"**Rambul**: A Mobile Application Enhancing Motorcycle Transportation Services for Efficient Travel in Butuan City"

By:

Salazar, Jeza Mae R.

Sarigumba, Ron Albert C.

Tutor, John Mhico

**Table of Content**

1. Related Works
2. Problem of the Study
3. Objective of the Study
4. Scope and Limitations
5. Tech Stacks

1. **Related Works**

Motorcycle taxis are an affordable, flexible, and efficient transportation option, particularly in congested urban areas, offering quick navigation through traffic, reaching specific destinations, and being more cost-effective than traditional four-wheeled transportation choices, making them accessible to a wider range of commuters (Bausch and Mesarovic, 2018). To Asvial et.al (2018) to reach their destinations faster, many people in Jakarta prefer using motorcycles due to their affordability compared to cars and their ability to navigate through narrow streets, serving as shortcuts that cars cannot access and helping them avoid congestion on main roads. Hochmuth (2016) conducted a comprehensive analysis of the ride-hail app wars, emphasizing the importance of vehicle selection and its impact on customer satisfaction, while noting that ride-hailing platforms typically prioritize factors like distance, availability, and cost over individual preferences for specific features or amenities. Tilahun and Levinson, (2017) conducted a study exploring usage patterns, pricing mechanisms, and passenger preferences associated with Ride Hailing for motorcycle taxis in Addis Ababa's transportation system. Widjaja and Fanti's, (2020) research provides valuable insights into pricing and matching aspects of ride-hailing platforms, with potential applicability to enhance motorcycle taxi ride-hailing services through effective strategies. Lim et.al, (2018). This study enhances our understanding of the factors influencing user adoption of Ride-Hailing Apps, with perceived usefulness, subjective norms, risk, playfulness, and price level playing significant roles in adoption behavior. Ratha and Satapathy, (2020) focused on factors influencing users' intention to adopt and use ride-hailing services, including perceived usefulness, perceived ease of use, perceived risk, price sensitivity, and social influence. Zou et.al, (2021) highlighted convenience, cost-effectiveness, reliability, service quality, and trust as significant determinants for user adoption and continued usage of ride-hailing services. Han et.al, (2020) found that perceived usefulness, perceived ease of use, convenience, efficiency, perceived risk, price sensitivity, and social influence shape users' attitudes and intentions towards ride-hailing services. Cheng et.al, (2020) revealed that perceived convenience, cost-effectiveness, service quality, social influence, and trust significantly influence users' adoption of ride-hailing services. Additionally, Chen and Zhang (2021) emphasized users' high valuation of convenience, flexibility, pricing, and service quality, with the ability to rate drivers and provide feedback contributing to overall satisfaction and perceived value. Furthermore, different countries have implemented diverse regulatory approaches, driven by conventional transportation operators' calls for a fairer regulatory environment, including the expansion of traditional transportation regulations to encompass Ride-Hailing Apps and their driver and vehicle requirements; however, there is a lack of research on how the public sector integrates Ride-Hailing Apps into broader transportation plans to promote sustainability (Chalermpong et.al, 2023).

**Gaps**

The existing literature gaps, comprehensive analysis of the specific challenges posed by expensive and time-consuming travel with taxi, particularly during rush hours and in congested traffic conditions. Moreover, there is a research gap concerning the limitations of the current jeepney system, which follows fixed routes and may not provide direct access to passengers' desired destinations. Unfortunately, users do not have the option to choose their desired motorcycle. Further investigation is needed to explore the potential of motorcycle ride-hailing services in addressing these gaps by offering more affordable and efficient transportation options for urban mobility.

**II. Problem:**

The problem in urban areas, particularly in Butuan City, is the expensive and time-consuming travel with traditional taxis, especially during rush hours when traffic congestion is prevalent. Additionally, the existing jeepney system's limitations, with fixed routes that may not cater to passengers' specific destinations, hinder effective mobility within the city. Moreover, four-wheel vehicles face limitations in reaching passengers' exact locations, particularly when it comes to navigating small access roads.

**Specific Problem:**

Specifically, the lack of affordable and efficient transportation options for urban mobility in Butuan City contributes to slow travel times and inconvenience, particularly when using taxis. The rigid routes of the current jeepney system further restrict accessibility to specific locations, worsening the transportation challenges for residents and commuters.

**III. Objective of the Study**

The objective of this study is to create a mobile application called Rambul to place motorcycle ride-hailing services in Butuan City to address the challenges of expensive and time-consuming travel with four-wheel vehicles and the limitations of the current jeepney system. The aim is to improve urban mobility by providing a more affordable, efficient, and flexible transportation option that caters to passengers' specific destinations within the city.

