Software Requirements Specification

For

Dynamic and Intelligent parking assistant for Educational Hub

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# Introduction

## Purpose

The aim of this project is to develop RFID based automatic parking system. The increasing efficiency of existing manual parking systems and reducing their operation cost by reducing personnel requirement, cost of operation, processing speeds at check etc.

This would help in tackling the increasing demand for parking facilities by decreasing capital requirement slot.

It will also provide a platform for monitoring parking demand at different times of the day. When we visit the various colleges during the college festival time it creates more parking problem.

## Intended Audience and Reading Suggestions

This system is made for college members such as staff, students and visitors as well. College security guard is also one of the stakeholder of application.

## Product Scope

* To develop system that a RFID-based intelligent vehicles parking system.
* The software has been handled for the management, controlling, transaction reporting and

operation tasks for parking lots located on various areas of college

* Check-ins and check-outs of the parking-lots under control with RFID readers
* Check-ins and check-outs will be handled in a fast manner
* Locate the parking lot to the new user
* Detect the vehicle automatically by detecting the number plate of vehicle
* To increase the efficiency of existing manual parking system.

## References

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# Requirement Analysis

* The traditional parking management system included manual searching of vacant parking spaces which consumed fuel, time and efforts.
* Besides, in an educational hub, manually verifying each person entering the college is not feasible.
* To eliminate this, we are trying to develop a system using image processing and RFID based dynamic and intelligent parking system. This system also reduces the operation cost by reducing personnel requirement, cost of operation, processing speeds at check, etc.
* A camera module will capture the image of the number plates of the vehicles to determine if the vehicles are registered or unregistered (i.e. unauthorized).
* This will prevent the entry of unauthorized vehicles.
* The data recorded will be analysed using various algorithms to provide details for monitoring parking demand at different times of the day.

# Functional Requirements

* RFID tags(attached on the vehicles) and readers check if the vehicles are authorized or unauthorized
* When vehicle is detected by the RFID reader, an SMS or a notification on application will be sent to the user regarding the most convenient available parking slot and the user will have to park the vehicle in the same slot.
* If the vehicle is detected as unauthorized (i.e. in case of visitors) the security guards will perform manual security check and will ask them to park in the visitors parking.
* At the entry of each major parking space an RFID reader will be used for detecting that the vehicle is being parked in the allocated parking slot as well as for increasing the count as and when vehicles enter that particular parking space.
* When the count reaches the maximum capacity of the parking space, the system declares the parking space as completely occupied. The same RFID reader is used to count the exits of vehicles from parking space.
* A camera module is required to monitor vehicles in each parking space( for damage of vehicles, etc). The mobile application also performs data analysis. It records day to day data and processes it to predict and alert the users if on a particular day the vehicles being parked will increase/decrease so as to manage efficiently.

# External Interface Requirements

## User Interfaces

The user interface for the software shall be compatible to any operating system

Such as Windows, Ubuntu etc*.* by which user can access to the system. The user interface

Shall be implemented using any tool or software package like Java, Java script, HTML etc.

## Hardware Interfaces

All the RFID readers and cameras must be connected to network using wired or wireless connection constantly.

## Communications Protocols

Internet is the communication interface between application and RFID reader which is the part of hardware of the project.

## Database Backend

The Database intended to be used is MySQL.

# Technical Specification

## 5.1 Performance constraints

* Fancy number plates can cause number plate detection problems.
* Network connectivity can hamper the parking allocation messages to be received by the vehicle owner.
* Multiple vehicle entries can cause problem in image processing of number plates at a time.

## 5.2 Memory/OS/Hardware

* RAM: 8GB
* Hard Disk:500Gb
* RFID tags and readers.
* Camera
* Arduino
* Digital display
* Operating system: windows 7

Appendix A: Glossary

RFID – Radio Frequency Identification.

OCR – Optical Character Recognition.

RTO – Regional Transport Office.