

## Smart Driverless Railway Engine

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**Abstract** - This work is concentrated on predicting the major cause of railway accidents that is collision on the same track, automatic gate control to reduce manual errors, automatic station detection, automatic signaling, automatic track cut detection & mapping the position of train. The primary goal of this anti-collision system is to identify collision points and to report these error cases to main control room, nearby station as well as grid control stations. So that if any collision likely to occurs then this system will help to avoid such conditions by stopping train at a signaling. Implementation of an efficient micro-controller based Train Anti-Collision for railways are being proposed in this paper.

It is expected that if this system is implemented widely, train collisions and accidents can be avoided. The up-gradation is also done by following the idea of checking cascaded connection of the compartments in sequence manner. This project will also track the position of train through Rf & signaling. With the advent of and the ubiquitous wireless sensor network, real time train tracking for better transport management has become possible.

**KEY WORDS:** Micro-controller, sensors, wireless transceiver, Anti-collision system, gate control, position mapping, etc.

### 1. INTRODUCTION

In these days train accidents are most common and the damage due to these accidents are more severe and takes many lives of passengers hence to reduce the accident rate due to collision and breakage of rails can be reduced to maximum by the means of designing a system that makes use of network to a limited area (using a GSM), micro-controller for monitoring the Rf module, train motor, encoder, decoder, create personal area networks built from small, low-power digital radios. Rf is based on an IEEE 802.15 standard.

Though low-powered, Rf devices often transmit data over longer distances by passing data through intermediate devices to reach more distant ones, creating a mesh network; i.e., a network with centralized control or high-power transmitter/receiver able to reach all of the networked devices. The decentralized nature of such wireless ad-hoc networks make them suitable for applications where a central node can't be relied upon. RF is used in applications that require a low data rate, long battery life, and secure networking. In this project, it is proposed to develop automatic railway gate operation to prevent accidents at

unmanned gate and automatic closure of unmanned gate. It is also developed to prevent collision of trains running on same track. Automatic closure of unmanned gate sensors, and a part of internal memory for dumping the required program. The design cost is low and the use of the designed system reduces the accident due to the cutting of track & due to the human error. The Rf module is described below Rf is a specification for a suite of high-level communication protocols used to reduce the time for which the gate is being kept closed and provides safety to the road users by reducing the accidents. The collision of trains running on same track is also prevented by employing IR Transmitter-Receiver system at each sections of the station and passes the information to a master control room via GSM MODEM.

### 2. MOTIVATION

The main objective of the auto controls the railway and signaling, gate control and make system fully independent. Presently railway-crossing gates are operated manually. At present scenario, in level crossings, a gate keeper operates the railway gate normally after receiving the information about the train's arrival. When a train starts to leave a station, stationmaster of the particular station delivers the information to the nearby gate. The above said procedures are followed for operating the railway gates. Sometimes the road traffic is so busy that it becomes impossible for the gatekeeper to shut down the gates in correct time. In many remote areas, railway-crossing gates are open and no person is located for the operation of gates and hence leading to accidents. Many times gates are shut down too early leading to wastage of time of people stuck at crossing. Presently as such no centralized system is there through which we can track the location of train any center point. As trains cannot be centrally located, often more than one train runs on the same track in opposite direction leading to accidents. There is no position detection. So we have proposed the system which is automatic & helpful in time saving, requires less man power, reduces accidents, reduces errors etc.

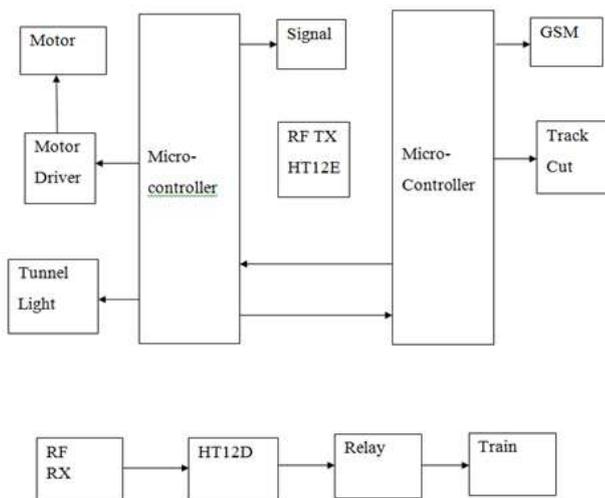
### 3. Methodology

The proposed system is concentrated on modelling of driverless railway which will help to reduce human errors, predicting the major cause of railway accidents that is collision on the same track, automatic gate control to reduce manual errors, automatic station detection, automatic signaling, & mapping the position of train which will save the time and will be helpful for railways to reach the station

