

**Trimester March/April, 2025**

**CSE6224 SOFTWARE REQUIREMENTS ENGINEERING**

**Project Part 1**

**Topic: Campus Ride-Sharing Platform with**

**Parking System Integration**

**Software Requirements Specification**

|  |  |  |
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# 1 Introduction

## Problem Statement

The Multimedia University (MMU) Cyberjaya campus often faces issues with limited parking availability and the lack of coordinated transportation options for students or staff. Parking spots are hard to find due to absence of a real-time monitoring system or poor carpool coordination. Additionally there is no centralized platform that enables trusted ride-sharing among campus members while ensuring the security and legitimacy of users through digital ID verification. As a result, campus members waste time on searching for parking, contribute to environmental pollution and experience inefficient travel around campus.

## Vision

To create a secure, user-friendly, and efficient campus ride-sharing platform integrated with a real-time parking management system. It aims to provide a secure, user-friendly, efficient and useful system that enables students or staff to coordinate carpools, promotes sustainable transportation and helps in reducing parking demands. By integrating with the university's digital ID verification system and real-time parking status checking, we aim to build a trusted, eco-friendly, and smarter mobility experience across campus.

## 

## 1.3 Scope

**The system will:**

* Allow university members to verify their identity using their digital student or staff ID during registration.
* Enable users to offer and request rides based on time, destination, and availability.
* Automatically match riders and drivers using customizable filters.
* Display real-time parking availability across campus.
* Indicate which parking spaces are currently occupied by verified users.
* Obtain users' locations (with permission) for more accurate matching and parking coordination.
* Allow users to claim and unclaim parking spaces to maintain parking legitimacy.

**The system will not:**

* Provide rides to individuals outside the university community.
* Handle financial transactions or facilitate payments for rides. ( have to decide?  possible?) *(I mean its possible, but like student carpooling around campus should be fixed, its not a big place after all)*

## 1.4 Purpose

The purpose of the Campus Ride-Sharing and Parking Management System is to address the transportation and parking challenges at MMU Cyberjaya by providing a secure, integrated system for campus ride-sharing and real-time parking management. It aims to facilitate trusted carpool coordination through integration with student ID , reduce time spent searching for parking by showing available parking spots, lower environmental impact, and promote more efficient and sustainable campus mobility for students and staff.

On the other hand, this document defines the software requirements for the Campus Ride-Sharing and Parking Management System at Multimedia University Cyberjaya. It’s purpose is to provide a clear and detailed description of the system's functionalities, constraints, and goals of the system. It serves as a reference for the development team, project stakeholders, and university administration to ensure the system is designed to meet user needs and institutional goals. This document also provides the foundation for future system design, development, and validation. It aims to ensure all parties share a common understanding of the system's expected behaviour, features, limitations and evaluation.

## 1.5 Goals

* Reduce campus parking congestion through coordinated ride-sharing.
* Provide secure and exclusive access to university members by using digital ID authentication.
* Offer real-time parking availability data to optimize parking usage.
* Encourage environmentally friendly commuting habits.

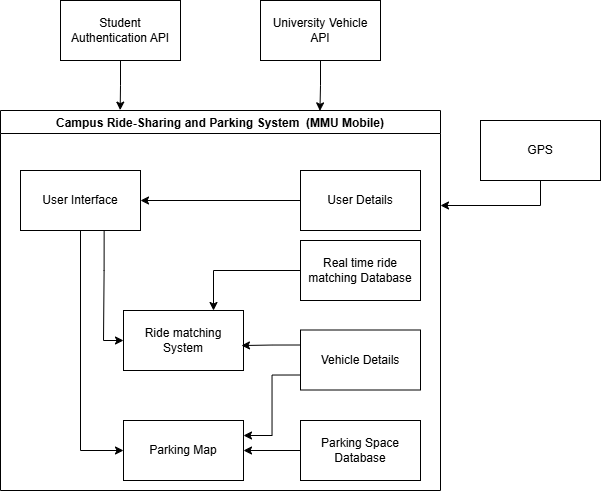
# 2 Product Overview

The Campus Ride-Sharing and Parking System is a module integrated within the existing MMU Mobile campus app. It provides additional functions to the app by coordinating secure, safe ride-sharing and providing real time parking for end users.

This integration supports reducing parking problems and promotes shared mobility while complementing other digital campus services. The system communicates with the campus app through APIs, sharing user data with the campus parking system, student authentication services with student id, and real-time mapping tools. It synchronizes with backend services for ride-matching and parking space management. These interfaces ensure seamless functionality within the larger campus infrastructure.

Accessible through mobile platforms, it offers a centralized solution to reduce parking congestion, lower carbon emissions, and enhance overall campus mobility.

