IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 11, Issue 3, March 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.282

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 3, March 2022 ||

DOI:10.15662/IJAREEIE.2022.1103021

Railway Track Crack Detection System Using Aurduino

Abhishek Rangari, Samyak Meshram, Sagar Kotkondawar, Dr. J. P. Sathe, Dipali Nankate, Eshakha Sarve

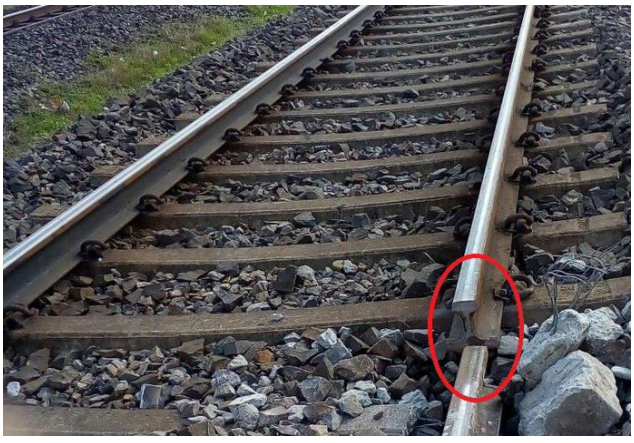
Department of Electrical Engineering, Priyadarshini College of Engineering. Nagpur, India

ABSTRACT: In India railroads transportation administration is the modest and the larger part helpful method of traveler transport and furthermore for significant distance and rural traffic. The fundamental driver of the mishaps occurred in rail lines are rail route track crossing and concealed break in rail line tracks. In this manner, there is a need to have new innovation which will be hearty, effective and stable for both break discovery in rail line track as well as article location. This task examines a Railway track break identification utilizing sensors and is a unique methodology which consolidates the utilization of GPS global positioning framework to send ready messages and the topographical direction of area. Arduino Microcontrollers used to control and facilitate the exercises of this gadget.

I. INTRODUCTION

Rail route is one of the main transportation methods of our nation however it involves extraordinary distress that, railroad tracks of our nation are extremely inclined. That is the reason, countless mishaps are happened consistently because of this crude sort of rail route tracks and as the outcomes of those mishaps we lose enormous number of lives consistently. Those mishaps propel us to thoroughly consider the issue and find essential ways to safeguard those lives. Through our proposed framework, we want to lay out more present day and secure rail line framework. Other than this, there is no such sort of innovation or framework in our country which can stop the crash between two trains coming from the other way of one another on a similar track. We really consider this matter and inspired to do as such. Additionally cataclysmic event can toss any item on the rail track which can't be eliminated rapidly in the far off region. We supposed in the event that our framework can recognize those item or obstruction and illuminate to the control room then they can find vital ways to stay away from mishap.

The Rail transport is developing at a quick speed in India. It is one of the significant method of transport yet our offices are not that precise, more secure when contrasted with global guidelines. Thus, it isn't more secure for Human Life. This should be at the greatest possible level of consideration. These goes unrecognized and the appropriately upkeep of tracks isn't finished. This framework has GSM and GPS module which will give the continuous area or directions as Short Message Service (SMS) to the closest rail route station.



II. OBJECTIVE

1. The main objective is to locate the gaps in the railroad tracks and to determine if there are any hazards in the tracks to avoid and dissuade accidents.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 3, March 2022 ||

DOI:10.15662/IJAREEIE.2022.1103021

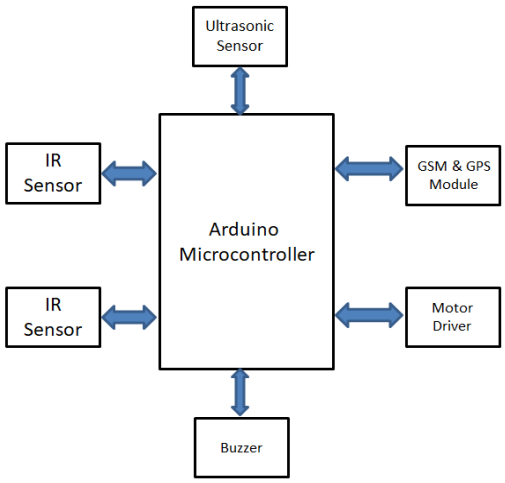
2. This type of model provides a cost-effective solution to the railroad crack detection problem by using a ultrasonic sensor and a IR sensor joint that responds to the exact situation of the faulty track, as well as forwarding the information to the control room via SMS, so that any incidents can be gridlocked.

III. LITERATURE SURVEY

This framework is basically worried in recognizing the breaks in rail route tracks and assists with forestalling the mishaps without manual power. It's focused on tracking down harmed tracks as well as supportive to figure out the crash and the specific spot where it is. In these specialized arrangements presented by many organizations in the location of breaks in rails include intermittent upkeep combined with infrequent checking typically one time each month or in a comparative time period. Be that as it may, the mechanical technology has the inborn benefit of working with observing of rail tracks consistently during evenings, when the typical train traffic is suspended. Further, that the straightforwardness of this thought and simple accessibility of the parts make for execution for a huge scope with very little beginning venture.

