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Transporter Mobile Application

Empowering Your Journey with Reliable Transport Services

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Abstract— Transporter is a popular service within the IIUM community. It is an e-hailing service operated by the community itself. It is hosted on the Telegram app, which is available on Android, iOS, and desktop computers. However, there are various downsides related to handling user registration, transportation requests, and efficiency. To address these shortcomings, a transporter application was created as a mobile app. This project intends to create a mobile application employing the agile method and FlutterFlow, a low-code platform built on top of Flutter, an open-source development framework. At the same time, it improves on the current IIUM transporter system while retaining the features that make it so popular among the community.

Keywords— transporter, e-hailing services, mobile application, agile, SDLC

I. Introduction

E-hailing is perhaps among one of the fastest booming businesses of the 21st century. Applications such as Grab and Uber have changed the private transport business by making public transport available on demand all around the world and becoming far more popular than traditional public transport such as bus and taxi [1, 2]. As people increasingly rely on smartphones for various services, the demand for transport services has skyrocketed. In the university community, e-hailing services from popular apps like GrabCar are frequently used to commute between locations on campus and off campus [2, 3]. Besides that, there are efforts for developing an application for ridesharing or carpooling services [4-6] and also bus shuttle tracking system [7, 8]. This effort also extended to the university campus [5, 6].

Transportation services in university communities often face numerous challenges that make it difficult for students and employees to commute efficiently. Common problems include limited public transportation, inefficiency and delays, safety concerns, and accessibility.

- Limited public transportation: Many university or college campuses have limited public transportation, making it difficult for students and staff to travel to and from campus, especially during off-peak hours.
- Inefficiency and delays: Existing transportation services may suffer from inefficiencies and delays, resulting in frustration among members of the University community who rely on these services for their daily commutes [9].
- Safety concerns: Safety is a primary concern for university communities, and inadequate transportation options may pose a safety risk, particularly late at night or when traveling off campus [2, 10, 11].
- Accessibility: Not all members of the university community have easy access to transportation services, particularly for those with disabilities or those living in off-campus housing.
- Availability of parking spaces: In the university campus, the land is very limited and already equipped with certain specifications, which resulted in a limited number of parking spaces [12]. Due to this factor also, there are rules that limit the student to bring their own vehicle to the campus.

These challenges are also experienced by the IIUM community, which requires them to develop their own ride-hailing system within the IIUM social bubble to better meet the demands of the community than those provided by e-hailing companies. However, the system has its own flaws. It is mostly administered through a Telegram channel, a social media network that provides little to no moderation and security safeguards to its members. Therefore, it is high time to develop a dedicated application to overcome these problems and offer features that may improve what was developed for the IIUM community. Therefore, for now, we are keeping the name Transporter, which is widely known in the IIUM community. This mobile application will improve the functions of the previous system and ensure the security of the entire IIUM community when using these e-hailing services.

The aim of this project is to raise the quality standards of the transportation system in IIUM, as a dedicated ride-hailing application within the community can from now on improve the overall transportation experience for the entire IIUM community and for future generations of IIUM community. In addition, this project also aims to ensure the life safety of every member of the IIUM community while providing security to all users of the e-hailing system.

II. Related Works

In the context of university campuses, transportation that commonly used by their community might be internal, such as shuttle buses, or external, such as GrabCar, Uber, taxis, and public buses. These applications often offer features tailored to the unique needs of students, faculty, and staff. There are several efforts in utilizing the system or mobile application to enhance the transportation services to overcome limitation that they have in the campus. To name some of the efforts are the shuttle bus tracking system [7, 8] and ride-sharing application [5, 6]. Through these apps, users can conveniently schedule rides, access information on shuttle routes and schedules, and receive updates on service disruptions or delays.

Table 1 shows the comparison between the tomb and the transporter system initiated by the IIUM community to facilitate their access to other locations internally and externally. The transport driver is among IIUM students that can give them the advantage of earning some pocket money for their daily living. However, the current transporter system at IIUM exclusively uses the Telegram platform, which may have certain disadvantages.

