ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 1, January 2018

RFID Loco Tracking Using IOT

[1] Jyoti Patil, [2] Satish Chikkamath, [3] Jyothi Halaharavi, [4] Basavraj Hosur, [5] Sharada kabadagi, [6] Nikita Kulkarni
[1][2][3][4][5][6] B V Bhoomaraddi college of Engineering and Technology

Abstract: **- The paper presents a solution to provide an intelligent locomotive tracking and management system to improve the existing railway service in the Diesel loco shed Hubli. The goal of our project is to exploit the precise collection, storage of the details like the entry and exit of the loco along with the date, the lane number, the position of the loco through most advanced communication technologies to support value-added services for the administration of the loco shed. The project has been analysed with possible solutions. The project presents our research in embedding a control system into an automatic updating and storage of details using different technologies in its design, development, testing and implementation. The system designed and developed has an authorized user access and thus the information is secured.**

***Key Words*: - Loco, RFID, Internet of Things, communication.**

I. INTRODUCTION

The locomotives of India presently consist of electric and diesel locomotives. Steam locomotives are obsolete in India. A locomotive is also called loco or engine, Indian Railways Maintenance Manual for Diesel Loco, popularly known as "White Manual", was published in the year 1978.However technological advancements like microprocessor based control system, computer control brakes and introduction of new variants in locomotives have changed the maintenance scenario altogether. Maintenance of these technologically advanced locos is completely different from the traditional methods and at the same time the diesel locos present in shed demands a different maintenance setup. The diesel loco shed in Hubli was established in the year 1999. This shed has been constructed by imbibing various features of diesel sheds across the globe. It was the first shed on Indian Railways where these locos were based, and their maintenance was undertaken. With the increasing number of locomotives and introduction of new technologies in the current scenario, there is no proper schedule of maintenance and monitoring the details of locos in the diesel shed. Hence proper scheduling of maintenance, recording the details and storing them for future access is gaining importance. In view of above discussions, the project aims in building a system which can keep track of locos and collecting precise information of different details related to maintenance. The proposed system includes RFID technology to fetch the entry and exit time of locos into shed. Advanced controller Raspberry Pi 3 and IOT technology is used and to record these timing details automatically and store the fetched data onto cloud, the entire system is protected and information can be accessed by the officials only through their registered credentials. The Entire system is cost effective and easy to

II. FRAMEWORK STRUCTURE OF PROPOSED SYSYTEM

In this section, we formalize and define system components followed by a review of related work to contextualize and underpin the necessity of the proposed work.

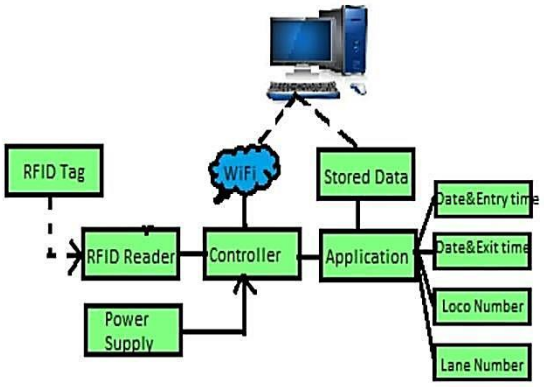

Fig 2.1 Structure

2.1 Radio- frequency identification (RFID) devices are wireless microchips used for tagging objects for automated identification. A RFID system consist of a reading device called a reader, and one or more tags. The reader is a powerful device with ample memory and computational resources. RFID can identify objects wirelessly without line-of-sight. The RFID used in this project is MFRC 522. Locomotive operators find it challenging to balance excellent services to loco movement in the loco shed. Radio Frequency identification (RFID) technology applications in loco shed helps to ensure safety enhance operations, and boost service

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 1, January 2018

levels in the rail transport industry. Using a RFID tags and readers, applications can be setup to provide the following benefits
implement in diesel sheds.

