Research Article

Application of Location-Based Service (LBS) in The Information System for Determining The Location of Craft Shops in The City of Tasikmalaya Based on Android

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Abstract: Information is data that is necessary and essential in the era of technological development. One of the information needs is to find the location of craft shops in Tasikmalaya City, especially for foreigners who need information to buy craft products who do not know the location. Currently, information is only created manually through official documents in the form of paper posted on walls or in public places where people gather. Based on the description of the problems obtained, it is necessary to improve services in the information sector, designing a manual craft shop location search information system which will be developed into a technology-based digital information system using the Android Studio application and MySQL database. With the Location Service (LBS) and Global Positioning System (GPS) methods, with this system, users will be given location information and routes to their destination points easily to craft shop locations in Tasikmalaya City. All of these systems provide convenience in conveying information on searching for the location of craft shops in the city of Tasikmalaya.

Keywords: Information System; Android Studio; GPS; Location Based Service; MySQL database

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1. Introduction

One of the trademarks of Tasikmalaya is handicrafts such as Bamboo Crafts, Geulis Umbrella, Embroidery, Batik, Mendong Plait, Kelom Geulis, and Wood Crafts made with love and happiness scattered in several districts in the city of Tasikmalaya. The need for an information system to facilitate the need for information about handicraft products. With the rapid development of information technology where many innovations and technological applications are born, it is appropriate for all circles to be able to utilize it optimally, two internet and cellphone technologies that have grown rapidly in recent years and have greatly influenced the lives of millions of people. The Internet provides easy access to valuable information.

The search for craft addresses and locations is one of the important information needed by lovers of craft products as well as tourists who stop by a place where they do not know the overall state of the location of the craft. At this time the location of crafts in the city of Tasikmalaya is scattered in several different places so that it is not collected at the center of the craft point, currently searching for locations still uses a telephone number to ask for the location of crafts or with brochures that are now rarely obtained. The current address search process will be developed into a digital information system in the form of Android-based Mobile technology using the Location Based Service (LBS) method and Global Positioning System (GPS) technology, thus providing convenience to students and the public to find the location of crafts needed by users.

The purpose of this research is to produce an internet-connected address search information system application with WAP (Wireless Application Protocol) technology that can be applied in Bekasi City. The benefits of this research are expected to make it easier to provide online information in time efficiency, which can be accessed anywhere and anytime information is needed without having difficulty obtaining it.

2. Theory

2.1 Location Based Service (LBS)

One of the methods that will be discussed in this research is Location Based Service (LBS) (R. Mumpuni, 2023). In previous research conducted by (Susanty Wiwin et al 2019), Bandar Lampung City is one of the cities in Lampung Province and is the capital of Lampung Province. In the city of Bandar Lampung, there are still locations such as tourist attractions, hospitals, hotels or inns, education (high school or vocational or university), restaurants, and malls or traditional markets that have not been explored so many local and non-local tourists do not know these locations. So that the author designs an android-based application, namely the Bandar Lampung city profile application (Probal) which aims to help or facilitate the people of the city of Bandar Lampung and tourists who come from various regions to be able to more easily find locations in the city of Bandar Lampung by using the location-based service (LBS) method.

In previous research conducted by (Cahyadi Cepi. 2019), The search for the address of the Bina Sarana Informatika University campus which has PSDKU almost 29 campuses outside the main campus spread throughout Indonesia at this time can only be done through official documents, brochures and on calendars made by the campus and some are also posted on walls in the campus environment. The current address search process will be developed into a digital information system in the form of an Android-based mobile technology. This technology is made using the Android Studio application and MySQL database. With the Location Service (LBS) method and GPS technology, users will be given location information and routes to the intended UBSI campus easily.

2.2 Information System

A system within an organization that brings together daily transaction processing needs that support managerial organizational operating functions with strategic activities (Cahyadi Cepi. 2019). an organization to be able to provide certain external parties with the necessary reports, (Sutabri, 2012: 46).

2.3 Android OS

Android is a Linux-based mobile device operating system that includes an operating system, middleware, and applications. together with more than 34 major companies in the world united to form an alliance called OHA (Open Handset Alliance) which is useful for perfecting this new operating system, (Safaat 2012: 513).

