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*Article*

# The Planning Process for USIM Students' Car Booking

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***Abstract*— The main purpose of this research is to develop a car booking mobile application for USIM students to enhance the current method of booking a car. The limitation with the current system via Telegram, a chat application, is not purposely developed for transportation service. Moreover, existing app as Grab is costly, especially for USIM students. The application's key technology is the Global Positioning System (GPS), which is built into every smartphone. A GPS receiver is used to track real-time car coordination by continually receiving location data from GPS satellites in the form of latitude and longitude information. Therefore, the goal of this research is to develop MyRide: a mobile application for car booking. Finally, a Waterfall approach was chosen for this research, and the system includes authentication and authorization capabilities as security measures.**

***Keywords*—** mobile application; USIM; Telegram; Grab; real-time location; MyRide

## I. INTRODUCTION

Among all transportation services, a mobile application is a major technology used by the public as a medium for convenience purposes. A smartphone application is the most simple and convenient way to book a car, especially in a crowded town or metropolis. Back in the old days when taxi was popular, people need to wait for passing by taxi or make a booking via call. This creates a huge downgrade in transportation service if time and convenience are considered. Creating a transportation system that is easy to use and accessible to the public can be a difficult task, as it must take into consideration the variety of elements that are involved in travel, including the connectivity of the public transportation system [1].

Nowadays, the tech world is emerging as people want services that need less involvement and can be done entirely on their mobile devices. The mobile trend in every industry is massive, from booking flights to renting a hotel. Car booking app development is an example of a service that saves time and money by delivering user-friendly mobile apps. Having a more confident attitude among people toward technology increases the odds of self-booking ride-hailing trips, using an app [2]. In Universiti Sains Islam Malaysia (USIM), for example, students tend to use their mobile phones in case of booking transport, especially cars.

However, USIM has a problem when it comes to booking a car method. Individual public passenger services had been experiencing issues with information asymmetry and coordination between the user and the driver, as it was unclear

where to take a taxi, service hours, safety, cleanliness, car quality, driver reliability, driver knowledge of the city, and the fee to be paid for the service provided. To solve these problems and enhance the car booking services, it is essential to have a mobile application that mainly focuses on car booking for USIM students.

There was a situation when providing good quality of transport services to the public became a great challenge due to the poor service of current public transport. A developing country like Malaysia is still facing low ridership in public transport as one of the reasons people do not use public transport is their dissatisfaction with the lack of information about arrival and departure times [3]. Nevertheless, uprising mobile used to upgrade transport services via a mobile application like car booking. At present, some problems occurring in current USIM car booking:

*A. Ineffective way of booking via Telegram.*

When a user tries to find an available driver via Telegram, it is unorganized as the user's request mixes with other users in the same group. In addition, although a driver replies to the request by personal message, the user keeps getting messages from other drivers as well.

*B. Lack of information on the driver, exact location, and price.*

The information of the driver, exact location, and price is not provided on Telegram as it is a chat application in the first place. Hence, the users had difficulty choosing their driver within their interests.

*C. Limitation on survey system.*

The user cannot give feedback or rating to the driver. Customer satisfaction surveys are used to determine how happy consumers are with various elements of a product or service. It is just as crucial to identify dissatisfied customers as it is to discover prospective changes.

Three research questions have been identified for the research. (1) What are the gaps in the existing car booking mobile applications for USIM students? (2) How to ensure the car booking mobile application for USIM students, MyRide is protected from any threat? (3) How to ensure the secured MyRide mobile application is working?

Three research objectives have been identified for the research. (1) To investigate the gaps in the existing car booking mobile application for USIM students. (2) To develop a secured car booking mobile application, MyRide. (3) To implement system testing to ensure MyRide mobile application is working.

As the concept of e-hailing service was related to car booking mobile applications, the unique characteristics of e-hailing were discussed extensively. Some key terms linked with e-hailing services have been specified in previous research. To begin, e-hailing was defined as the provision of compensation-based scheduled and on-demand transportation services that connect passengers with drivers of personal vehicles. Booking, ratings (for both drivers and passengers), and electronic payment are all made easier using smartphone mobile apps [4]. Smartphone-enabled ride-hailing services have been made possible by technical improvements in the transportation sector and mobile smartphones [5].

