

Intelliter: An Android- Based Intelligent Commuting Mobile Application

Jonh Ray B. Medina

College of Computer Studies
Angeles University Foundation
Angeles City, Philippines 2009
medina.jonhray@auf.edu.ph

Jobelle L. Lapira

College of Computer Studies
Angeles University Foundation
Angeles City, Philippines 2009
lapira.jobelle@auf.edu.ph

Jeuel P. Pamintuan

College of Computer Studies
Angeles University Foundation
Angeles City, Philippines 2009
lapira.jobelle@auf.edu.ph

Karen Mae C. Liscano

College of Computer Studies
Angeles University Foundation
Angeles City, Philippines 2009
lapira.jobelle@auf.edu.ph

Wayne C. Manalili

College of Computer Studies
Angeles University Foundation
Angeles City, Philippines 2009
lapira.jobelle@auf.edu.ph

Abstract

The Intelliter is an android-based intelligent commuting application that will help commuters for their travelling needs using public transportations e.g., jeepneys. This aims to reduce the effort of the people who are commuting or who are not used to commute. The methodology used in developing the proposed system is Design Thinking which is an effective method to develop the system. The tools used in developing the mobile application were XML, Java, and Android Studio and the database was designed using Firebase Realtime. To simplify, the proponents aimed that this study will help commuters not just in commuting but also in gaining knowledge and information using public utility jeepneys.

Keywords

Intelligent, Commuter, Mobile Application

1. Introduction

Based on the researchers' observations and ideas with public transportations, the researchers sought to develop an android-based Intelligent Commuting System. The ability of the system is to have a faster, reliable, and easier way of travelling with public transportations. With this system, the commuter will be guided whenever he chooses his desired destination. By that, the commuter can reach his destination without any difficulties. With this system, the researchers' client will have the opportunity to travel with ease and achieve maximum productivity with minimum wasted effort.

1.1 Objectives

To develop an Intelligent Commuting System is the main objective of the study in order to guide the commuters to his desired destination using public transportation. The researchers' purpose of the system is to assist people who are having difficulties in commuting. This system would also help commuters with their daily travel.

Specifically, the objective of the study is to

- The commuters will be able to know places in Angeles City
- The commuters will be able to know their exact location
- The commuters will be able to know what public utility jeepneys to ride going to their destination
- The commuters will be able to know how much will it cost them to go to a specific location using public utility jeepneys
- The commuters will be able to know each public utility jeepney's route inside Angeles city
- The commuters will be able to gain knowledge and ideas on how to commute to a place in Angeles city.

2. Literature Review

Intelligent Commuting System (ICMS)

Intelligent Commuting System is needed to define the issues of stress factors and time management faced by the commuter student and some of the coping strategies (J. J. Newbold, et al., 2015). The sector of the public transport has increased the operators in checking the satisfaction standards of passengers. Their actions have been adapted through the quality-of-service perception. (R. de Oña, E. Estevez, L. Garach, F.J. Calvo, J. de Oña, 2018)

With Intelligent Commuting System, it will conduct a study on how to inspect how social interactions affect commuters' route choice. The conclusions in the study provide some understanding into using social information to guide the route choice of commuters. (G. Zhang, F. Wei, N. Jia, S. Ma and Y. Wu, 2019). It will focus on the commuting problems. Based on psychographic factors from the widen Theory of Planned Behavior, we pin down three commuter segments: Unhurried timely commuters, Self-determined commuters, and Busy commuters. (Sonja Haustein, Mikkel Thorhauge, Elisabetta Cherchi, 2018). With the help of ICMS, commuters will no longer have a hard time in commuting because they will have an easy access on the map for their destination. (George H.R. Costa, Fabiano Baldo, 2015). With this system, commuters will be more secured and confident as they go to places that they are not familiar with (Chris M.J. Tampère, Marco Rinaldi, Francesco Viti, 2017)

Mobile Application

Mobile application helps to lessen the amount of time in accessing application content, buying product, transferring money, and managing business from anywhere (João Falcão e Cunha, Tânia Fontesz, Vera Costa, Marta Campos Ferreira, José Luís Borges, Teresa Galvão Dias, 2017). Mobile applications can perform useful tasks for its users. (Sharma et al., 2016). Without mobile application, an IT department or business will cost more for the person rather than saving and will give them a hard time when changing version of their system (Kiruthika et al., 2016). In order to have a well secured website, an extensive knowledge in planning and developing the application is required.

Common problems for mobile are dealing with bugs, system failures, compatibility issues, and etc. because these problems have the possibility to leak information about the system. Businesses that use mobile application often consider vulnerable to security as their main problem (Alzahrani et al., 2017). With mobile application, it will give you an ease of access navigating the system (Haosheng Huang, Yi Cheng, Robert Weibel, 2019).

Public Transport System

President Rodrigo Duterte is terminating all the old jeepneys next year. Not only jeepneys, but also other public utility vehicles such as buses and vans that are aged 15 years and above will not be allowed (Llanesca T. Panti, 2017). The government and jeepney operators had a clash over the regulations and requirements of the Public Utility Vehicle Modernization program's implementation (Iñigo S. Roces, 2017). The study aims to make effective the present transportation system by giving low-cost measures. Public transport is the answer to the future of the urban sustainable growth. It must be permanently rearranged to meet the changing demand in modern cities. (Răzvan Andrei Gheorghiu, Maria Claudia Surugiu, 2016). The National Academy of Science and Technology concentrated on Urban Transportation such as roads, water transport and air transport issues that need to be communicated by the government. The challenges in Urban Transport Development were discovered that the public transport routes are not systematically organized (Napalang, 2016).