2.4 Android Studio

Android Studio is the official IDE (Integrated Development Environment) for Android application development and is open-source or free. The launch of Android Studio was announced by Google on May 16, 2013, at the Google I / O Conference event for 2013. Since then, Android Studio has replaced Eclipse as the official IDE for developing Android applications, (Juansyah 2015).

2.5 Database

A database is a set of data that is logically interconnected and well organized, (Sadeli Muhammad., 2014), Database is a set of tables that contain data and is a collection of fields or columns. The file structure that composes a database is Data Record and Field "(Pahlevi 2013: 1).

2.6 Global Positioning System (GPS)

Global Positioning System is a satellite navigation system developed by the United States Department of Defense (US DoD = the United States Department of Defense). GPS allows us to know our geographical position (latitude, longitude, and altitude above sea level), (Mustofa A M., 2015). Global Positioning System as a position determinant provides information through alternative communication channels connected to an auxiliary server, where the receiver will get some information that is usually received from satellites through the server to the server assistance element also called location Base Service (LBS) (Mulyadi, 2010: 328).

2.7 Location Based Services (LBS)

This information service can be accessed via mobile devices using a mobile network, through this LBS can provide the possibility of two-way communication and interaction. (Astari L. & Khairil.2014) Users can tell the service provider the information they need, concerning the user's position.(Fanani Lutfi, et al 2018). This service can be described as a service meeting three technologies namely: Java Java is a programming language, java can create all forms of applications, desktop, web, and others, as made using other conventional programming languages. (Winarno E. & Smit A Z., 2014). Java is an object-oriented programming language (OOP) and can be run on various operating system platforms. The development of Java is not only focused on one operating system but is developed for various operating systems that are open source (Dzullian, 2022).

3. Method

3.1 Block Diagram System

In detail, this study is shown in Figure 1. Where the entire system is described in detail, from start to stop.

