Rail Defect Detection With Real Time System

Priyanka Mane[1], Jayshri Manmode[2], Kumudini Khond[3], Sagar Kawade[4], Prof. Kanchan Pradhan[5]
Dept of Computer Engineering
[1, 2,3,4,5] Shree ramchandra college of engineering

Abstract- *In this project we introduced the integration of ultrasonic and total station for railway track geometry surveying system. this project consist of GPS modules for application of communication purpose, crack detection and finding of human being present in the railway track. The GPS module and GSM modem help us to find and sending railway geometric parameter of crack detection to nearest railway station. In the present of days we are using the measurement of track distance by using high cost LVDT with less accuracy, but we use the less cost ultrasonic sensor for above process with high accuracy. We implement PIR sensor in this project to avoid manual checking of detection of presences of human being in recent trends of application. The importance of this project is applicable both day and night time detection purpose.*

Keywords- GPS module, GSM modem, Ultrosonic distance meter

I. INTRODUCTION

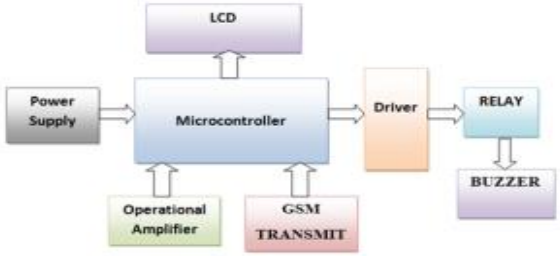
Transport is very important to carry the passengers and goodsfrom one place to another. The better transport leads to moretrade. Economic level is mainly depends on increasing thecapacity and level of transport. This paper presents animplementation of an efficient and cost effective solutionsuitable for railway application. In this paper we are going touse IR sensor to detect the crack in rail road, when the crack isdetected its latitude and longitude values are send as a messageto nearby station by using GPS and GSM service. ThenUltrasonic is used for the surveying process. Then other important component is PIR sensor it is used to detect the presence of humans in track.

II. LITERATURE SURVEY

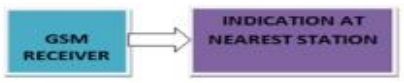
The railway transportation has a major significance in the world. It is required that the railways to be examined in more detail with theimproved railroad technology. Contact measurement technique is used to detect failures in the rails obtain low sensitivity and low accuracy rate results [1]. So it remains insufficient about meeting the needs of today's advanced railway technology [2]. The failures upon rails with advanced railway technology is identified without contact [3]. In time, the ascending wears on the rails bring about the disruption of transportation security, the off-road accidents, the interruption of the harmony between the rails and the wheels [4]. Detection of most critical components for the safe operation of trains is important [5]. The analysis of the rail profile must be repeated at regular intervals in order to prevent these situations and detect early failures that can occur in rail [6]. Nevertheless this process is costly and it needs that the railway track should be temporarily disabled [7]. The developed methods to detect failures in railway as contactless are available in literature.Shah [8], did work detection place and type of rail defect. He increased the quality of the image acquisition with controlled lighting and the use of superior computing power technology.

III. PROPOSED SYSTEM

In proposed system our project are detect the rail road crack,measuring distance for two rail road and also measure the pursuing human in the railway track. when ultrasonic sensor are used for detect the crack in the track and ultrasound sensor measure the distance between the two track . If any crack are occurred in the track means longitude and latitude of the place are messaged to the nearest station and ultrasonic sensor are measure the distance between the two track if any small variance means they detect and message to the nearest station using GPS and GSM modem. when ultrasonic sensor are detect the human being and animals on the railway track, if any one pursuing on the track means they stop the surveying work after crossing rail road they are detect the track.



(a) Transmitter section



(b) Receiver section

IV. EXISING SYSTEM

Computer vision-based condition monitoring methods, the methods are increasingly used on railway systems. Rail condition monitoring process can be performed using data obtained with the help of computers using these methods. In this study, a computer-based visual rail condition monitoring is proposed. By means of a sensor placed on top of the train the rail that the train is on and the neighbor rail images are taken. On these images, the edge and feature extraction methods are applied to determine the rails. The resulting several faults between railways were studied to determine if there is a failure. The results obtained are given at the end of the study. Experimental results show that the proposed method is examined, it is observed that a healthy and effective results.

Images from a railway order to test the actual work performed is examined with the proposed approach. These images using the proposed method, the distance between the rail cruising on and neighboring rail was calculated respectively. Between the rails with this approach it is determined whether any expansion or contraction. Image processing algorithm has been carried out on images taken at the study. Rails mainly are determined initially by the image processing algorithm. The distance between the marked tracks is calculated using image processing algorithms. The distance between the rails pixels values are obtained. In the proposed approach, and finally it analyzed the change of the pixel value. According to a user-defined threshold value determined as the sudden changes in the pixel values examined it offers detailed information about whether any contraction or expansion between the rails. If the obtained distance above a determined threshold value, means that the expansion of the rails. Likewise, in case of falling below the threshold value it is determined to be contraction in the rails. Such problems are important conditions that could prevent trains to travel safely, the detection of this fault with the work previously done will prevent major accidents will happen in the future.