## 2.1 Product Perspective



The block diagram above illustrates the campus ride-sharing and parking application. It extends the existing MMU Mobile App by integrating user data for secure login and accessing APIs for verified vehicle details and owner information. The app also interfaces with GPS to track user location and provide navigation to the destination. Integrated user and vehicle data are used to display information without creating additional databases. Data flows between the system, APIs, and databases to deliver a seamless user experience. These connections delivers efficient coordination between parking and carpooling services.

## 2.2 Product Functions

**User Capabilities**

* Log in using Student ID and password
* View and interact with the campus map (zoom, navigate)
* Check real-time parking space availability and associated vehicle plate numbers
* Report illegitimate parking
* Claim a parking space
* Release a parking space after using
* Book a ride to another faculty with available student/staff drivers

**Admin Capabilities**

* Perform all standard user functions
* Log in using Admin ID and password
* Access and manage reported parking cases
* View detailed information of car owners and related parking incidents

## 2.3 User Characteristics

|  |  |  |
| --- | --- | --- |
| **User Group** | **Description** | **Relevant Characteristics Affecting Usability** |
| **MMU Students** | Foundation and undergraduate students who will use the system for parking and carpooling. | - Moderate to high digital literacy - Familiar with MMU app ecosystem - Prefer fast, intuitive interfaces  - Prefer Shortcuts |
| **MMU Staff** | Academic and administrative staff using the system occasionally. | - Varying levels of technical skill - Require simple and clear navigation - May Prefer larger text  - Not overly complicated interactions |
| **Administrators** | |  | | --- | |  |  |  | | --- | | Security guards responsible for handling parking issues. | | - Require simple and straightforward navigation  - Clean layout focused on their specific tasks |

## The targeted user groups include both end users and administrators. Since the users are primarily adults and teenagers, mobile device access is not an issue. However, differences in age and technical familiarity mean that a non-intuitive interface may cause difficulties for some individuals. Therefore, simplicity and clarity should be prioritized in the UI/UX design.

## 2.4 Limitations

The following table outlines the limitations that may impact the design, development, and deployment of the Campus Ride-Sharing Platform with Parking System Integration:

|  |  |
| --- | --- |
| **Limitation Category** | **Description** |
| **Regulatory Requirements and Policies** | Only registered university students and staff can use the platform. User data must comply with the university’s privacy policies and external data protection regulations (e.g., PDPA). |
| **Hardware Limitations** | Real-time parking information depends on the university’s parking management infrastructure, which may have latency, limited coverage, or data inaccuracies. |
| **Interfaces to Other Applications** | Integration with campus digital ID verification and parking management systems is required. External system limitations (e.g., API restrictions) may affect platform functionality. |
| **Parallel Operation** | The platform must operate alongside existing manual parking procedures during the transition phase. |
| **Audit Functions** | User login and ride-sharing activities must be logged, but real-time auditing is not mandatory. |
| **Control Functions** | The platform provides parking recommendations but does not directly control external devices like parking gates. |
| **Higher-Order Language Requirements** | No restrictions on programming languages; system interfaces should follow common standards (e.g., REST APIs). |
| **Signal Handshake Protocols** | Standard HTTPS communication and OAuth authentication are sufficient; no special signal protocols are required. |
| **Quality Requirements** | The platform must ensure at least 99% uptime during semesters. Parking data refresh intervals should not exceed 2 minutes. |
| **Criticality of the Application** | The system is important for convenience but is not safety-critical; failures should degrade gracefully without endangering users. |
| **Safety and Security Considerations** | Authentication must be secure. Personal data must be encrypted both during transmission and at rest. |
| **Physical/Mental Considerations** | The user interface should include accessibility features (e.g., support simple navigation) to assist users with disabilities. |
| **Limitations Sourced from Other Systems** | Accuracy and timeliness of parking availability and ID verification depend on external university systems, which may introduce occasional delays or errors. |

# 3 Requirements

## 3.1 Functions

**User Capabilities**

* Log in using Student ID and password
* View and interact with the campus map (zoom, navigate)
* Check real-time parking space availability and associated vehicle plate numbers
* Report illegitimate parking
* Claim a parking space
* Release a parking space after using
* Book a ride to another faculty with available student/staff drivers

**Admin Capabilities**

* Perform all standard user functions
* Log in using Admin ID and password
* Access and manage reported parking cases
* View detailed information of car owners and related parking incidents

Each function’s use case and activity diagram can be found in Chapter 4 Use Case.

## 3.2 Performance Requirements

## 3.3 Usability Requirements

## 3.4 Interface Requirements

## 3.5 Logical Database Requirements

## 3.6 Design Constraints

## 3.7 Software System Attributes

## 3.8 Supporting Information

# 4 Use Case

4.1 Use Case Diagram

4.2 Detailed Use Case Descriptions

# 6 Appendix

## 5.1 Assumptions and dependencies

## 5.2 Acronyms and abbreviations

## 5.3 Glossary