Railway Track Fault and Obstacles Detection and Control Using Zigbee

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ABSTRACT

Nowadays we face many train accidents due to track faults, obstacles etc. These problems are difficult to detect and control manually. To overcome these problems we use sensors and Zigbee for detection and control through long distance wireless communication. The Ultrasonic, PIR sensor and serial data transmitter detect the problems in the train track and give a message to the microcontroller. Zigbee receives that message and turns ON the safety alarm to warn the passengers and the driver. The MOSFET controls the speed of the train and stops before 20 km of the obstacle or the fault in the train tracks.

Keywords: Fault detection, Zigbee, PIR Sensor, Ultrasonic sensor and MOSFET.

1. INTRODUCTION

We use many transportation systems to travel from one place to another place. Many people use railway system to going for jobs and because of low cost they use this way. But we face many train accidents and also we lose people in the accidents. The man regularly checks the railway track whether there is any fault in the track by a walk. Due to impossible to find the fault by using man power, we use sensors, wired and wireless communication methods. The wired communication methods are not a safety one so we use wireless communication like ZIGBEE. Train cannot stop suddenly it is dangerous. So we use transistors to control the speed of the train and it will stops before some kilometer. In these methods we reduce the train accidents.

2. PROPOSED WORK

In this paper we explain about how to reduce the train accidents. We use sensors such as ultrasonic sensor detects distance between train and human in the track, PIR (passive infrared) sensor detects the moving objects and serial data transmitter detects the fault in the track. Here we use LCD as a safety alarm it display message of problem in the track. The sensors become damage means that message also display in the LCD. Finally the MOSFET is used to control the current passing and speed of the train and it stops.

3. BLOCK DIAGRAM

3.1 Transmitter Section

In this transmitter section we are using ultrasonic sensor, PIR sensor, serial data transmitters as the input device and LCD display, signal LED, ZIGBEE module, buzzer as the output device. These are all connected to the microcontroller. When the sensors detect the fault in railway track suddenly the signal was sent to the microcontroller. Then with the help of the ZIGBEE module, immediately the alert messages will be send to the output devices such as LCD display and buzzers in the train.
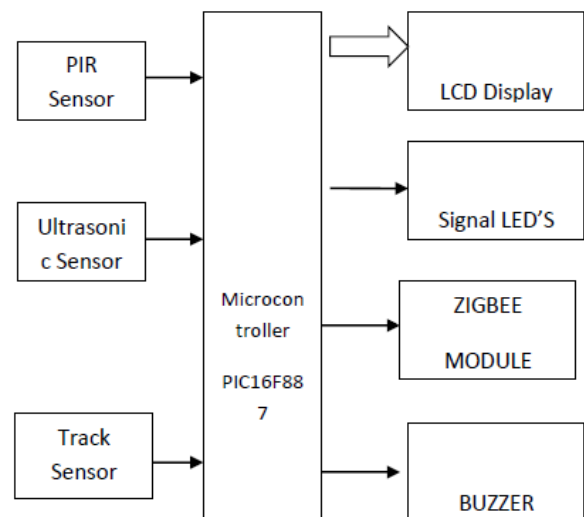

3.2 Receiver Section
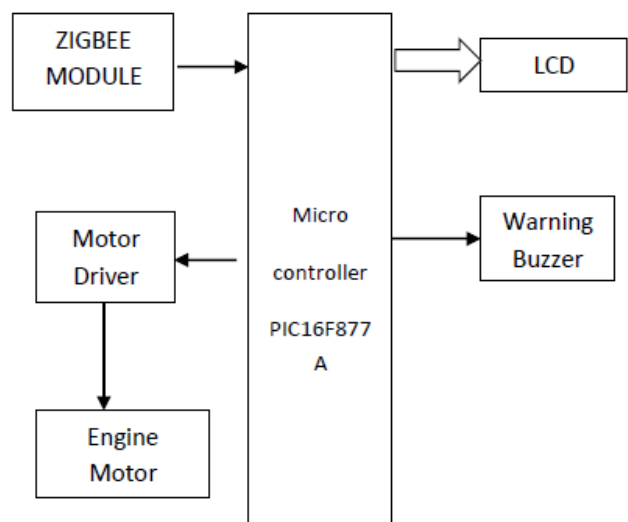
After the message gets displayed in LCD, the warning buzzer sound will be produced and then the motor driver gets switched on. And simultaneously the Engine motor will control the speed of the train with the help of MOSFE and the train gets stopped before 20 kms.

4. RESULT

Automatic Track Switching and Gate Control

Accidents occurring in railway transportation systems cost a large number of lives. Many people die and several others get physical and mentally injured. There is certain need of advanced techniques that can prevent these accidents and also eradicate all possibilities of their occurrence. Here we have designed Advanced Railway Track Fault Detection System with remote station message system using ZIGBEE communication. Developed an embedded system to identifying rail track fault sending message to near station using ZIGBEE technology.

5. CIRCUIT DIAGRAM
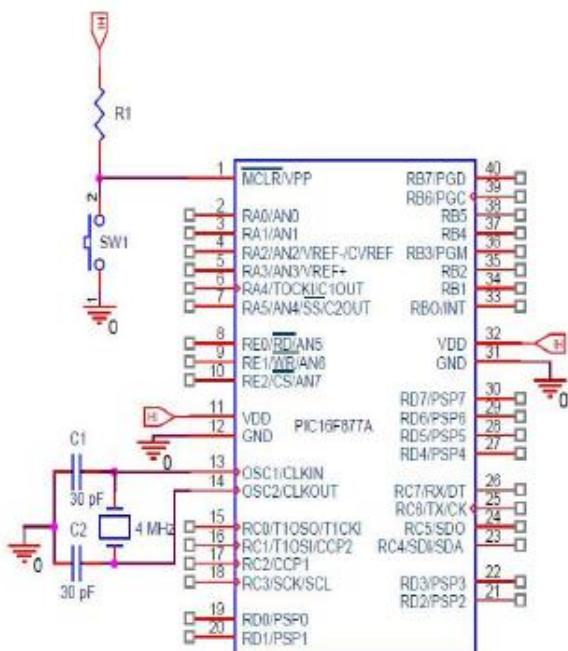
6. CONCLUSION

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.

REFERENCES

[1] Arun.P, Saritha.S, K.M.Martin, Madhukumar.S "Simulation of Zigbee based TACS for collision detection and avoidance for railway traffic", *in International conference on advanced computing & communication technologies for high performance application, paper ID 51,* June 2012.

[2] "Communication Systems" by Simon Hawkins.

[3] Jennic, JN-AN-1059 Deployment guidelines for *IEEE 802.15 ZigBee wireless networks,* 37-38, 2007.

[4] D.Roychoudary and Sail Jain "Linear Integrated Circuits", *New Age International.*

[5] Kenneth.J.Ayala, "The 89C51 Microcontroller Architecture programming and Applications", *Penram International.*

[6] "Principles of Electronics" by V.K.Mehta.