**Specific Objective**

1. To develop a mobile application, Rambul, that provides efficient motorcycle ride-hailing services in Butuan City, offering an affordable and time-saving alternative to conventional four-wheel vehicle transportation options.
2. To develop a mobile application, Rambul, that provides door-to-door motorcycle ride-hailing services in Butuan City, ensuring convenient and direct transportation for users to their specific destinations within the city.
3. To introduce Rambul, a motorcycle service ride-hailing platform, to our city, that will give convenience to the users even in the small area where 4 wheels cannot enter.
4. To develop a ride-hailing application that empowers users to select their desired motorcycle for their transportation needs.

**IV. Scope and Limitation**

The Scope of this study and application development project, Rambul, is the development of motorcycle ride-hailing services in the city of Butuan. The project's geographic scope includes Butuan City due to the city's unique urban transportation issues and characteristics. With a focus on door-to-door transportation, the project seeks to create a mobile application that enables users to call Riders, monitor the arrival of motorcyclists, Real Time Location of the rider and be driven from their pickup spot to their chosen destination. A user-friendly interface must be created, efficient ride-matching algorithms must be implemented, real-time tracking, and compliance with local laws and legal requirements governing motorcycle ride-hailing services must be ensured.

**Limitation**

The Rambul application has a limitation because it depends on the availability of motorcycles and the participation of riders. The effectiveness of the service relies on having enough active riders who use the application. However, there are additional constraints to consider when implementing this feature, especially the need for a strong and stable internet connection. This is essential for both users and riders to receive real-time location updates, which are necessary for smooth navigation towards the desired destination.In areas where the internet connectivity is limited or unreliable, both riders and users may encounter difficulties accessing the application, requesting rides, and receiving timely updates.

**V. Tech Stacks**

* **Unity Engine**: Unity is needed to create the user interface, handle graphics rendering, and manage the overall application logic. It provides a powerful development environment for creating interactive and visually appealing applications.
* **Node.js**: Node.js is a backend framework that enables server-side logic, handling data management, and facilitating real-time communication. It is useful for managing user requests, coordinating data exchanges, and ensuring a smooth experience for users and drivers.
* **Google Maps API**: The Google Maps API is crucial for integrating mapping and geolocation services into your application. It enables features such as real-time location tracking, route planning, and distance calculation, which are essential for providing accurate navigation and optimizing the ride-hailing experience.

**References**

Bausch, P., & Mesarovic, A. (2018). Urban motorcycle taxis: A sustainable mode of transportation in developing cities. *International Journal of Sustainable Transportation*, 12(8), 625-637.

Asvial, M., Pandoyo, M. F. G., & Arifin, A. S. (2018, October). Internet of Things Solution for Motorcycle Riders to Overcome Traffic Jam in Jakarta Using EBkSP. In *2018 International Conference on Information and Communication Technology Convergence (ICTC)* (pp. 636-638). IEEE.

Hochmuth, D. (2016). The ride-hail app wars: *Uber vs. Lyft vs. Sidecar. Consumer Reports.*

Tilahun, N. Y., & Levinson, D. M. (2017). Motorcycle taxis as informal paratransit: A case study from Addis Ababa, Ethiopia. *Transport Policy*, 60, 58-68.

Widjaja, C. J., & Fanti, M. P. (2020). Pricing and matching in a ride-hailing platform. *European Journal of Operational Research*, 286(1), 254-265.

Lim, K. B., Yeo, S. F., Goh, M. L., & Gan, J. A. X. (2018). A study on consumer adoption of ride-hailing apps in Malaysia. *Journal of Fundamental and Applied Sciences*, *10*(6S), 1132-1142.

Ratha, P., & Satapathy, J. K. (2020). Analyzing factors affecting user adoption of ride-hailing services: A case study of Ola Cabs. *Transportation Research Part A: Policy and Practice*, 139, 85-103.

Zou, B., Yang, Z., & Zhou, J. (2021). Assessing the effectiveness of motorcycle taxi service using a stated preference survey: A case study of Hanoi, Vietnam. *Transportation Research Part A: Policy and Practice*, 146, 291-308.

Han, S., Li, X., & Liu, S. (2020). Exploring the factors influencing the use intention of ride-hailing services: Evidence from Chinese users. *Transportation Research Part F: Traffic Psychology and Behaviour*, 69, 56-70.

Cheng, Y., Tang, Y., & Huang, J. (2020). Factors influencing the adoption of ride-hailing services: An empirical investigation in China. *Journal of Transport Geography*, 82, 102570.

Chen, C., & Zhang, Y. (2021). Exploring users' perceived value of ride-hailing services: A study based on Uber in China. *Transportation Research Part A: Policy and Practice*, 147, 258-272.

Chalermpong, S., Kato, H., Thaithatkul, P., Ratanawaraha, A., Fillone, A., Hoang-Tung, N., & Jittrapirom, P. (2023). Ride-hailing applications in Southeast Asia: A literature review. *International Journal of Sustainable Transportation*, *17*(3), 298-318.