

RFID Based Smart Parking System

Naman JatinBhai Shah¹, Sejal Thakkar²

¹Student, Department of Computer Engineering, Indus University, Gujarat, India

²Assistant Professor, Department of Computer Engineering, Indus University, Gujarat, India

Abstract - The growing urbanization among more and more engorged urban areas and large growth within the range of urban vehicles, has resulted within the want for secure parking areas. during this paper, an answer is provided for preventing thievery of car from parking exploitation RFID and GSM technology. there's an enormous quantity of reduction in dealings price with oftenness identification technology in automation. This resolution includes parts like GSM kit, RFID readers, RFID tags, barrier gates, computers, software system and light-emitting diode lights. this method is employed for dominant GSM kit, in operation barriers and glowing LEDs in several cases. this method is freelance and may add any quite organization. this method will forestall thievery of the vehicle in a company. Members of the organization will feel secure for his or her vehicles. Check-ins and check-outs are going to be controlled by the software system on the idea of open-end credit and RFID vehicle Tag. licensed member are going to be knowing just in case of any thievery activity through SMS and alarm can ring for security alert.

Key Words: RFID, smart parking, sensors

1. INTRODUCTION

Radio-frequency identification (RFID) is associate degree automatic identification technique whereby the information keep on RFID tags. The RFID tag may be a device that may be joined to or incorporated into a product, animal or person for identification and trailing victimization non particulate radiation. Some tags are often scan from many meter away, on the far side the road of sight of the reader. RFID technology is employed in vehicle parking systems of malls and large buildings. The system consists of a vehicle counter, sensors, board, gate controller, RFID tags and RFID reader. bestowed here is associate degree automatic vehicle parking system victimization remote sensing micro controller.

Basically, associate degree RFID system consists of associate degree antenna or coil, a transceiver and a electrical device electronically programmed with distinctive data. There area unit many various kinds of RFID systems within the market like sensible parking, IOT parking system e.t.c. These area unit classified on the idea of their frequency ranges. a number of the foremost used RFID kits area unit low-frequency, mid-frequency and high-frequency.

1.1 Need and Motivation

This project can be enhanced for tracking the vehicles in parking lots. To differentiate the vehicles of staff and visitors. The camera can be used for security. By using GPS system, we can find where the car is parked and also we can find number of vacancy available in parking area. Paying system can be made very efficient.

2. SCOPE

2.1 Functionalities

Using RFID Smart Parking System we can accurately identify and authorize vehicle movement. Collect and record vehicle movement data. Their will be increase in security within the parking facility. Most Improved and efficient way of parking in the urban areas which saves lot of time.

2.2 Limitation

Use of redundant systems will result in a greater cost. It may be a bit confusing for unfamiliar or traditional users. It is not recommended for high peak hour volume facilities as the cost will increase. It is not recommended to be used in smaller parking as it will be very costly. Storage of Data is a big problem as lot of vehicles data is to be stored at a given time. Complete automated system is hard to develop some sort of manual work is to be done.

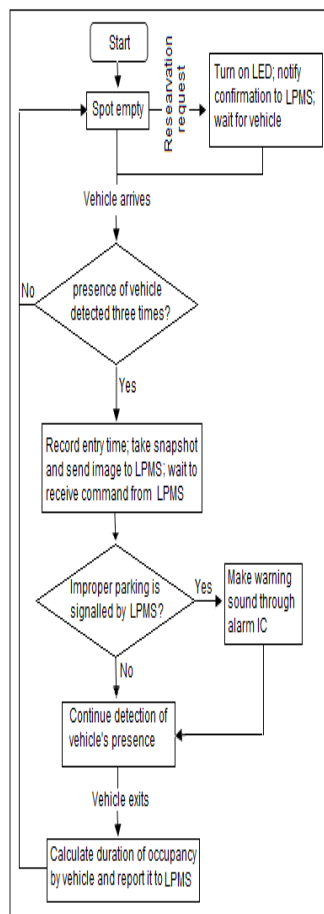


Figure 1. Flowchart of the proposed RFID smart parking System

3. LITERATURE SURVEY

The metropolitan areas are becoming heavily crowded as there is enormous growth in the human population as well as in transportation and vehicles moving in the area. Parking is becoming a major issue in the metropolitan areas as the use of vehicles is increasing more and more, thus it is difficult to manage the parking of vehicles in a particular mall and building. These problem is troublesome task for any parking system.

