



IoT Based Railay Tracking System

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ABSTRACT

This paper proposes the design of crack finding robot car in the railway tracks. In India rail transportation engage a major pose in asset with the essential transportation to maintain necessities of a briskly emergent financial system. At present, India possesses the 4th major railway net in the globe. Railways are therefore a dangerous option for travel. It has proven inappropriate for the control system currently in use in Indian railways. Therefore, there is a need to have new technology which will be vigorous, well organised and stable for both crack detection in railway track as well as objector things detection. A robust monitoring system has been suggested and clarified in this paper to address the shortcomings of the existing rail surveillance system to detect cracks of the railway tracks. To detect cracks & broken track in railway track. To design & develop IoT enabled Robo-Car. To inform Railway Controller about cracks & damaged track information when detected by the ro-bot. To send all the information through wireless communication based devices. Designing the project to overcome this problem. This robot includes two ultrasonic sensors, GPS Sensor, Node MCU ESP8266 Wi-Fi Module, Lead Acid 12V/1.3Ah Battery, 16x2 LCD Display, 12V DC Geared Motor, Motor Driver Module L298N,Buzzer.

Keywords: Crack Identification, Two Ultrasonic Sensors, Node MCU ESP8266 Wi-Fi Module, Safety Management, GPS Sensor, Railway Supervision.

I. INTRODUCTION

The Indian Railways consists one of the largest railway networks in the whole world , crises-crossing over **1,15,000** km in distance , all over India . The Indian railway network today has track length of **113,617** kms (70,598 mi) over a route of **63,974** kms(39,752 mi) and **7,083** stations. In **28 may 2010** due to the damage of rail track **148 passengers** were died and In 12 July 2013 because of the rail track crack 6 people were confirmed death and nearly **200** were injured. The main problem about a railway analysis is detection of cracks in the structure. Indian railways is not up to the global standards. Among other factors, the cracks are developed on the railway tracks due to absence of the inefficient timely detection. These type of incidents motivate us to think over the above mentioned issue and take necessary steps to protect those lives. Through our proposed system, we need to establish more modern and secure railway system .This is a era of automation which is broadly defined as replacement of manual effort by electronics and robotization in all degrees of automation. Degree of automation are of two types, (a. **Full automation** and b. **Semi automation**)[1, 2]. In previously existing system, the work is to be done by hand rather than automatically or electronically, but the proposed system has a robot which will run automatically on the tracks.

II. Related work

This section will present existing literature review. In other existing works, Mohsen et al. Proposed a new location based authentication system. In their work they used mobile coupon system. In this service, users receive mobile coupons based on their location information from nearby stores[3]. in author presented a framework named Hidden fear, that based on effectiveness of social media[4]. .Internet based backup technique to store client data[5]. It protects data from free riders and disrupter attacks. However, it can't detect data modifications or data changes. Schwarz et al. presents a new model to check the security of data in distributed storage systems. It verifies the large amount of data with minimum bandwidth in distributed storage systems. However, in this scheme the server can access linear no of file blocks per each challenge. Filho et al. Describes a secured hash function to prevent cheating in a P2P system, however it is unusable when a file is large. Shah et al. Proposed a new scheme, which allows Third Party Auditor (TPA) to keep on-line storage honesty with hash values computed by user on encrypted file. However, this scheme works only for encrypted files. Recently, Mohsen ahmadi a homomorphic distributed verification scheme using Pseudorandom Data to verify the storage correctness of user data in the cloud[2].

III. METHODOLOGY

Hardware

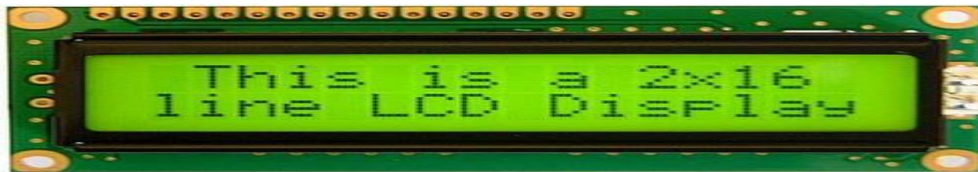
- **Microcontroller: NodeMCU ESP8266 Wi-Fi Module:** NodeMCU is an open source development board and firmware based in the widely used ESP8266 -12E WiFi module. It allows you to program the ESP8266 WiFi module with the simple and powerful LUA programming language or Arduino IDE.



- **Ultrasonic Sensor: The HC-SR04** is an affordable and easy to use distance measuring sensor which has a range from 2cm to 400cm (about an inch to 13 feet). The sensor is composed of two ultrasonic transducers. One is transmitter which outputs ultrasonic sound pulses and the other is receiver which listens for reflected waves. It's basically a SONAR which is used in submarines for detecting underwater objects.



