Self-Operating Railway Level Crossing System Using IoT

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Abstract— The railway crossing accidents are increasing day by day from past few years due to carelessness in manual operations at railway level crossing. The aim of our project is to automate various operations related to opening and closing of railway gates in order to minimize the accidents at unmanned railway gates. Automatic railway gate at a level crossing replaces the gates operated by gatekeepers. 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 roads users by reducing the accidents. By employing the automatic railway gate control at the level crossing the arrival of the train is detected by the RF transmitter and signal will be received at receiver station. Hence, the time for which it is closed is less compared to the manually operated gates. The operation is automatic. Automatic railway gate control is highly microcontroller based arrangements. The proposed system overcomes the traditional Railway Level Crossing System without intervention of human which can be done automatically.

Keywords: Aurdino Uno, Node MCU, Battery 6V, RF Transmitter and Receiver, Buzzer

I. INTRODUCTION

The Railway Level Crossing System in India is leading to many accidents which are very dangerous and there is lot of Human loss. In our present level crossing system, the gatekeeper gets the signal from the relay cabin and then closes the gate, opens after the train leaves the station. But due to this there are many accidents caused. Many human are losing their life because of their negligence. Our project is trying to reduce those accidents by making the system automatic. In this automatic system the person cannot cross the gate until it is opened. It will be opened only when the train leaves the station.
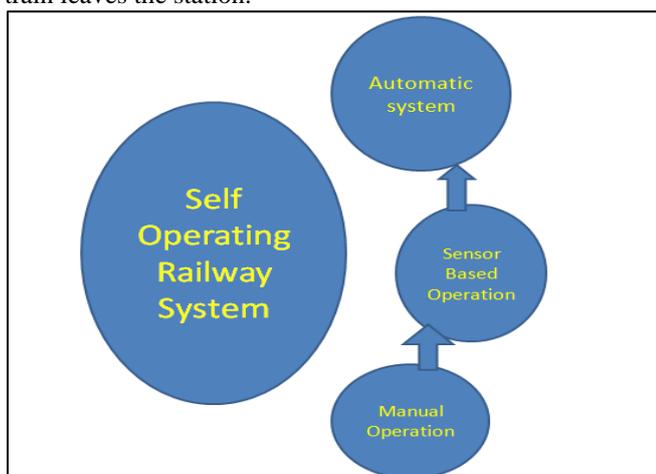
II. EXISTING SYSTEM

In this system the operation of the railway gates will be operated manually by the gate keeper. Before each train is arriving to enter the block section i.e. railway gate, the Station Master shall ask the Gateman on the telephone to close the gate and control the road traffic for the passage of a train. The Gateman after receiving the message from the station master, he will close the gate by the locking system. When the train goes away from the gate the gatekeeper send the signal to the nearest station. This system takes much time and makes the people wait for much time and the gate keeper should work for day and night shifts. If the gate keeper forgets to close the gate it may cause a huge damage. It is very hard to work a gate keeper for long hours at railway level crossings.

A. Disadvantages

1) This system totally depends on gate keeper.
2) Accuracy of this system is not good.
3) Low reliability.

III. PROPOSED SYSTEM

In this project we are making a self-operating railway level crossing system at unmanned level crossings by replacing the gates operated by gate keepers. It is better than previous existing systems. It deals with two things, Firstly it deals with the reduction of time for which the gate is being kept closed and secondly, to reduces the accidents which are occurring by the manual operations. In this project microcontrollers RF transmitter, RF receiver, buzzer, 9v and 6v batteries are used. The arrival of the train will be indicated by the switch of the train driver and the RF transmitter transmits the signal. When the RF receiver receives the signals, through the microcontroller (Arduino UNO) and L298 chip the motor drivers gets activated and makes the gates open and close. Here the L298 chip acts as a bridge that sends the required amount of power to the motors. This operation is automatic. Automatic railway gate control is highly microcontroller based arrangements. The proposed system overcomes the traditional Railway Level Crossing System without intervention of human which can be done automatically.

