

A Survey on RFID Based Vehicle Authentication Using A Smart Card

LITTY RAJAN¹, ALPANA GOPI², DIVYA P R³, SURYA RAJAN⁴

littyangel123@gmail.com₁, alpanagopi@gmail.com₂, divyapr1295@gmail.com₃, suryarajan33@gmail.com

Abstract : Now a day's every system is automated in order to face new challenges. In the present days Automated systems have less manual operations, flexibility, reliability and accuracy. Due to this demand for less manual controlling, every one prefers automated control systems. Especially in the home and industries of electronics, automated systems are giving good performance and flexibility to get controlling without your involvement. We are conducting a survey in this paper based on RFID applications. In this paper, we discussed about the vehicle authentication with RFID. RFID used for the automatic tracking and detection of tagged objects through radio waves. It requires RFID tag stores digital information when it comes in the visibility of reader and reader reads the digital information and send to the server.

Keyword : RFID, tag , reader, rfid card, identification.

I. Introduction

Radio Frequency Identification (RFID) technology uses radio waves to identify people or objects. There is a device that reads information contained in a wireless device or “tag” from a distance without making any physical contact or requiring a line of sight.

RFID technology has been commercially available in one form or another since the 1970s. It is now part of our daily lives and can be found in car keys, employee identification, medical history/billing, highway toll tags and security access cards. As a kind of wireless automatic identification technology, RFID can automatically identify the objective and obtain the relevant data from radio frequency signal without

man-made interference. Different from traditional bar code identification technology, RFID technology has characteristics of waterproof, anti-magnetism, high temperature resistance, long service life, far read distance, cryptographic label data, large storage capacity, free information alteration and etc. No personal information is stored on the RFID card – only a number, which points to the information housed in secure databases. The RFID technology has two components – the reader and the tag. The reader has two parts a transceiver and an antenna. The transceiver generates a weak radio signal that may have a range from a few feet to a few yards. The signal is necessary to wake or activate the tag and is transmitted through the antenna. The signal itself is a form of energy that can be used to power the tag.

The transponder is the part of the RFID tag that converts that radio frequency into usable power, as well as sending and receives messages. When the transponder is hit by the radio waves, the waves go up and down the length of the transceiver, oscillating. You might know that when a wire passes through any sort of magnetic or electric field, it can convert and conduct that field down its length.

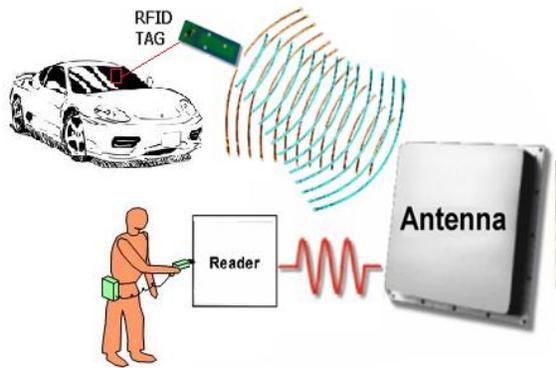


Fig 1. RFID used in vehicle authentication

In this paper, we discussed about vehicle authentication using RFID technology shows in figure1 and also documents such as pollution documents, insurance documents, RC books etc are stored in RFID tags.

2. Literature survey

A smart tag which is used for vehicle authentication with the help of RFID technology. The aim of this survey is to find RFID application in authentication of all vehicles during inspections.

Wei Wang and Shidong Fan [1] proposed a system that RFID technology and information management are leading tools that are imperative for future sustainable development of container transportation, not only port facilities and transportation but also a manufacturer and retailers. The useful application experiences are extremely helpful for RFID widespread and successful adoption in the future. From the analysis of above-mentioned RFID container transportation implementation, some

key points can be concluded for further RFID application systems implementation. As information systems play a crucial role in RFID implementation, information system development is essential for RFID project success. And RFID information system should be developed as all open systems that can be easily integrated with others system in supply chains. Security is a critical issue for RFID systems since they manage cargo information that must be protected from theft, modification or destruction. As a new wireless technology that often links to the Internet, security presents additional challenges that must be factored into any installation of RFID systems.

