

# Railway Track Monitoring System

Pratiksha Girase, Swarali Aswale , Ankita Rout, Prof.Govind Rao Mettu

BE Student1, BE Student2 , BE Student3 ,Assistant Professor4

Computer Engineering,

Pillai HOC college of Engineering and Technology, Rasayani, Raigad- 410207,India

**Abstract:** The development in the railroad area has brought about an expansion in the train activity thickness over the world. This has brought about the expansion in the quantity of mishances including trains. In this paper, the proposed structure incorporates a few elements which forestall train mishaps. It incorporates flame recognition, water level recognition, railway track split discovery. This structure makes utilization of IR sensors, fire sensor, GSM and other inserted structure. Rail mishances have been expanded because of the surge streaming over the railway track. We are proposing a surge identification structure to overcome such mishances. Here, at whatever point we distinguish that there is a flood over track, we will send a sign to the train through GSM which will stop the train. Furthermore, send messages to higher powers of south focal railroad. In recent or in past years most of the accidents are happened due to weather conditions or not having proper balance of tracks. Automated Screening System (ASS) is used to avoid accidents. It is used to monitor traffic, Climatic conditions, it calculates distance between the tracks and strength of the track and number of gaps on tracks. Reliable compact Blue chips are used near fish plates of tracks and connected to ASS. Satellite transmission system is the medium used to transmit data from tracks to train and train to railway signalling system and vice versa. Track information is accessed from database and stored into ASS. If status is accurate then train will get signal to move forward. Digital siren is used to avoid level crossing accidents.

## Introduction

In India, the railway is the main source of transport and, therefore, as with any problem during transport, the main damage to the economy occurred despite the social life. At present, railways use manual methods of detecting cracks through human inspectors. Taking all this into consideration, it will be necessary to develop an automatic obstacle detection system, which is also used to detect railway breakage. Rail transport always depends only on the train tracks. If there is a crack in these tracks, it creates a big problem. Most of the train accidents are due to cracks in the train tracks, which can not easily be identified. It also takes more time to solve this problem. Most of the commercial transport is carried out by the railway network and, therefore, any problem in the railway has the capacity to cause significant damage to the economy, despite the social impact of loss of life or physical integrity. This project presents an economic solution but robust to the problem of the detection of railway cracks using a unique method in the sense that, while it is simple, the idea is completely profitable. The project analyzes in detail the technical and design features and also provides the robust cracks detection algorithm proposed. The project also presents details of the implementation results of the use of simple components that include the IR-LED-PHOTODIODE based cracks detector assembly.

## I. PROBLEM DEFINATION

India's railways take numerous measures to prevent accidents, but they still have to face the loss of problems and the waste of money. ASS manages a detailed track state database and track trace / installer engineers will update the accurate measurement of the complete track database. During the time period we plan to work on a project that can help solve some real problems. Then, we discovered some problems such as detecting faults in the railroad to avoid accidents and we also tracked down the location of such faults. With the exponential growth of IOT and digitalization, connecting everything safely and without problems has become a true art. What is required is that the industry allows to create architectures that allow the convergence of a growing range of access technologies, terminal devices, sensors, software levels, analysis and solutions.

### A. Working

Case 1:

In case there is a crack between tracks, then crack is detected and it will be displays on the screen.

Case 2

As in the case II to avoid accidents while level crossings, we use the horn to prevent people from crossing the tracks when the train is in operational mode.

case3:

We will use the Float sensor to detect the water level in case it rains and notify the water level using the bell.

### WIFI Module

The ESP8266 WiFi Module is an autonomous SOC with incorporated TCP/IP convention stack that can give any microcontroller access to your WiFi network. The ESP8266 can perform either accommodating an application or offloading all Wi-Fi organizing

functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

This module has a powerful enough on-board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions, and requires no external RF parts.

