

RFID Implemented Parking System

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Abstract

Radio-frequency identification (RFID) is the wireless non-contact use of Radio Frequency Electromagnetic Fields to transfer data. It is basically used for the purposes of automatically identifying and tracking tags attached to objects. RFID technology uses RFID tags, RFID readers and RFID antenna. The application can be used for managing and controlling various reports and operations of parking system. By using this software the check-ins and check-outs will be in control of the RFID tags, readers and barriers. With this software and technology the check-ins and check-outs can be done in a fast manner by avoiding the traffic jam problem near the gates of parking lots. Drivers will not have to wait for the identification of their vehicles as it will be done automatically by the tags that are provided to them. This will also ensure security as only the registered tags (users) are allowed to enter.

1. Introduction

RFID is an Automatic Identification and Data Capture (AIDC) technology that uses RF waves to transfer data between a reader and a tagged object. The objective is to identify, track and monitor objects. RFID is known for a long time has not been used frequently because it is bit expensive than other technologies. In RFID, the objects are identified using tags. Each tag has a unique tag id. The tag id can be provided by the manufacturers or can be provided by the programmer of the system. There are basically two types of tags available: passive tags and active tags. Passive tags are less expensive than those active tags and widely used. But passive tags do not have a battery inside them and they are powered by the antenna. In active tags there is a battery inside them that's why they are expensive than those passive tags and also they have more memory space than passive tags.

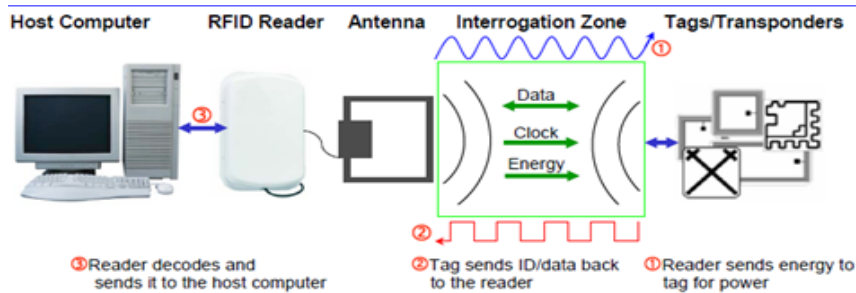


Fig. 1: Basic working of a RFID system with antenna, tags and database (computer).

The use of RFID technology is better because: the workloads can be decreased to a great extent [1], it is efficient [2], much more secure than other networks [3]. In this automated vehicle identification can be done. In this multiple check-ins of a particular vehicle are only possible if that vehicle performs a check-out. Once the vehicle has checked-out, than only the next check-in will be allowed for that vehicle otherwise the system will not authenticate that vehicle. The system will also control the barriers that are on the entry and the exit gates. The barrier will only open if the vehicle is authentic.

The purpose of using RFID for parking system is to provide the simple solutions to the problem that are encountered in the parking lots, to decrease the work load and to maintain the records of vehicles. In this study the main components of our system are tags, antenna, reader, barriers and the software we are using. The purpose and aim of software is to maintain the records and to perform various operational tasks..

The problem of space in parking lot should be solve programmatically by keeping the count of total number of space available and the total number of vehicles that have entered in the parking lot. In this way the time that is being waste to search for a parking space can be avoided. The problem slow verification is also being solved as the manual identification takes more time that tag identification and also logs and records can be maintained for a long time period as there is no use of manual registers and the data is maintained in form of files that can be utilized further according to the system's requirement.

2. Design of System

In this purposed system the check in and check out of vehicle is maintained and controlled using a database. The purposed system is shown below in the Fig. (Fig.1):

For the parking system both hardware and software are being used. RFID reader, antenna, tags, labels, cables, barriers and computers have been used utilized for the hardware requirements. A database management system is being used to store and manage the data as a software requirement and a programming language has been used to collect and operate the data of parking lot. The RFID reader is Intermec Reader and that is IF2. It has four ports for antenna which means we can connect four different antennas to it. The working frequency is in UHF (Ultra high Frequency). The different ports of reader are shown below in the figure. Fig2:

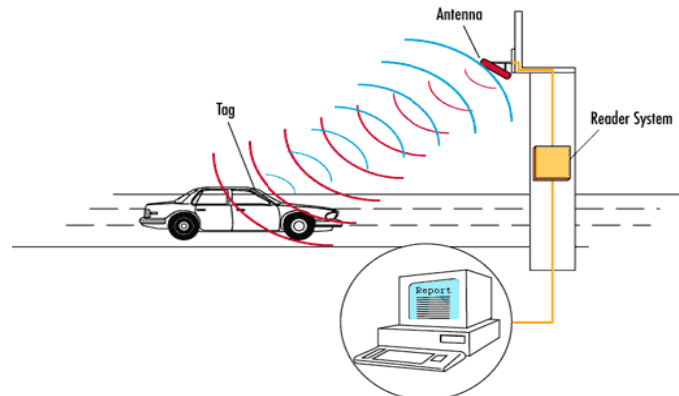


Fig. 2: Basic Working of RFID implemented Parking System.

