

Railway Track Finding and Collision Avoidance with RFID

Bhushan Bawankar¹, Vaibhavi Dhawad²

¹²(Department of Information Technology, Yeshwantrao Chavan College of Engg, Nagpur/RTMNU, India)

Abstract :- After USA, Russia and China, The Indian Railways is world's fourth largest railway network. There is a many problem of collisions of trains. So that Indian railway organization is working in this aspect to promote the motto of safe travelling. This module is implemented A RFID based railway track finding system in this paper. In this system both the RFID tags and for attaching in the tracks the reader are used and engine consecutively. So Railway Engine automatically get the data of way by receiving it from RFID tag and detect it. suppose path is correct then train continue to run on track and if it is wrong then the information of signal is generated and sent to the control station as well as after that automatically engine stop in a minimum time and the LCD show the message "WRONG PATH". So the collision as well as accident of train can be avoided. The train engine would be programmed to move according to the requirement. The other advantage of this system is automatically change the tracks by which the track jointer would move automatically according to availability of trains.

Keywords: - Railway Track Finder, RFID, Train Collision Avoidance, Track Changer.

I. INTRODUCTION

The accident generally arrives because of human error and failure of the machines. The Indian railway loss large amount of money because of cancellation of trains during winter for every year. It is very difficult to run the trains properly during winter season because fog. The Indian Railways system has worked on different technologies to overcome these problem .The system has worked on innovative approach to apparatus with the problem faced by railways. Although many people's have taken place in India to control the problem of accidents as well as traffic problem in train[1].The konkan developed The ACD(Anti collision device) railways which uses the GPS technology for tracking the position and location of the train. It is quite useful of India.[1,2] But it is use for detection of rail tracks separated by a distance of 10–15 feet because of its limitations of accuracy of GPS in our country. Due to The ACD device and a GPS system both are preventing collision between trains. However, The accidents occur due to other factors such as collapsing of bridges or derailment cannot be overcome. The RFID technology which used in developed system to locate the train. This is leads to atomization of railways so far. Data logging mechanism measuring and recording of physical or electrical parameters over a period of time. Data logger used in a various applications such as in-vehicle data logging, environmental monitoring and machine condition monitoring [3]. If the accident happened this exact information about those parameters can be taken out so that the fault can be find. The automatic track changer also made the unique feature which can rotate according to the availability of trains on tracks. Track changer is a small piece of track which is used to join the tracks .The figure show the prototype for better perception of it. The aim of this system is to design and implement a cost effective module with the help of RFID and microcontrollers, which is uses the wireless transmission technology. The RFID application which is cost effective and have unique feature of identity is used in this system [4]. Software is used to controlled the train for prototype. According to the instruction given by the applications the train has work. The software are developed according to the path information of train. When the train starts running according to the application it follow the path, the controller of the train already defined it. If the train chooses other path because of human fault or track mismatching the train will stop automatically in the limited time so that accidents caused by this reason can be avoided.

II. OVERVIEW OF PROPOSED SYSTEM

The railway system uses the new concept to enhance its working. It is used Active and Passive RFID has done a great advancement in terms of applications. For the innumerable applications RFID has been used so far. Active RFID required continuous power and Passive RFID is powered by the reader when RF energy is transferred from it to the tag [5]. So here we are used them for the implantation of new technology. The RFID is designed on the railway engine and the RFID tags are attached in the tracks at some specific distances. The important coil is in RFID reader with a power supply and RFID tag also has a coil and a small chip consist RAM which consist the 12 bit unique code. RFID is one of important technology which is used for Automatic Identification same as voice recognitions as well as smart card. RFID uses the principle of electromagnetism and inductive coupling and works without the physical contact between tag and reader. It is works on the different frequency levels for different purposes [6]. For the betterment of transportation and signal handling, the Indian railways is working on the services of RFID. Many industries uses the applications for tracking their products. Here passive RFID tag is used for implementation. The passive RFID tag that does not contain battery, the power is supplied by the reader when it reaches in contiguity with the tag[7]. When signals from the reader fall on a passive RFID tag and coiled antenna within the tag starts to induce the magnetic field. It is forwards it to the circuits in the tag and draws power from it. Then tag sends the information encoded in the tag's memory for system.