Tracking Systems

The use of traditional method of tracking information is usually using pen and paper to list down all the data gathered inside the organization. This method takes so much time and is prone to errors. That's why it is important to have a computerized tracking system that can reduce errors, human efforts, and also to be more precise and efficient with data gathering (Abdulsada, 2017). Some provide tracking system by listing all the data gathered in the database which can be accessed on the web or mobile applications (Alrifaie et. al., 2019). If there is no computerized tracking, system data gathering will be difficult because information gathered may change at some point (Kim et. al., 2015). Some of the challenges of tracking systems are the security and how the organization will gain the trust and loyalty of the client (Frontoni et. al., 2019). With the help of this tracking systems, we can obtain more information and gain knowledge from them (A.D. Marra, 2019).

3. Methods

Design Thinking is a methodology that has a solution to solving problems. It's useful in handling difficult problems that are unknown by brainstorming sessions and through hands-on approach in testing and prototyping.

“Design thinking requires bridging “knowing-doing gap.” The implement of the design thinker—to create stories to share our ideas, using prototyping to learn with our hands, and joining forces with people from others—are ways of intensifying what we know and broaden the impact of what we do.”

– Tim Brown CEO, IDEO

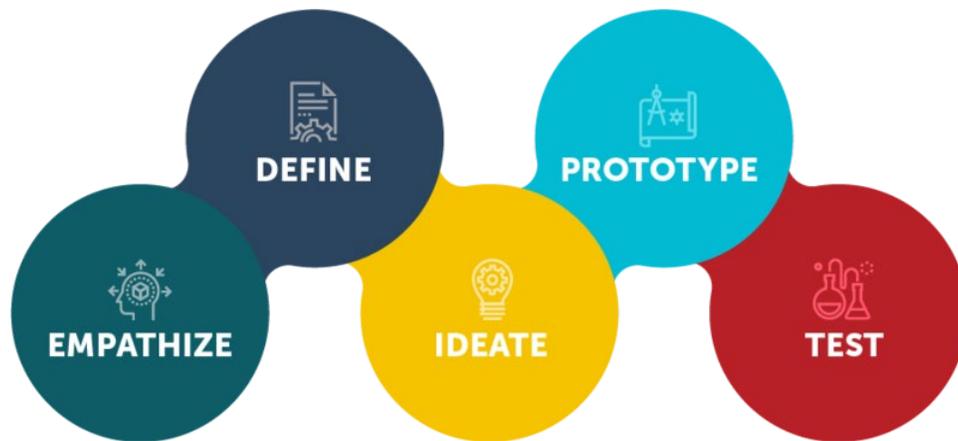


Figure 1: Design Thinking Process

- **Empathize** – According to a commuter, most of the time he will be asked to go to places that he is not familiar with to run some errands, to meet someone or to do something important. He always tends to ask people on how to commute to those places and how much to pay to get there. He also experienced that some people gave him false information that he might go the wrong way and end up wasting time and effort. The proponents felt that they need to create a system that will aid the commuters in their travel.
- **Define** - The problems that the commuters encountered were the routes of the public utility jeepney, what is the correct public utility jeepney to ride, how much it will cost them and where to ride them.
- **Ideate** - The proponents suggested to create an android based intelligent commuting mobile application. This application will only cover places inside Angeles City.
- **Prototype** - The proponents developed an android based application that searches for places inside Angeles City only and then displays all the public utility jeepneys available together with their computed fare throughout the route. The information that are displayed will then guide the commuters on how to go to places that they are not familiar with. By using the proponents' system, commuters will be more knowledgeable and commuting will be more efficient.
- **Testing** – In this phase, the proponents started testing the solutions. This phase is where you articulate and then evaluate the solutions based on feedback from the tested solutions.

4. Data Collection

The proponents' main target for gathering information are commuters and public transportation terminals. In this case, the proponents can gather accurate information about commuters that has problems in terms of going to places they do not know and for those who do not know how to commute. The participation of public transportation terminals is also essential in gathering information in the study.

The study will be conducted at the nearest public utility jeepney terminals around Angeles City. The target population are the commuters, which will be asked to test and respond on the project for the study.

5. Results and Discussion

The graphs listed below are the results of the surveys and test that was conducted by the proponents.