- The problem is solved by various system they manage vehicles particularly in a dedicated area. Accurately identify and authorize vehicle movement.
- Collect and record vehicle movement data.
- Increase security within the parking facility.
- Improve customer service.
- Save time for parking.

These solve the management of vehicles easily. However the problem arises about the security, authentication of vehicles, differentiate between the visitors and employee

working on that area. Thus these are huge problems which are difficult to perform by other system.

These complication can be overcome using RFID based car parking system. In the system there is dedicated slot given to employee and visitors. Suppose the employee are given the id and thus they login they are given slot while in visitors view the system when create the token it create a dedicated slot in which the vehicle should be parked. RFID sensors are useful if the parking is at wrong place. It also create payment of the revenue for the parking of vehicle and thus at the exit of the parking a dedicated men is allotted to collect a revenue.

The project uses RFID technology by which providing authentication of vehicle by any theft. We can have security against any serial attack. Navigation of vehicle can also be done using GPS location.

3.1 Objectives

- Allotment of vehicles in a proper way differentiating both employees and visitors thus management of vehicles is easy.
- Safety to the vehicle from the theft due to authentication of the vehicle, Security from major serial attack due to RFID sensors.
- Easy collection of revenue from the parking system.

4. SPIRAL MODEL

AGILE Methodology

Agile SDLC model is a combination of iterative and incremental process **models** which focus on process adaptability and customer satisfaction by rapid delivery of working software end product. **Agile** Methods break the product into small iterative parts. These builds are provided in iterations and to complete it in particular time as per project managed.

We have chosen agile methodology as it is a small project and so we can start our project with some basic analysis and then if our product owner want to change some functionalities can also change in the end product or add some module.

Based on the type and size of project agile methodology is best suited as we can cover basic requirements in its first iteration and if we want to add some advanced modules we can work according to it.

5. Design and implementation

5.1 Product features

The main features of RFID car parking system are as follows:-

- Checking the status and location of car parking- Sensors are used to detect whether the car is in parking space which is allotted if it is not there it will show "EMPTY". It will also check the location of your car if the user is misguided it will help him to reach at destination.
- Car parking Space Management- The space for the parking can be easily managed with the help of RFID sensors if the space is available it will inform the administrator to enter the area and will create token. There will be management in the vehicle management between employee and visitor.
- Easy revenue generation- There can be easy revenue generation using these system as it will calculate the time specified on to the token and will generate the bill. The employee will be given pass by which they can easily register in to the app and can use smart parking system.
- Security and Authorization- Security will be stronger as the sensor will help to detect any harmful thing. If it is found it will produce alarm and attack can be stopped. Authorization will be done using microprocessor and thus no theft of vehicle will be there.

5.2 Modules

1. **Mobile app** - In these module there will be option for the login in to the app or to navigate your vehicle. Status of your vehicle is also shown.
2. **Registration**- in these module the one who come daily like employees working there can register and can add or delete their membership as per their choice.
3. **Parking search**- in these module there is accessibility of searching your vehicle or slot available or not. It can be used by both Admin and user.
4. **Admin app**- In these module admin check whether the space is available and manages as per the space.
5. **Report**- In these module report is there in which we have the analysis of vehicle or they should increase space or not.

6. **Add parking**- In these module if the space is less as per reports there should be increase in the parking lot.