The effortlessness of this work guarantees strength of activity and furthermore the plan has been painstakingly changed to allow rough activity. One more burden that can be ascribed to the customary financially accessible testing hardware's is that they are weighty which represents a pragmatic impediment. This significant hindrance has been corrected in mechanical technology project as the plan is basic and reasonable empowering the gadget to be effectively convenient. While planning the mechanical pieces of the robot, due thought has been given to the variable idea of the tracks and the one of a kind difficulties moved by the deviations in the Indian situation. For instance, in regions close to street intersections the external piece of the track is generally covered with concrete. Additionally, there is generally the issue of rocks impeding the way within parts of the rails. So the particular wheels that have been given in robot that has considered and are explicitly intended to conquer this previously mentioned issue. The rail line track break discovery is utilized to recognize the break whiles the train running on the track

BLOCK DIAGRAM



- 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.

- Arduino UNO R3

Arduino is an easier-to-use, programmable circuit with open source hardware and software. It is very strong in nature, and can effectively support devices. This concentrates on the ATmega328. It has 14 digital I / O connectors,6

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 3, March 2022 ||

DOI:10.15662/IJAREEIE.2022.1103021

analog outputs, a USB interface, an ICSP connector, a power jack and a reset switch.Attaching it to the laptop via an USB connection or attaching an AC/DC power source can able to provide the power that is needed to run the card.

- GSM Module

The module GSM SIM 900 (Global mobile communication system). A GSM module is a designated device with a serial link, USB, Bluetooth or a mobile phone which offers support for GSM modems. A GSM module allows programs like SMS to transmit and receive messages over the modem interface.

- GPS Module

The Global Positioning System is denoted as GPS, It is a satellite communication system used to identify a path of an object on the earth.

- IR Sensor

The infrared sensor module is equipped with an integrated IR transmitter and IR receiver which sends IR energy and checks for reflected IR energy to identify any cracks between the track.

- Motor Driver

The Motor Driver is a module for monitoring the motor movements.

- Buzzer-

A Buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezo electric. Typical uses if buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

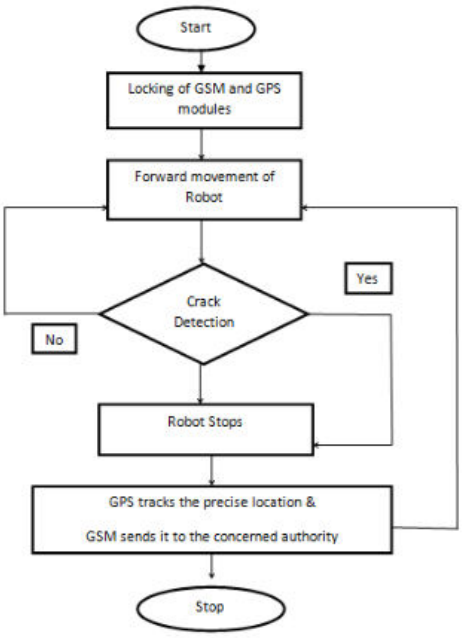
V. WORKING PRINCIPLE

In our venture, there are two arrangement of IR sensor units fitted to the different sides of the vehicle. This unit is utilized to actuate/deactivate Arduino transmitter unit when there is any breaks in the track. The IR transmitter and IR recipient circuit is utilized to detect the breaks. It is fixed to the front sides of the vehicle with a reasonable game plan.
Whenever the vehicle is Powered On, it moves along the model track. The IR sensors screen the state of the tracks. In typical condition the engine, LDR, Serial transmission is in starting stage. At the point when the battery power supply supplies the microcontroller then its turning over the engine in forward heading and sequential transmission is utilized to send the messages to the microcontroller.
At the point when a break is recognized by the IR sensor the vehicle stops without a moment's delay, and the GPS collector locates the place of the vehicle to get the Latitude and Longitude directions of the vehicle position, from satellites. The Latitude and Longitude arranges got by GPS are changed over into an instant message which is finished by microcontroller. what's more, sent through the GSM regulation to the base station.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 11, Issue 3, March 2022 ||

