IOT BASED AUTOMATIC VEHICLE DETECTION FOR RAILWAY GATES

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ABSTRACT

This paper proposes the design of Internet of Things (IoT) based Automatic vehicle detection system on railway gate can be used to detect the vehical on railway gate The importance of Automatic vehicle detection in product development. This paper provides a comprehensive review of the state-of-the-art research in this field. Automatic vehicle detection entails various issues related to traffic handle . With respect to a holistic view of Automatic vehicle detection, key challenges and future research directions are iden. The importance of Automatic vehicle detection is to control the traffic rule and follow the traffic rule in signal it's also protect the major accident in signal. It's also used for people to cross road easily.

1. INTRODUCTION

Internet application development demand is very high. So IoT is a major technology by which we can produce various useful internet applications India has the biggest rail network and becomes major mode of public transportation. According to the survey of public relation office of Indian railways, there are more than 30,300 railway crossings in India. More than 11000 railway crossings are unmanned where there is no man to manage barriers while arrival and departure of trains. Many techniques have been developed to enhance the security system of railway crossings. Many of the systems use ultrasonic sensors and infrared sensors to detect the arrival of train and access it at control room that can manage railway barriers. Some systems used GPS and GSM for tracking train to avoid accidents at railway crossings. Image processing has also been used to develop a system for secured railway crossings. Overall, a reliable system is required to operate in robust condition and able to prevent accident at the railway tracks. Review of various systems which has been proposed is discussed in the section of literature survey. An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. Using this project we can find out the vehicle which cross the railway line which break the rule of railways.

2. PROPOSED SYSTEM

"IOT Based Automatic Vehicle Detection System for Railway Gates", the system is propose for prevention the accident on railway gate. In that system we used IR Sensor, Buzzer, Led, Web Camera and NodeMcu etc.

component. When the train is pass through railway gate that time the gates are closed for passing the train and Vehicles wait for some time. Whenever gate is closed so that time any vehicle is not pass from below the gate, but some people breaks the rule and pass through below the gate. It is very dangerous due to that many accident will happen. To avoid such kind of accidents here we propose a system i.e. "IOT based automatic vehicle detection system on railway gates."

When any vehicle pass below the gate the IR sensor (infrared sensor) detect the object. After detecting the object the value of buzzer and the value of led is high both buzzer and led will glow. Due to buzzer and led glow that person should know that they do something wrong or it is dangerous for them. Also at the same time notification and email send by controller to them. One camera is attach on the setup to capture the image of detected object. After capturing the image it will be send by controller and save into the database for further process. Also we classified the image for easy to next process using that image controller take action on that particular detected object.

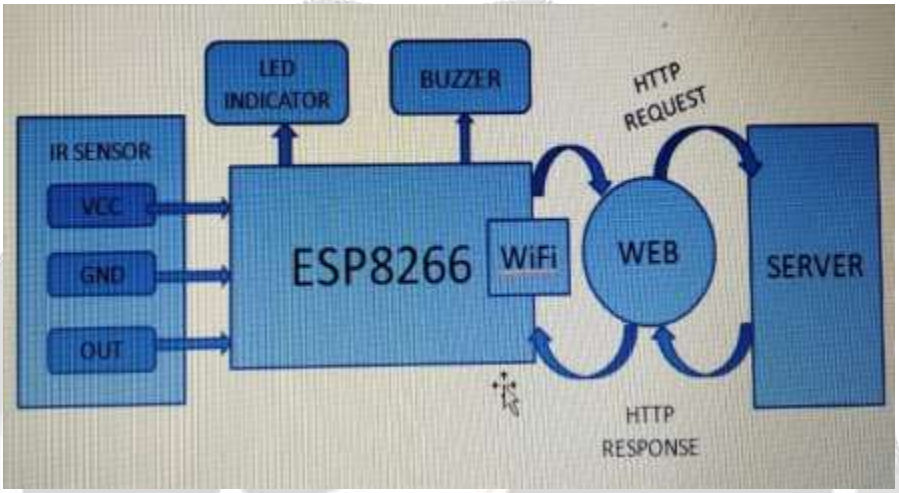

Fig -2: General Architecture of Proposed System

3. COMPONENT USED

The automatic gadget control system consists of different hardware components that can be used for sensing, processing and controlling of appliances. These hardware components are discussed below

3.1 LED:

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor.] White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device. Appearing as practical electronic components in 1962, the earliest LEDs emitted low-intensity infrared light. Infrared LEDs are used in remote-control circuits, such as those used with a wide variety of consumer electronics. The first visible-light LEDs were of low intensity and limited to red. Modern LEDs are available across the visible, ultraviolet, and infrared wavelengths, with high light output. Early LEDs were often used as indicator lamps, replacing small incandescent bulbs, and in seven-segment displays. Recent developments have produced high-output white light LEDs suitable for room and outdoor area lighting. LEDs have led to new displays and sensors, while their high switching rates are useful in advanced communications technology.

