

SMART PARKING SYSTEM USING RF ID

Aditya vikram singh¹, Abhisekh Bhattacharjee², Mayuri Bhosle³, A.Prabhakar⁴

⁴Associate Professor

Department of Electronics & Communication Engineering

BVDUCOE Pune

avsingh1994@gmail.com

Abstract— The steep increase in the number of vehicles and the additional problem of available parking spaces has lead researchers with a complicated problem to deal with . The concept of smart parking system has been under development for quite some time and now MNC's and other corporations are looking to not only deal with the problem of traffic for the benefit of their employees but also the problem of parking spaces by introducing Radio frequency identity based parking systems.

Keywords: smart parking, RF ID (radio frequency identification), RF ID TAG, RF ID READER

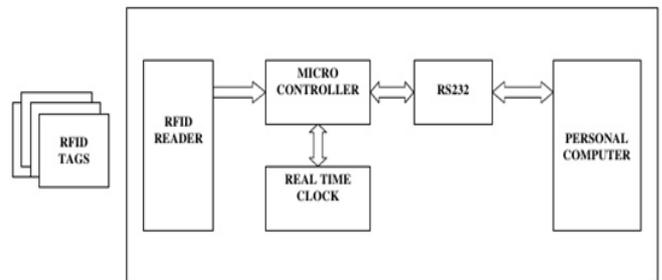
I. INTRODUCTION

Comparing the rise in the number of vehicles over the years has shown exponential growth. Parking issues have now taken a serious turn in major cities across the problem ,insufficient and already under pressure of further development available parking places are dwindling leading to rise in pollution which leads to various health hazards and traffic jams that can cause socio economic issues on a macro level and in the future demand for the intelligent parking service will increase because of the rapid growth in the automotive industries. The solution can be provided by wireless sensor network which consist of placing large number of sensor in the parking lots without the expensive cabling which are capable of adjusting with the cheap and easily available sensors.

There are two ways in which this process works the information enters and is routed in 2 ways centralized and distributed this is done to evaluate other important parameters such as time of parking, automatic payment etc,. The RFID can be used for secure, fast and easy checking in and checking out of the vehicles.

A large LED screen is placed at the entrance of the parking lot to tell the new-coming car about the available parking spaces in the parking lot and show the path to the optimal parking space. the aim of the project is to implement an Automated vehicle management system using radio frequency identification (RFID) technology. This digital vehicle management system aims to use of available parking space and help user to check the availability of the parking space and as well as direct the priority vehicles to their particular respective parking slots. The RFID kit includes RFID tags and RFID readers.

BLOCK DIAGRAM OF RFID TOOL KIT CIRCUIT



A. HOW TAG WORKS

There are two types of tags: passive and active. Passive tags have no direct power source, while active tags do. Passive and active tags can be either class 0 (read only) or class 1 (read/write) tags. The approved radio frequency range for RFID applications is 900MHz for Class 0

In the case of a passive tag the reader initiates communication via a radio signal strong enough to enable the tag to "answer" the reader with a return radio signal carrying information regarding the item to which it is attached. In the case of an active tag either the tag or the reader can initiate communication. Further, active tags allow for a greater distance between the reader and the tag. It should be noted that with the recent improvements in passive tag technology the distance limitation is decreasing - in other words some passive tags are crossing over into read distance ranges previously only supported by active tags . the choice between the use of active or passive tag for the smart parking system is totally situational but active tags are more likely to be used due to their greater distance handling capacity

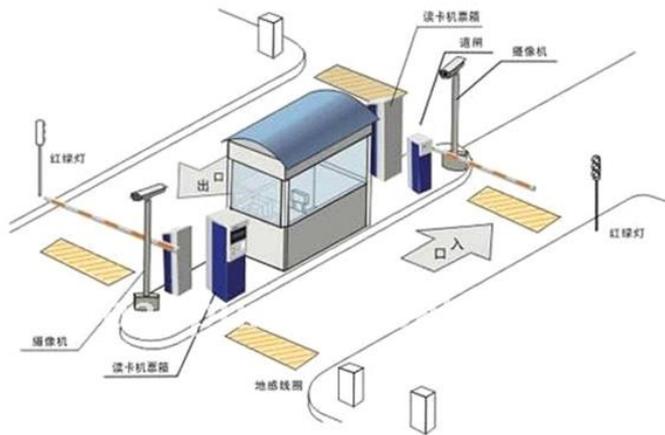
B. HOW READER WORKS

A reader has a field (a distance range) within which it can query via radio waves for whatever tags may be present. The reader follows a protocol that is intended to enable it to avoid duplicate reads but capture all tags present within its range.

There is a large variation in reader capabilities, ranging from how many tags a reader can capture within a specific time

period to more complicated tasks like filtering and communicating with a product database. Readers have to be matched to tag type: active or passive class: 0 (read only) or class 1 (read/write), gen 1 or gen 2 tags. Some readers can capture multiple tag types. Readers communicate with tags over radio waves and by following a specific RFID communications protocol.

The implementation challenge with readers is determining how many you need and their ideal placement in your physical facility. Poorly placed readers can result in creating duplicate reads of tags when their read range overlaps (some readers have special edge software to address this problem). Or, you can end up with the opposite result with missed item reads when they are located too far away from the tagged items.



Radio Frequency Identification (RFID) technology is very useful technology in automation of vehicle parking in office complexes and other locations such as malls and other buildings.