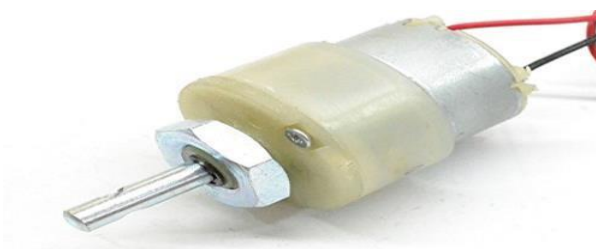
- **Lead Acid 12V/1.3Ah Battery**



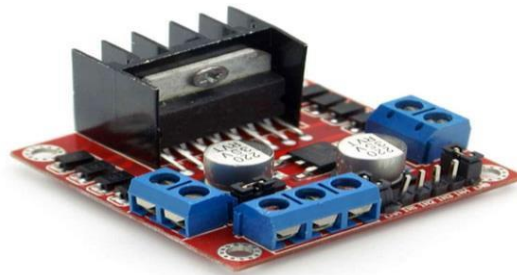
- **16x2 LCD Display**
- **GPS Sensor:** GPS sensors are receivers with antennas that use a satellite-based navigation system with a network of 24 satellites in orbit around the earth to provide position, velocity, and timing information.



- **12V DC Geared Motor:** Geared DC motors can be defined as **an extension of DC motor** which already had its Insight details demystified here. A geared DC Motor has a gear assembly attached to the motor. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. 12v DC motor with maximum **1.5A capacity can generate 18W of power**. 12v DC motor with maximum 3A capacity can generate 36W of power.



- **Motor Driver Module L298N:** The L298N is an integrated monolithic circuit in a 15-lead Multiwatt and PowerSO20 packages. It is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic level and drive inductive loads such as relays, solenoids, DC and stepping motors. Two enable inputs are provided to enable or disable the device independently of the input signals. The emitters of the lower transistors of each bridge are connected together and the corresponding external terminal can be used for the connection of an external sensing resistor. An additional Supply input is provided so that the logic works at a lower voltage.



- **Buzzer:** When power is applied, current runs through the coil of wire inside the buzzer, which produces a **magnetic field**.....By oscillating the signal through the coil, the buzzer produces a fluctuating magnetic field, which vibrates the disk. This movement makes the buzzer sound.



Software

- **Front End**
 - HTML & CSS
- **Back End**
 - PHP & MySQL
- Arduino IDE: Arduino Programming

IV. RESULTS AND DISCUSSION

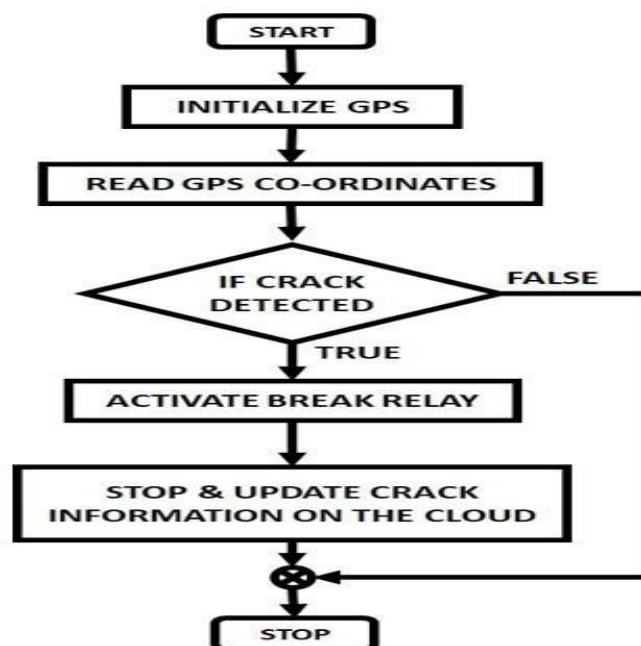


Figure 2: Flow Chart

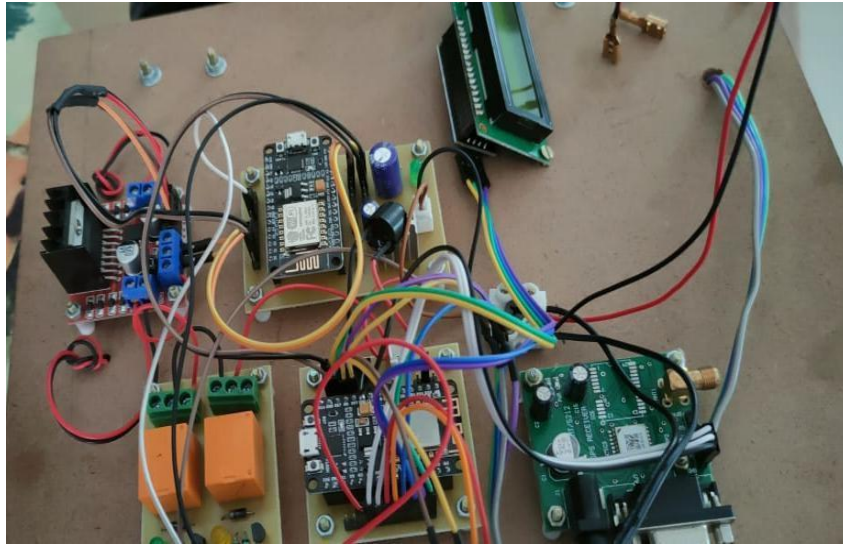


Figure 3: Robot Car model

V. CONCLUSION

Crack detection by this method can be done during both day and night time and exact location of fault can be obtained. Hence we conclude that by this process we can easily inform Railway Controller about cracks & damaged track information when detected by the bot. And by using Cloud computing and http protocol for the data transmission the work will be done more easier.

VI. REFERENCES

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