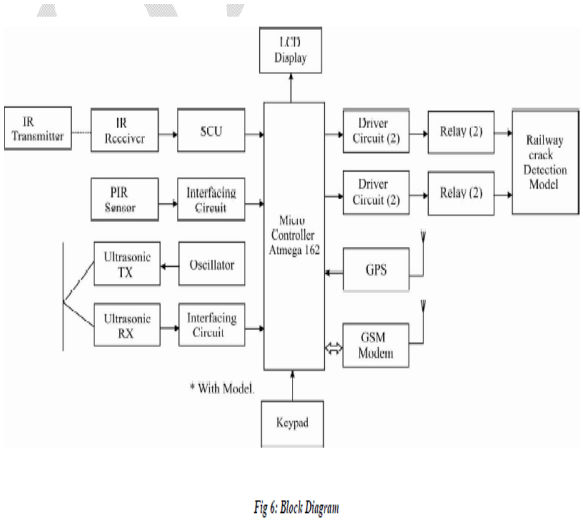


Fig 6: Block Diagram

Fig3.Blockdiagram of Rail defect detection system

V. MATERIALS AND METHODS:

In this work, rail defect detection method is improved according to the past work .

GPS

GPS stands for Global Positioning System. The GPS is used to receive the position data from the vehicles and display on adigital map. It too will have the interface to thecommunication link. Enhanced features include videofeatures, trace mode, history track, vehicle database, network
support.

GSM module

The GSM net used by cell phones provides a low cost, longrange, wireless communication channel for applications thatneed connectivity rather than high data rates. It is used to sendthe SMS to mobile phone.

DC Motors

To traverse a distance of 22 Km in 4 hrs, an average speed of1.5 meters/sec is needed. The proposed design uses 4 DCmotors. DC motor works according to relay operation.

- When relay 1 is in the ON state and relay 2 is in the OFF state, the motor is running in the forwarddirection.
- When relay 2 is in the ON state and relay 1 is in theOFF state, the motor is running in the reversedirection.

Ultrasonic Sensor

An Ultrasonic sensor is a device that can measure the distance to an object by using sound waves. It measures distance by sending out a sound wave at a specific frequency and listening for that sound wave to bounce back. By recording the elapsed time between the sound wave being generated and the sound wave bouncing back, it is possible to calculate the distance between the sonar sensor and the object.

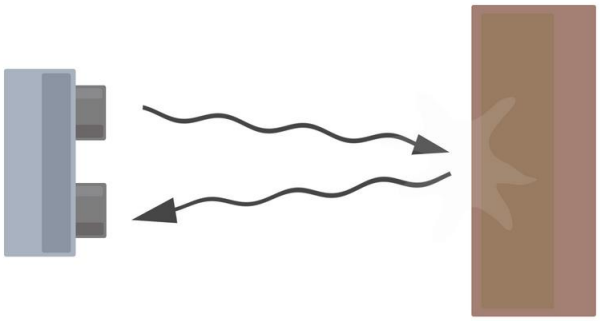


Diagram of the basic ultrasonic sensor operation

VI. RESULT

When the crack is detected on the track the text message issend to the preferred number by using the GSM and GPSservice. The text message contains the latitude and longitudevalue of the place where the crack is detected. The ultrasonic distance meter will verify the distance between two tracks.

After they moved on the track it will continue the process.

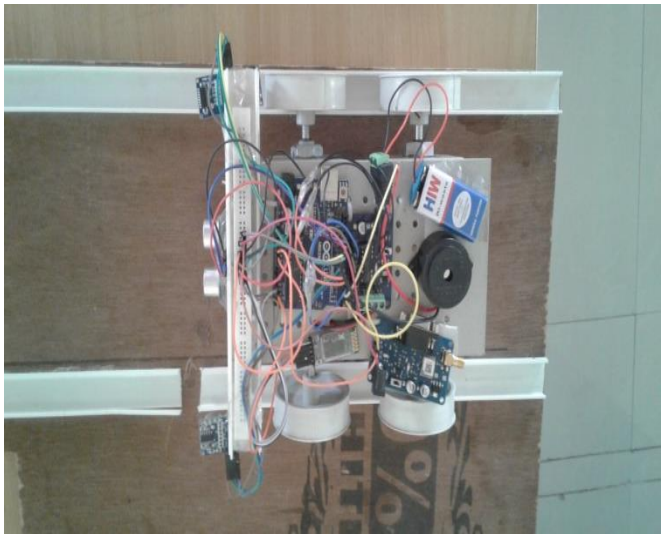


Fig:Result Of Project

VII. CONCLUSION

The rail defect detection system makes an attempt in providing a viable solution in making the railway tracks crack free with sensor,GPS,GSM based railway detection scheme. By using the op-amp the cost of this system is totally reduces as compare to another system which is already invented for track security purpose. The main idea of the system can be implemented on a large scale in order to have safe track with sound infrastructural facilities for better results in future. also this system find out the track crack and avoid the train accident for human security..

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