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IOT Based Automatic Crack Detection in Railway Track

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ABSTRACT: In this world people provide themselves various types of transportation system to travel from one place to another place. Mostly they provide importance to public transportation for safer journey. At the same time the transport departments check out the safety measures implemented in them. The proposed system is suitable for railways transportation to identify the cracks in the railway tracks earlier and prevent the accidents. In this paper to use crack detection sensor, this will be placed in the train engine. By this, if some crack is detected on the track the train starts to slow and stop at respective point automatically and exact place of crack would tend to control room. Secondly the next cause of accidents is prevented from two trains opposite in same track by using the same sensors fitted in the engine, if the sensor senses the same signal from opposite train then it automatically applies the brake and stops the train at certain distance. The derailment causes several loses in railway accidents. The proposed system introduces Bluetooth based technology, to stop the trains accident. The Bluetooth device is installed at each front of the locomotive. If the train starts to derail, automatically signal is braked and an alert is given to engine driver and on the other emergency brake is applied automatically. The main aim of the work is to avoid the train accidents without manual power.

KEYWORDS: Track Safety, Crack monitor,Testing.

I.INTRODUCTION

The cracks and other problems with the rails generally go unnoticed thanks to improper maintenance and irregular manual track line monitoring that's being administered within the current situation. Nowadays system have some limitations, if the bridge or track damaged, that information goes to railway authority people, they notify and informs to the corresponding trains it'll takes more time informing that information. In the literature survey, the commonly employed rail crack detection schemes in foreign countries are usually ultrasonic or eddy current based techniques which are the reasonably good accuracy in most cases. However, the one characteristic which the above mentioned methods have in common is that they are both expensive, which makes them ineligible for implementation in the current Indian scenario. Also, the ultrasonic can only inspect the core of materials(i.e.), the method cannot be check for the surface and near the surface cracking where many of the faults are located. Many of the foremost serious defects which will develop within the rail head are often very difficult to detect using the currently available inspection equipment. This system is mainly concerned in identifying the cracks in railway tracks and helps to prevent the accidents without manual power. It’s not only concentrated on finding damaged tracks but also helpful to find out the derailment and the exact place.

II.SYSTEM MODEL

In this paper, I have used the two tracks; each track will be monitored by one ULTRASONIC sensor. Whenever there is a crack on the track, the ultrasonic sensor senses the crack and activates IOT. The location Latitude and Longitude coordinates of the crack is sent to the predefined website. Once the crack has been successfully identified and message is sent, the vehicle moves further on the model path till next crack.

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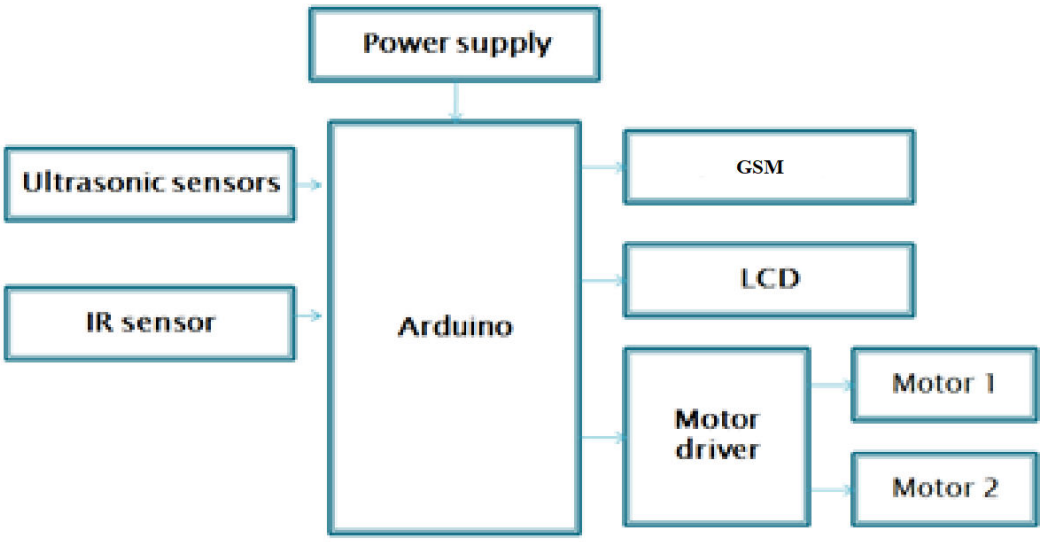