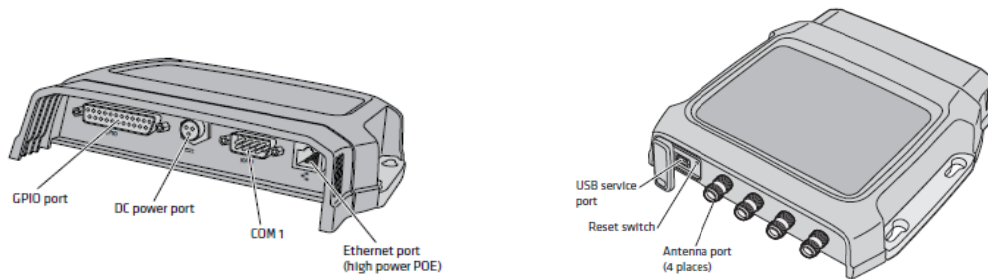


Fig. 2: RFID reader with different ports and switches.

We need a fixed IP address, so that we can assign it to the reader. The database name PARKINGDATA is used to store the data of vehicles. In the database there are many tables that are used to store the data of vehicles for example VEHICLEINFO, OWNERNAME, TAGID etc. but the main table consists of plate number, vehicle id and model. The reports and database is being created by the software itself. The reader is connected to the computer using a cable to provide a communication between the reader and software and there is also a connection for the automation of barrier.

2.1 How System Works?

Information of all vehicles are stored in the database and the respective tags and there tag id's are provided to the users, so all the information can be accessed by the system. When the vehicle checks in, the reader reads the data of the tag. If there is no tag on the vehicle than the barrier will remain close. Now the reader will read all the information of the tag and transfer that information to the software. Now that software compare the information of tag with database and if the id of tag matches than the barrier gate will open and if the id doesn't matches than barrier will not open or it will trigger a alarm.

When vehicle goes out (Check out) from the parking lot, the identification information of vehicle is searched in the database. If it is an authorized vehicle and does not have unauthorized access than only vehicle will be allowed for a checkout otherwise the gate will not open.

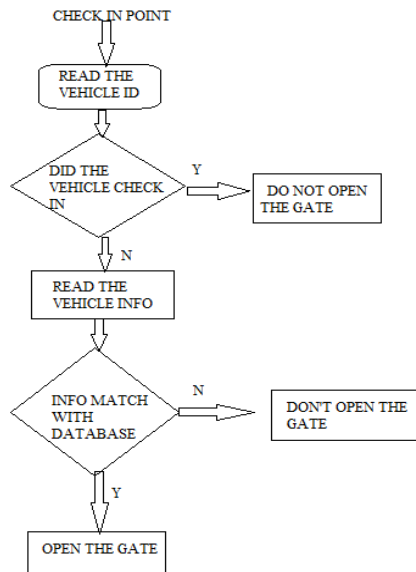


Fig. 3: Check in process.

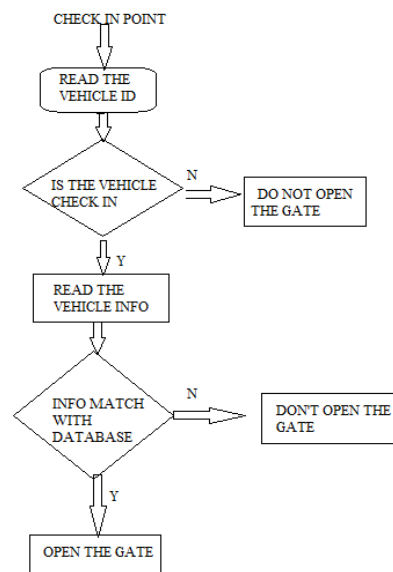


Fig. 4: checkout process.

3. Conclusion

In this project it has been proved that using RFID tags and reader with a database we can develop a secure and well managed parking lot. This project not only provides automatized parking but we can also manage records in a better way. By using a centralized database system easy administration and access is possible. The admin can easily keep a check on the vehicles that are entering and leaving according to the date and timing. If this system is installed in some university or school for the teacher's parking than we can expand the system to keep the track the attendance of teachers by keeping the track of vehicles that are present in the parking lot.

By using of this system, personnel cost will cut off and traffic jam problem will be solved by the faster check in and check outs. By expanding this system we can also use this system to collect revenue for the parking in an efficient manner. We can keep the record of the income in the database itself. In this system we can use LED display which can keep an account about the number of cars or the vacancies left in the parking lot.

References

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