

Smart Parking Network Modal

Project Supervisor:

Abu Bakar (Internal Advisor)

Project Manager

Fahad Maqbool

Project Team

S#	Roll Number	Name	Email	
1	Bilal Arshad	BCSF16E038	bilal.arshad.khokhar12@gmail.com	Team leader
2	Muhammad Usama	BCSF16E024	usama.pakistan55@gmail.com	Team member

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Chapter 1

Introduction

1.1 Introduction

Due to the proliferation in the number of vehicles is leading to problems of vehicles parking at an appropriate place especially the car parking at university. At university we are still using the manual vehicle parking system and that is why we are facing problems like wastage of time and fuel finding free space around parking ground when we need to park our car. This indirectly leads to traffic congestion. Another issue is chaos that happens while parking because there is no particular system anyone can park anywhere that sometime causes damage to the vehicles while moving out or in parking lot. Security is also an issue there.

In this project report, we propose a Smart Parking Network System that help users to automatically find a free parking space. Car-park management systems operate by monitoring the availability of car-parking spaces and making that information available to user and facility administrators. The objective and the scope of project is described. Some general approaches to the design are reviewed. The results and conclusions of an experiment to determine the required number of parking slots is discussed. Then, the suggested design is explained in detail with the purpose, requirements and constraints and test results for each of its parts. Finally, the design is criticized and suggestions are made for future improvements.

1.2 Scope and Objectives

The main scope of this project is to overcome the parking congestion in the parking slots. Because staff vehicles are increasing day by day in our university. Furthermore, we are going to design a new smart parking system which will assist to drivers to find parking spaces. In addition, an important scope is to reduce the time for

parking and reduce energy consumption. In this regard, separate parking area will be allocated for staff in which IOT modules will work automatically.

The following aspects were considered in the objectives:

- To develop a user friendly automated car parking system which reduce the manpower and reduce parking congestion in parking slots.
- To highlights the steps and decisions that were taken during the conception, design and implementation of smart parking system which concentrating on architecture and hardware required.
- To provide parking space in limited area.
- To learn about design, implementation, development and operations cahllenges in smart parking system.
- To evaluate and manage the challenges in smart parking system.

Chapter 2

Research and Requirements

2.1 Source of Information:

The required information was found from variety of sources. The information about car parking system using IOT in research paper^[1]. The authors of [2] propose a multi-parking system to extend the services to a scaler larger than a single car parking lot; for instance, outdoor car parking management, e.g., in streets, guiding towards an appropriate car parking lot within a city. This may require a collaboration between multiple car parking managers. The solution in [3] proposes a framework of parking management, called iParking, that monitors incoming/outgoing vehicles using a sensor network. iParking calculates the number of available parking spaces and disseminates the information to the parking lot's customers.

2.2 External Interface Requirements

2.2.1. Hardware Interface:

Hardware interface include following:

- Personal Computer
- RFID
- NODEMCU
- IR Sensor
- Arduino LCD
- Servo Motor
- RGB Lights
- Jumper Wires

2.2.2. Software Interface

Software Name	Description
Operating System	We have chosen windows operating system for the best support and user friendly.
NODEMCU Tools	To make it applicable to control the system.
PHP Language	To implement the project, we have chosen PHP for its more interactive and database support
Database	To save the sensors reading information in SQL + Database

2.3. Functional Requirements:

- Admin will login into system.
- Admin can view total users and add new users.
- Admin assign particular RFID to users.
- User scan its RFID at main entrance gate.
- Barrier will open if RFID matches.
- User then again scan its RFID at parking gate.
- For barrier opening we use Servo Motor.
- If the RFID matches then relevant barrier is open to identify that whether Student Slot or Teacher slot barrier will open.
- IR sensor continuously send information to LCD to show that which slot number is free and which slot is occupied.

2.4. Non-Functional Requirements:

2.4.1. Performance Requirements:

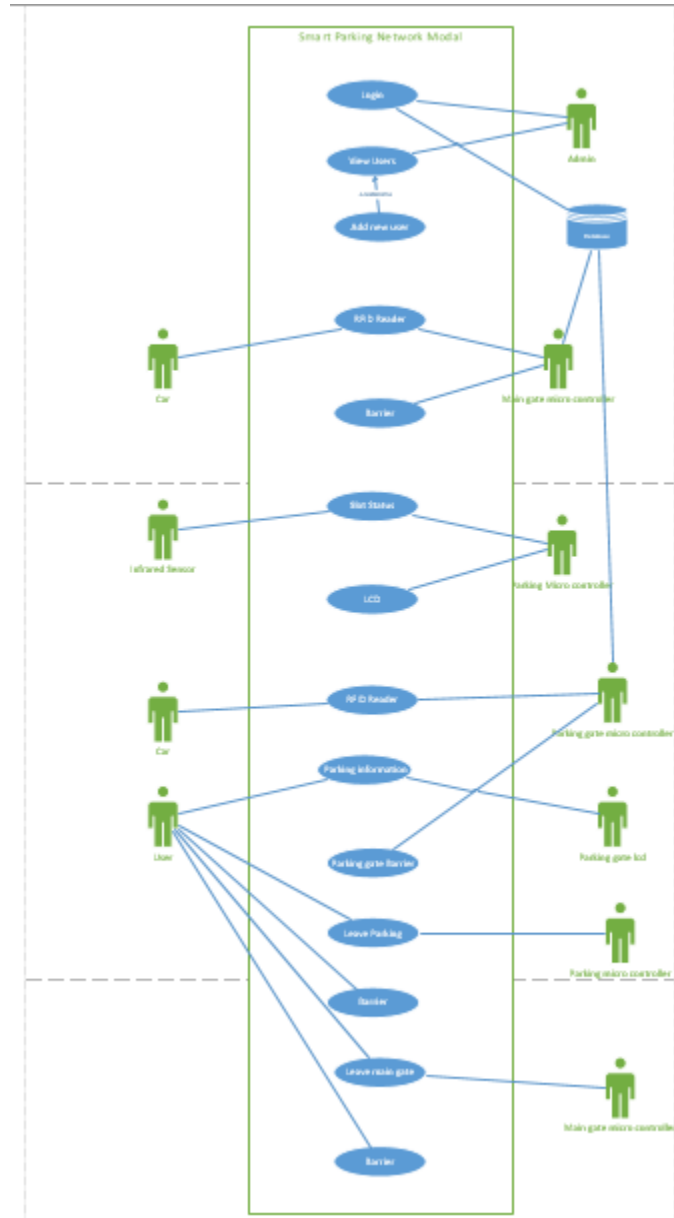
The smart parking system should have a very quick performance capability to make the system efficient enough to act upon the generated commands abruptly. All devices connected NODEMCU to will confirm their duties within Nano seconds or within no time after receiving a notification from it. Talking about performance concerns all devices connected to the NODEMCU are nicely communicating to each other to send and receive information. All modules are well integrated and process is running in adequate flow.

2.4.2. Security:

The application will provide database security. Only authorized user will be able to update database values. Unauthorized user would not be able to invoke the system. Only registered user with registered RFID can use the smart parking network modal.

Chapter 3

Use Case



References:

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3. Chinrungrueng J., Dumnin S., Pongthornseri R. IParking: A parking management framework. *Proceedings of the IEEE 11th International Conference on ITS Telecommunications (ITST)*; St. Petersburg, Russia. 23–25 August 2011; pp. 63–68. [[Google Scholar](#)]