The phrase "ride-sourcing" was only used by the US Department of Transportation (DOT) in notary and legal affairs [6]. The word "E-Hailing" was coined by the Malaysian government and included in the updated Land Public Transportation Act of 2017 [7]. The term has been widely used in Malaysian media and literature in the past. Therefore, the term "E-Hailing" was used throughout this research to designate these sorts of services because the discussion of car booking mobile technology in this study took place in a Malaysian environment.

There are a lot of existing mobile applications that provide car booking services. Some of them use different strategies and approaches to get a good response from their users. The top three mobile applications that have been used by USIM students in early 2022 based on the survey were chosen and have been reviewed below.

*a. Grab Car*

Grab is now available in Malaysia, Singapore, Myanmar, Indonesia, Vietnam, Thailand, Cambodia, and the Philippines in Southeast Asia, as well as Japan in East Asia. Several sharing platforms have evolved, according to Zervas, Proserpio, and Byers [8], allowing users to share commodities and services such as automobiles, household products, and services. Grab has evolved to grow into Southeast Asia's largest mobile technology firm, a network of millions of consumers with millions of drivers, shops, and businesses.

Grab Car is one of the most famous Grab services. Customers frequently choose Grab Car as their primary form of transportation to get to their destination. Users may easily use the service by just opening their smartphone applications and waiting for the drivers to arrive. Cash or Grab Pay can be used to make payments. Grab offers free accident insurance to passengers and drivers to safeguard the social welfare of consumers and Grab drivers. It is the very first and most complete private accident insurance coverage in the Southeast Asia ride-hailing sector, covering Grab Car, Grab Bike, and passenger drivers and passengers for free, with no deductions. Passengers may ride the Grab with more peace of mind. Users also won't need to alter or adapt if Grab has updated its platform with new updates or added new services provided as the changes are not significantly different from the previous version and features [9]. Fig. 1 illustrates Grab Car user interfaces.

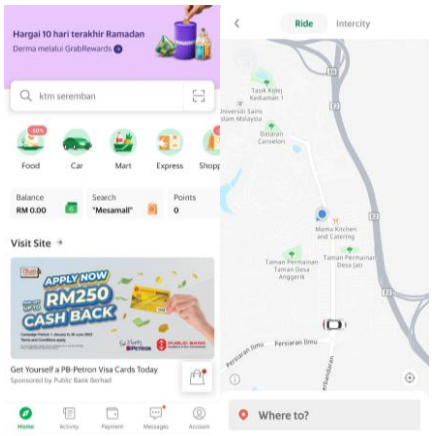


Fig. 1 Grab Car interface [10]

Grab provides a function that allows users to share the specifics of their ride with friends and family. This means that they are aware of the whereabouts of users when they are traveling with Grab. It also has PDRM's Support, which includes an in-app alert button that may be used to instantly notify the authorities in the event of an emergency.

*b. Telegram*

Telegram is a cloud-based program that lets users send and receive movies, photos, audio, and any other information stored on a server without taking up space on their phones [11-13]. According to the Telegram Company, there is a dramatic increase in the usage of Telegram, with 200 million monthly users in 2018 [14]. Other than education, the Telegram app has made contributions in a variety of disciplines. Many advertising and business organizations use it as a forum for promoting their services and goods, raising awareness, and receiving feedback from consumers [15].

The app came to revolutionize when users use Telegram as an alternative in the private transport sector. The interesting thing about this alternative is that it uses the functionality of telegram apps. Therefore, it is not necessary to install any additional application to the messaging service, this makes it quite practical and easy to access. Telegram allows connect passengers with drivers easily and practically, it eliminates intermediaries, promoting direct interaction between the passenger and the transport service provider.

*c. MyCar*

Officially launched in April 2018, MyCar is an app for e-hailing rides providing on-demand services for passenger transportation in 13 of the country's major cities in Malaysia. MyCar's fleet includes over 100,000 drivers and over 2 million MyCar passengers in all major cities and towns [16]. For starters, the app practicing cash transactions for the time being. MyCar, on the other hand, works similarly to Grab because it has a credible interface that matches Grab's, as shown in Fig. 2.

