

RESEARCH ARTICLE

Design of Android-based Online Ticketing System Application on Hiba Utama Bus Using Location Based Service (LBS)

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Abstract

Hiba Utama buses still use conventional methods in ordering tickets and searching for the departure schedule of a prospective passenger, namely through outlets/counters and via telephone only. This method is less effective both in terms of time and cost because there can be a discrepancy between the customer's wishes in terms of departure time or even the tickets have sold out. So that information applications and ordering bus tickets are needed that can provide clear information and are not limited by distance and time by using mobile media. This study aims to build information applications and order bus tickets based on Android. The application development stage includes analysis, system design, implementation, and testing. Methods of data collection using the method of literature study, and observation. Android-based bus ticket information and booking applications built with the Java programming language. Android-based bus ticket information and booking applications that are made to provide bus information and ticket bookings. So that it can make it easier for customers to access information and order bus tickets due to the level of effectiveness and efficiency of the function of the mobile itself. The results of system testing show that this application is feasible and can be used as a tool to provide information and to order Hiba Utama bus tickets.

Keywords

Application; Bus Ticket Ordering; Android; Location-Based Service (LBS); Waterfall Method.

1 | INTRODUCTION

In this era of globalization, many people use transportation services, whether by land, sea or air. One of the most frequently used modes of transportation is the bus, because the price is affordable. With so many enthusiasts of bus transportation, buying bus tickets manually is considered less effective and efficient. Information that is clear and not limited by distance and time is needed by customers, for that companies must be able to facilitate it by using mobile media. Current technological developments have a major influence on various fields including the transportation industry. Utilization of technology in the transportation industry enables the development of more efficient and effective systems. One of the developing transportation system developments is an online ticket booking system for buses. Bus Hiba Utama is a transportation company that wants to develop an online ticket booking system using the Location Based Service (LBS) method. The LBS method allows the system to utilize user location information to provide more personalized and accurate services. In developing an online ticket booking system using the LBS method, it is necessary to design the right application so that the system can run properly and efficiently.

Research conducted by Putri, Prabowo, & Widyanto (2019) aims to design and implement an Android-based electronic ticket (e-ticket) application using the prototyping method. The prototyping method is used to speed up application development and allows users to see the features and appearance of the application from the start of development. The results showed that an Android-based e-ticket application designed using the prototyping method was able to increase user satisfaction in terms of ease of use and application performance [1]. Wijaya & Pakereng (2021) conducted research to design an e-ticketing application for a website-based bus agent using the Laravel framework. This study aims to provide solutions for bus agents in managing online ticket sales. The results showed that a website-based e-ticketing application using the Laravel framework was able to make it easier for bus agents to sell tickets online and increase ticket sales efficiency [2]. Research conducted by Tarigan, Kusosi, & Usri (2022) aims to design a helpdesk ticketing system application at PT. Indonesia Nippon Seiki. This application is designed to make it easier for users to report machine problems or repairs made by the company. The results of the study show that the designed helpdesk ticketing system application can improve the performance of technicians in solving problems and providing better service to customers [3]. Ciksadan, Rakhman, & Safira (2019) conducted research to design an Android-based inter-city travel e-ticketing application. This application aims to make it easier for users to order tickets online. The results showed that the designed Android-based inter-city travel e-ticketing application was able to improve the quality of service for users and make it easier to order tickets [4]. Chafid, Kusumawati, & Imami (2017) conducted research to analyze and design ticketing applications for ATM helpdesk services using a 3 tier architecture. This application aims to improve service quality and make it easier for users to report problems with ATM machines. The results showed that the ticketing application on the ATM helpdesk service using a 3 tier architecture was able to increase service efficiency and speed up problem solving [5]. Simatupang & Sianturi (2019) conducted research to design an information system for ordering bus tickets at POs. Handoyo is online based. This application aims to make it easier for users to order tickets online and increase the efficiency of ticket sales [6].

All the research mentioned in the list is related to the development of electronic ticketing or ticketing systems, both web and mobile based. This relates to research topics related to the design of an online ticketing system application on the Android-based Main Hiba Bus using the Location Based Service (LBS) method. Research by Putri, Prabowo, & Widyanto (2019) and Ciksadan, Rakhman, & Safira (2019) discusses the design of an Android-based e-ticketing application, which is similar to the topic of this research. Wijaya & Pakereng's research (2021) discusses the design of e-ticketing applications for website-based bus agents using Laravel, while research by Simatupang & Sianturi (2019) discusses the design of an online-based bus ticket ordering information system. Tarigan, Kusosi, & Usri's research (2022) discusses the development of a ticketing helpdesk system, which, although not something similar to the topic of this research, is still related in the context of web-based application development. Overall, these studies can provide insight and insight in developing online ticketing system applications on Android-based Hiba Utama Buses using the Location Based Service (LBS) method, both in terms of design, implementation, and development and management.