Block diagram

III.IOT CONTROL DEVICE

The IOT based automatic crack detection will enable the user to use to find a crack in a track supported Internet of Things (IoT). The through the web and therefore the crack will be detected. The user commands over the web are going to be obtained by the Wi-Fi modems. Advantages of using IoT results in Effective Customer Engagement, Technology Optimization and Reduction of Waste. The working of the vehicle is followed by,

- When the vehicle is turned on, it moves along with the model track. The ULTRASONIC sensors monitors the condition of the tracks
- When a crack is detected by the ultrasonic sensor the vehicle stops at once, and the IOT transmitter triangulates the position of the vehicle and send it to the IOT.
- Once the location has been successfully sent to the website, the vehicle resumes its movement forward depending on the type of crack.

IV.WORKING PRINCIPLE

The proposed system consists of an influence supply unit, crack detection sensor, microcontroller display unit and a motor controlling driver. The power supply to the robot is given through a 12v battery attached to it, after providing power to the system the robot is actuated. The sensor detects the cracks while traveling through the robot on the railway track. If it detects any cracks or disjoints, sends the signal to the microcontroller and microcontroller further transmit the detected signal to a LCD displaying unit for showing the number of cracks. The GPS module is additionally placed inside the system to alert the user by sending the precise location of cracks. The movement of dc motor is controlled by the microcontroller. If no input is given, then the motor remains in steady state. If only input2 is given, then the robot will move in anticlockwise direction and if input supply is given to input then the robot will move in forward direction and both inputs is given then motor will stop.

V. RESULT AND DISCUSSION

The prototype of railway route crack detection system is shown by Fig. In this paper all the sensors, microcontroller and LCD displaying unit are mounted to the movable robot. In order to detect the cracks on the railway track the robot moves on the track and sensor detects the crack if any and alert the user with the help of microcontroller. The microcontroller also controls the movement of the robot, measured distance and difference between actual and measured distance.

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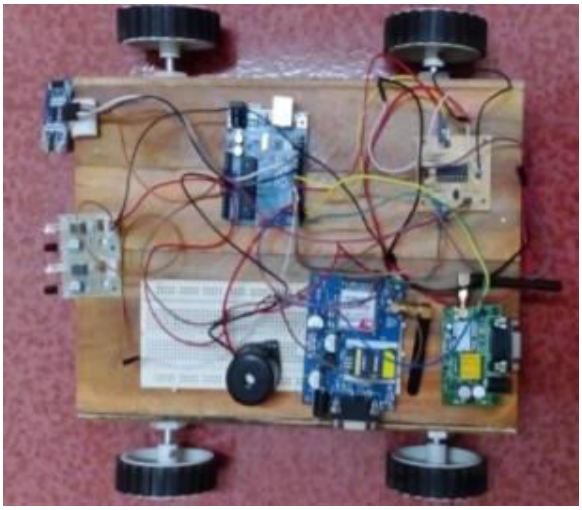


Fig. 1 Overview of Prototype

The major applications of the system are as follows:

