



# OBSTACLE DETECTION IN RAILWAY TRACK USING IOT

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*Abstract:* There are many people are using trains as their mode of transportation and train can carry many passengers at a time. The growing population needs more trains for the transportation where in which safety is the main criteria so railways are one of the primary medium of transport in India. So, the safety of the passengers has to be ensured. The proposed system is fully automated using Arduino, ultrasonic sensor, Nodemcu module. If it finds any obstacle, then the motor will stop and these sensor values are continuously monitored in webpage using Nodemcu microcontroller. Also the distance from the obstacle is printed into LCD and webpage.

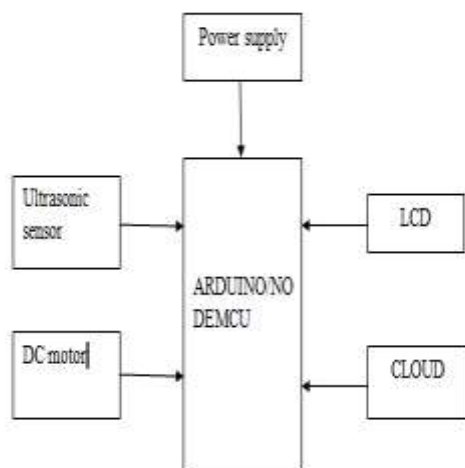
*Keywords:* Arduino, Nodemcu module, ultrasonic sensor, DC motor, Cloud.

## I. INTRODUCTION

Railway is that the hottest and friendly transportation of the most important a part of the cities within the world. Train is widely used for comfortable and safe journey during a reasonable fare. Almost 10,000 billion freight tonne-Kilo meters and quite 5 billion Passengers of rail transport are travelled round the world per years. The railway transportation plays a crucial role for business also as for leniency and safe travelling in modern life. But at every turn, the train is facing unexpected situation in travelling due to wrong signal, wrong track switching, insecure grade crossing etc. that collision are occurred. As a result, lot of damages has been wiped out economic sector with lot of causalities which affect our progress. We will avoid this unexpected collision and take prevention from the accident dynamically by using the collision detection technology during which an efficient prototype is proposed supported Internet of Things (IOT).By proper implementation of the project are going to be very useful to stop many human lives and damaging of public and personal properties. the web of things is that the system of physical objects like gadgets, vehicles, buildings and various things which are connected with electronics, programming, sensors, which empowers these objects to collect and exchange information. The web of things permits objects to be detected and controlled remotely over existing system structure. In 2014, there have been 1928 persons killed or seriously injured in railway accidents in the European Union (EU). A complete of 2213 significant train accidents were registered within the same year in EU. Train accident rates are much higher in another countries. For instance, 25,006 people died and three, 882 people were injured during a total of 28,360 railway accidents alone in India within the year 2014. When the casualties are so high it's vital that reliable and safe collision detection and prevention\ systems should be developed to stop such casualties.

## II. PROPOSED SYSTEM

At present many accidents are occurring in railways thanks to which many people are losing their lives. The rationale for accidents are obstacles on the railway track, broken railway tracks and sometimes human intervention. The proposed system is implemented using Arduino, Ultrasonic sensor, Nodemcu iot module. If it finds any obstacle, then the Motor will stop and these sensor values are continuously monitored in webpage using Nodemcu microcontroller. Also the space from the obstacle is printed into Lcd and webpage. The proposed system solves of these issues by fully automated obstacle detecting system for railways that ensures the passengers security and avoid railway accidents.



### Arduino Uno

Arduino is an Open Source electronic prototyping platform supported flexible easy to use hardware and software. The Arduino version is 1.0.5 wont to send the knowledge about the train status with the assistance of sensors. It consists of the Arduino code in c-programming. The system should contain certain software to run and accept the code.

### Microcontroller ESP8266

When prototyping new Iot equipment, development boards like Arduino and Raspberry Pi are popular options. These development boards are fundamentally minicomputers that a traditional PC or Mac can hook up with and program. The planning boards can then connect and regulate sensors within the field after it's been programmed. The planning boards need how to attach to the web because the "I" in IoT stands for internet. The Node cu (Node Micro Controller Unit) is an open source software and hardware development environment round the ESP8266, a really inexpensive system-on - chip (SoC) environment. The ESP8266, designed and made by Espressif Systems, involves all the most parts of recent pcs: CPU, RAM, networking (Wi-Fi), and even a modern OS and SDK. This makes it an excellent choice for IoT initiatives of all kinds.