• Operations and Productivity: Determine Entry and Exit time and control the positioning of loco and automatically capture the deviations. And track their locations as they are undergoing maintenance.

• Asset Management for loco: The ability to track loco, and infrastructure to ensure maximized asset utilization.

• Service and Controller Satisfaction: Receive real-time information on loco location and that can be used to update information displays at computer.

2.1.1 MFRC 522

Fig 2.2 overview of MFRC 522

MFRC522 RFID readers are electronic devices which produce and accept a radio signal. The antenna contains an attached reader, the reader translates the tags radio signals through antenna. The reader consists of a built-in anti-collision scheme and a single reader can operate on multiple tags with different frequencies. As a result, these readers are expected to collect or write data onto tag and pass to computer systems. The MFRC522 is a highly integrated reader/writer for contactless communication at 13.56MHz.The operating voltage is 2.5v to 3.6v. It supports contactless communication using MIFARE higher transfer speeds up to 848 Kbit/s in both the directions Communication overview reader/writer:

Table: 2.1

Communication direction	Signal type	Transfer speed		
		106 kBd	212 kBd	424 kBd
Reader to card (send data from the MFRC522 to a card)	reader side modulation	100 % ASK	100 % ASK	100 % ASK
	bit encoding	modified Miller encoding	modified Miller encoding	modified Miller encoding
	bit length	128 (13.56 µs)	64 (13.56 µs)	32 (13.56 µs)
Card to reader (MFRC522 receives data from a card)	card side modulation	subcarrier load modulation	subcarrier load modulation	subcarrier load modulation
	subcarrier frequency	13.56 MHz / 16	13.56 MHz / 16	13.56 MHz / 16
	bit encoding	Manchester encoding	BPSK	BPSK

Advantages of RFID:

• RFID has numerous advantages over other system when carefully matched to the requirements of the application.

• Passive RFID tags contain no power source and therefore have a very long life.

• Ideally suited for providing low cost remote and instant identification of objects

• It provides location to the reader along with its ID without line of sight.

2.1.2 INTERNET OF THINGS

The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. The Internet of Things-the recent communication paradigm, has gained significant attention in academia as well as in industry because, it represents an enormous opportunity for cost savings and new revenue generations across a wide range of industries. IoT can be used to create a world where all smart objects of our everyday life can be connected to the Internet and interact with each other with minimum human involvement to reach a common goal [5]. The term Internet of Things was first appeared by Kevin Ashton [4] in the context of supply chain management. Gartner forecasts that the IoT will reach 26 billion units by 2020, up from 900 million just five years ago, and this will impact the information available to supply chain leaders. The enabling technologies that are expected to form building blocks of the sensing and communication technologies in IoT are wireless Sensor Networks (WSN) and RFID-based networks connected through Internet. Implementation of IoT relies on the integration of RFID systems, WSNs, and intelligent technologies are used to construct a network which covers everything. RFID and wireless data communication technology are used to construct a network which covers everything. RFID is considered as one of the leading technologies due to its low cost, and its strong support from the business community. Objects such as RFID tags and readers, sensors, actuators, mobile phones, smart devices, embedded computers, etc., will be included into the network and will interact with each other through unique addressing schemes. These objects have actuating, processing, storing and networking capabilities. With the advances in sensor technology, sensors will be embedded within all the objects around us. The result will be the generation of huge amounts of data which will have to be stored, processed and presented in efficient and easily

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)
Vol 5, Issue 1, January 2018

interpretable form. IoT allows people and various objects to be connected anytime and anywhere with anything and to any service, and use any network; and communicate with each other in real time if they are online [10]. The controller used is the Raspberry Pi 3 through which the integration of RFID and IoT is done. Finally the results are displayed on the web page which can be accessed only by authorized staff.

