A Comprehensive Survey on RFID based Vehicle System

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Abstract:*In the present world, the population is increasing. Therefore, there will be more vehicle usage. Monitoring vehicles in the parking lot is a major challenge. Parking should be secured at the guarded entrance and exit. We need an automated and efficient monitoring system. RFID vehicle monitoring systems can be used to automatically collect vehicle information for efficient and safe vehicle management. An RFID tag is assigned to each vehicle. RFID readers are located at the IN and OUT gates. Information in the RFID transponder which is used to identify the vehicle is placed in it and is obtained via reader tags. An RFID reader reads the vehicle ID and sends this information to the controller for display on the monitor along with the date and time with the help of RTC module.In the case of private sector parking lots, we can identify if the vehicle is already registered in the system or not with the help of the information from the RFID transponder. This way we can identify if the vehicle is authorised or unauthorised and the barrier gate is automatically openedaccording to it. This information is also sent to the owner as an SMS with the help of the GSM module. The device labelled "RFID based vehicle monitoring system" can be very useful for the safe tracking of all the vehicles' records and also providing an alert message to the owner in case of any theft.This describes a prototype development to solve recurrent monitoring problems in developing countries using RFID technology and is capable of eliminating the time wasted during manual collection of data.*

Keywords: vehicles, Monitoring, RFID, GSM module.

1. INTRODUCTION

Behind the radio frequency-based vehicle surveillance system, the main goal of this project is to manage vehicles. Maintaining records of vehicles and data are a complicated task in a manual process moreover it is difficult to generate reports. Maintaining records of vehicles' reports is much easier with this vehicle monitoring System. It is easier to automatically update the vehicle entries in the database via software than through a manual process. With this system there is possibility to maintain in and out times easily and send this information to both the authority and the vehicle owner.

2. RELATED WORKS

2.1 Tracking moving vehicle

For example, there are many ways to track a moving vehicle using RFID system, ZigBee technology, and so on. Let's take a closer look at each of them as follows:

2.1.1 RFID system:

RFID vehicle tracking system develops vehicle tracking system using RFID (Radio Frequency ID). The three main problems in the city are traffic lights, road congestion, and vehicle theft. Traffic signalling is dynamic based on the regression of a data archive that contains a detailed set of traffic quotients and times. This technique includes a simple and unique way to calculate traffic based on the physical dimensions of the road and the type of traffic on the road. Car theft is detected based on the vehicle's truck logs. Congestion analysis is an important attribute of traffic light systems and is used to suggest high-speed routes to vehicle drivers and balance traffic on different routes. RTSV requires RFID tags to be placed on RFID readers at intersections of all vehicles and different cities for tracking purposes. [6, 10]

2.1.2 RFID for Vehicle plate number

RFID vehicle plates (ePlate) [7, 10] for tracking and management systems use RFID vehicle plates (ePlate) for tracking and management systems. The system is designed based on the size of the vehicle's license plate and describes an RFID plate antenna that uses the size of the license plate and the RFID chip attached to the license plate for optimum performance. The Eplate design antenna uses low cost FR4 material and the antenna tape operates at a frequency of 902928MHz for UHF RFID applications which results 3.8dbi antenna gains. The shape of the antenna is rectangular and the dimensions are 300mm x 100mm. This is usually the typical size of a traditional license plate. All information entered into RFID Eplate tags is collected by RFID readers and analyzed for vehicle tracking, monitoring, and transportation management systems. [6,10]

2.1.3 Zigbee based Vehicle tracking:

Zigbee RFID-based vehicle tracking [8, 10] provides a solution to improve traffic conditions through Zigbee-based vehicle monitoring. Describes the design of network-level RFID and Zigbee-based system architectures for tracking vehicle information sent to centralized servers. The

design goal is to provide a simple and easy solution for tracking the position of moving vehicles. Compared to older systems, the Zigbee-based network architecture can provide accurate information about the vehicle. The vehicle receives a unique RFID tag (radio frequency identification). RFID readers are placed in specific locations. RFID readers are incorporated into the car monitoring statistics system. This RFID reader can check or collect the data and information passed to the control station via the Zigbee protocol. The Zigbee protocol is used for message service between the control center and the vehicle.

2.1.4 ETC system:

Radio frequency chips are used to design electronic toll collection systems on highways. System security is also explained by the new RFID authentication and authorization protocol model. [1,10] Radio frequency identification (RFID) -based toll collection systems efficiently use communication links between RF modems over radio channels for highway vehicle monitoring, vehicle authentication, and automated tolls. Makes collection easier. The system is implemented to automatically register highways or vehicles entering and exiting the freeway, reducing the time spent paying tolls in large rows. A detailed monthly statement will be sent to the customer at the end of the month. Customers can register and receive transmitter modules without having to stop at the tollhouse to get in and out of the highway.

3. RFID TRACKING VS OTHER SYSTEMS

RFID frameworks track vehicles from one highlight another, dissimilar to GPS which can give ceaseless following. Nonetheless, RFID has various benefits over GPS, including programmed ID and recording, more prominent precision and dependability, and the capacity to work inside indoor or restricted spaces without any GPS signal. While following vehicle on the open street will for the most part require a GPS framework, it is feasible to utilize RFID frameworks outside of your own terminal, for instance by introducing per users at a client site. Regularly vehicles will fuse the two kinds of framework - GPS for when vehicles are progressing and RFID for recording their appearance and take-off from stops.