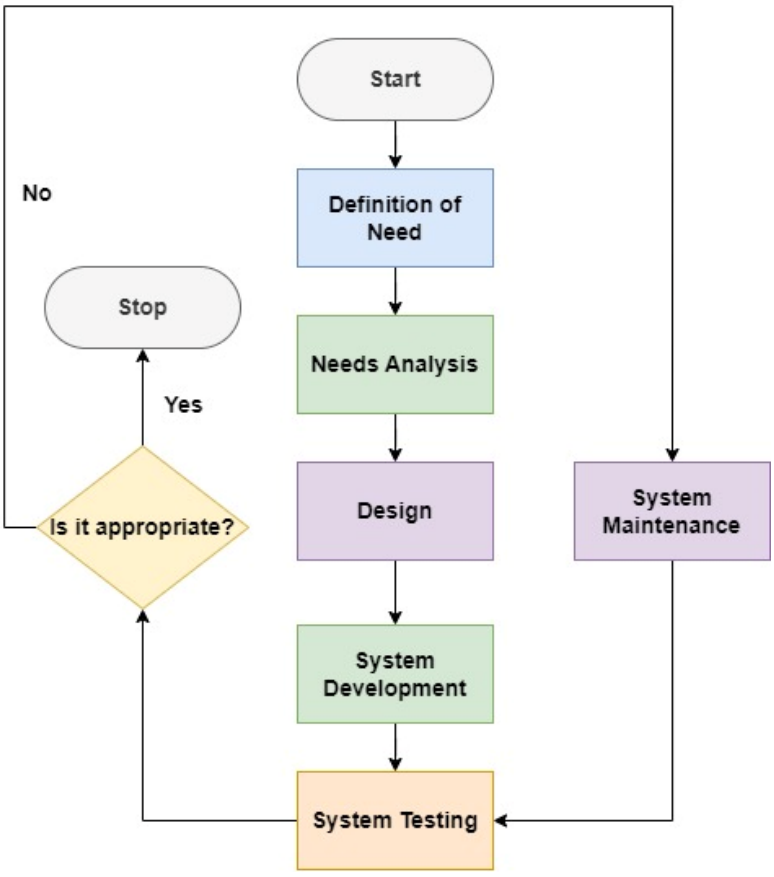


Figure 1. Block Diagram System in this research

The software design method is based on the theory of the waterfall model (Kurniawati & Badrul Mohammad, 2021) The waterfall model provides a sequential or sequential software lifecycle approach starting from analysis, design, coding, testing, and support stages to make it easier to understand, analyze and, facilitate the creation of a program using UML (Unified Modeling Language) (Sugiarti Yuni.2013). a. Analysis The data and information needs analysis stage is the stage where the collection of materials and materials related to the research, namely analyzing the needs of data sources, and identifying hardware and software requirements. b. System Design At this stage use UML diagrams. a. Analysis The data and information needs analysis stage is the stage where the collection of materials and materials related to the research, namely analyzing the needs of data sources, and identifying hardware and software requirements. b. System Design At this stage use UML diagrams. c. Programming The implementation stage of the design is with a programming language that is a programming language. The program display from the coding results will be visualized in an emulator. d. Implementation At the implementation stage, several things are considered so that the designed system functions as efficiently as possible, starting from domain preparation, database, and feasibility testing. e. Maintenance Application maintenance from the client side is carried out by updating the application to get the latest version, while from the server side, regular content updates are carried out. In full Figure 2 shows the Use case diagram, it shows the system that is built later, what parameters are there, and how the connectivity shows the direction of use, purpose, and function.

Moreover, to find out the activity diagram in this research can be seen in Figure 3. There are two parameters or entities, namely User and System, where these two separate parts have connectivity, namely between User and System, the function of the User is to penetrate directly into the Application and see the Application in detail and directly, whereas the function of this User is as the End User of the system to be built, regardless of the design which is multi-user or multiple users, a more detailed analysis is on the communication structure that will be built. On the server side, it will display the entire menu or Display Menu, and provide information about searches to display data in detail.