Based on the background, namely the formulation of the problem, namely; How to build an online ticket application using Android and Location Based Service ?, How to keep customer data neat and safe?, and How to make clients comfortable in making transactions?. The research objectives are; Know the process of making an online ticketing system on the Android Studio software, and can find out how to integrate the e-ticketing program in the database. Therefore, the design of an online ticketing system application on the Android-based Hiba Utama Bus using the Location Based Service (LBS) method is an interesting topic to discuss. In this paper, we will discuss the design of an online ticketing system application on the Android-based Main Hiba Bus using the Location Based Service (LBS) method. The discussion will cover several aspects, including analysis of user needs, design of use case diagrams, activity diagrams and sequence diagrams, as well as application implementation and system testing. It is hoped that this paper can provide a clear picture of the design of an

online ticketing system application on Android-based Hiba Utama Buses using an efficient and effective Location Based Service (LBS) method.

2 | BACKGROUND THEORY

Kazi *et al.* (2018) proposed a smart e-ticketing system for public transport buses. The authors highlighted the benefits of e-ticketing systems, such as reducing the use of cash, improving the efficiency of fare collection, and providing convenience for passengers [7]. James *et al.* (2008) conducted a study on the acceptance of e-ticketing in the Universiti Utara Malaysia bus service. The study found that the majority of respondents were willing to adopt e-ticketing systems and suggested that the implementation of such systems should consider the users' needs and preferences [8]. Soegoto *et al.* (2020) examined the impact of e-ticketing applications on bus transportation in Bandung. The authors found that e-ticketing applications can improve the efficiency of fare collection, reduce waiting times, and enhance the overall experience of passengers [9]. Nithya and Kiruthika (2020) studied the factors determining the service quality of e-ticketing processes in the Indian context. The study identified factors such as reliability, responsiveness, and convenience as significant predictors of customer satisfaction with e-ticketing services [10]. Ibrahim and Ta'a (2015) proposed a mobile-based bus ticketing system in Iraq to overcome the challenges of the traditional paper-based ticketing system. The study highlighted the potential benefits of mobile-based ticketing systems, such as improving the efficiency of fare collection, reducing fraud, and enhancing passenger convenience [11].

The theory put forward by these studies has a close relationship with the research topic, namely the application of e-ticketing in public transportation services. These theories discuss the application and acceptance of e-ticketing technology in public transportation services, the factors that influence the quality of e-ticketing services, and the development of mobile and web-based e-ticketing systems. In research that discusses the implementation of the prototyping method in designing Android-based e-ticketing applications, theories about the development of information systems and prototyping methods are used as the theoretical basis for designing the application. Other research that discusses the design of e-ticketing applications for website-based bus agents using Laravel uses theories about web application development and the Laravel framework as a theoretical basis. Meanwhile, other studies discuss the factors that influence the quality of e-ticketing services in India and the design of a mobile-based e-ticketing system in Iraq. The theories used in this research include factors that influence user satisfaction, technology acceptance, and the development of mobile-based information systems. Thus, the theories put forward by these studies make an important contribution in understanding and developing e-ticketing applications in public transportation services, including in the studies discussed in the list. Some of the research in the list given related to the e-ticketing system also includes Location-Based Service (LBS) technology. For example, in the study by Kazi *et al.* (2018) implemented a smart e-ticketing system for public transportation buses that uses GPS technology to determine bus locations and provide accurate arrival time information. Likewise in the study of Soegoto *et al.* (2020) analyzed the impact of e-ticketing applications on bus transportation in Bandung and found that the application of LBS technology to e-ticketing applications can increase user satisfaction by providing more accurate and real-time information about bus schedules and locations. Thus, LBS technology can play an important role in the development of e-ticketing systems, especially in providing information.

3 | METHOD

When the research was carried out from May 2021 to June 2022, the location of the research with data collection took place at PT. Main Hiba which is addressed at Jalan Gedoran Depok, Kec. Pancoran Mas, Depok City, West Java. Collection of this data is the most important step in the purpose of exploration. The stages of data collection consist of; Observation, that is, the analyst does direct perception to the observation area to find straightforward and measure the recording carefully and methodically so that the information obtained is actual information [12]. Another stage is the Literature Study, which aims to find and deal with problems to be researched, and get reliable sources. The strategy carried out in this last effort, in particular to concentrate on several journals and diaries managing the problems to be examined. In the design using Use Case Diagrams, Activity diagrams, and Sequence diagrams. Use Case Diagram is a type of diagram used in software design to describe interactions between different systems and actors [13], where actors can be users or other systems related to software systems [14]. Use Case Diagram helps in identifying the functionality of the system to be built and helps in understanding the user needs of the system [15]. Activity Diagram is a type of diagram that is used to describe the workflow of a software system.