TABLE I
Comparison between Grab and Transporter Mobile Application

Criteria	Grab	Transporter (Telegram)
Matching passenger and driver	Fully determined using the system's algorithm. Neither the passenger nor the driver has any say with the selection.	Manually chosen by both the driver and the passenger. Both driver and passenger must mutually agree for the ride.
Pricing	Fully determined using the system's algorithm. Neither the passenger nor the driver has any say with the pricing. Grab takes 20.18% commission for every ride [13].	Recommended by the price list provided by the admin. Determined by the driver itself. Must be mutually agreed by both the passenger and driver.
Online Safety Features	Best-in-class security frameworks; protect user accounts, transaction data, e-wallet and private information.	Standard Telegram app safety features. Minimal transaction record, minimal account verification, lack of authorization.

III. Methodology

In this project, an Agile Software Development Life Cycle (SDLC) was chosen as the process model for the development activities. Agile SDLC combines both iterative and incremental process model. This approach prioritizes process adaptability and product quality by delivering functional software quickly. Agile SDLC divides the product into smaller incremental builds. These builds are organized into iterations. In the agile SDLC development process, results from each iteration can be seen and analysed, allowing for improvements in the next iteration. This is one of the benefits of the agile SDLC methodology. Steps involved in the agile SDLC are explained below.

A. *Requirements Gathering*

This phase gathers relevant requirements so we can determine what tools and resources are required. The methods of requirements gathering include communication with the supervisor and research in various system-related publications and studies as well as relevant specialist journals and studies. Since this application was based on the original Transporter system of the Telegram application, critical analyses were carefully carried out; Identifying features that existed on the original system was key to ensuring that the system was familiar to users, and was therefore the reason why the Transporter system was so widely used in the IIUM community. Any disadvantages were also taken into account. The plan was to incorporate improvements into the final product.

B. *Design*

In this phase, we designed the high-level architecture of the system, the potential functions of the system, as well as the user interfaces to better understand where the project is going. The development went through several design changes throughout its development cycle as planned features could not be implemented due to technical limitations and some features were added during the development process as more insights were gained as development progressed.

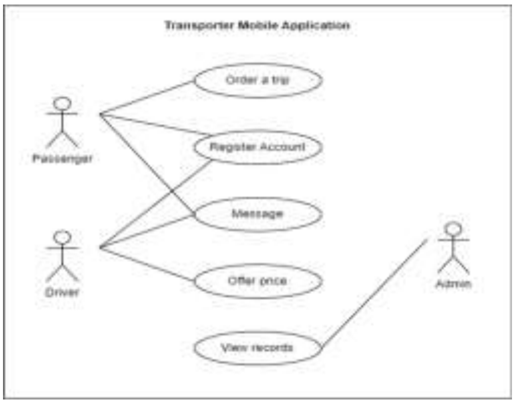


Fig. 1 A use-case diagram for the Transporter mobile application

Figure 1 illustrates the use-case diagram for the Transporter mobile application during the design phase. Basically, there are three main actors for this system who are passenger, driver and administrator of the system.

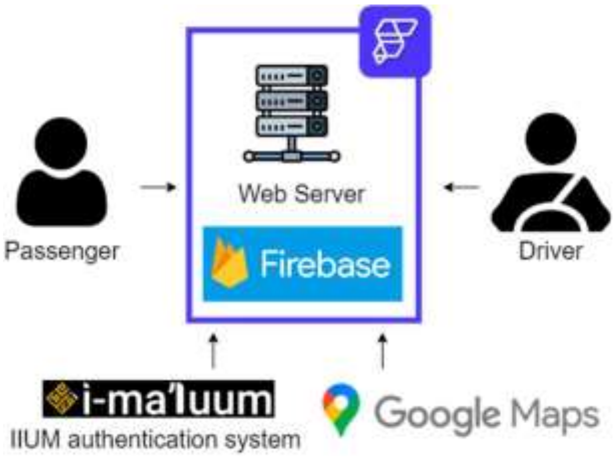


Fig. 2 High-level system architecture of the system

Meanwhile, Figure 2 shows the high-level of the system architecture.

