Railway Security System For Track Fault Detection Using ZIGBEE Communication

K SANDEEP KUMAR, Dr.K.SRINIVASA REDDY,RUPA KUMAR DHANAVATH, E.GEETHA REDDY

Department of the Electronics and Communication Engineering, NITS, Hyderabad, TS, India.
Department of the Electronics and Communication Engineering, NITS, Hyderabad, TS, India.
Department of the Electronics and Communication Engineering, NITS, Hyderabad, TS, India.
Assistant Professor, Dept of EEE, VITAE, JNTUH, Hyderabad, TS, India.

ABSTRACT: The main aim of this paper is to develop an embedded system to identifying rail track fault sending message to near station using ZIGBEE TECHNOLOGY.

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 the crack detector robot, which detects the crack in the rails and gives an alarm.A robot is an apparently human automation, intelligent and obedient but impersonal machine. It is relatively, that robots have started to employ a degree of Artificial Intelligence (AI) in their work and many robots required human operators, or precise guidance throughout their missions. Slowly, robots are becoming more and more autonomous.

I PROPOSED WORK

This system involves the design of crack finding robot for finding cracks in railway tracks. This system uses controller for interfacing the robotic vehicle and crack detection sensor. 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.The robotic model is interfaced with the microcontroller with the help of SPDT relays and driver IC. If any crack occurs in the rail, the robot will be stopped and then an alarm 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 out put of secondary of 230/18V step down transformer.
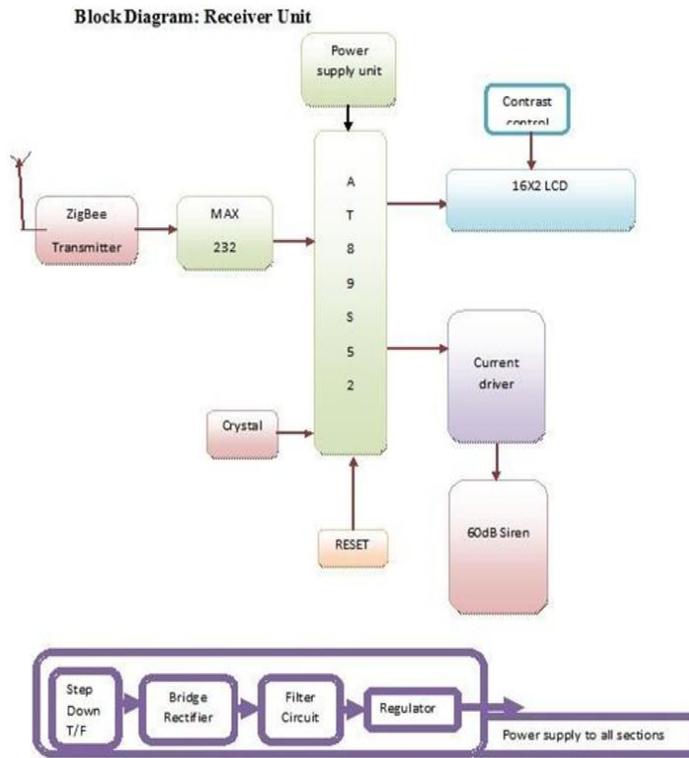
II.BLOCK DIAGRAM

Figure:1.2 block diagram of receiving unit

III HARDWARE&SOFTWARE TOOLS

A Hardware tools:
- Microcontroller unit
- Crack detection sensor
- Interfacing unit
- Robot Mechanism

B Software tools:

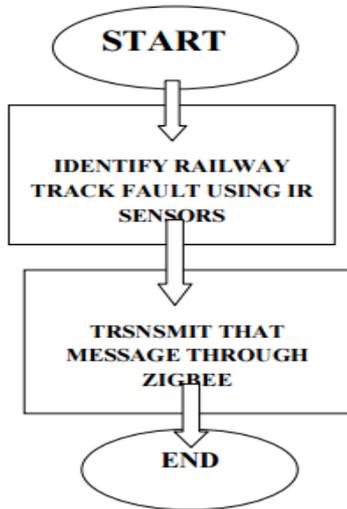- Keil Compiler Embedded C
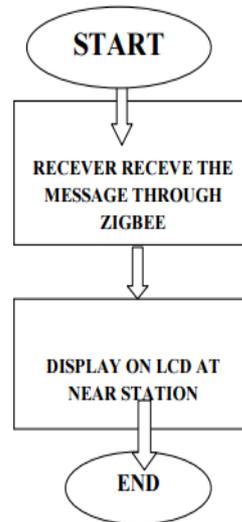
IV RESULTS

A Flowchart of transmitting section
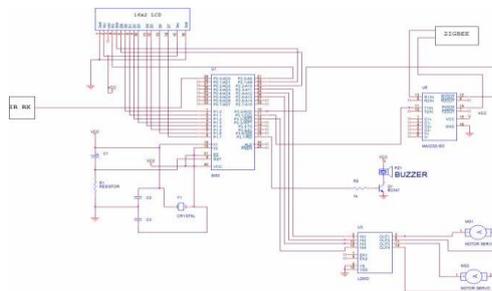B Flow chart of receiving section

A Flowchart of transmitting section

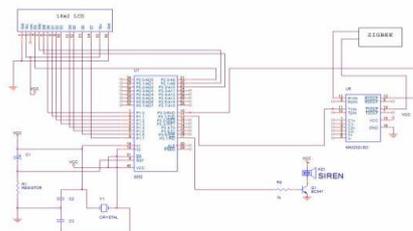*B Flowchart of receiving section*

V PINNING INFORMATION OF TRANSMITTER

VI PINNING INFORMATION OF RECIEVER

VII APPLICATIONS

I.   Can be used for Railway Department.
II. Can be used for industries.
III. Used in detecting applications.

VIII ADVANTAGES

- It reduces the man power
- Crack detecting efficiency is high.
- Accuracy is high.