Activity diagrams help identify existing business processes in the system and help understand the sequence of actions required in each process [16]. Activity Diagrams can also be used to identify possible problems and improvements to business processes. Sequence Diagram is a type of diagram that is used to describe the interactions between objects in the system. Sequence Diagram helps in understanding how objects interact with each other in the system and helps in identifying problems that may occur in these interactions [17]. Sequence Diagrams can also be used to validate and test software systems. These three types of diagrams complement each other and are used to describe the overall software system. Use Case Diagrams are used to identify system functionality and user needs [18]. Activity Diagram is used to identify existing business processes in the system and the sequence of actions required. Sequence Diagrams are used to describe interactions between objects in the system and assist in validating and testing software systems.

4 | RESULT

In Figure 1 Use Case Diagram, there are 4 actors who have access rights to login first to enter the system which include admin, client, agent, and driver.

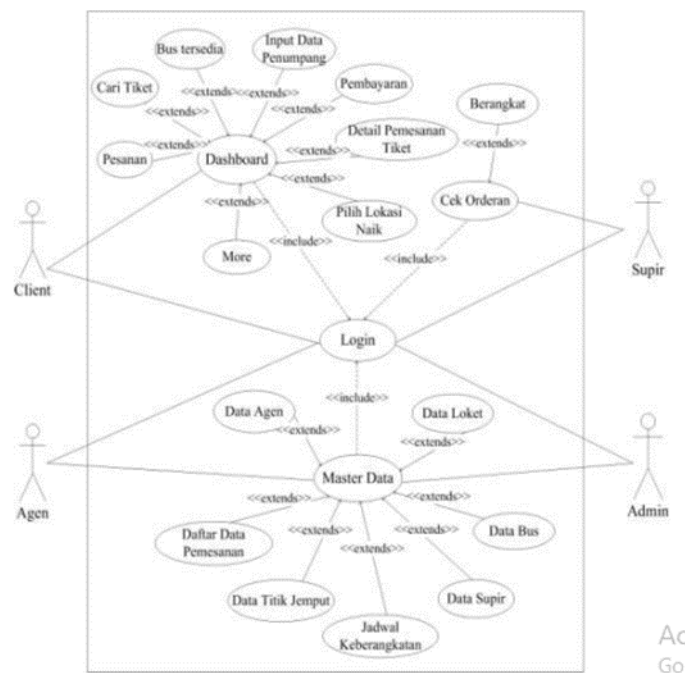


Figure 1. Use Case Model Diagram of Online Ticket Purchase Application

In Figure 2, this activity diagram illustrates the management of master data that can only be accessed by the admin, where the admin first logs in to enter the system. First the system will display the admin main menu which will manage the master data. If the admin selects counter data, the system will automatically display the counter data form, then the admin fills in the counter data, if the data is correct, it will automatically be stored in the database and so are the actions that the admin will choose other than counter data, the system will provide a form according to admin selected.

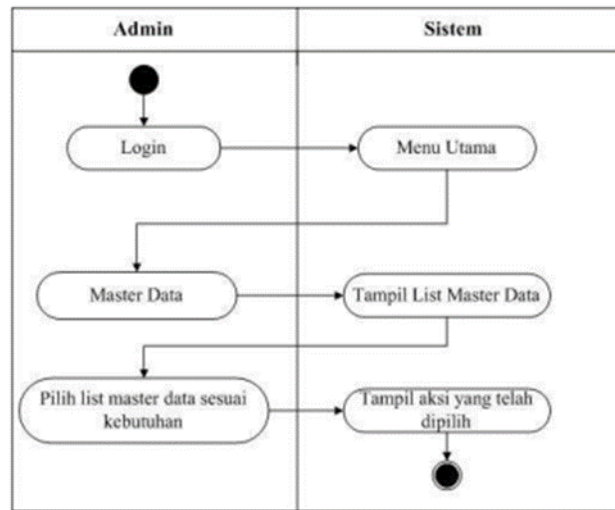


Figure 2. Activity Diagram of Online Ticket Purchase Application

In Figure 3, the Sequence Master Data explains that message 1-3 admin opens the application and logs in. Message 4-5 if the username and password are incorrect it will display a failed login message and you have to re-login, but if the login is successful then you will go to the main page. Message 6-10 is the process where the admin has selected the master data that he wants to change, add, and delete which will be stored in the database.