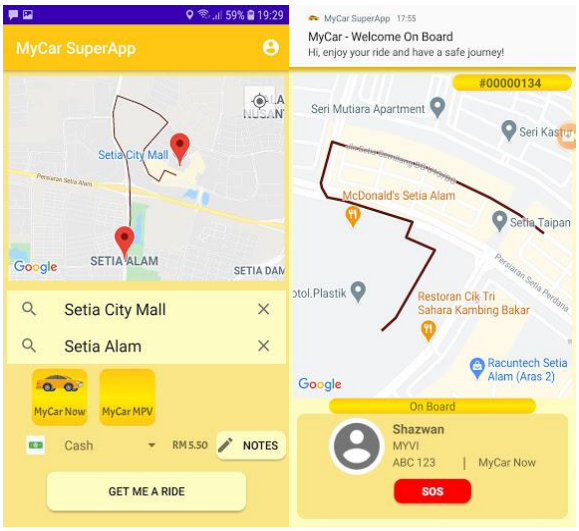


Fig. 2 MyCar interface [17]

The app has a lot of work ahead of it, including bringing its support center services online, which has been in development since its beginnings. Riders are now able to grade drivers and provide feedback (if any) after each journey. There is also an SOS button on the MyCar app that passengers and drivers may use if their safety is at stake. It also conducts severe procedures that are performed immediately by related agencies for instance JPJ, SPAD, and PDRM before allowing a driver to use their operating system.

From the statement above, each application has different features and limitations. Nonetheless, they all have the same contribution to car booking services. Table 1 shows the comparison between Grab, Telegram, and MyCar.

TABLE I. COMPARISON BETWEEN EXISTING MOBILE APPLICATIONS IN CAR BOOKING

| **Existing Mobile Application** | **Features** | **Limitation** |
|---|---|---|
| Grab Car | Presents a well-engineered and organized application to guarantee easier usability.<br>Provide a real-time tracking system via the map. | Too costly as Grab practices good maintenance. |
| Telegram | Allows connecting passengers with drivers easily and practically.<br>Affordable price. | Users cannot keep track of the drivers in real time.<br>Lack of user interface to book a car.<br>Users are not able to rate the drivers and establish driver ratings for the public. |
| MyCar | Well-designed and structured interface.<br>Provide a real-time tracking system via the map.<br>Affordable than Grab.<br>Users can rate the drivers and give any feedback. | Not popular as Grab and Telegram. |

There are a few gaps that had been found in existing mobile applications. One of the most prevailing issues is the price range. Grab, for example, was hailed as a more affordable and superior alternative to taxis, but consumers have since complained that Grab's charges are higher than those of traditional taxis. MyRide aims to provide suitable fares for the user especially students.

Another gap addressed by this research is the user cannot keep track of the driver in real time. An alternative method for a budget ride for USIM students is to book the car via Telegram. Unfortunately, the user found it hard to know the exact location of the driver like most other mobile apps.

Additionally, the security element may be one of the key gaps as well. Information about the car drivers in Telegram is not provided to the users. This can expose the users to great danger as unknown individuals become their car drivers.

## II. METHODOLOGY

The term "methodology" refers to a series of procedures. The structure for organizing, creating, and managing the practices engaged in building a good system in system development processes are known as methodology. There are various methodologies available, all of which are based on the System Development Life Cycle's foundation pillar (SDLC). The SDLC consists of five steps to build a system: planning, analysis, design, implementation, testing, and maintenance. This chapter explains each phase.

The proposed MyRide mobile application will be developed using the waterfall technique as part of the Software Development Life Cycle (SDLC). The phases of the Waterfall process include requirement, design, implementation, testing, and maintenance.

The waterfall development model is a typical variation of the system development life cycle model for system engineering. According to a 2017 survey from the Project Management Institute, 51 percent of firms still utilize Waterfall. It is a sequential and linear development approach that is frequently referred to as a classic style for the life cycle of development (Margaret Rouse, 2007). The waterfall method effectively takes developers into a step-by-step guide to the procedure of developing a good system [18]. This concept is unique in that developers must complete one stage before going on to the next, and they cannot return to a prior stage after moving on to the next [19]. In short, there is no overlapping in the Waterfall model, as Fig. 3 below.