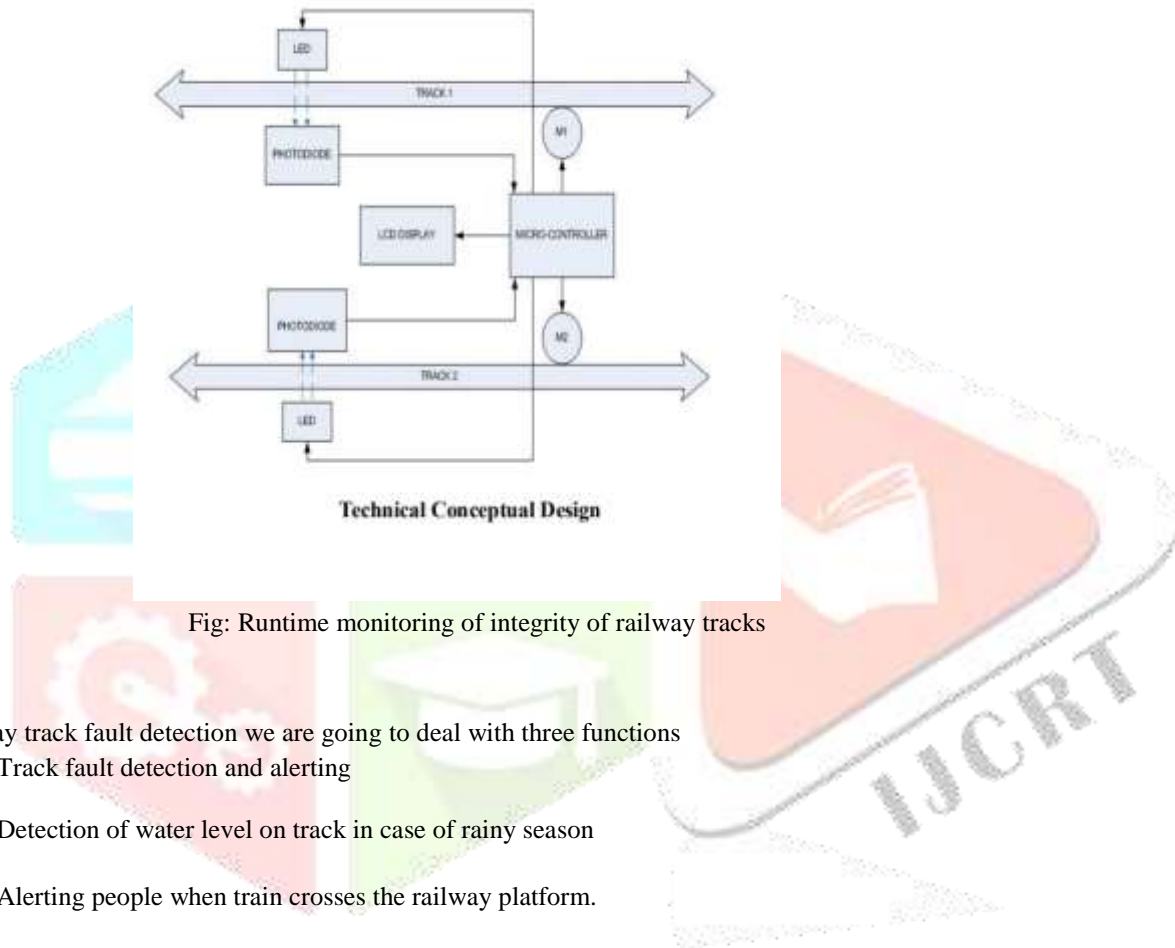


Fig: Runtime monitoring of integrity of railway tracks

In Railway track fault detection we are going to deal with three functions

1. Track fault detection and alerting
2. Detection of water level on track in case of rainy season
3. Alerting people when train crosses the railway platform.

## II. WORKING OF SENSORS

The moisture sensor contains of two probes which are used to measure the volumetric content of water. The two probes allow the current to pass through then it gets the resistance value to WiFi Module - ESP8266

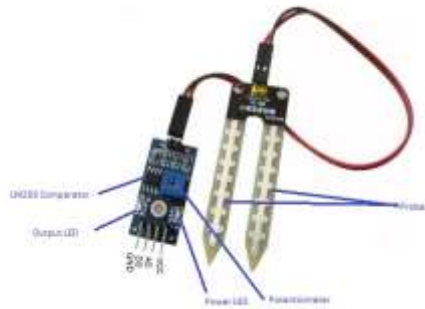


Fig. IR Sensor

### IR Transmitter, Receiver WHAT IS INFRARED?

Infrared is energy radiation with a frequency below our eyes sensitivity, so we cannot see it. Even that we cannot “see” sound frequencies, we know that it exist, we can listen them. Even though we cannot see or hear infrared, we can feel it at our skin temperature sensors. When you approach your hand to fire or warm element, you will “feel” the heat, but you can’t see it. Fire can be observed because it emits other types of radiation, that is visible to our eyes, but it also emits lots of infrared that can be only felt by your skin. The reason behind Infra-Red is interesting, is due to its easy generation and doesn’t suffer electromagnetic interference, so it is nicely used for communication and control, but is not perfect, other light emissions may contain infrared as well, and that can interfere in this communication. The sun is an example, since it emits a wide spectrum or radiation.

### Float Sensor

Float switch is used to open or close a circuit as the level of a liquid rises or falls. Most float switches are “normally closed,” meaning the two wires coming from the top of the switch complete a circuit when the float is at its low point, resting on bottom clip (for example, when a tank is dry).



Fig.Float Sensor

Float switch. A float switch is a level sensor, a device used to detect the level of liquid within a tank. ... One pattern uses a reed switch mounted in a tube; afloat, containing a magnet, surrounds the tube and is guided by it. When the float rises the magnet to the reed switch, it closes.

### Limit Switch

Limit switch is operated by the motion of a machine part or presence of an object. They are used for controlling machinery as part of a control system, as a safety interlocks, or to count objects passing a point.



Fig.Limit Switch

#### IV.References

- [1] Prof. Sachin D Anap, Mr. Prasanna L. Ronge, Mr. Lalit P. Bhalerao, Dharme Sandip Railway Track Monitoring and Accident Avoidance Using Smart Sensor Network, International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 4, April 2016
- [2] B. K. Konstantinos Domdouzis and C. Anuba., "An experimental study of the effects of different medium on the performance of advance system," vol. 21. Advanced Engineering Informatics, 2011.
- [3] K. M. R. Sudeep Dogra, "Radio frequency identification (RFID) applications: A brief introduction, advanced engineering informatics." The IUP journal of Electrical and Electronics Engineering, 2011, p. 3.
- [4] J. Trehag, P. Handel, and M. Ögren, —Onboard estimation and classification of a railroad curvature, IEEE Trans. Instrum. Meas., vol. 59, no. 3, pp. 653-660, Mar. 2010.
- [5] B. Akpınar, —A new measurement system design for determining al changes on railways, Ph.D. dissertation, Yildiz Technical Univ., Istanbul, Turkey, 2009
- [6] NASA. "National Eronautics and Space Administration." Zervas, E., O. Sekkas, et al. (2007).
- [7] Fire Detection in the Urban Rural Interface through Fusion Techniques. Mobile Adhoc and Sensor Systems (MASS 2007)
- [8] L. Beales, —Track system requirements, Railway Group Standards, GC/RT5021, Railway Safety, London, Oct. 2003.
- [9] Ember Corporation, Ember ZNet Application Developer's Reference Manual, 2008.