C. Develop

In this phase we begin the process of developing the system based on the planning from the previous phases.

The application was built with Flutterflow. FlutterFlow is a low-code platform that enables developers and non-developers alike to build web and mobile applications using pre-built components and a drag-and-drop visual interface. FlutterFlow is based on Flutter and therefore uses the same programming language (Dart) and development tools. However, FlutterFlow is designed to be more accessible to non-developers and allows users to build applications without having to write code.

Flutter is an open-source mobile application development framework developed by Google. It is used to build cross-platform mobile applications for Android and iOS with a single codebase. Flutter features a fast development cycle with hot reload, visually appealing design, and native performance. It also has a large and active developer community, meaning there is a wealth of resources and support available to those using Flutter.

To summarize, FlutterFlow is based on Flutter and uses the same programming language (Dart) and development tools. However, it is designed to be more accessible to non-developers and to allow users to build applications without having to write code.

Learning about the development tool and development were done concurrently, which proved to be quite a difficulty because mistakes made earlier in the development process had to be addressed later on during development. FlutterFlow was chosen as the development tool because learning Flutter has shown to be more difficult, particularly given the time constraints. However, FlutterFlow seems to be a lot more feasible tool to use, especially with limited technical skills.

D. Testing

In this phase, a series of tests are carried out to evaluate and determine whether the objectives of the previous phases are being achieved. Tests were carried out regularly throughout development. When developing each new feature, a series of unstructured tests were carried out. In summary, over the course of the development process, more than 200 builds were created, each built in small increments from each other. Due to time and knowledge constraints, only features and user experience were tested. Further testing needed to be done in the future with a proper procedure. For example, high traffic stress testing and security penetration.

E. Deploy

In this final phase of the agile methodology, the product is expected to be completed and ready for use. Flutter can easily create .apk builds and also deploy them to Google Play Store and Apple App Store. However, since both require the purchase of a specific license, implementation is considered financially unfeasible. Therefore, the plan is to release the app on the web in the future and users can later add the app to their smartphones using the “Add to Home Screen” shortcut that is present in smartphone browsers these days.

IV. Results and Discussion

A. Features in Transporter Mobile Application

In Table 2 describes the features developed in the Transporter mobile application.

TABLE II
FEATURES IN THE TRANSPORTER MOBILE APPLICATION

Feature	Description
Authentication System	This feature was implemented using Firebase authentication service. This allows users to sign up and log in to the app using their email address and password. Firebase authentication provides a secure and scalable way to manage user accounts and credentials. It also offers features such as password reset, email verification, and account linking.
Improved User Experience	The user experience on the legacy system relies on the existing user experience of the Telegram app. Therefore, it was meant for instant messaging, not designed for e-hailing. Several user design principles were taken into consideration, that drastically improved the user experience on this new application.
Rating System	This feature allows user to be able to review their drivers. This effectively helps other users to choose their rides before selecting a driver. "Rating Stars" are one of the criteria that passengers can choose from their drivers.
Detailed account personalization	User profile can be customized and personalized. This can build trust and familiarity among users. Car profiles are also introduced, drivers have their car profiles displayed as the passengers are choosing their desired drivers.
Integrated chatting system	As the legacy system runs on the Telegram app, which is itself is an instant messaging service, it does allow communication between drivers and passengers. This feature is carried over to this new app, as communication between drivers and passenger on e- hailing apps have become the standard these days.
Google maps visualization & Price estimation	Although experienced locals do not rely on this feature, this will help new IIUM members to better visualize their chosen locations.