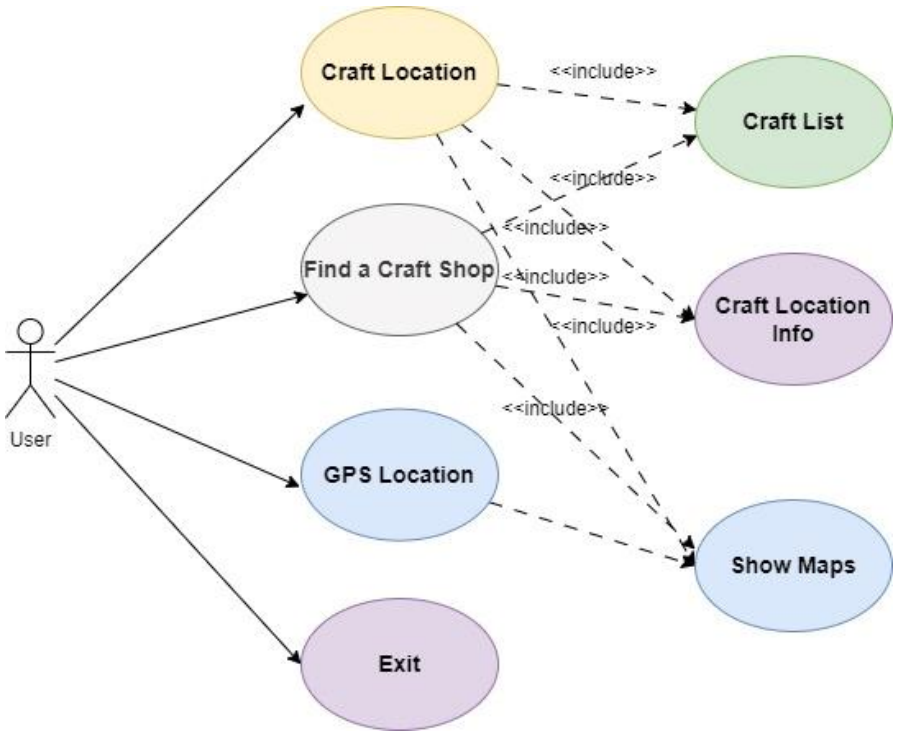


Figure 2. Use case Diagram User

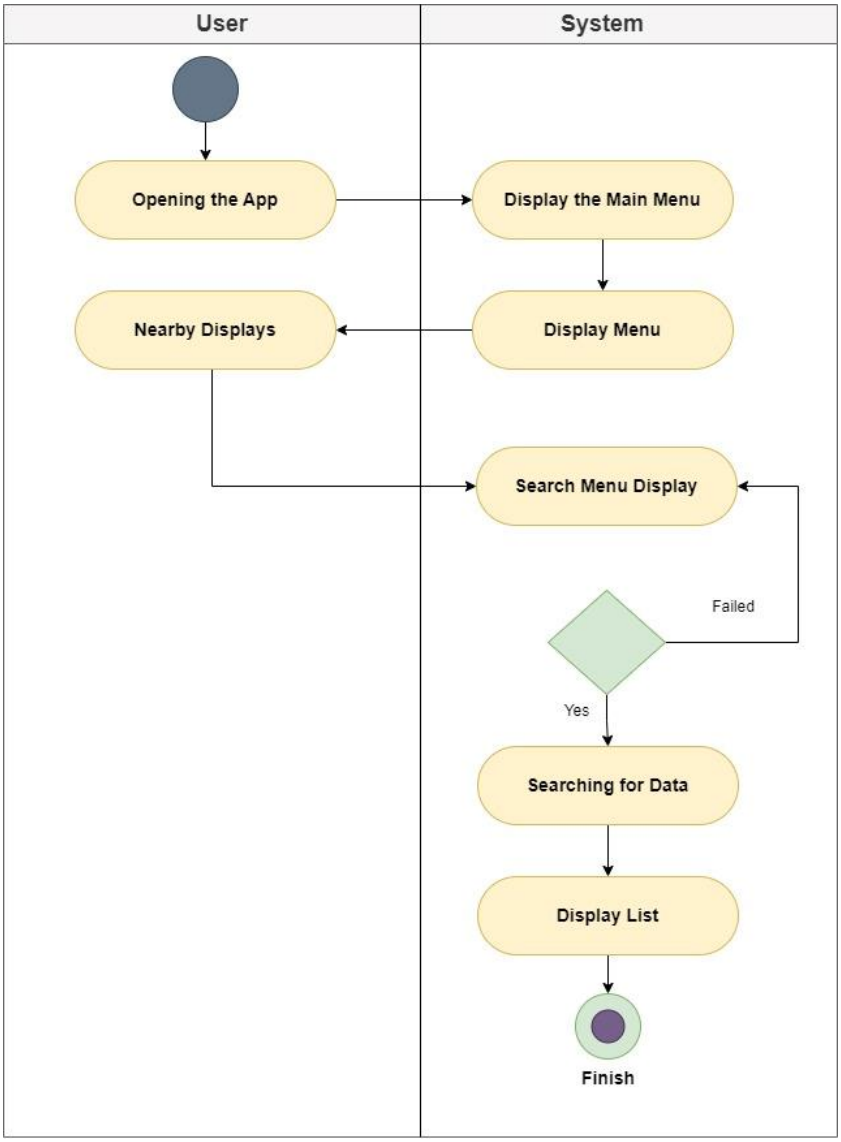


Figure 3. Activity Diagram

Sequence diagram is one of the Unified Modeling Language (UML) used to represent a software interaction model, there are several components in this Sequence diagram, including Actors or objects, messages delivered, lifelines, activities, message return processes, and fragmentation. The complete user sequence diagram in this research is shown in Figure 4. There are 4 components in the user sequence diagram, namely the user as an actor, then the Address search, Display Address, Validation, and Database processes. In Address Search, there is a Display Request process, and in Display Address there is a connection between Validation whose job is to provide validation or system response, then from Validation to the database, there is a Search and Response process. In this case, the detailed Sequence Diagram of the software system that was built needs Validation as one of the mandatory parts. Conversely, if the validation process fails, the user cannot log in to the system as a super user or Administrator, only on the external display side, not entering the database for editing and formatting. While in Figure 5 is the Class Diagram, this is the relationship between the Address Finder, Menu, Maps, and Location Address parameters, each of which has parameters in its calculation and measurement.

