REVIEW PAPER ON RAILWAY TRACK CRACK DETECTION ROBOT USING IOT

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ABSTRACT

In India railways transportation service is the cheap and the majority convenient mode of passenger transport and also for long distance and suburban traffic. 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. In country like India, where majority of people depend on railways for transportation, if a crack in railway track is not detected during the early stages they may lead to derailment causing heavy loss to human life and property. Almost 24 million passengers use the railway system on a daily basis. The main cause of the accidents happened in railways are railway track crossing and unrevealed crack in railway tracks. Therefore, there is a need to have new technology which will be robust, efficient and stable for both crack detection in railway track as well as object detection. Our work involves a project that aims of designing a railway crack detection system (RCDS) using Ultrasonic Sensor, GPS (Global Positioning System) and Node MCU ESP8266 Wi-Fi module whose implementation is an efficient method of detecting the cracks which is present in the tracks and thus avoiding derailment of the trains. Crack detection by this method can be done during both day and night time and ex act location of fault can be obtained.

Keyword : *Crack detection; GPS; Ultrasonic sensor; Railway track; Node MCU ESP8266 module.*

1.   INTRODUCTION

Railway is one of the most significant transportation modes of our country but it is a matter of great sorrow that, railway tracks of our country are very prone. That's why, a vast number of accidents are occurred every year due to this primitive type of railway tracks and as the consequences of those accidents we lose huge number of lives every year.

These types 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.

The Rail transport is growing at a rapid pace in India. It is one of the major mode of transport but still our facilities are not that accurate, safer as compared to international standards. A survey on the internet states that

about 60% of all the railway accidents is due to derailments, recent measurements shows that about 90% are due to cracks on the rails. Hence, it is not safer for Human Life. This needs to be at the utmost attention. These goes unnoticed and the properly maintenance of tracks is not done. In previously existing system, the work is to be done manually, but the proposed system has a robot which will run automatically on the tracks.

2. PROBLEM STATEMENT

- The principal problem is the lack of cheap and efficient technology to detect problems in the rail tracks and course, the lack of proper maintenance of rails which have resulted in the formation of cracks in the rails.
- In previously existing system, the work is to be done manually, but the proposed system has robot which will run automatically on the tracks.
- System having LED and LDR sensor assembly, but the main disadvantage is that the LED and LDR must be placed opposite to each other and also the environment needs to be perfect to detect the track.
- The existing system is slow ,tedious, and time consuming.

2.1 PROPOSED SYSTEM

- To overcome the above disadvantages, here sensers are used, which will detect the crack accurately.
- This system has GPS module which will give the real time location to the nearest railway station.
- The prototype of testing tracks and this prototype takes the power supply from a 12v battery.
- Cloud computing and http protocol for the data transmission.

3. LITERATURE SURVEY

1) Designing of Improved Monitoring System for Crack Detection on Railway Tracks

Author- Nilisha Patil1 , Dipakkumar Shahare1 , Shreya Hanwate1 , Pranali Bagde1 , Karuna Kamble1 , Prof. Manoj Titre2. Published-April 2021

In this paper, we present an automated system based on microcontroller and sensors to overcome the problem of faults in tracks and to identify the moving object or animal on the tracks. The system designed is an autonomous robot consist of PIR and Ultrasonic sensors, coupled with GPS and GSM for providing the real time alert.

2) Detection of Crack in Railway Track using Ultrasonic Sensors

Author- Anushree B.S, Priyasha Purkayastha, Anjali Girgire, Anjana K,Ruma Sinha. Published-May 2017

This paper a crack detection system is proposed which detects the crack without human intervention and sends the location of fault to the authorized personnel using GSM. Crack detection by this method can be done during both day and night time and exact location of fault can be obtained.

3)   Automatic Railway Track Crack Detection System

Author- Rahul Singh, Leena Sharma, Vandana Singh , Vivek Kr. Singh. Published- May 2020.