III. SYSTEM ARCHITECTURE

By the manual entry, the efficient reports of the loco details cannot be generated. So, this system is developed will reduce the manual work. As maintaining the details for long time in the registers it is difficult task for the admin and staff. The developed system basically consists of MFRC522 reader and tag. The tag is placed on the locomotive and the readers are placed at the entry and exit gateways of loco shed. Database module has authority for creating any new entry of the locomotive. The system is designed in such a way that only authorized persons should be allowed to access the modules. System architecture consists of two readers which are placed at the entry and exit gateways of loco shed where the locomotive can be entered and can exit. Readers are connected to the controller 'Raspberry Pi'. Readers scan the tags present on the locomotive and send the details to the controller through which the details are updated and stored on the webpage using WIFI module. The webpage shows the entry time, exit time and the lane number with the appropriate date.

3.1 Flow Chart Showing the Mode of Operation of the Loco Tracking System

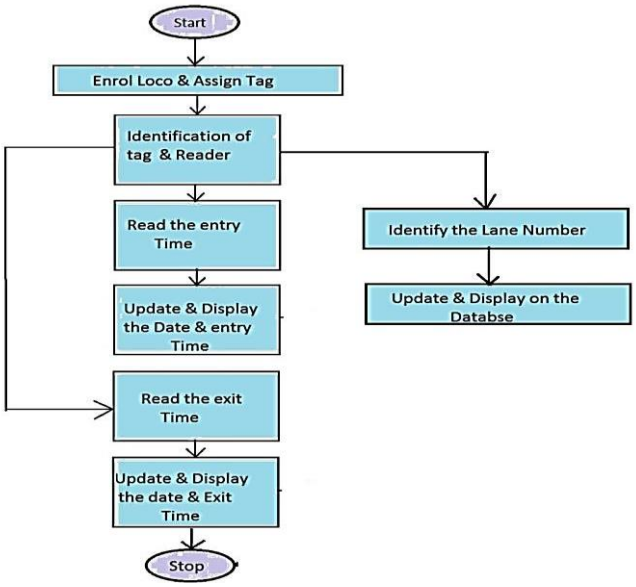

Fig 3.1- Flow chart

IV. RESULTS AND SNAPSHOTS

The prototype is tested for the system and described in the paper. This is a modern approach towards atomization of railways. Every component has worked successfully. This work presented is more effective when use at the practical level. Here prototype has performed well with the idea for which it is made. The database is continuously updated when the locomotive enters or exits the loco shed and the details are stored as well.