6. Testing and Result

Testing is a phase in the software development life cycle. We perform software testing to see whether the expected result of the system is equal to the result that we obtain from the system. Two important keywords in testing are verification and validation.

Verification is about are we building the project or a system right. It should work perfectly without any bug. E.g. if we want to add two numbers $2+2$ should be equal to 4, it should not give you 5.

On the other hand, we have validation. It is more about what we are building should match the client's requirements. If the client wants $2+2=5$ then the system should give $2+2=5$.

When we are talking about various phases or levels of testing it can be stated as follows

6.1 Unit Testing

It is the micro level of testing to make sure that each unit is working properly. A unit can be a specific piece of functionality; it can be a program or a particular procedure within the system. It helps to verify the internal design and logic.

6.2 Integration Testing

It is usually done immediately after unit testing. Here individual units are combined and are tested on how they work as a group. It also identifies interface issues between modules.

6.3 System Testing

The next level of testing is system testing. As the name implies, all the components of the software are tested as a whole in order to ensure that the overall product is working properly as expected.

6.4 Acceptance Testing

The final level of testing is Acceptance Testing or UAT (User Acceptance testing). It determines whether or not the software is ready to be released. As the requirements keep on changing, in this level of testing the user ensures that all the requirements are met before the product is released.

6.5 Test case

TEST CASE ID	1
TEST CASE NAME	FINDING THE SLOT
PRIORITY	1
PREREQUISITS	CHECK THE AVAIBALITY
STEPS	CHECKING THE SPACE AND ALLOCATING THE SLOT
EXPECTED RESULTS	THE SYSTEM SHOULD GIVE DEDICATED SPACE

TEST CASE ID	2
TEST CASE NAME	CREATING REVENUE OF THE TOKEN
PRIORITY	2
PREREQUISITS	THE VEHICLE SHOULD BE PROPERLY AUTHORIZED
STEPS	CREATING BILL FOR THE TIME CALCULATED AS PER TOKEN
EXPECTED RESULTS	THE SYSTEM SHOULD GIVE CORRECT BILL

7. Conclusion

The development of RFID parking system have helped for the management of vehicle parking. The users who access the technology can know the status whether the slot is available or not. Further if the space is already occupied they will get automatic notification which will save lot of time and fuel. The administrators of the parking system can easily know the need of Improvement or increasing the space of parking area. The visitors who are visiting can easily access the use of parking area in which they know their vehicle is safe from any theft and they can also

navigate their vehicle if they are misleading to their destination. Nowadays terror attacks are also increasing the sensors will stop these type harmful things to enter into the parking system. The mobile application will save time instead of using web sites, application for IOS should also be prepared so it can be run on both android and IOS device.

REFERENCES

- 1) Kumar, L., Khan, M. H., & Umar, M. S. (2017). Smart parking system using RFID and GSM technology. 2017 International Conference on Multimedia, Signal Processing and Communication Technologies (IMPACT). doi:10.1109/mspct.2017.8364000
- 2) Mainetti, L., Palano, L., Patrono, L., Stefanizzi, M. L., & Vergallo, R. (2014). Integration of RFID and WSN technologies in a Smart Parking System. 2014 22nd International Conference on Software, Telecommunications and Computer Networks (SoftCOM). doi:10.1109/softcom.2014.7039099
- 3) Pala, Z., & Inanc, N. (2007). Smart Parking Applications Using RFID Technology. 2007 1st Annual RFID Eurasia. doi:10.1109/rfideurasia.2007.4368108
- 4) Smart vehicle Parking Monitoring system using RFID Ankita gupta, Ankit shrivatsava, Rohit Anand, Paras Chawla ISSN: 2278-3075, Volume -8, July 2019(IJITEE)
- 5) M. Patil and V.N Bhonge, "Wireless sensor network and RFID for smart parking system", *International Journal of Emerging Technology and Advanced Engineering*, vol. 3, no. 4, pp. 188-192.