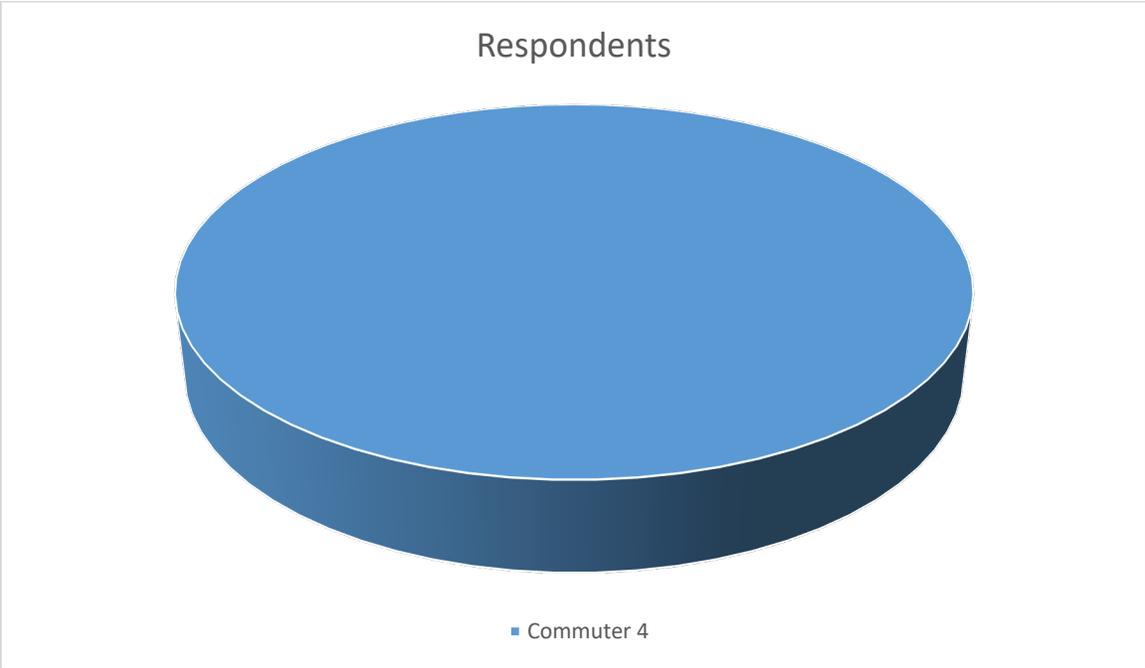


Figure 2. Pie Graph for Respondents

Survey Percentage per Question for Mobile Application Functionality

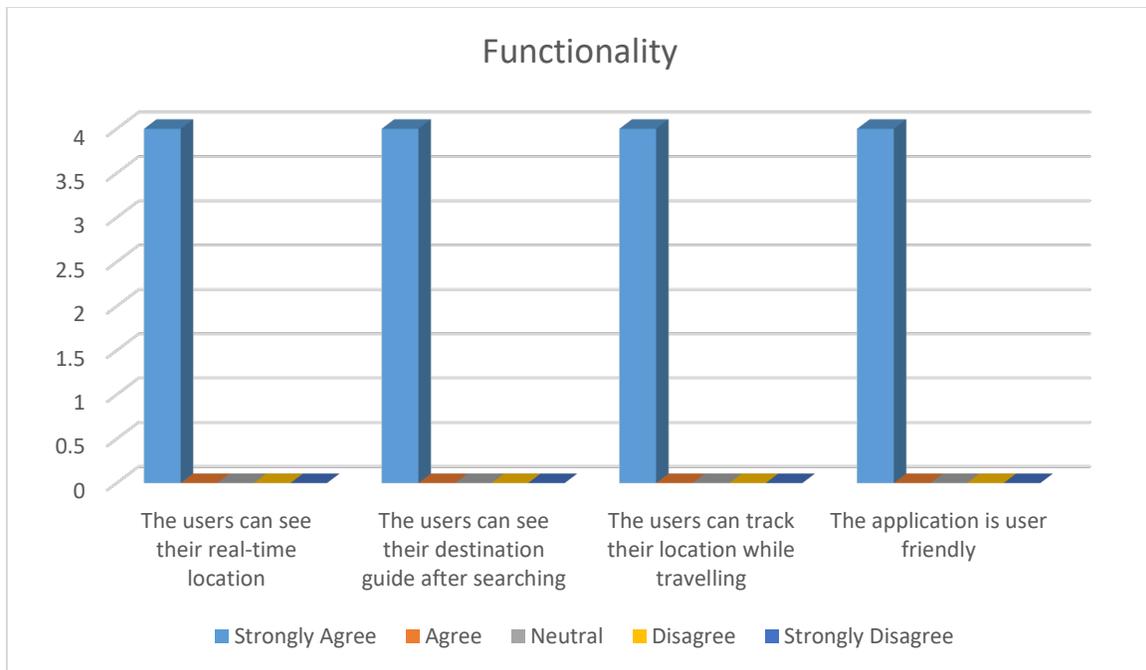


Figure 3. Application Functionality

This figure 3 shows the percentage of evaluation for the application’s functionality. The first, second, third, and fourth criteria received 4 Strongly Agree ratings.

