

Railway Accident Prevention using Ultrasonic Sensor with Microcontrollers

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Abstract: *Railway Transport is indispensable in modern day life, both for business and private users. Nowadays, rail networks across the world are getting busier with trains travelling at higher speeds and carrying more passengers and heavier axle loads than ever before. The combination of these factors has put considerable pressure on the existing infrastructure, leading to increased demands in inspection and maintenance of rail assets. But nowadays, it is not that much safer as lot of accidents occur due to improper communication among the network like wrong signalling, worst weather condition, immediate route change, etc., The train driver doesn't get proper information on time and before time so that the hazardous condition can occur. While maritime and air transport are already benefiting from collision avoidance application based on infrastructure less communications. We propose this system to avoid train collision by using Ultrasonic Sensors to provide communication between trains and to avoid same track collisions*

Keywords: Train collision avoidance, Track occupancy detection, Automated signaling system, Ultrasonic proximity sensors, Real-time track monitoring, Railway safety system, Emergency, brake activation, IoT-based railway security, Sensor-based accident prevention Railway automation technologies

I. INTRODUCTION

Our project is fully concentrating on avoiding train collisions and ensures passengers safety through embedded system integrated with ultrasonic sensor based control system inbuilt in the train. However, Collision avoidance systems using ultrasonic IR sensor and anti-collision device are being used by the Railway sector is still facing some problems due to the consideration of some factors such as cost effectiveness, despite it is increasing the amount spent on implementation of the devices. Currently, to some extent the Konkan Railways has put efforts to provide train safety through ZigBee and Infrared based sensor concepts. Even though it has the disadvantages such as limited range of signal covered and difficulty in their implementation in the real world it is still being used. This work is concentrated on predicting the major cause of railway accidents that is collision on the same track. Implementation of an efficient embedded system integrated with ultrasonic sensor based Train Anti-Collision for railways is being proposed in this paper

II. LITERATURE SURVEY

1. Sarath Chandran. P, Karthika. M. The proposed system is an enhanced technique for monitoring the obstacle which uses arduino microcontroller, ultrasonic sensor, and radar module. The radar will obtain the distance from the obstacle and ultrasonic sensor will ensure to avert the accidents that may occur by the collision between the train and obstacle

2. Rahul Singh, Leena Sharma, Vandana Singh, Vivek Kr. Singh. International Journal of Engineering Research & Technology Proposed a system which was able to detect the crack by the help of ultrasonic sensors, GPS and GSM module once the crack is detected the message along with the location is sent to the officials

2.1 Need of Project

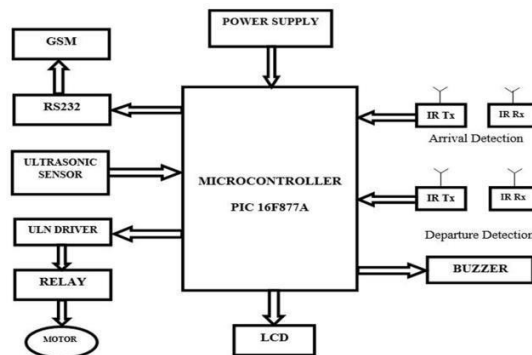
The proposed Train Anti Collision and Level Crossing Protection System consists of a self-acting microcontroller and two way GPS based data communication system which works round-the-clock to avert train collisions and accidents at the level crosses. Thus enhances safety in train operations by providing a NON-SIGNAL additional safety overlay over the existing signaling system. The system operates without replacing any of the existing signaling and nowhere affects the vital functioning of the present safety systems deployed for train operation

2.2 Aim & Objectives of Project

The main objective of this project is to detect the cracks present on the railway tracks and also to detect the obstacles entry on to the railway tracks.

As the sensor will sense an obstacle or fault in the tracks it can send immediate signal to the user or driver and the train will stop as soon as signal is came The major objective of this is to the development of the accident avoidance system for automobiles

III. SYSTEM DEVELOPMENT



IV. WORKING

The sensors sense the input and sends to the microcontroller, where it responds and gives command to the particular component with predefined algorithm.

The time parameters are crucial which can be easily changed and modified using Micro-controllers. Thus, this device would work in coherence would help to reduce the train collision

V. ADVANTAGES

- System will help to reduce accidents caused due to railway cracks.
- This system helps track inspection coach to complete track inspection faster.
- No Manual intervention needed

VI. CONCLUSION

- Collision avoidance systems are especially useful in bad weather conditions.
- In this paper, a design for automatically averting train collisions and accidents at level crossing gate have been designed, simulated and tested.
- It uses the advanced features of pic micro controller with vibration sensor and GSM communication technique, proves to be effective in achieving the objects.
- It is applicable at every aspect of the railways for uninterrupted service Saving human life, protection against accidents and the communicable electronic systems are the salient features and the added advantage of this project

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