2.1 The system consists of following eventful circuits

2.1.1. Control Panel

2.1.2. Data logger circuit

2.1.3. RFID reader circuit

2.1.4. Track changer

2.1.5. Track jointer control

III. SUBSYSTEM OF CONTROL PANEL

Subsystem Control panel is design in the engine and for real application in the engine author is developed another control panel which is use for software . LCD, supply switches, data pins are the component of control panel. The 12 bit unique code of RFID tag is displayed with the help of LCD. Microcontrollers consist of data input pins are used to programming in the engine. For data input purpose A 9 pin female connector is used here. A buzzer is attached in control panel and generate the sound when the RFID reader installed below the engine arrival near to the RFID tag in the tracks. There is proper ways for the data to transfer from RFID tag to RFID reader. When The RFID tag comes in the range of the reader it sends the data and unique code of each RFID. The microcontrollers are used to program the working of a train. Data logger, RFID receiver, RFID code transmitter which used in programming with the help of Microcontrollers working on main domain. The real time data of the train stored in the data logger SD card. With the help of wooden material and hard plastic sheets the tracks has been made. According to the width the difference between the tracks is kept of the engine so that it can run easily on it. Like the shape of alphabet "Y" the tracks are designed. So the availability and non-availability of trains on tracks it is demonstration the train can go in two different paths. The principle of the prototype is totally based on the RFID tag code receiving and transmission. If it receives the correct TID which stored in the programming of microcontroller then the loco continue to run and if it receives the incorrect TID then the motors of loco stop in minimum time.

IV. USED SOFTWARE FOR CONTROL PANEL

The control panel make friendly to the controller for display the information. Many characteristics can be added to this control panel and make them controllable. To evaluate this graphic user interface the prototype level is used .The running parameters of the train which show through the control panel. With The help of controller to enter only source as well as destination station . The train is start with the help of engine that is start as well as stop switch and it show the real time temperature and speed of the engine. The horn switch is also there which is controlled manually.

The touch screens technology is advanced feature of control panel .The LAB VIEW is communicate with arduino kit to provides the interface transmission from this screen to the circuits [8]. Arduino is an open-source electronics kit which based on flexible, easy-to-use hardware and software. It is most user friendly because graphical coding also possible and Microcontroller signal can easily transmitted computer through LAB VIEW [9]. One important thing is that we can easily check, getting signal type and amplitude as well as Analysis of received signal is very easy.

V. SUBSYSTEM IN CONTROL STATION

The current position of the train can be traced in this section because of Microcontroller. The receiver – transmitter pair is used for working on the wireless transmission of signal from the engine. The transmitter is attached in the engine and receiver is attached with the control station. A distinct circuit is designed for the control station which is controlled with microcontroller. The working of Flow chart of control station as show in fig5. Suppose train goes on the wrong path then engine send a signal to control station and turn on a buzzer which display that something is wrong with the engine. Information which received in control panel that send to control station so that control station LCD display the same information at that time. This is significant for cross check of track data. If driver does not take any proper decision then control station engineer send a stop signal for engine. A control station is same as wireless signal Receiver for train is near to the station .The station received the broadcast signal which is transmitted by the engine and then control station display the all information about coming train.

VI. TRACK CHANGER CIRCUIT

The track changer is connected to tracks and it is attached with the motor that which it can rotate. The jointer is installed between the tracks and is able to rotate on its axis in this prototype. The weight sensors are used on the tracks when a train coming on track and the weight sensors send a signal to the motors of rotator jointer and the jointer locomotive to the direction opposite to coming train and give the information to the coming train so that it can pass over it . A signal post is useful to demonstrate the working of track jointer. The LED has installed of 3 colors that is Red, blue and green. They flicker when the weight sensor send signal to motor and the track take its current position .The colors provide the signal that now the track is ready to pass. The Track changer circuit show in fig 2 & 3 respectively.

RFID is Radio Frequency Identification Device. Radio frequency (RF) is use to communicate data between a RFID reader and a RFID tag. The RFID circuit is solid state memory chip. It is designed where several electronic components are used to form an integrated circuit. RFID is important of capturing data about an object without having a human to read it. It picked a small amount of unique data a serial of the item. The data can be read from specific distance no contact or ever line of sight necessary. RFID technology uses RFJD tags, which is a small object, like as an gummy sticker, that can be associate to and incorporated into a product. RFID tags have antennas to enable them for receive and reply to radio-frequency queries from an RFID transceiver.