B. *User Interface of Transporter Mobile Application*

This section shows the application's user interface. However, we only show the main interface of the application. Figure 3 until Figure 6 displayed the user interface from the passenger's view. The login page is shown in Figure 3. There are different users who can log in to the application who are the passenger and the driver of the transport. Both users can either sign up or sign in to the application. The sign-up function requires the first-time user to register in the application. After registering, they may sign in to use the application.

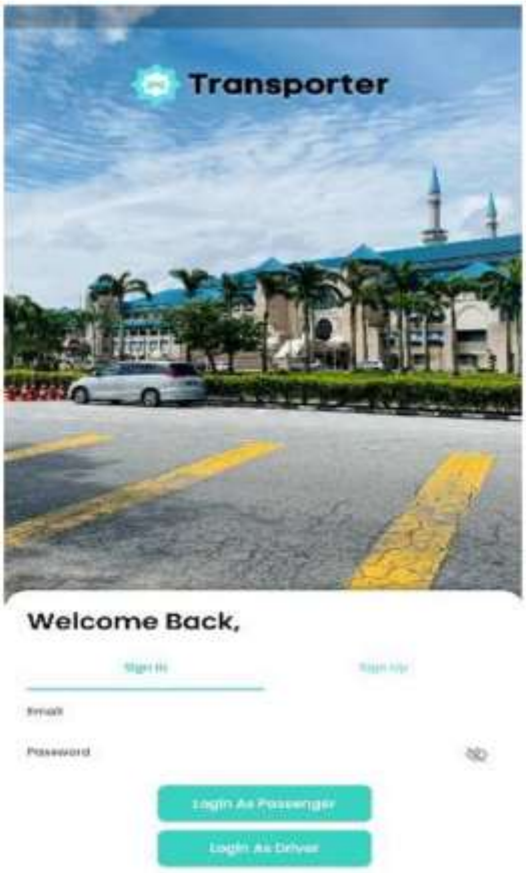
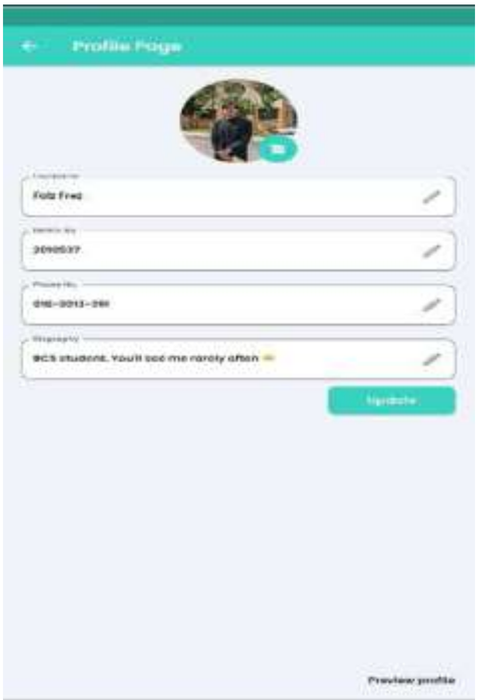


Fig. 3 Login Page



Faiz Frez

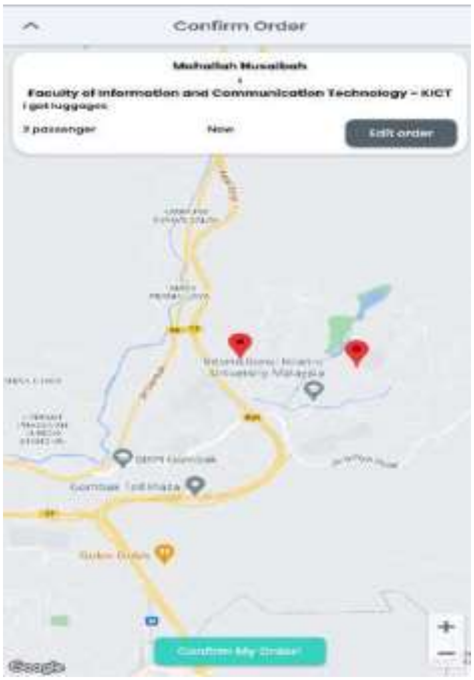
2010537

016-3013-391

BCS student. You'll see me rarely often

Fig. 4 User Profile

The registered user may see their profile as illustrated in Figure 4. The passenger can order transportation and select the venue he wants to go to.