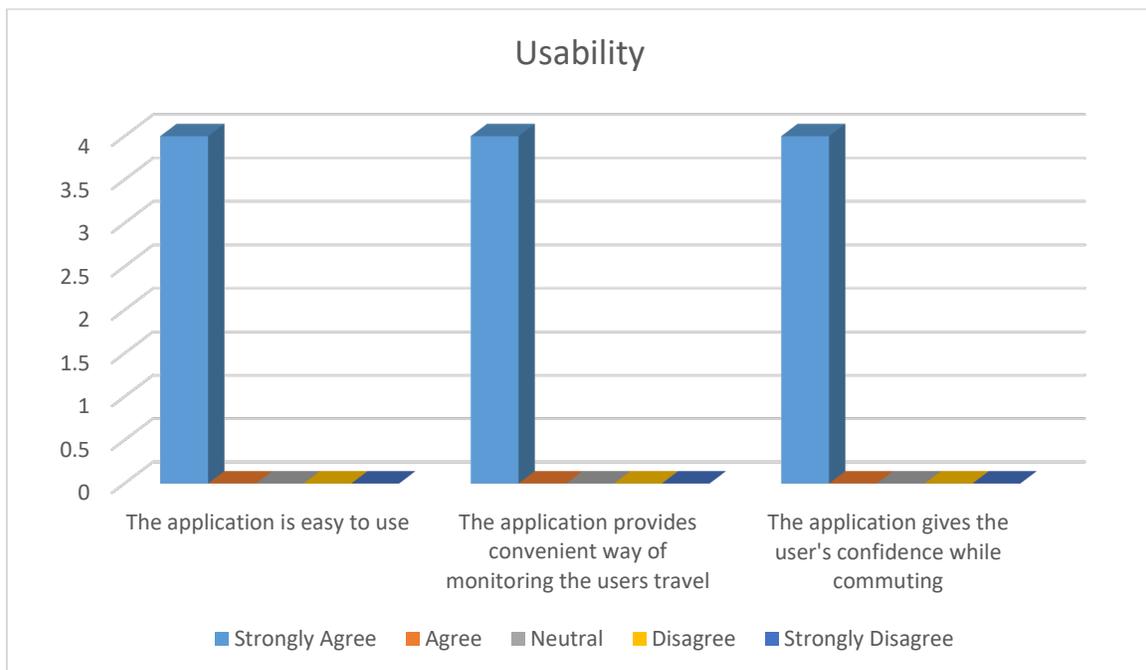


Figure 4. Application Usability

This figure 4 shows the percentage of evaluation in terms of the application's usability. The first, second, and third criteria received 4 Strongly Agree ratings.

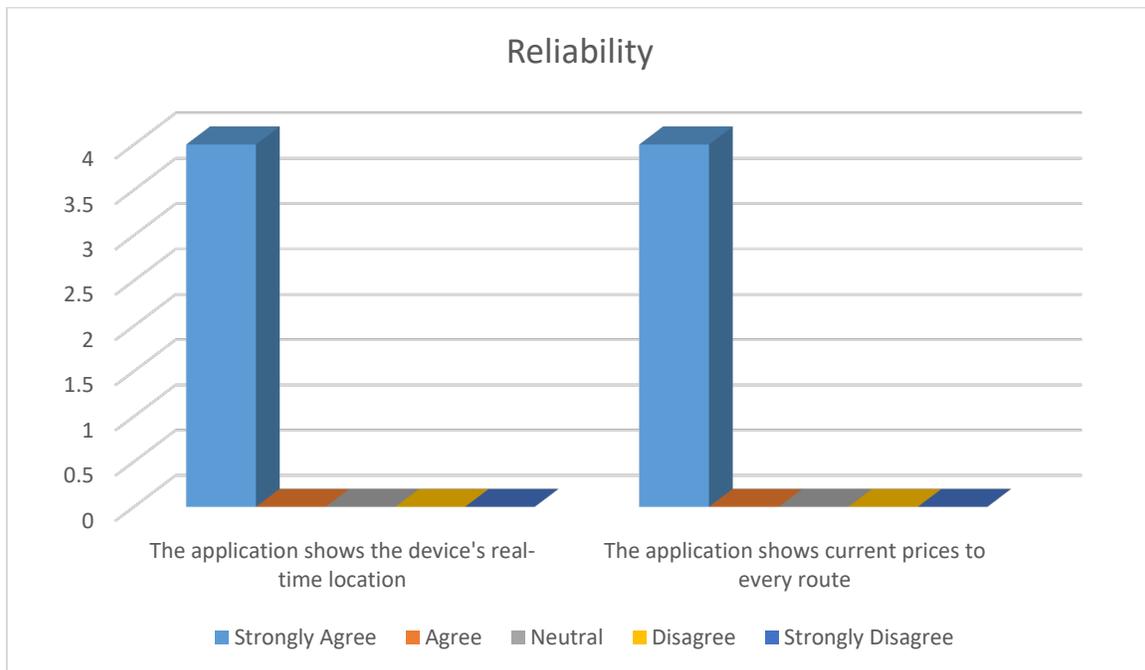


Figure 5. Application Reliability

This figure 5 shows the percentage of evaluation for application's reliability. The 1st criteria received 4 Agree and the 2nd criteria received also 4 Strongly Agree.