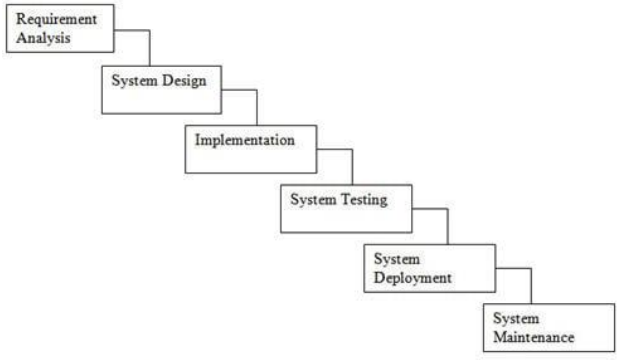


Fig. 3 SDLC Waterfall Model

The requirement Analysis phase defines all possible requirements for the system to be built in a requirement specification document. The developer will do brainstorming and walkthrough to understand the requirements. In addition, an online survey is conducted to require data on existing car booking mobile applications that have been used by USIM students in early 2022.

As per the requirements, the System Design phase will be the process of creating the design. During this phase, the database conceptual schema will be chosen, software architecture will be designed, and logical diagrams will be designed. System design assists in the creation of overall system architecture as well as the documentation of hardware and system requirements. Fig. 4 below illustrates on Use Case diagram.

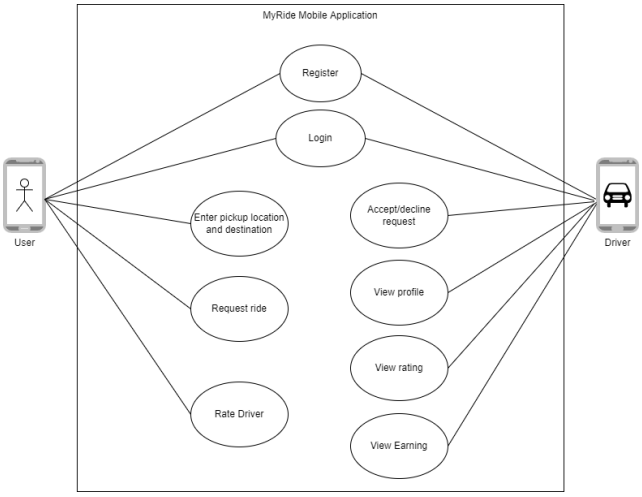


Fig. 4 Use Case Diagram

Once the design is complete, the real code is written during the implementation phase. In the Waterfall technique, this phase belongs to the programmers, who take the project requirements and specifications and develop the applications. Several programming languages can be used to develop Android applications, such as C++, Java, Kotlin, JavaScript, and many more [20]. Therefore, throughout the implementation phase, Java will be the primary programming language.

Once the coding of the application is done, the mobile application is tested to ensure that it is created according to the original specifications. In this phase, bugs and device vulnerabilities are identified, fixed, and improved. Functional testing will be employed as a testing approach.

After the release of mobile applications, it is a must to ensure that the application is operating in the appropriate environment. In case the user encounters any issues; the maintenance phase plays the role currently. When a problem is resolved, the modified code is deployed in the environment by listing the new features implemented.

## III. EXPECTED RESULTS

There were 23 respondents from USIM students who answered the survey from 15th May until 29th of May 2022.

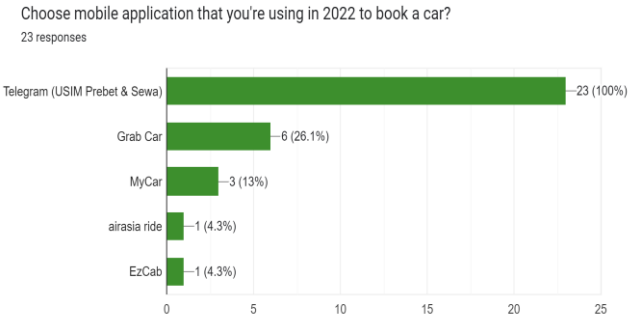


Fig. 5 The percentage of existing mobile applications used by USIM students to book a car either using Telegram group (USIM Prebet & Sewa), Grab Car, MyCar, AirAsia ride, or EzCab.