Mahallah Musaibah

Faculty of Information and Communication Technology – KICT

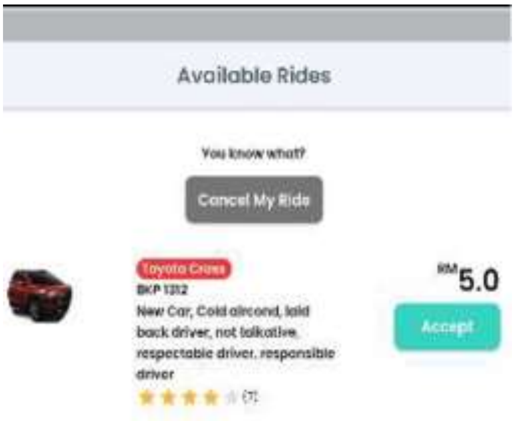
I got luggages

3 passenger

Now

Fig. 5 Confirm Order Page

On the confirmation page shown in Figure 5, the passenger will see the selected venue. Upon confirmation, the passenger can click on the "Confirm My Order" button.



You know what?

Toyota Cross

BKP 1312

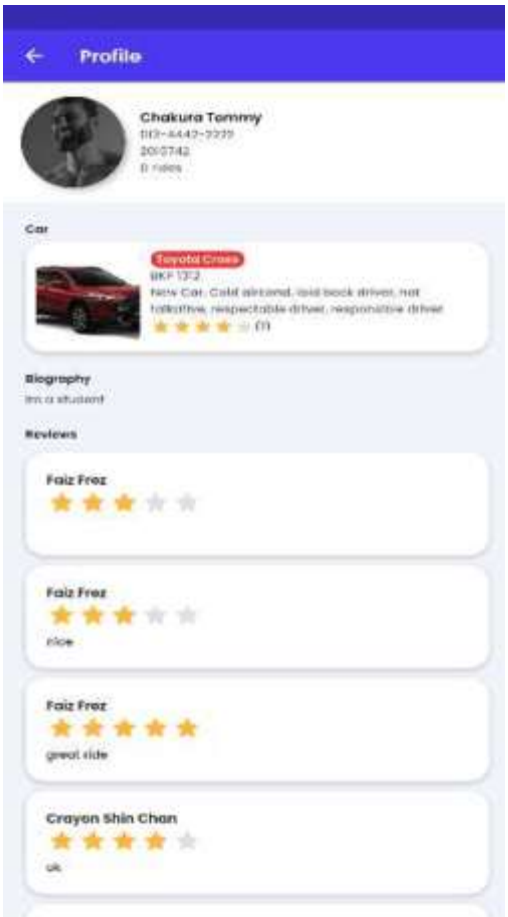
New Car, Cold aircond, laid back driver, not talkative, respectable driver, responsible driver

★★★★☆ (1)

RM5.0

Fig. 6 Notification Page

The notification page in Figure 6 is displayed to inform the passenger of the order accepted by the driver. The driver details are displayed on the notifications page in the passenger's view. Meanwhile from the driver's user interface, it is illustrated in Figure 7 until Figure 9.