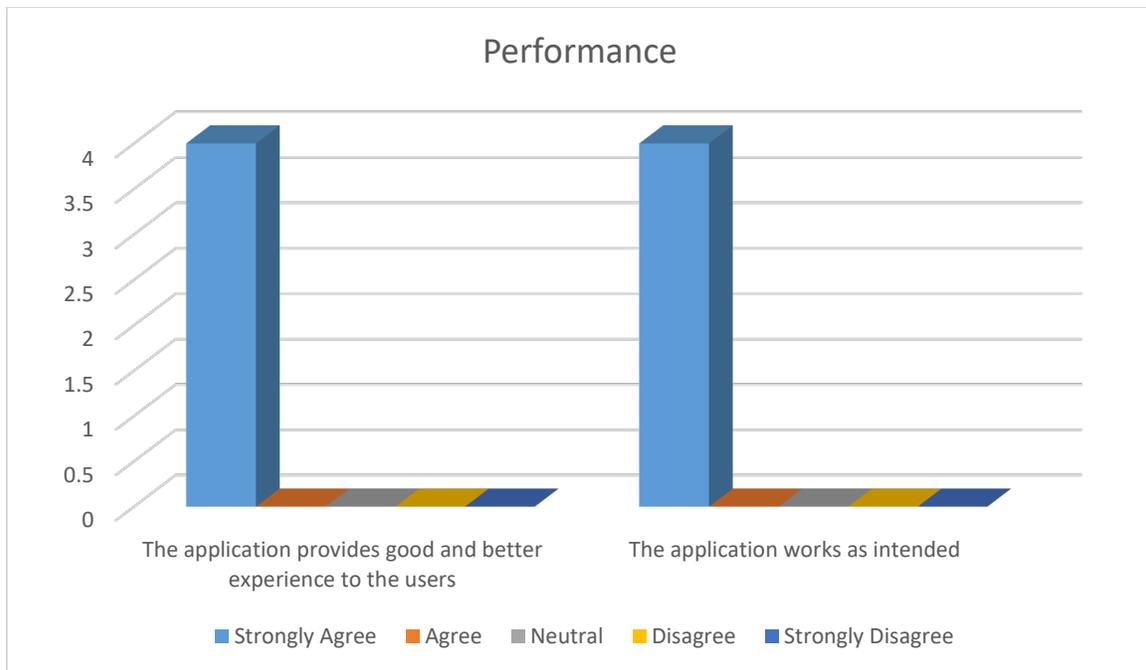


Figure 6. Application Performance

This figure 6 shows the percentage of evaluation for the application's performance. The first and second criteria received 4 Strongly Agree ratings.

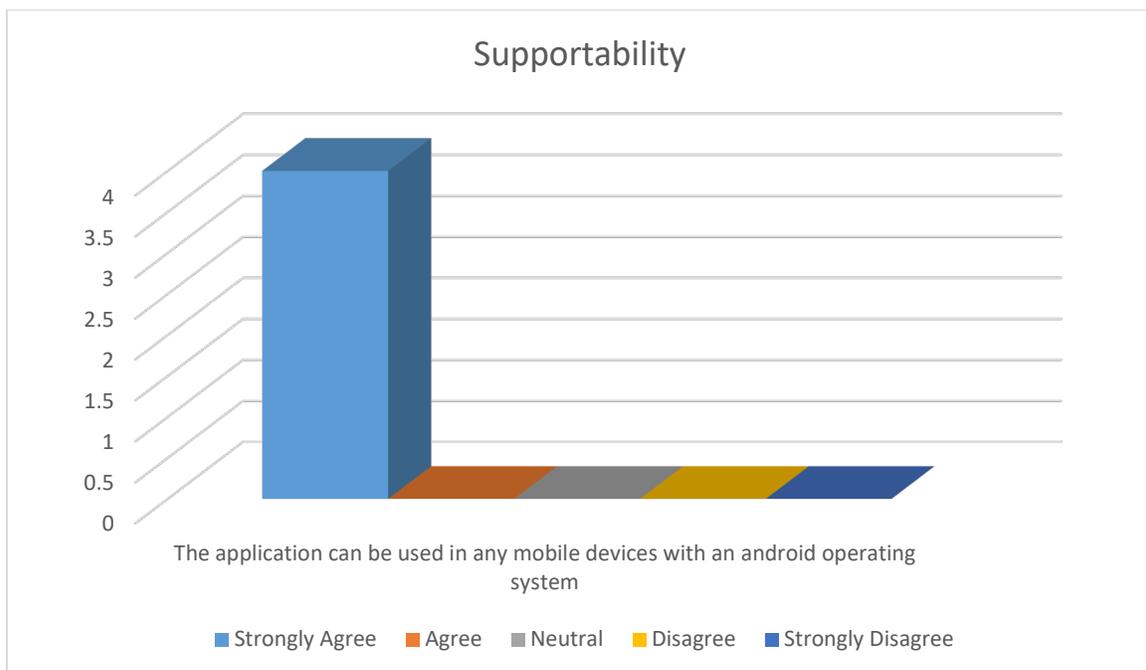


Figure 7. Application Supportability

This figure 7 shows the percentage of evaluation for the application's supportability. The first criteria received 4 Strongly Agree rating.