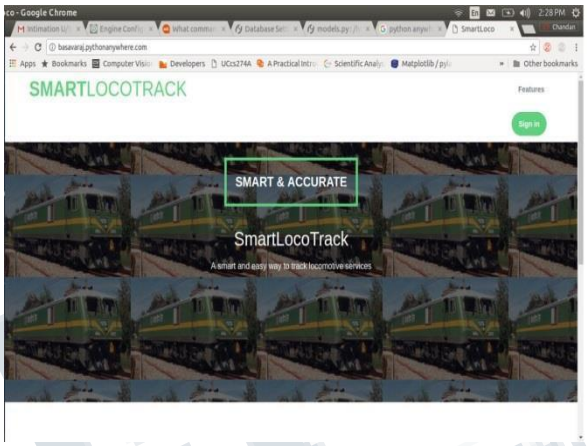

Fig 4.1- The webpage

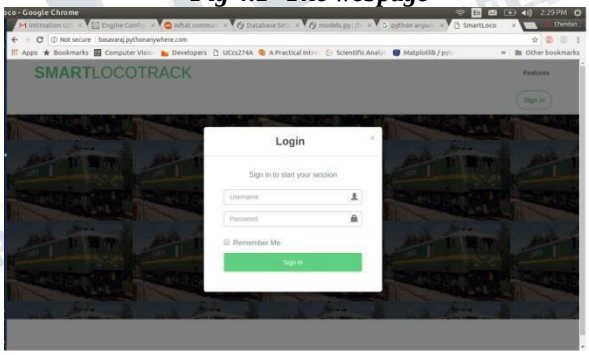

Fig 4.2 – login for authorised person

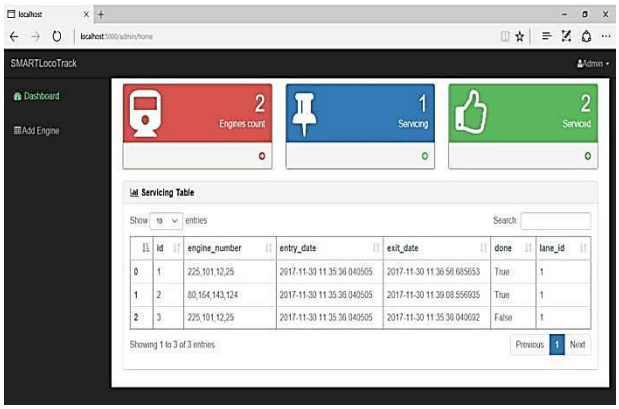

Fig 4.3 – The results displayed

V. CONCLUSION

This paper presents real-time information regarding the collection and monitoring of the details of locomotive inside the loco shed. The proposed architecture employs key technologies: Internet of Things, RFID, and wireless sensor network (WSN), Agents provide an effective mechanism for communication amongst networked heterogeneous devices within the loco tracking system The developed system can provide a new way of collection and monitoring the locomotive that helps to improve the present situation in the loco shed Hubli. This approach is cost effective and installation of RFID tag is easy. In addition, the real-time monitoring can prevent the dangerous situations and take necessary action. This system establishes a transparent functioning and ensures the safety. The data is being secured and privacy is maintained.

REFERENCE

[1] Anand Kr. Gupta, Sushant Katiyar, Nitin Kumar, "Railway Track Finding System with RFID Application" International Journal of Computer Applications (0975 – 8887) Volume 83 – No 7, December 2013.

[2] Jaroslav Kadlec*, Radek Kuchta, Radovan Novotný and Ondřej Čožík" RFID Modular System for the Internet of Things (IoT)" Department of Microelectronics, Brno University of Technology, Technická 3058/10, 616 00 Brno, The Czech Republic

[3] P. Karthika, J. Harriet Rathna Priya, A. Rathinavel Pandian" Indoor Location Tracking System Using RFID Technology" International Journal of Engineering Research and Reviews ISSN 2348-697X (Online) Vol. 3, Issue 1, pp: (73-80), Month: January - March 2015

[4] K. Ashton, ―That Internet of Things thing‖, RFID Journal, 2009.

[5] L. Atzori, A. Iera and G. Morabito, ―The internet of things: A survey", Comput. Netw, 2010, vol. 54, no. 15, pp. 2787–2805

[6] Biplot R. Ray, Moshed Chowdhury, Jemal Abawajy," Secure Object Tracking Protocol for the Internet of Things "Member, IEEE

[7] Information about the working of RFID:"http :// www. eecs. harvard. Edu /cs199r /rea dings / rfidarticle.pdf"

[8] K. Chawla, G. Robins, and L. Zhang, "Object Localization using RFID", IEEE International Symposium of Wireless and Pervasive Computing (ISWPC 2010), Modena, Italy, May 2010, pp. 301-306.

[9] LongeO.O. (2009)," Implementation of Student Attendance System using RFID Technology", B. Tech Project Report, Ladoke Akintola University of Technology, Ogbomosho, Nigeria.

[10] Hasan Omar Al-Sakran," Intelligent Traffic Information System Based on Integration of Internet of Things and Agent Technology" (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 6, No. 2, 2015

[11] Siror, J.K.; Compute. Sci. & Eng. Dept., Shanghai JiaoTongUniv., Shanghai, China; ShengHuanye; Wang Dong; Wu Jie, "Use of Rfid Based Real Time Location Tracking System to Curb Diversion of Transit Goods in East Africa"