Employees find it particularly tedious to search for parking spaces. The slot availability details are collected using an RFID system and are updated periodically into the database. Entry-point and exit-point of the parking-lots will be under control with RFID readers, labels and barriers and information will be displayed on the LED screen

Personnel costs will be reduced considerably using this technology. Entry-point and exit-point will be handled in a fast manner without having to stop the cars so that traffic jam problem will be avoided during these processes. Drivers will find it easier to locate parking slots and also determine availability of parking slots as LED display will show the available parking spaces (parking space for utility vehicles is always vacant if not used by them)

Process in monitoring section

The sensors are placed in the parking area, they provide the information about the parking slots, this information is processed by the controller and the information is displayed on the LED screens placed in the parking area.

This information is provided to the control section at the entrance through the zigbee so as to guide the drivers and also to maintain the database

II. WORKING

There are two sections in our system monitoring section and control sections, which contains sensing elements, processing elements and display devices.

First are sensor nodes, second is LED display, and last is information and management center. .

A. Monitoring Section

The monitoring section contains the sensor network, the controller to process, and the display device.

A. Monitoring Section

The WSN in the parking lot contains three kinds of sensor nodes, which are monitoring nodes, routing nodes and sink node. In addition, the LED screen is installed at the entrance of the parking lots.

Checking in process: When a registered vehicle comes to any parking-lot, system checks whether the vehicle has access to the parking lot or not. If it is authorized, the entry information is stored in the database and the vehicle will be allowed to drive in.

The sensor network is present in the monitoring section that is in the parking area to collect the data through different nodes and process it. This data is processed by a controller

Process in monitoring section

The sensors are placed in the parking area, they provide the information about the parking slots, this information is processed by the controller and the information is displayed on the LED screens placed in the parking area and at the entrance

This information is provided to the control section at the entrance through the zigbee so as to guide the drivers and also to maintain the database.

B. Control section

At the entrance of the parking area there are control section for checking in and checking out process of the vehicles, The rfid reader is used to read the rfid tags.

Block diagram of control section s

Flow diagram for the control is as follows:

At the entrance, the control section have zigbee module to get the data from the monitoring section .The obtained information about the parking slots has to be displayed on the LED panels This information is processed by the controller and then displayed.

If the zigbee module is ready then the data is transmitted or received. The obtained information is displayed further

IV. CONCLUSION

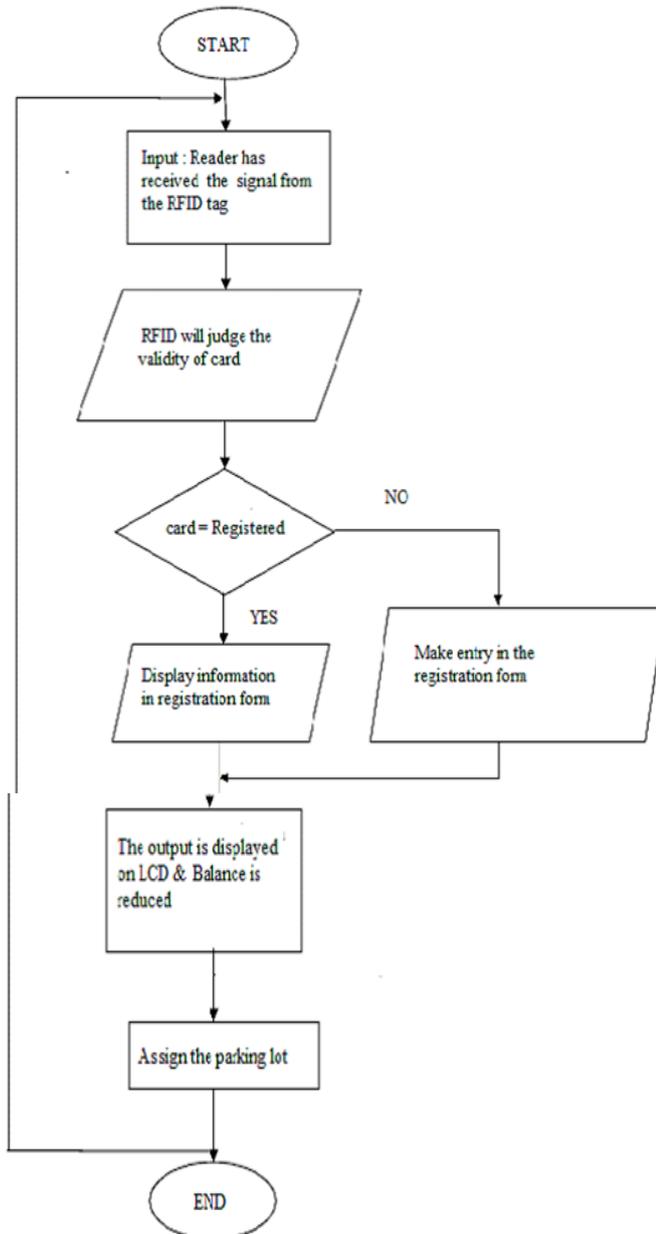
The conclusion that can be drawn from the above mentioned thesis is that the concept of smart parking system is for real and very much prevalent. The concept of maintaining the database for employees by registering their vehicle id's not only helps to efficiently use the available parking slot but also ensure that only vehicles of employees of that particular company are using the parking space .The add on feature of priority based parking helps to ensure that utility vehicles such as ambulances or fire brigade trucks are always available in the premises itself in case of aa emergency and it does so by specifying parking slots for such vehicles and ensuring no one else parks there

V. FUTURE SCOPE

Future scope of this project is both interesting and enticing, with the development of platform based applications ,connectivity of the project components with GPS (global positioning system) seems an obvious way to take the concept further . employees would get parking slot availability information on their smart phones will not only be convenient for them but will also help to reduce on road traffic during rush hour

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III. COST ESTIMATION

1. Rf id reader and tags - Rs 770 + Rs 20 each for tags
2. Microcontroller 8051 kit - Rs.600
3. receiver - Rs 850
4. micro controller development board - Rs 800