IV. USE OF BLYNK APP:

Blynk is a platform with iOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. It's really simple to set everything up and you'll start tinkering in less than 5 mins. Blynk is not tied to some specific board or shield. Instead, it's supporting hardware of your choice. Whether your Arduino or Raspberry Pi is

linked to the Internet over Wi-Fi, Ethernet or this new ESP8266 chip, Blynk will get you online and ready for the Internet of Your Things. Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, and it can store data, visualize it and do many other cool things. There are three major components in the platform: Blynk App: – It allows you to create amazing interfaces for your projects using various widgets which are provided. Blynk Server: – It is responsible for all the communications between the smart phone and hardware. You can use the Blynk Cloud or run your private Blynk server locally. Its open source could easily handle thousands of devices and can even be launched on a Raspberry Pi. Blynk Libraries: – It enables communication, for all the popular hardware platforms, with the server and processes all the incoming and out coming commands. Now imagine, every time you press a Button in the Blynk app, the message travels to the Blynk Cloud, where it magically finds its way to your hardware. It works the same in the opposite direction and everything happens in a blynk of an eye.
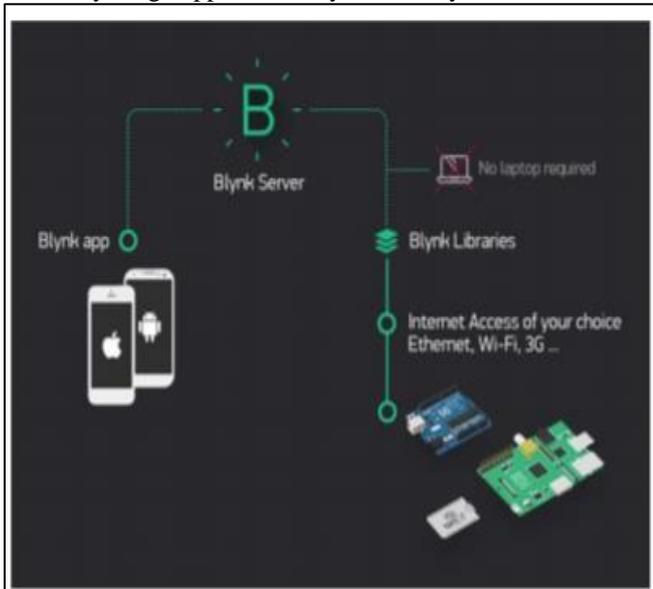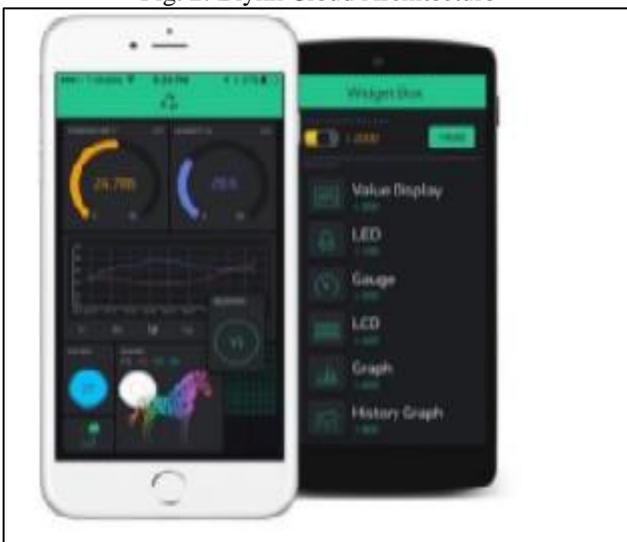