### Servo Motor

The servo motor is really an assembly of 4 things: a traditional DC motor, a gear reduction unit, a position-sensing device and an impact circuit. An electrical motor may be a machine which converts electrical input energy into mechanical output energy. The output power of the DC motor is measured by applying brake. A DC motor's speed are often controlled over a good range, using either a variable supply voltage or by changing the strength of current in its fieldwindings. Small DC motors are utilized in any appliances.

### Power supply

Here four channel relay is employed as power supply. Whenever the brake is applied it will automatically move backwards. A relay is an electromagnetic switch operated by a relatively small current which will activate or off a way larger current.

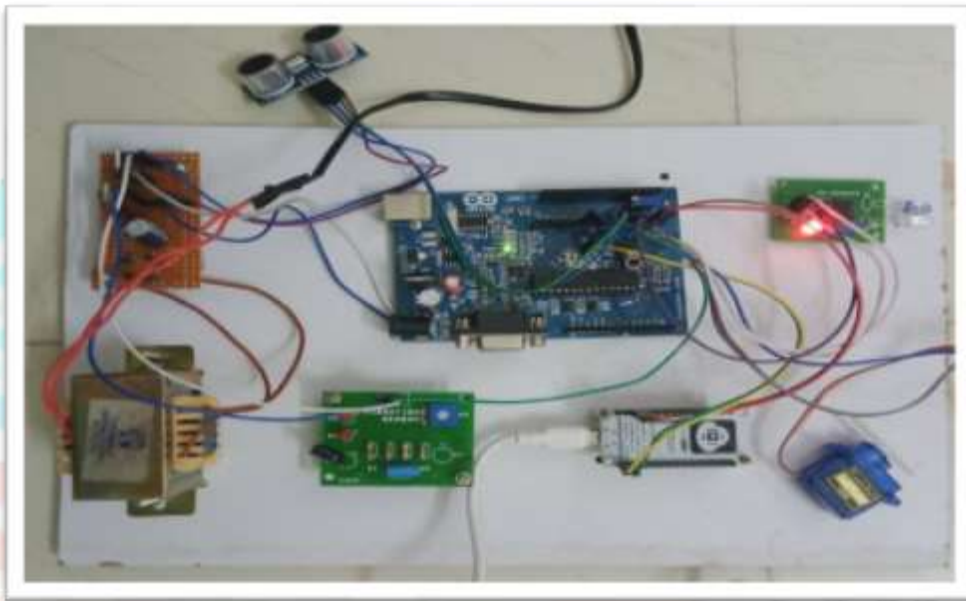
### Ultrasonic sensor

Ultrasound sensor may be a high frequency sound sensor. It produces frequency higher than 20 kHz. Which is non hearable for person. Usually ultrasound transducer devices convert the sound into ultra sound. It'll enable to seek

out an object into selected range. Its count an object as an obstacle if the thing like as humans, vehicles, big trees or quite bigger object. In air sound speed 345 m/s approximately, in water the speed of ultra sound is 1500 m/s approximately and in metal the speed of ultra sound is 5000 m/s approximately. The Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver module.

### III. RESULT AND DISCUSSION

The proposed system is one of the efficient and dynamic systems for collision, obstacle detection and anti-collision system. The technology used is IOT with an embedded system. The IOT is used to detect the location of the obstacle on the track and the measured distance from sensor end to track. If there is no obstacle then it will show green signal and display track clearance message. If obstacle is detected then it will give a warning with the help of a buzzer and red signal. Then it displays the distance of the obstacle from the train. In this Anti-Collision Device (ACD) there is a switch for reverse mode. If an automatic mode is activated then the emergency brake is initiated. The train will stop automatically and it will move backward for few distances. On the manual mode, the decision depends upon Loco-pilot.



### IV. CONCLUSION

The system is proposed supported Internet of Things. We developed a prototype for this and successfully verified the thing detection in railway track. It user friendly, and has required options, which may be utilized by the user to perform the specified operations. The goals that are achieved are less human involvement, efficient management of railway gates, Cost effective, Easy construction of the sensors on the track, reduced errors thanks to human intervention. Portable and versatile for further enhancement.

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