Advanced Railway Track Alarm Security System

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Abstract— system the advancement in railway sector has also resulted in the increase of railway traffic. Because of this the number of accidents in trains/railways have also increased. Every year, almost 11 million passengers travel by train. It is therefore very much important Railway is the backbone of transport system in India. Rail accidents occur more due to derailments than collision or fire in trains. These derailments are due to cracks in the railway tracks. Therefore, there is an immense need of crack detection and security system. This paper proposes the crack detection system in the rail tracks. This is to avoid rail accidents by using latest communication technologies. In this project GSM communication protocols are used to convey the message of crack detection via SMS. Crack detection is achieved by using the concept of eddy current losses implemented in the terms of Darlington pair circuit. With the detection of cracks, the system also alerts the railway authorities facilitating the security to involve such kind of technology which reduces the train accidents and hence human's life. This paper is the analysis of various critical and unwanted situation, accidents, occurs in train system and how to prevent those accidents. In our paper we have included various approaches done by various researchers in order to avoid train accidents.

Indexed Terms— Embedded system, ZigBee, RF transmitter, Head-on collision, Rear-end collision, GPS, GSM, IR Sensors, ARM7LPC2148, AT89S52 Microcontroller.

I. INTRODUCTION

The main aim of this paper is to develop an embedded system to identifying rail track fault sending message to near station. The Transportation of train always depends on railway tracks (rails) only. If there is a crack in these rails, it creates a major problem. Most of the accidents in the train are caused due to cracks in the railway tracks, which cannot be easily identified. Also, it takes more time to rectify this problem. In order to avoid this problem, we are using detects the crack detector, which the crack in the rails and gives an alarm. The main aim of this paper is to develop an embedded system to identifying rail track fault sending message to near station through SMS. Transportation of train always depends on railway tracks (rails) only. If there is a crack in these rails, it creates a major problem. Most of the accidents in the train are caused due to cracks in the railway tracks, which cannot be easily identified. Also, it takes more time to rectify this problem. In order to avoid this problem, we are using the crack detector robot, which detects the crack in the rails and gives an alarm.

II. LITERATURE REVIEW

Kalpana Sharma, Jagdishkumawat, Saurabh Maheshwari and Neeti Jain Paper Intl. Journal of Computer Applications, Vol 96, June 2014, Pp.32-35 In this paper the following things have been studied. Like various techniques for detecting the cracks in the railway tracks. Method of inspection and maintenance with the help of a basic algorithm which uses the wireless sensors for detecting the cracks and breakages in railway tracks. which is used for the examination of foot of rails especially in those area where corrosion is likely to be occur.

V. Saravana Moorthy and G.N. Murugananthan Paper "Identification of Obstacle and Crack Finding "Railway includes the techniques for the identification of obstacles and cracks finding techniques in ay system. According to their research, the train and the trolley would include a GPS receiver which sends the location to microcontroller placed in the train. "trolley" is the safety vehicle which will travel along a railway. If somehow, due to natural cause, trolley derail, stops or slows down due to any of the reason, then the CPU

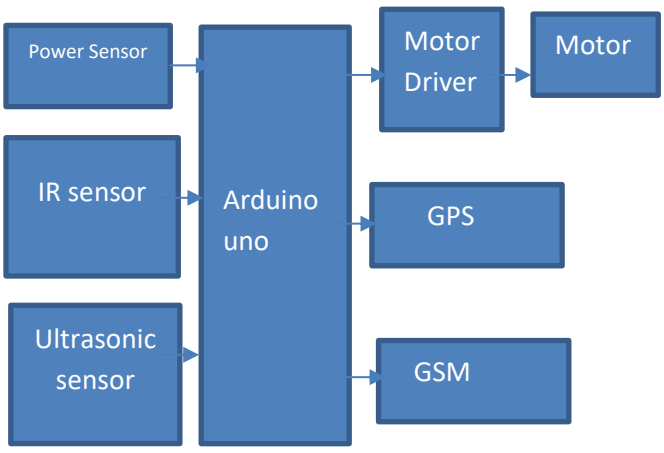
will generate commands to reduce the sped of the train so as to avoided derailing or colliding with the trolley. All this process will be enhanced by using wireless communication devices like ZigBee or RF transmitter.