J. Wisanmongkol, T.Sanpechuda and U.Ketprom [2] proposed the integration of sensors for automatic vehicle identification in a RFID-based poultry traceability system. The sensors are used to automatically detect poultry transport vehicles and control the RFID reader. When sensors are working with tower lights, they can also be used to control the vehicle direction instead of checkpoint staff. By integrating these sensors, the system is now fully automatic – no checkpoint staff is required to signal the vehicle movement or control the RFID reader's operation. In addition, the overall power consumption is improved because the reader only performs its reading routine while the transport vehicle is inside the reading zone, and hence minimize the reader talk time.

Xu Guangxian [3] reviewed the research and development work on the highway parking system. Using infrared wireless communication realized the core technology of ETC; from theoretical and experimental analysis, designed and realized outdoor prototype system for short-range wireless infrared communication, and through software simulated the vehicle terminals' integrate highway parking process. And it also realized the data exchange between terminal software and system control center; completed the business functions and system requirements of logical design phase; achieved the desired objectives. Its obvious advantage is no parking troll collection. Thereby it can significantly improve the dispose efficiency of the toll station and the traffic ability of toll road.

Cheng-kung Chung and Yu-kuang Hsieh, Yung-hau Wang and Ching-ter Chang [4] proposed system is integrated applications of the RFID (HF/UHF) and LPR technologies. Experimental results also show accurate detection in a prototype lab. The MIFARE ID rate is 99% , the LPR can reach up to 91%, and the e-Tag ID is with a detection of 93%, respectively. The integrated plans greatly enhance the adhesion of the original membership card, make it further to be a SMC. The managers have believed that the goal of marketing is to create as many as new customers as possible. In the business environment of the fast change generation, the mall face intense competition, service provider have to aim at exclusive customer groups who feel so strongly 255 that the managers can best meet their relevant needs. The customer loyalty has also formed to the mall in this moment [23]. Information is king, through collection and analysis of customer data will give the mall managers the best opportunities to understand and anticipate to the continuous communication that come with the connected consumers. The SMC can help mall managers to gain deeper insight into the value that is being generated for the SMCs' member, and provide them with more value-added experience desired by the constantly evolving connected SMCs' member. Through the proposed system, SMC is becoming much smarter itself. Consequently, one of the most trendy Internet of Things (IoT) were integrated into the mall construction where is becoming a smart environment.

Ning Li, Zhongliang Deng, Feng Wan, Shibo Zhu, Xiao Liu [5] presented that for various closed-loop systems , the designed information sharing platform in this paper provides a channel for information sharing, on one hand the problem of information sharing is solved. On the other hand, it makes full use of existing resources and avoid waste of duplication investment. This system overcomes the shortcomings of EPCglobal information sharing platform, and uses platform management identification code to share large capacity information and to manage the sharing permissions by means of user registration, authorization and authentication. With a distributed structure, the system has a strong suitability to subsystem, it can accommodate the systems of different frequency standard and different

network structure, and integrate GPS, GIS and other systems and complete visual positioning, tracking, information sharing. This system can be used in a wide range, such as municipal urban management, military information management and industry or inter-industry information sharing.