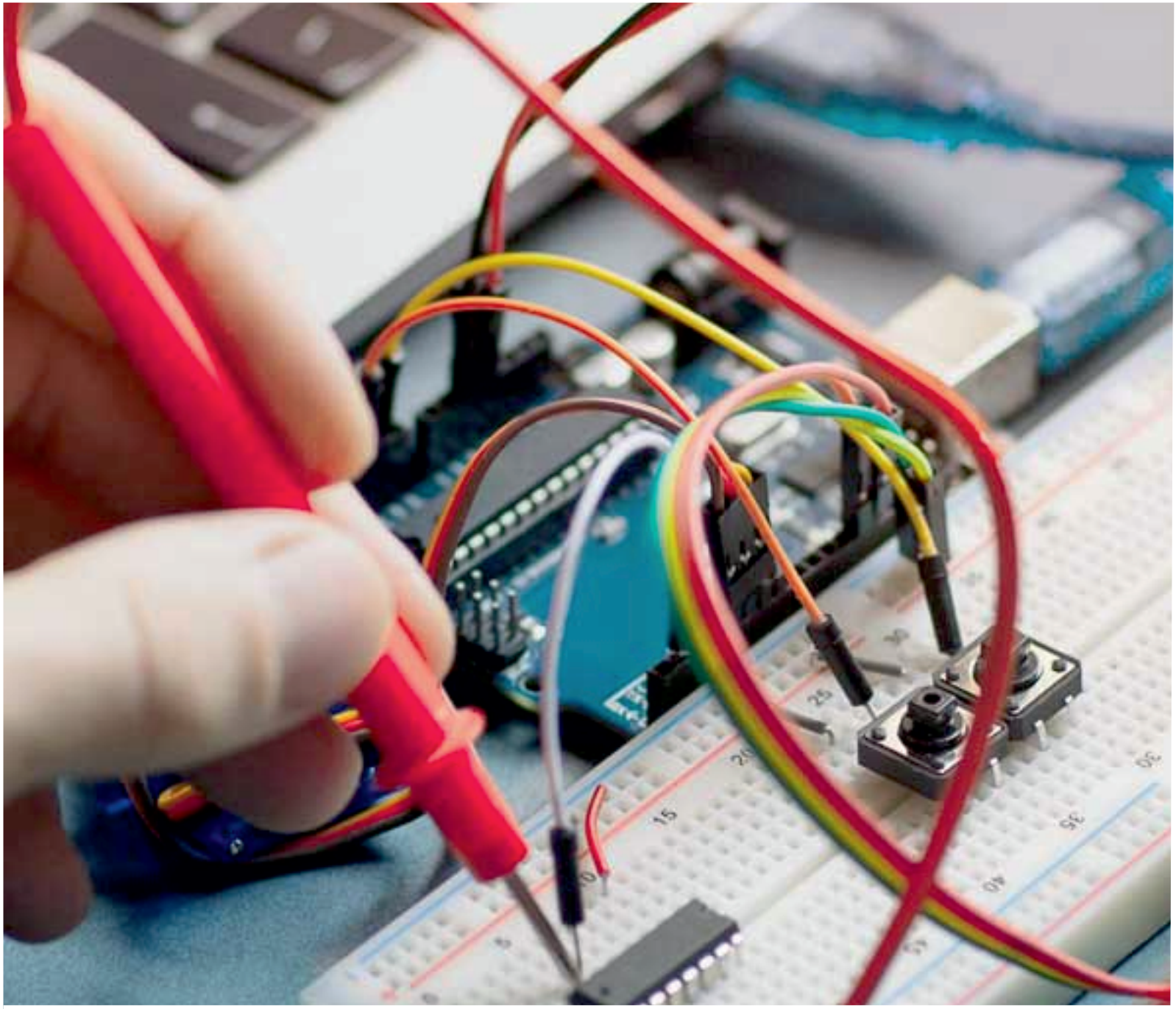
- It can be used for inspection at various important places like Automatic detection of crack on railway tracks.
- Calculation of distance of the crack from the origin.
- Automatic crack detection in forged metal plate.

VI.CONCLUSION

The prototype of railway route crack detection system is successfully designed. Large number of people travels in trains for going from one place to another due to its less reliability. In recent years, the detection of cracks in the railway lines are done manually by the workers physically going to the railway track to do inspection. These inspections waste a lot of time and is very difficult task. Hence, the proposed method eliminates these efforts made by railway staff to search the cracks. From the proposed system the time spend on detecting the cracks of railway track is reduced by 60 percent.If this system is brought in railways, the accidents could be controlled and the place of damage could be sent automatically to control room and since its completely automated system this can be used in village areas by which man power is reduced and time is saved.

REFERENCES

1. S. Sawadisavi, J. Edwards, E. Resendiz, J. Hart, C. Barkan, and N. Ahuja,"Development of a machine vision system for inspection of railroad track," in Proc. Amer. Railway Eng.Maintenance Way Assoc. Annu Conf.,2009.
2. M. Singh, S. Singh, J. Jaiswal, and J. Hempshall, "Autonomous rail track inspection using vision based system," in Proc. IEEE Int. Conf. Compute. Intel. Homeland Secure. Pers. Safety, 2006, pp. 56–59
3. J. Lin, S. Luo, Q. Li, H. Zhang, and S. Ren, "Real time rail head surface defect detection: A geometrical approach," in Proc. IEEE Int. Symp Indust. Electron. 2009, pp. 769–774.
4. R. Clark, S. Singh, and C. Haist, "Ultrasonic characterization of defects in rails," Insight, vol. 44, no. 6, pp. 341–347, 2002
5. R. Edwards, S. Dixon, and X. Jain, "Characterization of defects in the railhead using ultrasonic surface waves," NDT & E Int., vol. 39, no. 6, pp. 468–475, 2006.



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