DOI:10.15662/IJAREEIE.2022.1103021

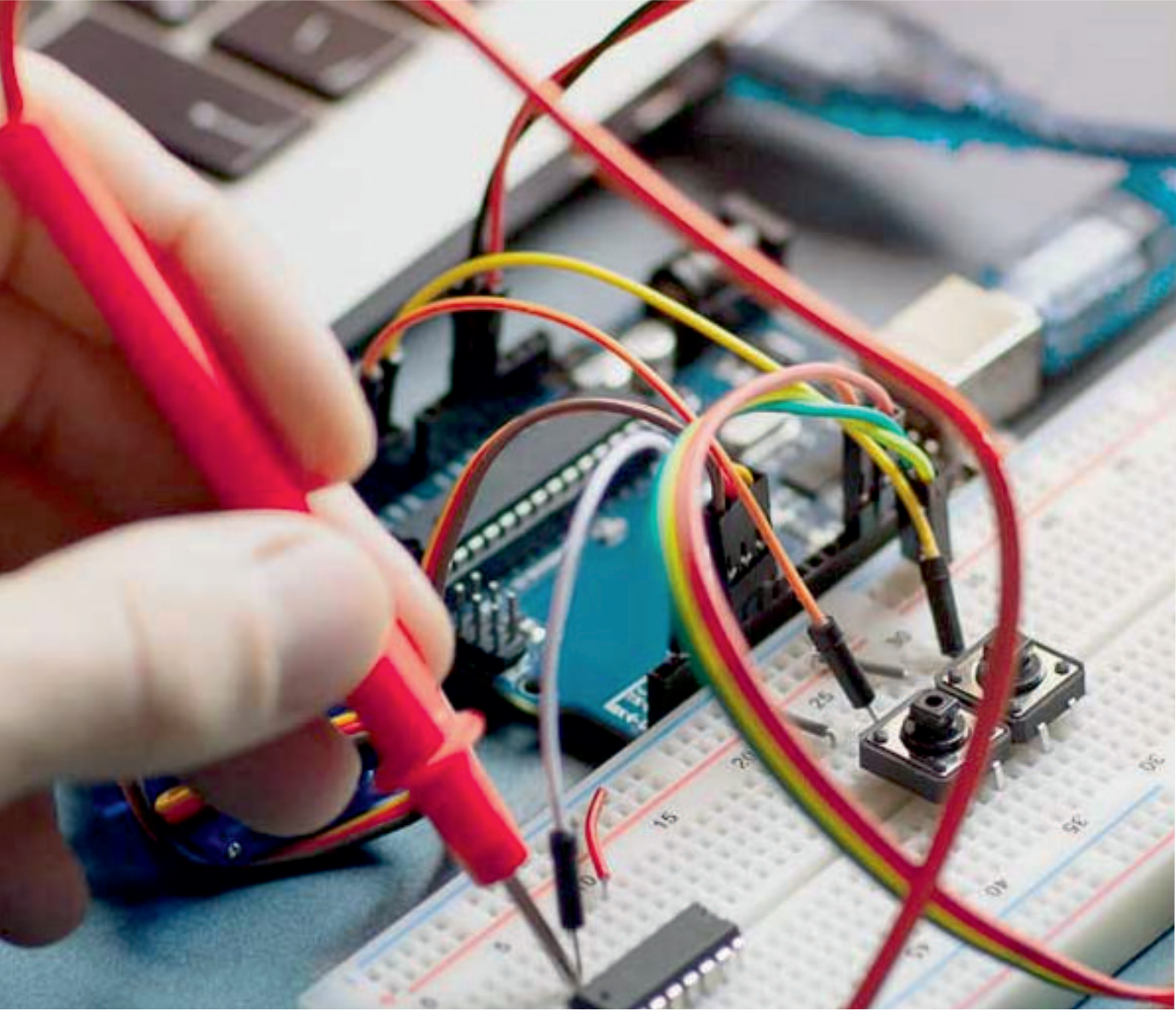


VI. CONCLUSION

The motivation behind this Automatic Crack discovery framework is to give a minimal expense, simultaneously a precise mechanized framework to recognize a wide range of the break present in the rail line track. Our robotized robot had the option to recognize the external breaks present on the track utilizing an IR sensor, then it helps the specific area through the GPS module and is shipped off a cell phone as a SMS by means of a GSM module. The information got is put away in a cloud data set. This robotized framework can recognize breaks created outwardly as well as inside consequently keeping away from wrecking of trains which brings about countless fatalities consistently.
The uniqueness of our framework is that it recognizes the external surface break as well as the inward surface breaks, making it an exceptionally precise framework to distinguish, screen and keep up with rail line tracks. Execution of this framework in our Indian Railways will end up being progressive and increment the wellbeing of train developments.

REFERENCES

1. “Implementation of Railway Track Crack Detection and Protection” by N.Karthick, R.Nagarajan, S.Suresh and R. Prabhu, International Journal Of Engineering And Computer Science, Volume 6 Issue 5 May 2017.
2. “Railway Crack Detection System”, by Akhil N., Dinu Mohan, Fayis P., SijaGopinath, International Research Journal of Engineering and Technology, Vol. 3, 2016.
3. “Railway Tracks Crack Detection Based on the GSM Technique” by A. S. Muley, S B. Patil, A.H.Shelar, IRJET, 2017.
4. https://www.researchgate.net/publication/317288415_Implementation_of_Railway_Track_Crack_Detection_and_Protection



INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 7.282

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details