Fawzi M. Al-Naima, Haider S. Hatem [6] presented system successfully merges the RFID readers and their tags with central database, such that all the parking lots in the university can work in fast and efficient manner. The RFID tag provides a secure and robust method for holding the vehicle identify. The web-based database allows for the centralization of all vehicles and owners records. This increases the security of data, as records can only be retrieved with an appropriate username and password, combined with the vehicle tag number. The proposed VASAUC website represents an attempt to fill part of Al-Nahrain university parking lots needs to offer e-services and to digitalize the request, store, view read and report for parking and tracking data about each vehicle access in these parks. Implementation of the VASAUC website over the proposed system decreases the time of renting servers, increase the security and privacy, which the VASAUC website is administrated and monitored under an authorized person and to accommodate any development process in the VASAUC website. The parking slots can be reserved by the registered user by sending a request to the administrator. The system calculates the number of vehicle of each parking lot automatically at access and leave time. The automation process is expected to reduce the waiting time for the users.

Paras Goyal, Iqbal Singh [7] proposed the automatic vehicle identification system using vehicle license plate. The system use series of image processing techniques for identifying the vehicle from the database stored in the PC. The system is implemented in MATLAB and it performance is tested on real image. The MATLAB results shows that the system robustly detect and recognize the vehicle using license plate against different lightening conditions and can be implemented on the entrance of a highly restricted areas. The implementation works quite well and thus there is still room for improvement. The camera used in this project is sensitive to vibration and

fast changing targets due to the shutter long time. The system speed and robustness can be increase if high resolution camera is used. The OCR methods used in this project for the recognition is sensitive to misalignment and to the sizes, affine transformation can be used to improve the OCR recognition from different angles and size. The statistical analysis can also be used to define the probability of detection and recognition of the vehicle number plate.

Jayalakshmi J, Ambily O A designed as a system is to automate the on road vehicle checking by the police department. For which we are introducing a new concept that every vehicle should have RF Device fitted with the vehicle. By replacing the on road checking the RF Reading device placed near by the road will read the card details, and automatically validates the owner details and corresponding certificate details. If any mismatch found the system will automatically send alerts to the specific department. Another facility provided by the system is lost vehicle detection and/or vehicle robbery tracking. The owner and police department can see the vehicle position that is the vehicle is under which station limit. So it will be much easier to find out the vehicle.

M. Rajesh , K. Vignesh Ramanathan , R. Jagadish , S. Dhayalan presented the design & development of a driving licence based security system for an automobile. This system prevents vehicle theft and driving without proper driving licence. The simulation of the system is done using PROTEUS 7.7 software. A physical system is under development and will be tested for effectiveness. The system will increase road safety and reduce vehicle theft. If installed in all the vehicles, it will be of use for the society as well as the law enforcement department. Ideally, this system could be made more convenient and effective with the use of satellite modems, instead of cell phones, as tracking device as the present system may fail when there is no cellular network coverage. This setup can be made more powerful with the help of a pinhole camera and GPS tracking device. The image captured by the camera and GPS data may be send to owner's mobile phone and the data can be identify the thief and retrieves the vehicle.

S. Dharanya , A. Umamakeswari proposed work gives a unique way to protect vehicles along with an automatic toll collection that helps to regulate the process in an easy way. In an outlook, automated vehicle tracking and monitoring may be done with a GPS system for tracing the vehicle speed and giving automated warning when a vehicle reaches the speed limit and deducing the penalty directly if the object ignores the warning. Identifying the stolen car using GPS and controlling the car from the remote using server can also be added. In addition to registering a bank account, a prepaid card can be allotted to each vehicle and object for those who don't wish to register their bank accounts, so that the amount will be deducted from the card which should be recharged when there is not enough balance in the card. Displaying the sign boards on the roadside in the LCD may also be implemented.

3.Conclusion

Now a day's due to the demand for less manual controlling, every one prefers automated control systems. The existing system contains some problems such as for slow manual checks lead to queuing up of needers, unavailability of real time information, incorrect information about vehicle owners. To remove the problems, we suggest vehicle authentication with smart tag using RFID. This technology is one of efficient technology for vehicle authentication. It contains an RFID reader and RFID tags whenever these tags is in the visibility of reader, data can be accessed. Also avoid manual verification and chances of occurrence of the error. Therefore, we can control time consuming during vehicle inspection.

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