Aims of designing a railway crack detection system (RCDS) using Ultrasonic

Sensor, The GSM (Global System for Mobile Communications), GPS (Global Positioning System) and Arduino based module whose implementation is an

efficient method of detecting the cracks which is present in the tracks and thus avoiding derailment of the trains.

4)   Railway Track Crack Detection

Author- Arun Kumar R, Vanishree K, Shweta K, Nandini C, Shweta G. Published-2020

This project discusses a Railway track crack detection using sensors and is a dynamic approach which combines the use of GPS tracking system to send alert messages and the geographical coordinate of location. Arduino Microcontrollers used to control and coordinate the activities of this device. The main aim of the project is to design the railway crack detection using ultrasonic sensors.

3.1 PURPOSED BLOCK DIAGRAM

- The main cause of the accidents happened in railways are railway track crossing and unrevealed crack in railway tracks.
- Therefore, there is a need to have new technology which will be robust, efficient and stable for both crack detection in railway track as well as object detection.
- Our work involves a project that aims of designing a railway crack detection system (RCDS) using Ultrasonic Sensor, GPS (Global Positioning System) and NodeMCU ESP8266 Wi-Fi module whose implementation is an efficient method of detecting the cracks which is present in the tracks and thus avoiding derailment of the trains.Crack detection by this method can be done during both day and night time and exact location of fault can be obtained.
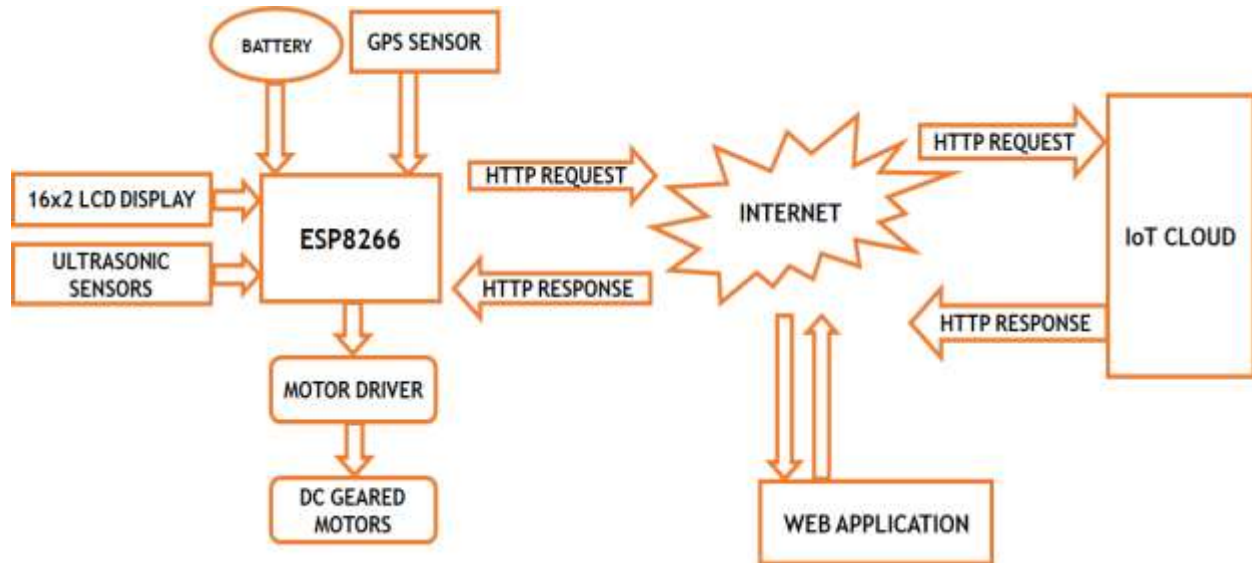
Fig -1: *Block diagram*

4. CONCLUSIONS

As per the study the existing systems are time consuming as well as uneconomical. The proposed system is not only overcome these problems but also improve accuracy and crack detection in rails.

5. REFERENCES

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