5.3 Proposed Improvements (11 font)

The images below are screenshots of the system including the description and functions:

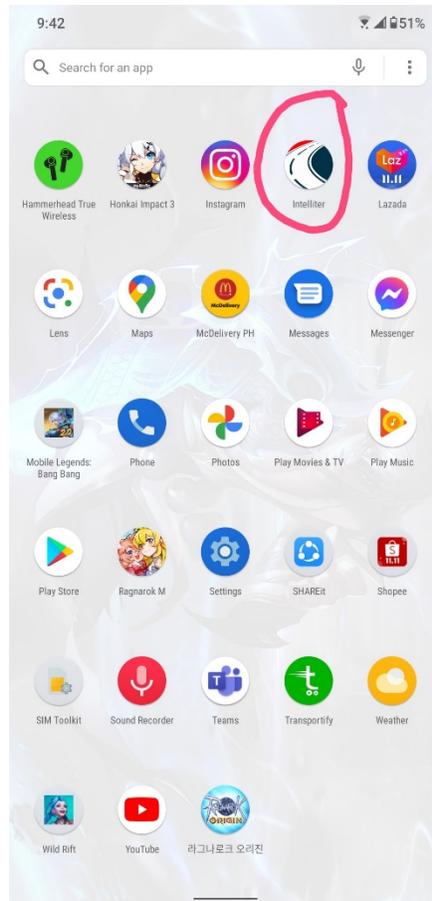
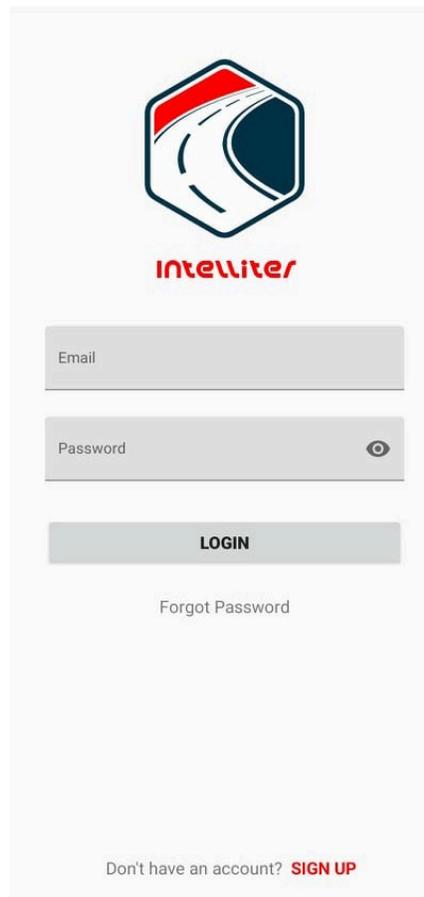


Figure 8. App Icon

In figure 8, it shows the Intelliter Application Icon in a Mobile Application.



The image shows a login page for 'Intelliter'. At the top center is a logo consisting of a hexagon with a red and white curved shape inside, and the word 'Intelliter' in red below it. Below the logo are two input fields: 'Email' and 'Password'. The 'Password' field has an eye icon to its right. Below these fields is a grey button labeled 'LOGIN'. Underneath the button is a link that says 'Forgot Password'. At the bottom of the page, there is a link that says 'Don't have an account? SIGN UP'.

Figure 9. Login Page

The login page is seen in figure 9. The user can log in as a commuter or an admin with each having different functionality.

Welcome,
Sign up to get started.

First Name

Last Name

Email

Password

Confirm Password

Terms and Agreement

SIGNUP

Already have an Account? [SIGN IN](#)

Figure 10. Registration

The registration or signup page is seen in figure 10. Before the user can use the application, they must create their account first.

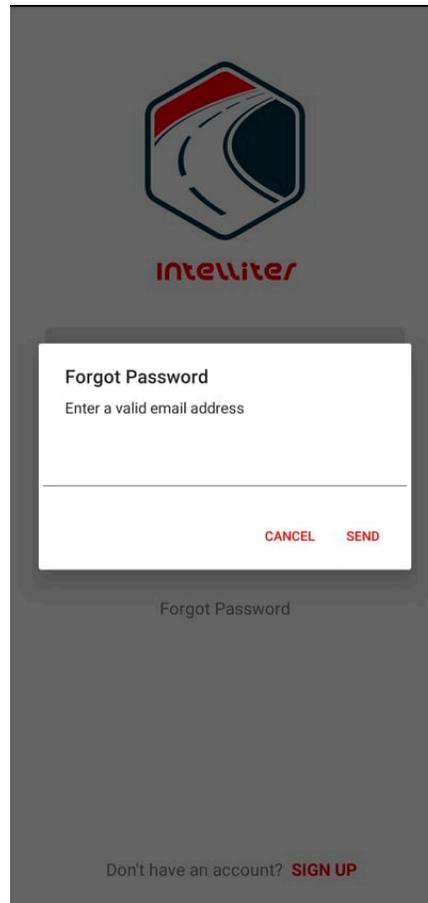


Figure 11. Forgot Password

The forgot password page is seen in figure 11. If users tend to forget their passwords, they can retrieve it by entering their e-mail addresses.

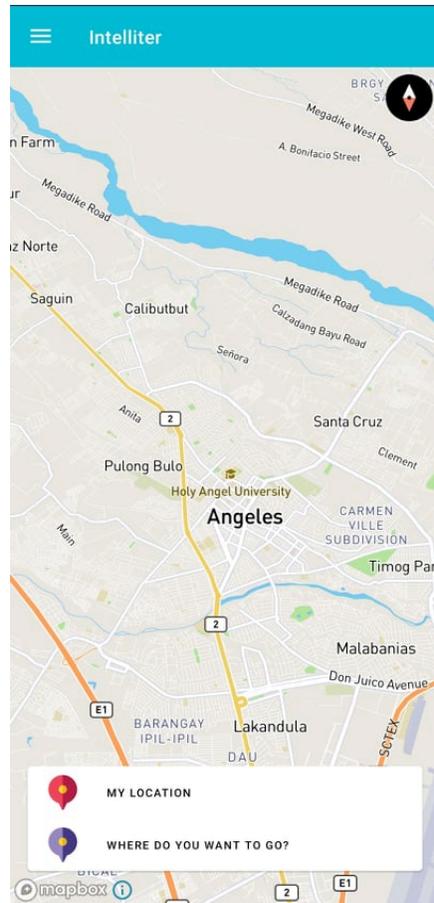


Figure 12. Home Page

The home or main page is seen in figure 12. Allowing your device to access your location will enable the user to fully utilize the features of the application. In this page you can monitor your location and search for your desired destination.

