"REVIEW: ON CRACK DETECTION TECHNIQUE FOR RAILWAYS TRACK BY USING IR SENSORS"

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Abstract

In India the train service is the cheapest and easiest way to transport passengers as well as long distance and urban traffic. The main cause of cracks and other rail problems is often overlooked due to improper maintenance and unusual track line monitoring that accidents on railway tracks vary according to the current situation. Crossing a railway track and cracks not exposed on railway tracks. Therefore, there is a need for new technologies that will be robust, efficient and stable in both the detection of cracks in the railway line and in the acquisition of objects. Today the system has some limitations, if the bridge or track is damaged, that information goes to the people in the train station, informing and informing the corresponding trains will take more time to disseminate that information.

Keywords: GSM Module; Arduino Microcontroller; IR sensor; voltage sensor; ultrasonic sensor; Railway Track

Introduction

In India, railway transportation service is the cheap and the majority convenient mode of passenger transport and also for long-distance and suburban traffic. 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 to object detection. This project discusses a Railway track crack detection using sensors and is a dynamic approach that combines the use of a 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 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. However, with regard to reliability, dependability, and passenger safety of 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 Our work involves a project that aims of designing a railway crack detection system (RCDS) using an Ultrasonic Sensor, Voltage Sensor, IR Sensor, The GSM (Global System for Mobile Communications), and Arduino based module whose implementation is an efficient method of detecting the cracks which are present in the tracks and thus avoiding derailment of the trains. In this project, we are using an ultrasonic sensor which is used to find the crack in the railway track and also capable of alerting the authorities in the form of SMS messages along with location by using GPS and GSM modules.

Fig.1. Railway crack on track

I. TYPES OF SENSOR

A. *Ultrasonic sensor*

Fig.2 *Ultrasonic sensor*

The ultrasonic sensor is an electronic device that detects a specific object's distance by generating ultrasound sound waves and transforms the sound transmitted into an electrical signal waves. Ultrasonic waves can travel quicker than electrical signal. Ultrasonic Sensor The ultrasonic sensor HC SR04 has a module of 4 pins whose pin names are Vcc, trigger, ground and echo.

B. *IR Sensor*

IR sensor is used to detect the crack in railway track. Infrared (IR) transmitter is one type of LED which emits infrared rays generally called as IR Transmitter. The transmitted light rays are received by IR receiver on adjacent side. IR transmitter and receiver should be kept parallel and adjacent to each other so that transmitted light can fall on receiver straight. Then the LCD display is used to view the result.
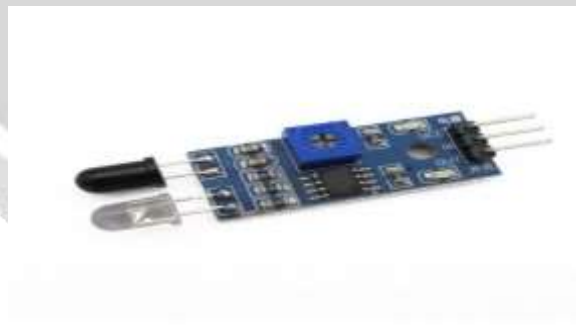

Fig.3 Ultrasonic sensor

C. *Voltage Sensor*

The microstructural changes induced in a thermal or stressed environment and cracked region of railway track often degradation of the mechanical properties of material. The Voltage Sensor (fluxgate sensor) can be used either to detect magnetic fields created by current passing through conductors or to detect localized magnetic fields non-destructive testing applications. The occurred discontinuity resulting from a crack also produces disturbance in the magnetic field in the material, and the magnitude of the disturbance is deter- *corresponding author mined by the size and shape of the crack. The Voltage Sensor (fluxgate magnetic field sensor) with amorphous ferromagnetic core can be to capture cracked regions in the railway track.
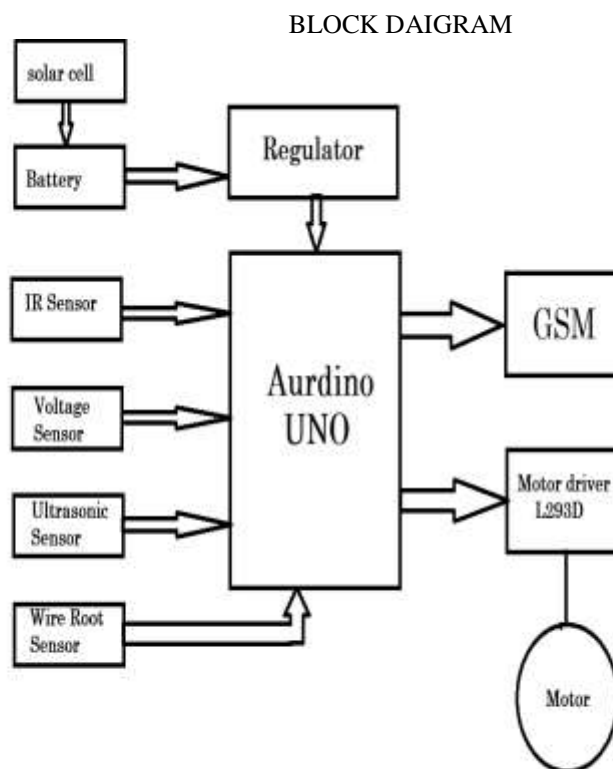
BLOCK DAIGRAM

Fig.3 Crack Detection On The Railway Track Using Multi Sensor

As supply given to the Arduino Uno this will be activate and at the same time all sensor will be active. Initially the tracks are being continuously monitored with the help of sensor, which is used to detect the crack in the track. IR sensor detect the obstacle presents front of the vehicle. As any obstacle comes in front of vehicle IR sensor sense the Signals to the Arduino Uno and this will generate the output 0 and vehicle will be stop. Voltage sensor mainly works as magnetic signal sensing device. When any crack present on the track it will sense by the voltage sensor and give the signal to Arduino Uno and it will generate 0 output and then stop the vehicle. All sensors works same but in different manner. As any one output comes 0 from all four sensors vehicle will stop and give the massage to the control room by using GSM module.

CONCLUSION

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. It is the most economical solution provided in order to achieve good results of railways of our country in order to minimize the stats of accidents caused. There by possible to save precious lives of passengers and loss of economy. It also saves the time and money for identification of crack. It is possible to save precious lives of passengers and loss of economy. It also saves the time and money for identification of crack.

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