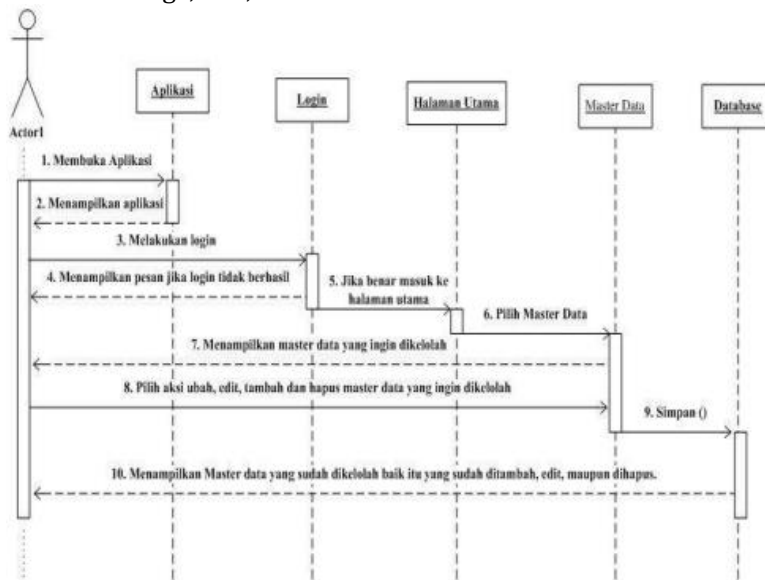


Figure 3. Sequence Master Data

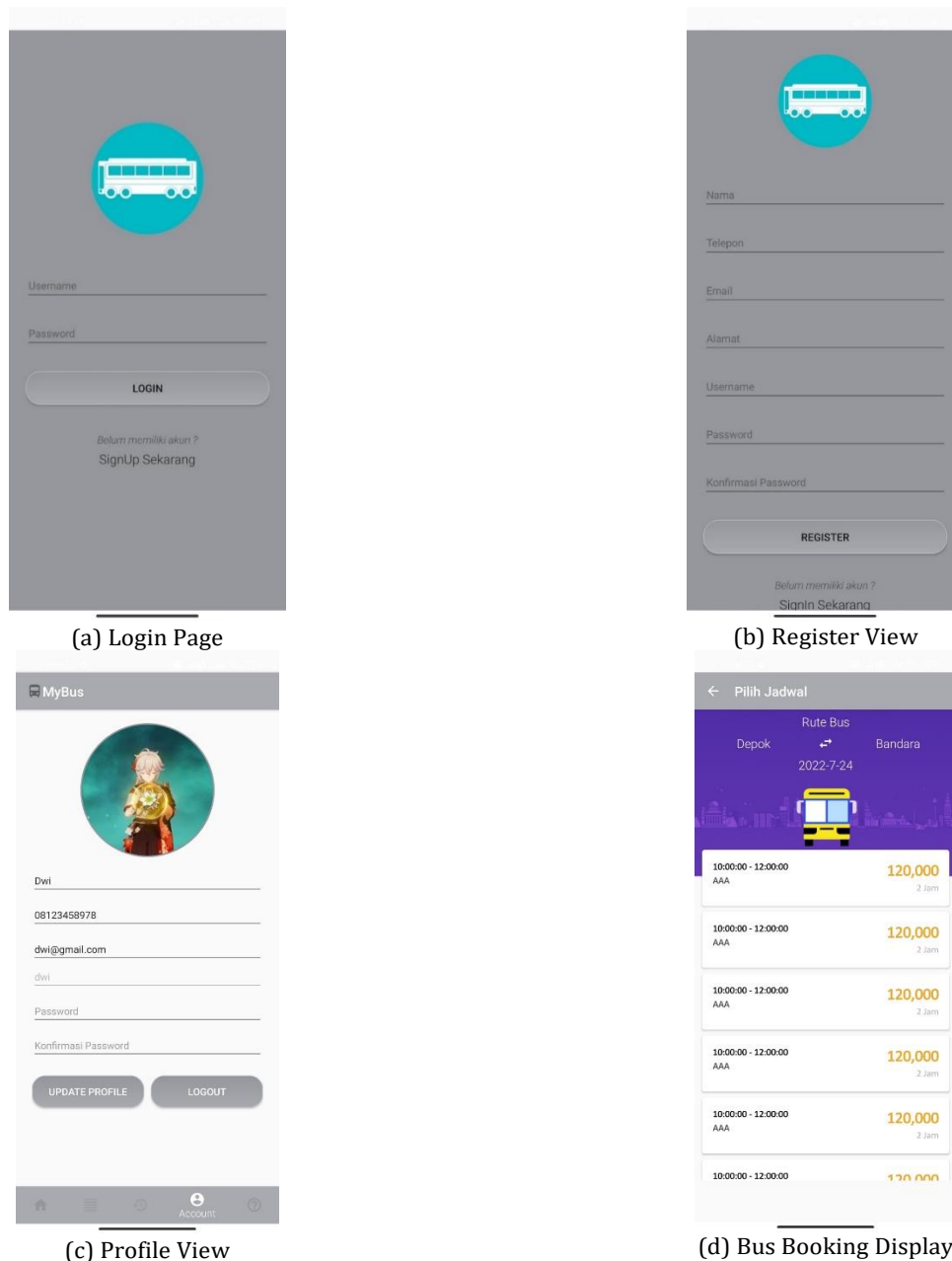
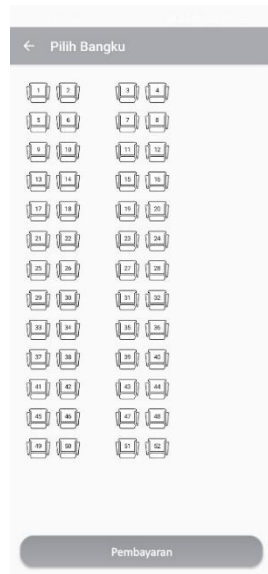
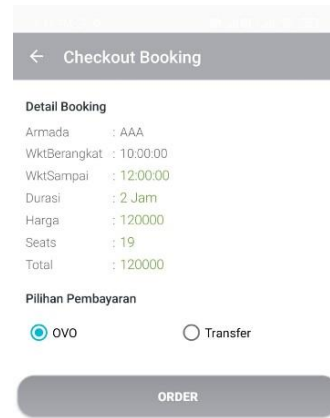