Kohilawamam And R. Balamurugan Paper "The System to Prevent Train Accidents Using Android Supported Embedded Systems Proposed the system to prevent train accidents using android supported embedded systems. Such systems would be used to avoid collisions in the trains. A track ID will be given to all the railway track. Whenever the train travels it will communicate its track ID with the help of a transmitter. The train which nearest to the existing train will receive a signal through receiver. So, if two trains by mistake travels on the same track then an alert signal will be generated and given to both the railway drivers in order to stop the tram.

III. METHODOLOGY

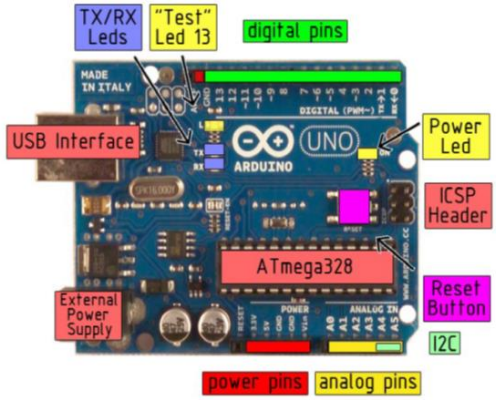
- Block Diagram

This system involves the design of crack finding for finding cracks in railway tracks. This system uses controller for interfacing the crack detection sensor and distance measuring sensor for object or human detection. The sensing device senses the voltage variations from the crack sensor and then it gives the signal to the microcontroller. The microcontroller checks the voltage variations between measured value and threshold value and controls the robot according to it.



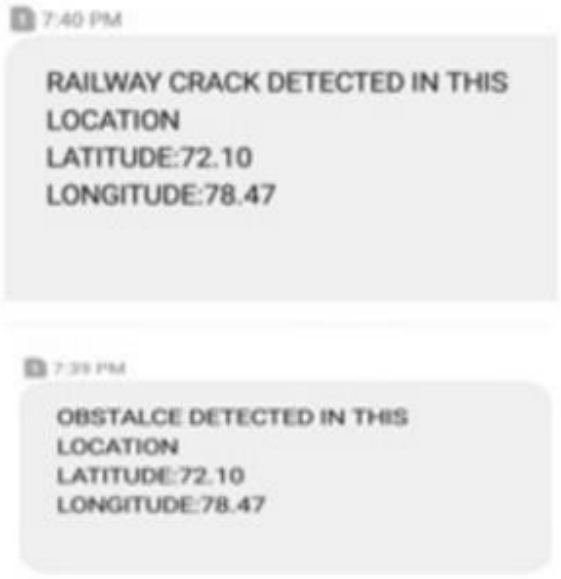
- Circuit Diagram

The model is interfaced with the microcontroller with the help of SPDT relays and driver IC. If any crack occurs in the rail, the system will be stopped and sends an alert message will be raised. This project uses regulated 5V, 750mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/18V step down transformer.



IV. RESULT

proposed system sets an example on how to use wireless network efficiently for railway track crack detection and the technology can be used at domestic and at commercial places. Instead of manual method of crack detection a more advanced technology is used to alert the railway office about the detected cracks immediately.



V. ADVANTAGES AND DISADVANTAGES

Advantages:

- Automation in railways
- Easy implementation.

Disadvantages:

- Limited to GSM signal for sending and receiving information
- Range of control

VI. APPLICATIONS

- Automation in railways.
- Can be used for Railway Department.
- Can be used for industries.
- Used in detecting applications.

VII. FUTURE SCOPE AND CONCLUSION

This proposed system can be enhanced and improved by using GSM (Global System for Mobile Communication) to send and receive SMS (short message service) from the place of detector to involved person. This method can be further used by using ACD (anti-collision devices), a Microcontroller based communication device design and developed by Konkan Railway (KR). The project "ADVANCED RAILWAY TRACK ALARM SECURITY SYSTEM" has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly using highly advanced IC's and with the help of growing technology the project has been successfully implemented. This paper shows the implementation of the railway crack detection circuit and security system.

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