3.2 Buzzer:

A buzzer or beeper is an audio signaling device which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke..

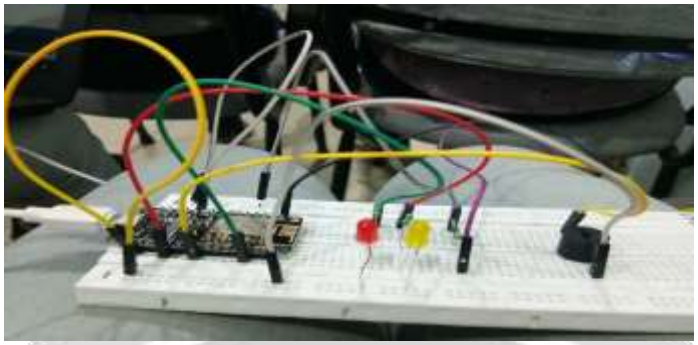

Fig -2: Hardware Connection with LED Light and buzzer

3.3 IR Sensor:

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.These types of sensors measure only infrared

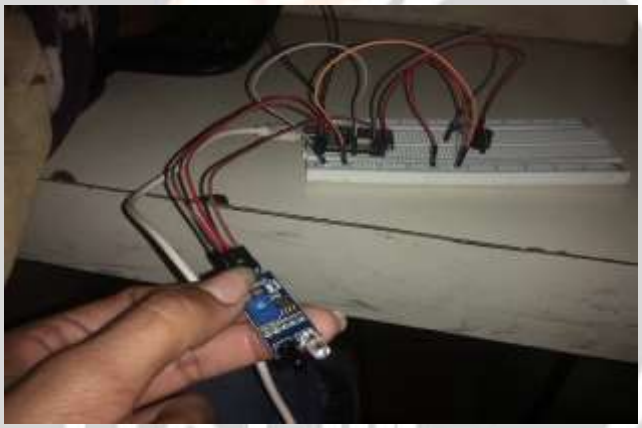

Fig -3: Hardware Connection with IR Sensor

radiation, rather than emitting it that is called a passive IR sensor. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode that is sensitive to IR light of the same wavelength as that emitted by the IR LED.When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

4. LITERATURE SURVEY

Nisha S.Punekar et al. proposed a system for the safety of railways by detecting obstacles and tracking trains. GSM and GPS technologies have been exploited to develop a tracking system of trains. For this, sensor is mounted on the train to sample the acquired signals from GPS satellitesystems. Extracted information is processed in data processing workstation where position andsensor's velocity has computed to find the location of train. Infra red i.e. IR sensor has been deployed to detect any obstacle and alarmed the system before any casualty. The system which has been proposed has many flaws for its practical usage. As for large area coverage, the system needs repeaters to get installed which increases the complexity of system. Bandwidth provided by the GSM is shareable which may interrupt the resultant data. GPS signals may get fluctuated in dense areas which leads failure of the system or may provide inaccurate information.Furthermore, use of infrared sensors for obstacle detection is

not a reliable option for the system as it has the capability to control one device at a time and uses for short range. Transmission rate of data, provided by IR sensors is very low. So the proposed system is not an effective and reliable option to get implemented.

K.Vidyasagar et al. proposed an automated system to control barriers at railway crossings and also presented a techniqu to prevent accidents. Approached method exploited piezoelectric transducer as a vibrator sensor to operate th barriers. Use of Ultrasonic sensor ensured the presence of any illicit object on the track. Conditions, on which proposed system relies, i.e. Detection of object and positional state ofthe gate, are managed and observed at the control room via wireless communication protocol. Although the use of piezoelectric transducer and ultrasonic sensors are not the reliable option as both are sensitive to change in nature. Vibrator sensors used in this system is highly sensitive to hike in temperature whereas ultrasonic sensor may get harmed due to dust, water and in high temperature. This sensitivity of installed sensors may oscillate the overall accuracy of system.

Eric Trudel et al. proposed a method relies on acquired data to scrutinize the effect of various aspects which can influenced the protection at railway crossings and concluded the key reasons for increasing safety at rail crossings. Proposed study took the database of accidents held at Canadian rail-crossings. Analyzed result is able to spot the main factors which can highly contribute to increase the safety and prediction of collision at rail crossings. Evaluation of the efficacy of geometric characteristics and factors involving in the collision of trains and vehicles at Canadian grade crossings taken place in the paper. Investigational outcomes shown three factors i.e. DSTOPPED, area of sight and clearance distance are highly influenced constraints for accidents. Various techniques like model fusion; which merges the result of separate systems to generate a comparative result with better accuracy, has been suggested to develop an effective system. Considering a model, based on weather and time will also be helpful to develop a reliable system.

5. CONCLUSIONS

In this project, we tried to attempt to effectively introduce the concept of IOT based automatic Vehicle detection .We explain the concept of online automatic vehicle detection system. We also give the brief overview of the technologies used during the development of our proposed system. This project can be further refined and extended by introducing new and more innovative features.

6. REFERENCES

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