IX CONCLUSION

Accidents occurring in railway transportation systems cost a large number of lives. Many people die and several others get physical and mentally injured. Accidents are the major causes for traumatic injuries. There is certain need of advanced and robust techniques that can not only prevent these accidents but also eradicate all possibilities of their occurrence .Here We Have Designed Advanced Railway Track Fault Detection System with remote station messaging system using Zigbee Communication. Developed an embedded system to identifying rail track fault sending message to near station using ZIGBEE TECHNOLOGY.

X FUTURE SCOPE

By using Wireless sensor networks techniques we also develop more and more reliable security systems applications, in which continuously monitors the railway track through the sensors and detect any abnormality in the track. The sensor nodes are equipped with sensors that can sense the vibration in the railway track due a coming train. The geographical positioning sensors are placed on the trains. These sensors send the train's geographic location.
The complete process is needed to be real time in nature and should meet the deadlines.

REFERENCES

[1] V.Reddy, "*Deployment of an integrated model for assessment of operational risk in railway track*", Master Thesis, Queensland University of Technology School of Engineering Systems, 2007.

[2] C. Esveld, "*Modern railway Track*". Second Edition, MRT Productions. 2001

[3] D.Hesse "*Rail inspection using ultrasonic surface waves*" Thesis ,Imperial College of London,2007

[4] C. Campos-Castellanos, Y.Gharaibeh, P. Mudge *, V. Kappatos, "*The application of long range ultrasonic testing (LRUT) For examination of hard to access areas on railway tracks*". IEEE Railway Condition Monitoring and Non-Destructive Testing (RCM 2011) Nov 2011.

[5] M. Singh, S.Singh1,J.Jaiswal, J. Hempshall "*Autonomus rail track inspection using vision based system*" .IEEE International Conference on Computational Intelligence for Homeland Security and Personal Safety .October 2006. pp 56-59

[6] S.Zheng, X.An, X.Chai, L. Li "*Railway track gauge inspection method based on computer vision*" IEEE International Conference on Mechatronics and Automation, 2012. pp 1292-1296

[7] W. Al-Nuaimy , A. Eriksen and J. Gasgoyne " *Train-mounted gpr for high-speed rail trackbed inspection*" Tenth International Conference on Ground Penetrating Radal; 21 -24 June, 2004

[8] A.Vanimiredd, D.A.Kumari "*Automatic broken track detection using LED-LDR assembly*" International Journal of Engineering Trends and Technology (IJETT) - Volume4 Issue7- July 2013

[9] Hayre, Harbhajan S., "*Automatic Railroad Track Inspection*," Industry Applications, IEEE Transactions on , vol.IA-10, no.3, pp.380,384, May 1974

[10] Z. Sam Daliri1, S. Shamshirband , M.A. Besheli " *Railway security through the use of wireless sensor networks based on fuzzy logic*". International Journal of the Physical SciencesVol. 6(3), pp. 448-458, 4 February, 2011

[11] S. Ramesh, S. Gobinathan "*Railway faults tolerance techniques using wireless sensor networks*". IJECT Vol. 3, Issue 1, Jan. - March 2012.

[12] A. Z Lorestani ,S. A Mousavi, R. Ebadaty, "*Monitoring RailTraffic Using Wireless Sensor Network (WSN)*" IJCSET ,June 2012, Vol 2, Issue 6,1280-1282

[13] Aboelela, E.Edberg, W.Papakonstantinou, C.Vokkarane, V, "*Wireless sensoer network based model for secure railway opeerations*," Performance, Computing, and Communications

AUTHOR'S BIOGRAPHY

Mr.K SANDEEP KUMAR pursuing M.Tech in VLSI & ES from Nagole Institute of Tech.Sci.,Hyderabad. he completed B.Tech ECE from JNTUH affiliated Engineering college.

Dr.K. SRINIVASA REDDY is Associate Professor of the Electronics and Communication Engineering, Nagole Institute of Technology and Science, Hyderabad .He received his B.Tech degree in Electronics and Communication Engineering from JNT University, Hyderabad, M.Tech degree in Embedded Systems from JNT University, Hyderabad and PhD from OPJS University, Churu – Rajasthan. He is a member of The International Association of Engineers (IAENG)and Member of IEEE. He had forty five publications in both National and International Journals. He has written three text books in the field of wireless communications.

Mr. Rupa kumar Dhanavath is Associate Professor of the Electronics and Communication Engineering, Nagole Institute of Technology and Science, Hyderabad .He received his B.Tech degree in Electronics and Communication Engineering from JNT University, Hyderabad, and M.Tech degree in VLSI System Design from JNT University, Hyderabad. He had about six publications in National and International Journals. His interested areas are micro electronics and communications.

Mrs.E.Geetha Reddy is Assistant Professor of the Electrical & Electronics Engineering, VITAE, Hyderabad.She Graduated from MIST, sathupally, in Electrical & Electronics Engineering and Masters in Power Electronics and Drives (PED) from Vignan University,Vadlamudi,Guntur.pursuing Ph.D from Vignan University,Vadlamudi,Guntur.