Chakura Tommy

013-4447-7777

2017742

0 rides

Car

Toyota Cross

BKP 1312

New Car, Cold aircond, laid back driver, not talkative, respectable driver, responsible driver

★★★★☆ (1)

Biography

Im a student

Reviews

Faiz Frez
★★★☆☆

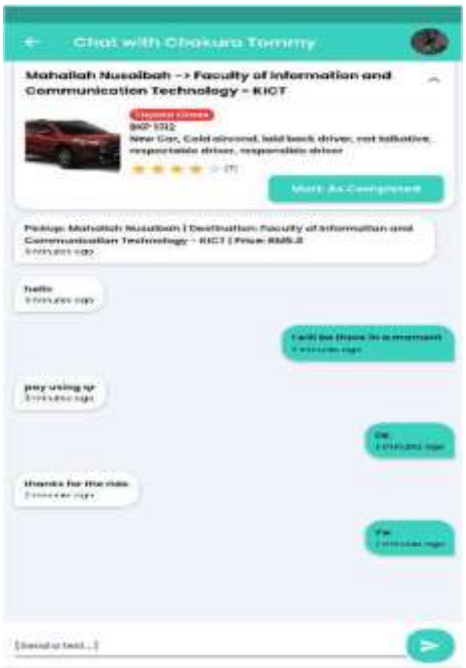
Faiz Frez
★★★☆☆
nice

Faiz Frez
★★★★★
great ride

Crayon Shin Chan
★★★★☆
ok

Fig. 7 Driver's Profile Page

The registered driver's profile is shown in Figure 7. In this page, it has details of the driver, details of the vehicle and rating they received for the completed ride. In Figure 8, it shows the chat page between the driver and the passenger. This feature allows the passenger to chat with the driver if needed. In Figure 9 illustrated the driver's homepage. In this page, the driver will be notified for the new request from the passenger and the driver is allowed to set the price according to the location's distance.



Chat with Chokuro Tommy

Mahaliah Nusaibah --> Faculty of Information and Communication Technology - KICT

[illegible]

Mark As Completed

Pickup: Mahaliah Nusaibah | Destination: Faculty of Information and Communication Technology - KICT | Price: RM5.2

hello

I will be there in a moment

pay using qr

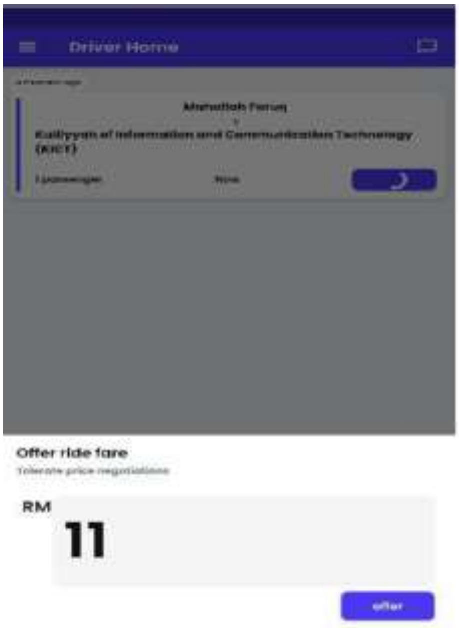
Ok

thanks for the ride

Ye

[Send a text...]

Fig. 8 Chat Page



Driver Home

Mahaliah Faruq

Kulliyyah of Information and Communication Technology (KICT)

1 passenger Now

Offer ride fare

Tolerate price negotiations

RM

11

offer

Fig. 9 Driver's Homepage

V. Conclusions

This paper describes the development of the Transporter mobile application, which transitioned from a Telegram-only platform to a better version using the mobile app. Several features for passengers and drivers have been included in the application using the agile methodology and the FlutterFlow technology platform, including a personalized homepage, chat area, and many more. It is expected that having this application will improve the overall commuting experience for the entire IIUM community.

Looking forward, future works innovations for the transporter mobile application will focus on several critical areas. To begin, there is a need to improve the integration with the IIUM authentication system to ensure seamless access and authentication for all university users. This could entail improving authentication mechanisms and increasing compatibility with various IIUM systems and databases in order to expedite user management processes. Additionally, there is room for enhanced integration with Google Maps by leveraging advanced features such as real-time traffic updates, alternate route ideas, and improved precision in finding locations within the campus environment.