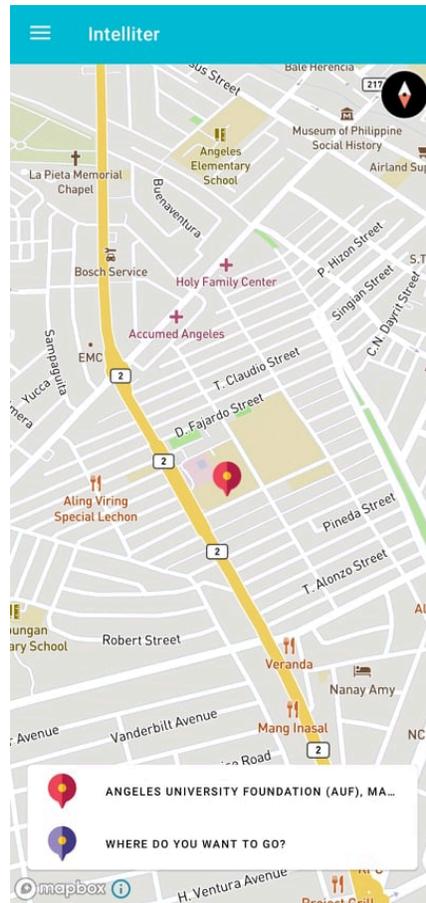


Figure 13. Location

The location page is seen in figure 13. Tapping "My location" in the home page will allow you to see your real-time location.

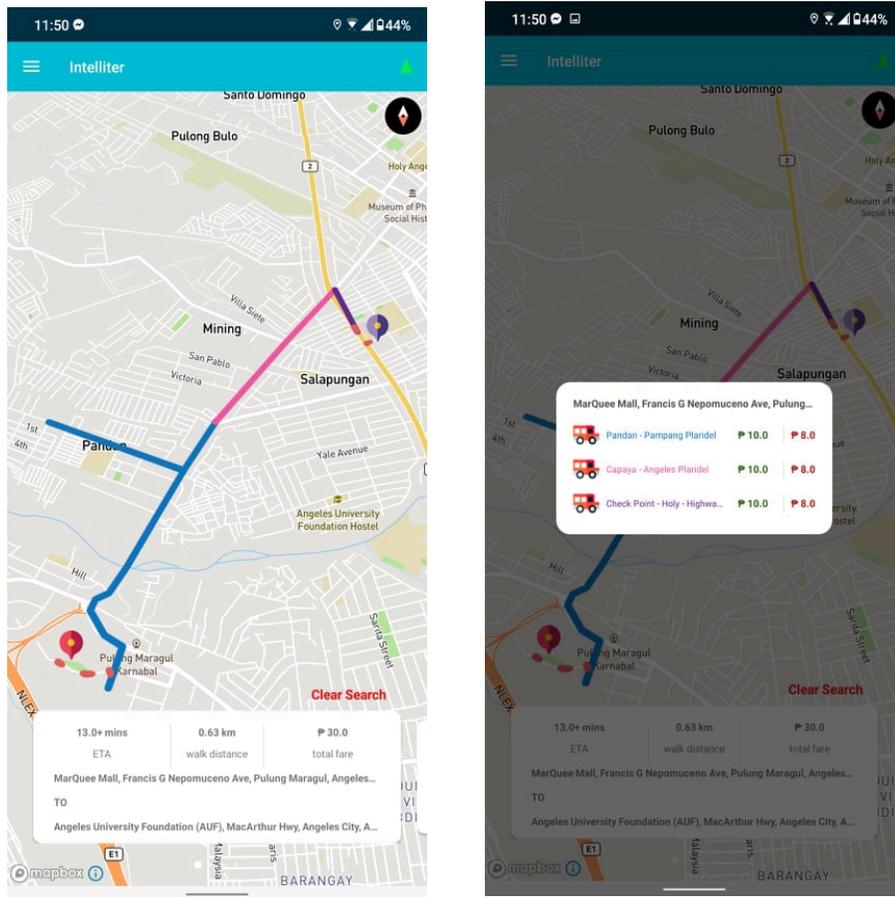


Figure 14. Destination Guide

The chosen destination guide seen in figure 14 allows the users to see the prices, where to walk, and proper jeepneys to ride with their color and estimated time of arrival.