Figure 4. Application View

In Figure 4.a the Login page is a page for user authentication. Every user who will use it is required to enter a username and password in order to enter into the system. Users who do not have a username and password are not entitled to use or manage the system. In Figure 4.b the Register display is a menu for registering an account that will be used in the application. Figure 4.c shows personal data. This view contains personal data such as photo, name, cellphone number, email, username, changing passwords and for logout. Figure 4.d is a bus booking page containing the place of departure, destination, bus name, departure time, and bus price.



(a) Seat selection display



(b) Order checkout display



(c) Main Menu Display



(d) About view

Figure 5. Advanced Application View

In Figure 5.a, we as users can choose the seats available and can choose the position according to what the user wants and can choose more than one chair. In Figure 5.b there are order details such as bus name, departure time, arrival time, trip duration, price, seats (selected seat position), total ticket purchases, and payment methods. In Figure 5.c, the user can see images that can be slided and can get information about the application. In Figure 5.d it contains what must be obeyed in the application.

5 | CONCLUSIONS AND FUTURE WORK

Main Hiba is updating the ticket ordering system using an Android-based application to make it easier to do for efficiency for users and service providers. This application can help prospective passengers to be able to find information more quickly about departure schedules and ticket prices from the user's position by utilizing GPS. Through this application, passengers do not have to worry about missing the bus. Applications built using Android Studio and utilizing GPS to access location based services.

Based on research on the Design of Online Ticketing System Applications on Android-Based Main Hiba Buses with the Location Based Service (LBS) Method, there are several future works that can be carried out, namely:

- 1) Implementation of new features: This research can be developed by adding new features such as notifications

- for bus schedule reminders, bus route maps, and more detailed seat choices.
- 2) Testing the system more comprehensively: This research can be continued by testing the system more comprehensively and with more user participation to determine user satisfaction with the system.
 - 3) Integration with other transportation applications: The system can be developed by integrating with other transportation applications such as ride-sharing applications or train applications so that users can make orders and payments in an integrated manner.
 - 4) Research on data security: Research on data security in this ticketing application can be carried out to ensure that user data is properly protected and not misused by irresponsible parties.
 - 5) Research on optimizing the use of GPS: Research can be conducted to optimize the use of GPS in this application so that the device's battery power consumption is not too large and remains effective in determining the user's location.
 - 6) Development for other operating systems: Apart from Android, this research can be developed for other operating systems such as iOS so that it can cover more users.

By carrying out future work as above, it is hoped that this research can make a greater contribution in the development of better ticketing applications and meet the needs of transportation users.

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