Based on Fig. 5, Telegram is the most popular mobile application to book a car among USIM students. Grab Car is a runner-up as 26.1% of the respondents are using the app while MyCar is the third choice with 13% and AirAsia ride has the same percentage as EzCab with 4.3% of the respondents.

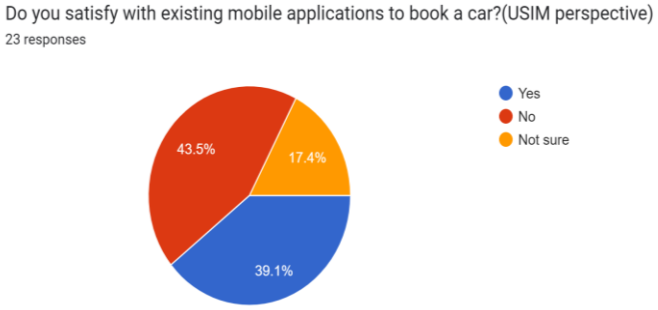


Fig. 6 The percentage of user satisfaction on existing mobile applications to book a car.

Fig. 6 has shown that among 23 respondents, 43.5% are not satisfied with the current existing mobile applications to make a car booking. This result indicates almost half of the respondents have problems with Telegram, Grab Car, MyCar, and other car booking mobile applications in the current market. The survey also includes respondents' reactions to the development of a specific mobile application to book a car among USIM users. Fig. 7 shows that 82.6% of respondents said 'Yes' and none of them choose 'No' on the development idea.

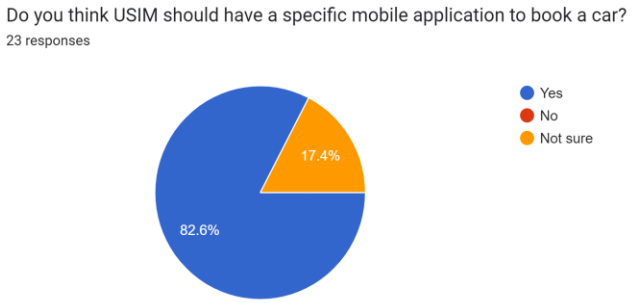


Fig. 7 Percentage of respondents' reaction to the development of a specific mobile application to book a car among USIM users.

MyRide will have a few functional requirements such as users can request a ride should be matched to a driver in proximity and can see all nearby drivers. Drivers can answer or decline requests from nearby users. When a trip is created, both parties see each other's real-time location. The system architecture for this project is visualized in Fig. 8.

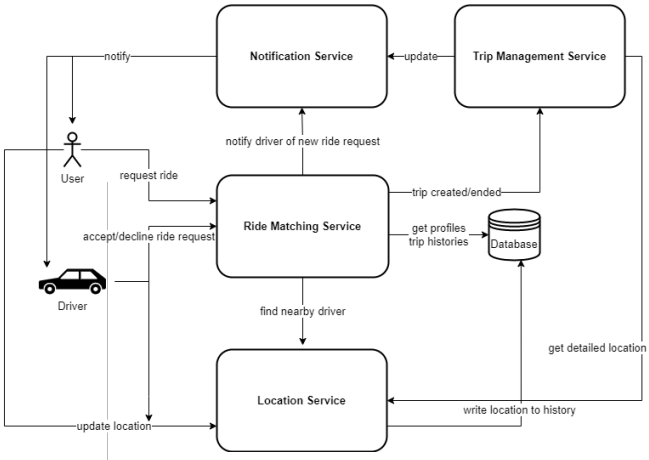


Fig. 8 System Design Architecture for MyRide

1) *Notification Service*

Whenever the backend needs to send information to the users or driver, the notification service is used to deliver the messages.

2) *Trip Management Service*

When a trip is initiated, this service is needed to monitor the locations of all parties (user and driver) as well as plan routes.