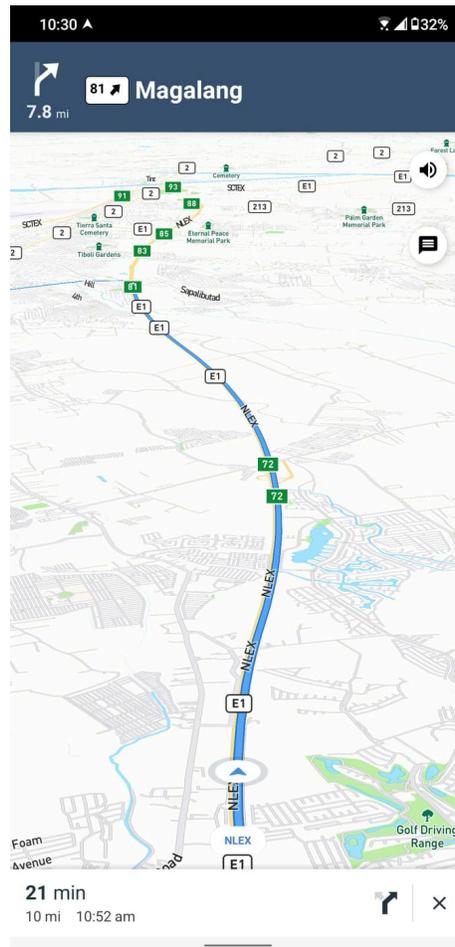


Figure 15. Real-time Navigation

Figure 15 will show the to users in order for them to monitor his or her travel.

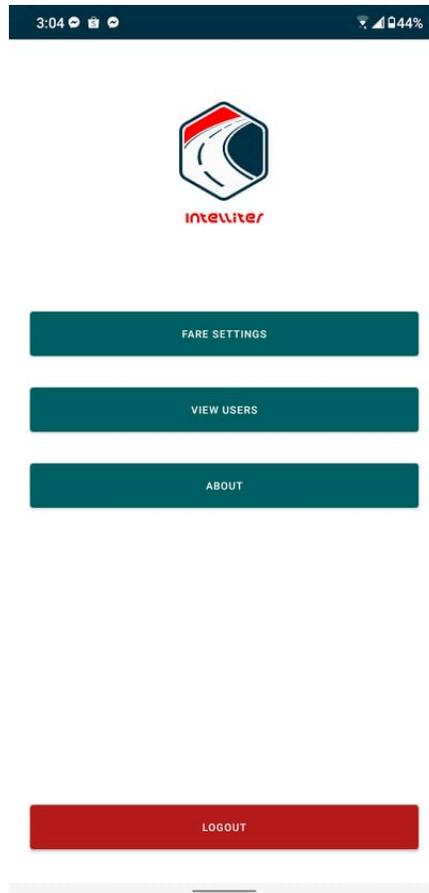


Figure 16. Home Page (Admin Side)

The figure 16 shows the home page of the admin side is seen in this figure.

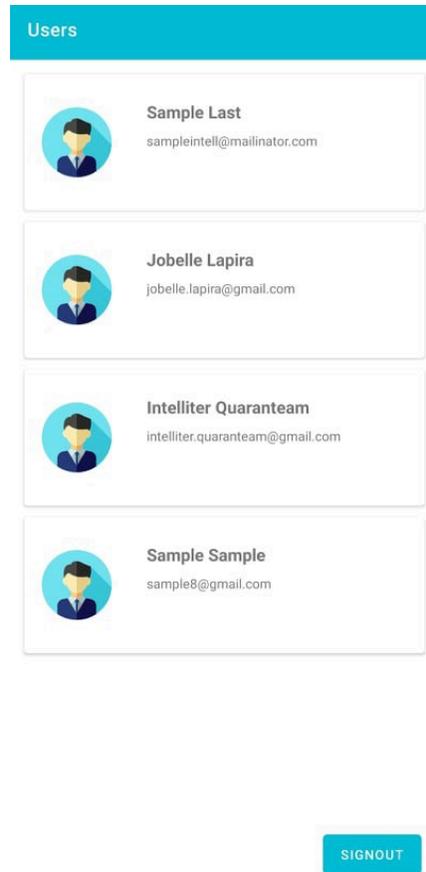


Figure 17. Registered Users (Admin Side)

This figure 17 displays the registered users of the application.

6. Conclusion

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Biography

Jonh Ray B. Medina is currently a Fulltime Professor specializing in Web and Mobile Applications and Software Development Processes and Application at Angeles University Foundation located in Angeles City, Philippines. He is also the adviser of Datalink organization which is the official publication of the College. Mr. Medina earned his Bachelor of Science in Information Management at Mary the Queen College of Pampanga since 2010. He also pursues his Master of Science in Information Technology and graduated since 2015. Currently, he is taking up his Doctor of Philosophy in Computer Science at Technological University of the Philippines.

Jobelle L. Lapira is candidate for graduation this 2021 on the degree of Bachelor of Science in Information Technology at Angeles University Foundation, Angeles City, Philippines. He also serve a student officer in a Non Mandated Organization in the College.

Jeuel P. Pamintuan is candidate for graduation this 2021 on the degree of Bachelor of Science in Information Technology at Angeles University Foundation, Angeles City, Philippines.

Wayne C. Manalili is candidate for graduation this 2021 on the degree of Bachelor of Science in Information Technology at Angeles University Foundation, Angeles City, Philippines.

Karen Mae C. Liscano is candidate for graduation this 2021 on the degree of Bachelor of Science in Information Technology at Angeles University Foundation, Angeles City, Philippines.