Furthermore, the establishment of a required subscription service for drivers creates opportunities for future improvements in driver management and incentivization. This could include implementing performance measurements and rewards systems to encourage high-quality service delivery and driver retention. Furthermore, continual efforts should be directed at expanding the application's user base, including thorough marketing tactics and user engagement programs, in order to maximize acceptance and usage.

In terms of technical development, the planned re-development of the application using Flutter presents opportunities for significant optimization and scalability. Future works in this regard could include fine-tuning the user interface for enhanced usability and accessibility across different devices and operating systems. Moreover, there is a need to prioritize the implementation of minor features that were previously neglected due to time constraints, addressing user feedback and enhancing overall functionality and user experience. These future works collectively aim to elevate the transporter mobile application to new heights of efficiency, reliability, and user satisfaction, positioning it as an indispensable tool for campus transportation needs.

Acknowledgment

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Conflict of Interest

The authors declare that there is no conflict of interest

References

[1] M. Zulkifli and M. Y. M. Yunus, "Comparative study of Uber and taxi in Kuala Lumpur," in *Journal of Physics: Conference Series*, 2019, vol. 1358, no. 1: IOP Publishing, p. 012076.

[2] A. Mohamad, E. S. Shukor, N. Zamberi, and N. F. S. Ahamad, "The factors that influence UMK students in using E-Hailing services," Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan, Kelantan, 2023.

[3] M. Yunoh and M. H. Ibrahim, "Factors That Influences The Uses Of E-Hailing As Public Transportation For University Students In East Coast, Malaysia," *International Journal of Entrepreneurship, Organization and Business (IJEOB),* 2020.

[4] W. Jiang, C. R. Dominguez, P. Zhang, M. Shen, and L. Zhang, "Large-scale nationwide ridesharing system: A case study of Chunyun," *International Journal of Transportation Science and Technology,* vol. 7, no. 1, pp. 45-59, 2018.

[5] K. A. Kamaruddin and N. R. M. Rozlis, "UiTM Share Ride: Requirements Validation, Design and Development of a Campus Ride-Sharing Mobile Application," in *2019 6th International Conference on Research and Innovation in Information Systems (ICRIIS)*, 2019: IEEE, pp. 1-6.

[6] G. Tirkeş, E. Yörükçü, B. Özbilen, S. Alkan, and C. Akgül, "GoToUni: A Mobile Application Suggestion for Carpooling," *Avrupa Bilim ve Teknoloji Dergisi,* no. 37, pp. 76-80, 2022.

[7] S. M. Chit, L. Y. Chaw, C. L. Thong, and C. Y. Lee, "A pilot study: Shuttle bus tracker app for campus users," in *2017 International Conference on Research and Innovation in Information Systems (ICRIIS)*, 2017: IEEE, pp. 1-6.

[8] M. N. Z. Juhari and H. Mansor, "IIum bus on campus monitoring system," in *2016 International Conference on Computer and Communication Engineering (ICCCE)*, 2016: IEEE, pp. 138-143.

[9] N. Norzalwi and A. Ismail, "Public approach towards sustainable transportation in UKM's campus," *Australian Journal of Basic and Applied Sciences,* vol. 5, no. 5, pp. 1332-1337, 2011.

[10] M. N. Md Nor, S. Md Sabri, and N. F. Mat Isa, "E-hailing service satisfaction: a case study of students in a higher education institution in Perlis, Malaysia," *Jurnal Intelek,* vol. 16, no. 2, pp. 138-150, 2021.

[11] A. M. Roshandeh and O. C. Puan, "Evaluation of University Technology Malaysia on campus transport access management," *International Journal of Humanities and Social Sciences,* vol. 3, no. 6, pp. 814-819, 2009.

[12] S. Chalermpong and N. Ampansirirat, "Modeling Chulalongkorn University campus parking demand," *Journal of the Eastern Asia Society for Transportation Studies,* vol. 9, pp. 566-574, 2011.

[13] K. Yufeng, "Grab to introduce variable commission rate, says move will make driver compensation fairer," in *The Straits Times*, ed. Singapore, 2023.