3) *Ride Matching Service*

This service handles ride requests. It finds nearby drivers and matchmakes based on driver responses (either accept or decline).

4) *Location Service*

All users and drivers must regularly update their locations via this service.

These upcoming figures will show the expected UI Design of MyRide. Fig. 9 and Fig. 10 display the initial page and login page for both driver and user


Fig. 9 Initial page

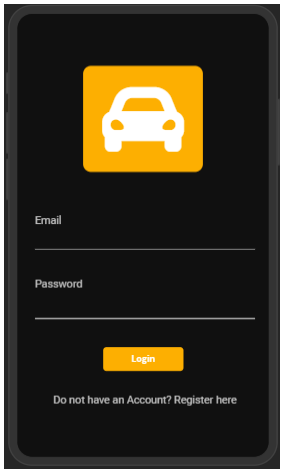


Fig. 10 Login Page (Driver and User)

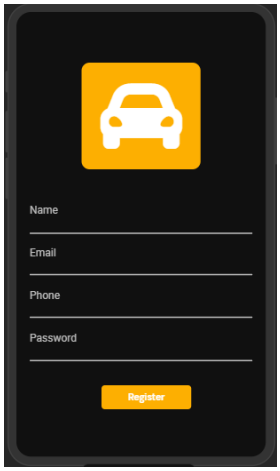


Fig. 11 Register Page (Driver and User)

Fig. 11 shows page registration if the user or driver chooses to create an account. Car Registration will be provided for driver registration as shown in Fig. 12, followed by a landing page after login for the driver in Fig. 13.

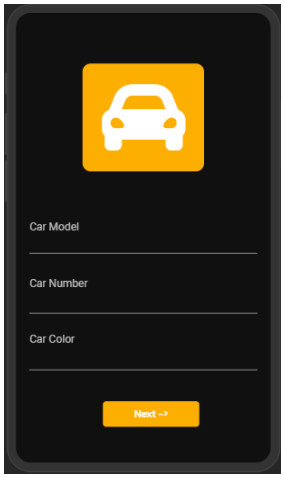


Fig. 12 Car Registration (Driver Only)

Fig. 13 and Fig. 14 reveal that both driver and user successfully log in to their account.


Fig. 13 Driver Map Screen (After Login)

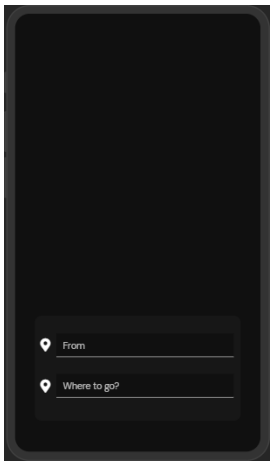


Fig. 14 User Screen (After Login)

The user side can choose to pick the nearest available drivers as shown in Fig. 15 and rate the driver after the trip as in Fig. 16.

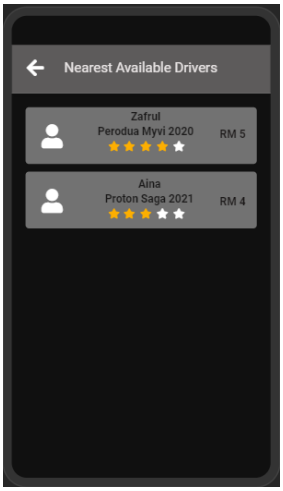


Fig. 15 Nearest Available Drivers Screen

Fig. 16 Rating View

## IV. CONCLUSIONS

The proposed mobile application, MyRide, is aimed to enable users in USIM to book a car via mobile application and construct a real-time platform to increase driver-to-user communication. There are several modules in this proposed application and the details are as follows:

### *A. Car Positioning Module (Global Positioning System – GPS)*

This module is created for car positioning. Within a three-second interval, this module will send the user the current location of the car.

### *B. Car Position Mapping Module*

A car mapping module is developed to show users about the car's position on a map. This module will use Google Maps to load the map file.

### *C. Authentication Module*

This module is purposed for adding security measures to the mobile application. Users need to register and log in to their accounts to use the app.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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