be prevented by automation.

Proposed work:

Here the proposed system makes use of an android platform. The working of the gate i.e. automatic closing and opening of the gate is controlled with the help of an application which will be on an android smart phone or a tablet. When a train is anywhere nearby the level crossing gate a SMS will be send from an android application to the gatekeeper. The SMS will be sending to the GSM modem (Global System for Mobile Communication) which will interpret the SMS and it will then forward the command to the microcontroller. Then the microcontroller will feed the output signal to the motor and motor driver is switched on and start working. It results in closing of the gate. Then for opening of the gate other command to open the gate will be given to the microcontroller through GSM modem from android application which will forward the signal to the motor driver

Hardware Used:

Cell phone: Any cellphone or mobile with a SIM card can be used through which communication takes place. The communication takes place through wireless medium through GSM technology.

Bluetooth: this module acts as a connection between user and systems. HC05 is used. It works at frequency of 900to1800 MHZ. GSM(Global System For Mobile Communication) module receives messages from cell phone and transmits them to the microcontroller.

ATmega328: ATmega328 is a microcontroller will be used for system. A microcontroller is the most important component of this system, because it controls the functioning and operations of the home automation system. Its coding is done in Arduino

Relays: Relays are used for switching of loads. After receiving particular message through the phone, microcontroller instructs the relay to switch accordingly. When more relays are used, transistors are used in parallel with relays so that changes can be done at low currents.

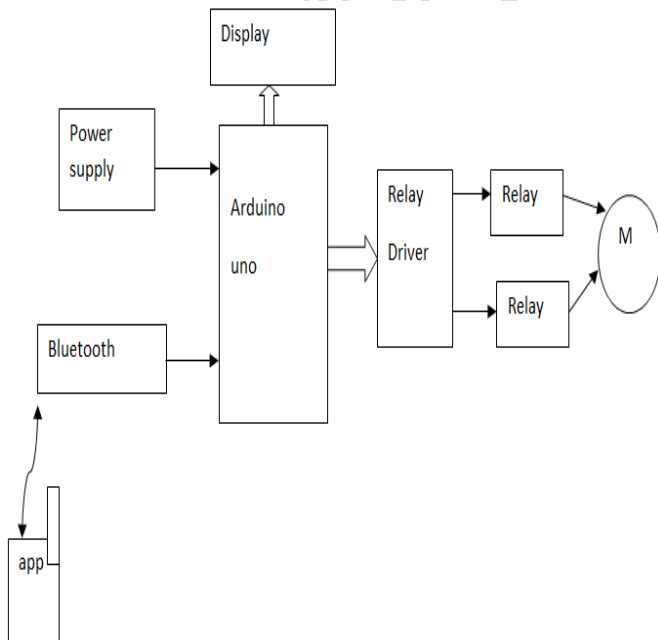
Software Used

Proteus: Proteus is a virtual system modeling and circuit simulation application. All the circuits are simulated in proteus before actually making them.

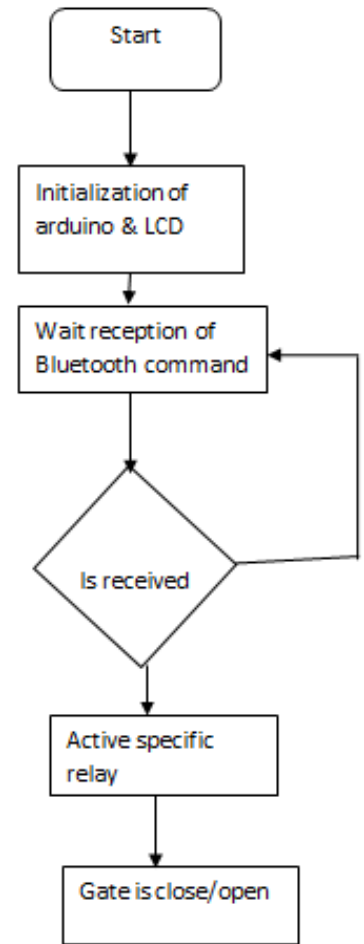
Arduino IDE: The open source arduino software makes it easy to write code and upload it to the microcontroller.

Android Studio: This software used for develop the android app for devices on/off

4. METHODOLOGY:



Flow Chart



5. ADVANTAGES, DISADVANTAGES & APPLICATIONS

Advantages

- Prevention of accidents inside the gate
- Time saving as the gate keeper operates the system through mobile application
- Easy to operate

Disadvantages

- As the system requires human operator the human error affects the system.

Applications:

- home automation
- lab automation
- industry automation

6. CONCLUSION:

- Avoids manual errors and provides ultimate safety to road user
- Gatekeeper not necessary and automatic operation of the gate through motor
- The mechanism works on a simple principle

7. REFERENCES

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