Programmed number plate acknowledgment can likewise be utilized as a component of a vehicle global positioning framework. It is generally minimal expense and ideal for distinguishing a singular vehicle. RFID is especially fit to frameworks working with unregistered vehicles or where distinguishing trailers,

rather than the enrolled farm hauler, is the significant component of the framework.

Creating RFID vehicle global positioning frameworks can be testing a direct result of the requirement for the framework to manage moving labels and labels on metal vehicles. Core RFID has created frameworks for some driving administrators and can instruct on the right mix concerning labels and per users for your specific prerequisites.

4. EXISTING MONITORING SYSTEM FOR VEHICLES

There are vehicle monitoring system are now available and sold within the market. A system was presented to watch the situation of the vehicle together with its parameters, like speed, compartment temperature, fuel consumption, from a centralized location for research and development purposes. this method may also store data for further analysis and records keeping but it uses internet-of-things technology. A RFID-based monitoring system was design for vehicles in Brunei Darussalam primarily to trace the speed of vehicles. The RFID kit is related to Raspberry-pi board and Central Control Unit (CCU) to determine reference to a distant administration server. There is also a Vehicle Monitoring System that uses RFID which generates and maintain daily reports of vehicles under monitor. Through this RFID vehicle monitoring system, information is collected automatically for efficient and safe vehicle management. Automatic vehicle identification increases the safety and hence, can prevent loss of vehicles Additionally, an identical system was established in Malaysia to trace the varsity children in class vehicles. the look used the world Positioning System (GPS) as a way of tracking the varsity vehicle. A passive RFID technology was integrated for recording the presence of the kids within the vehicle. Parents will know the situation of the vehicle while their children are on board. Hence, this paper concerns most on the protection on their children with the RFID and GPS technology. An implementation on Vehicle theft alarm and tracking the situation using GPS and RFID was also established. The System consists of a microcontroller printed circuit, keypad, alarm and a board with the mixture of RFID and GSM.

The key employed by the car is an RFID card that's convenient, contactless and secure. Vehicle Security System Using Zigbee is intended and implemented to test and secure the car supported combination of Zigbee system, Peripheral Interface Controller (PIC) 16F877A microcontroller, vibration sensor (body), temperature sensor and micro switch (engine), alarm, buzzer, fan and magnetic sensor (door). Users can monitor the status of car remotely using the liquid Display (LCD) display which is attached to the controller. The authors concluded that this technique is successfully tested for its performance. The

system about embedded Vehicle Monitoring system supported Web Technology used level sensor, pressure sensor, tilt sensor, gas sensor, and alcohol detector. These sensors are applied for Liquid Level, State of auto, Pollution by Vehicle, alcoholic taste of driver and then on are being checked. These sensors provide the knowledge to the Arduino (ATMEGA 328P-P0). Web Technology is employed to test the knowledge needed. The author concluded that this project is improved by employing a camera and by integrating a mobile based application to urge the knowledge from the vehicle in real time.

5. HOW DOES VEHICLE TRACKING SYSTEM WORK

The in-vehicle telematics uses GPS technology to automatically provide location information along with other data like date and time, vehicle diagnostics, engine management, and more. When paired with a user operates it automatically starts the operations and offers valid information and efficiencies of its vehicles, furthermore as data to supply insights into driver behaviour, like harsh usage, driving hours, excessive idling, speeding and fatigue. When implemented by businesses with fleet operations like in industries like transportation, construction, specialty services, delivery and government, vehicle tracking systems typically include – and meet – an expectation of assorted resources. When considering the slim margins seen in any fleet operations, any savings or efficiencies is also a giant improvement to a business bottom-line.

6. TECHNICAL OVERVIEW

The various initiatives discussed above greatly enhances the flexibleness of auto tracking, which might otherwise not be possible with the employment of a standalone GPS system. However, the primary challenge that's presented by complex environments still remains. so, on unravel this challenge, the technology of octenes identification (RFID) is introduced. RFID may be a wireless proximity communication method, which could be used as a standalone technology or it'll be complementary to existing technologies. RFID is present in a very good selection of applications. These applications include various procedures against theft. the world of RFID technology is additionally considered to be one all told the fastest growing technology fields that exist today. the most focus area of RFID technology within the past and present is security systems and access control methods. There has however been a rapid increase within the utilization of RFID systems within the transport sector, moreover as in supply chain management infrastructures. one altogether the predominant uses of RFID technology within the transport sector is in toll collection. The implementation of RFID readers on toll gate infrastructure, and

so the location of transponders in vehicles, has proved to possess a serious impact on the quantity of traffic that will be processed by a toll gate. By implementing RFID technology within the toll system, traffic queues are reduced and vehicle owners are saved a considerable amount of it slow and energy. Animal tracking is additionally a district during which RFID technology has played a big role. By placing transponders on animals, it's possible to remotely monitor the movements, and possibly even the behaviour of animals.

7. CONCLUSION

The most essential thing in today's world is providing security to the general public and personal vehicles. So, vehicle tracking system is proposed to locate the precise position of the vehicle when it's lost or hidden somewhere. GPS technology is used to trace the placement which data is transmitted to the user using GSM. together with the tracking system anti-theft system is additionally developed to produce security. it's mostly applicable in fleet management, facility, military applications, school buses, public vehicles etc. likewise various technology were used, as main purpose RFID technology has been utilized in wide area for surveillance and maintaining records.

SYNTHESIS

These various related studies and literature, the use of RFID and other monitoring systems, allow researchers to gain additional knowledge they already had when developing the proposed system. However, this research aims to develop a monitoring system using RFID tags and tag readers, and the related research is aimed at researchers developing non-existent systems with unique features that help them to effectively monitor the vehicles.

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