Fig. 2: Blynk Cloud Architecture

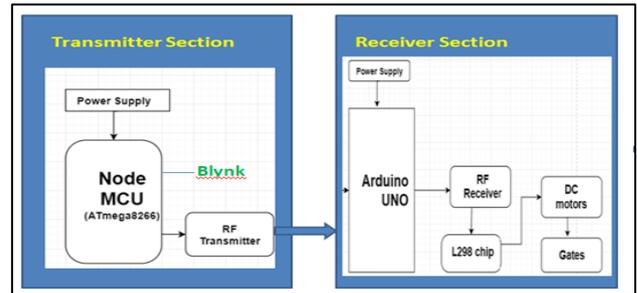Fig. 3: Blynk App Overview

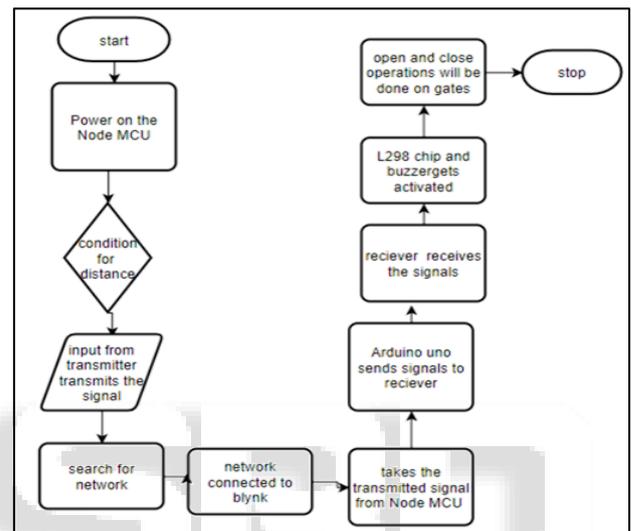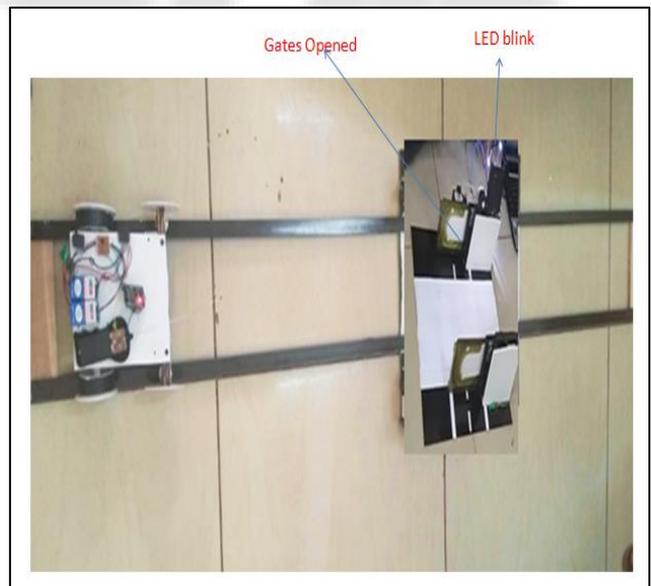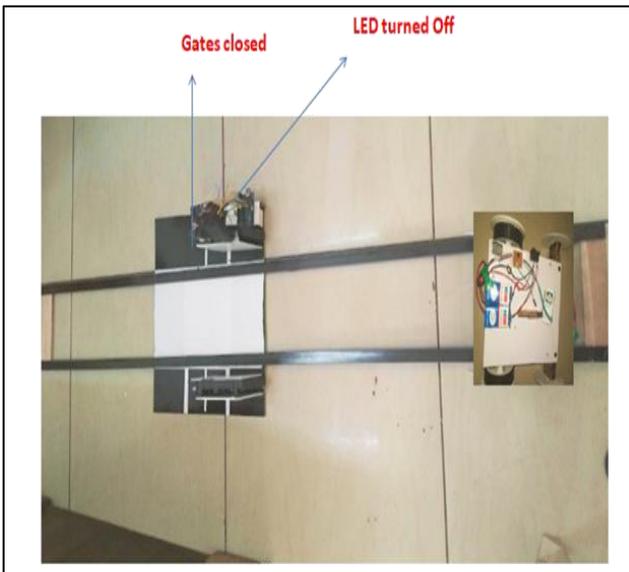## V. DESIGN AND IMPLEMENTATION

Fig. 4: Design of system

VI. FLOW OF THE SYSTEM:

VII. RESULTS

VIII. CONCLUSION

This system provides many advantages like, it reduces the time for which the gate remains closed, Automatic operation prevents errors which are occurring through the manual operations, Automatic railway gate control systems reduce the time for which gate remains closed, Less human resource is required. These may reduce the accidents.

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