VILFIGURES AND TABLES

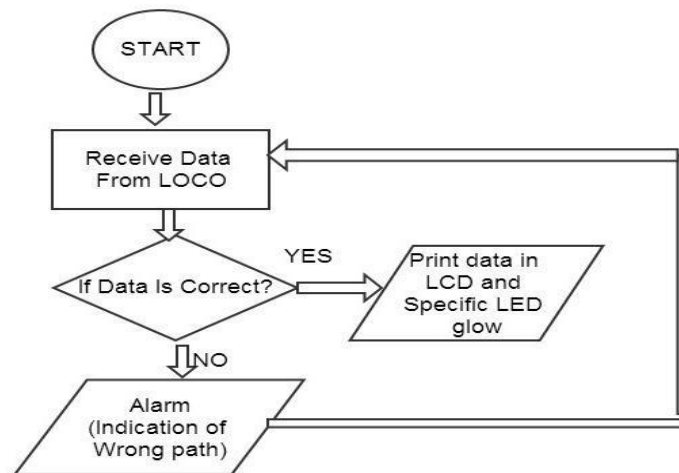


Fig1:- Simple Working Concept

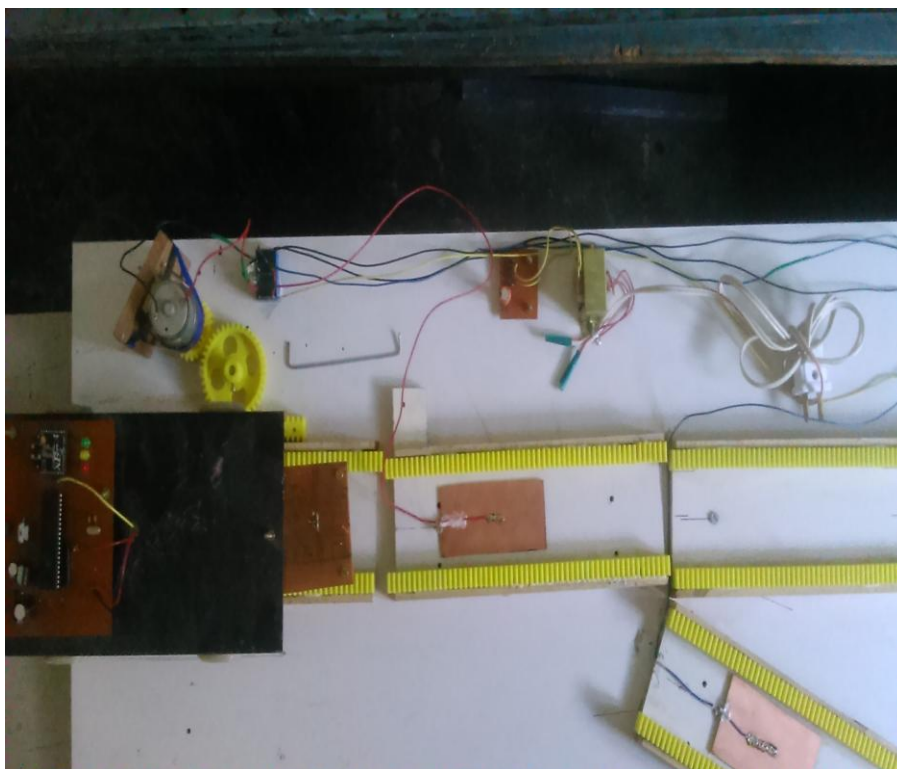


Fig2:-Hardware Mounting



Fig3:- Control Station

VIII. RESULTS AND ANALYSIS

The module is describe the work which is given to it and mention in the paper. This is a advanced approach towards atomization of railways. The each and every component part has worked successfully .This presented work by system is more attractive when use at the practical level. The system has performed good idea for which it is made. The control station in the term is a nearest station which keeps the whole information about the train. The engineers of china has developed ATIS (Automatic Train Identification System)[10] of quite successful in tracking of good train .But RTIS has some of unique principles over it and these are as follows.

S.N.	RTIS SYSTEM	ATIS SYSTEM
1	It can track the train anywhere	This technology can trace the goods train when it is near the station
2	The RFID cards are used in between the railway tracks at limited distance. Here RFID is used to locate the position of train anytime.	In this technology the RFID tags are pasted with the goods which are in the train so they can be located easily.
3	The data logger is used by which the required information about the train could be taken.	It Takes the state information of train with the help of database .This does not trace the different variables of train except train number.
4	Here the system is based on the RFID tags and reader	Here RFID and ATIS are working to make a complete system i.e. database of ATIS
5	Developed for reducing the train accidents and atomization	Developed for tracking of good from one place to another.

TABLE 1:- RTIS System and ATIS System

IX. CONCLUSION

The scenario made by system is the important idea for the practical application. It will changes or modify the working of railways if it will implemented .The cases of accidents can be mitigated commodiously. This aspect is so much cost effective and installation of RFID tag is so easy. After installation this module provides many features over the technology which is currently present in railways. This concept also leads to exact tracking of the train information that is its location can be traced clearly each and every point. The future scope of this system is so intrinsic. It would spread to full automation of railways. The distance between every train can be maintain according to the requirement with the application of this system .The High speed trains can also work with the help of this technology and run trains of using RFID.

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