on time. The primary goal of this system is to make the system independent and atomized control of railway through server via wireless network. Implementation of an efficient RF based Train for railways is being proposed system. Through RF based wireless network the railway will be controlled from server Also server will monitor the position of railway and also the problems if any pursued.

Server will be able to control signals and through signals monitoring server will detect the position of track. Server will also analyze the track faults and will be able to stop the train before any accident occurs. The work will include modelling of automatic station detection, automatic signaling, automatic track cut detection, automatic obstacle detection, tracking of train position, and controlling through server. These technologies can be applied to public transport systems, especially buses, trains which are not able to adhere to predefined timetables due to reasons like traffic jams, breakdowns etc. The increased waiting time and the uncertainty in bus arrival make public transport system unattractive for passengers.

#### 4. Block Diagram



#### Working Principle

##### Automatic Railway Gate Operation

In India maximum speed of train is 91.82km/hr and speed of passenger is 59km/hr. the distance at which the sensor could be place to detect departure of train is a 3km from the level crossing. Proposed technique use to ir sensor, driver ic, relay, dc motor, for automatic gate operation.

##### Opening of Railway gate operation

In real time IR sensor are placed behind a tract on the both the side of level crossing if IR1 detect the train, it send the signal to microcontroller. The microcontroller activate the dc motor which rotate in forward direction for 4 second to close the gate.

#### Closing of Railway gate operation

After the train cross the level. When IR2 detect the Departure of train. It sends the signal to microcontroller then microcontroller activate the dc motor in backward direction to open the gate.

#### Railway track cut detection

India has one of the largest railway network which perform the task manually and detecting cut the Railway track. It is very complicated process. In this proposed system we have to use microcontroller GSM, IR sensor, and GSM to track cut detection. GSM will be use to monitoring the location of track cut detection the controlling function perform by using microcontroller the railway move along the path on the railway track and IR sensor mounted on the front of the track it is use to detect the track cut when the track is cut the gsm module is use to send location to the coordinator in the form of short message service (SMS), to pre defined number.

#### 5. CONCLUSION

A new approach for improving safety at LC and train collision on IR has been suggested. Formats have been given to maintain records of LC inventories, accident / incident reports. Each LC should be assigned a hazard rating and the priority of safety enhancement works be decided accordingly. A regular assessment of safety performance should be done. This approach should be able to bring down the rising trend in accidents at LC and train collision accident.

#### 6. FUTURE SCOPE:

This makes the system independent and automized controlled of railway. Which enhance the infrastructure of our country. Whole system can be computerize controlled.

#### 7. REFERENCES

1. "BO AI and ET all. Future Railway Services-Oriented Mobile Communications Network. IEEE TRANSACTIONS ON COMMUNICATION, OCTOMBER 2015.
2. BO AI and ET all. Challenges toward Wireless Communications for High-Speed Railway. IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEM, VOL. 15, NO. 5, OCTOMBER 2014.
3. Morris Brenna and ET all. Application of Genetic Algorithms for Driverless Subway Train Energy Optimization. International Journal of Vehicular Technology Volume 2016.
4. Pedro Fernandes and ET all. Mufti-Platooning Leaders Positioning and Cooperative Behavior Algorithms of Communicant Automated Vehicles for High Traffic Capacity. IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, VOL. 16, NO. 3, 22 SEPTEMBER 2014.

5. R Karthik and ET all. Automated Train Control System with Real Time Train Tracking Facility Based on GPS and On board Disaster Prevention Network. International Journal of Science and Research (IJSR) Volume 3 Issue 4, April 2014.

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