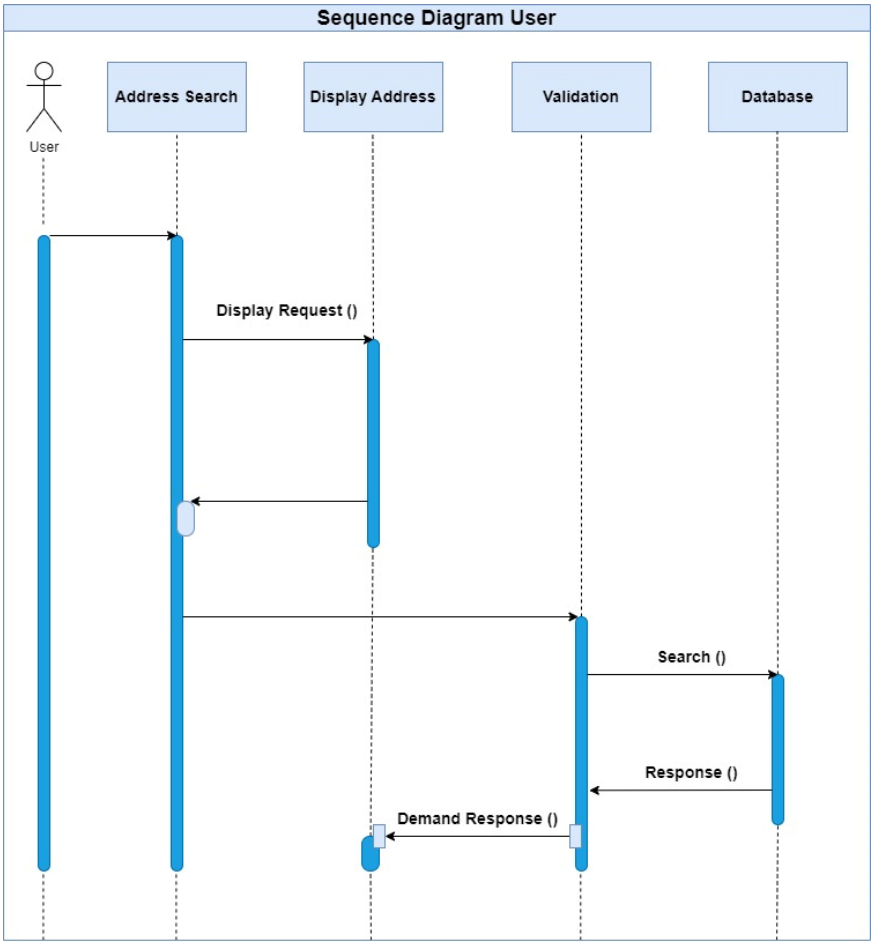


Figure 4. Sequence Diagram User

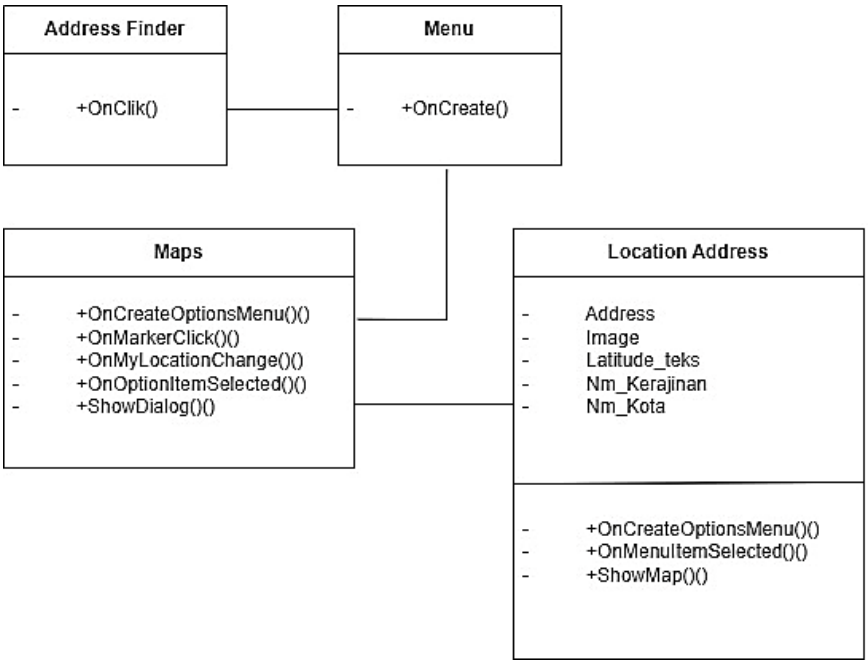
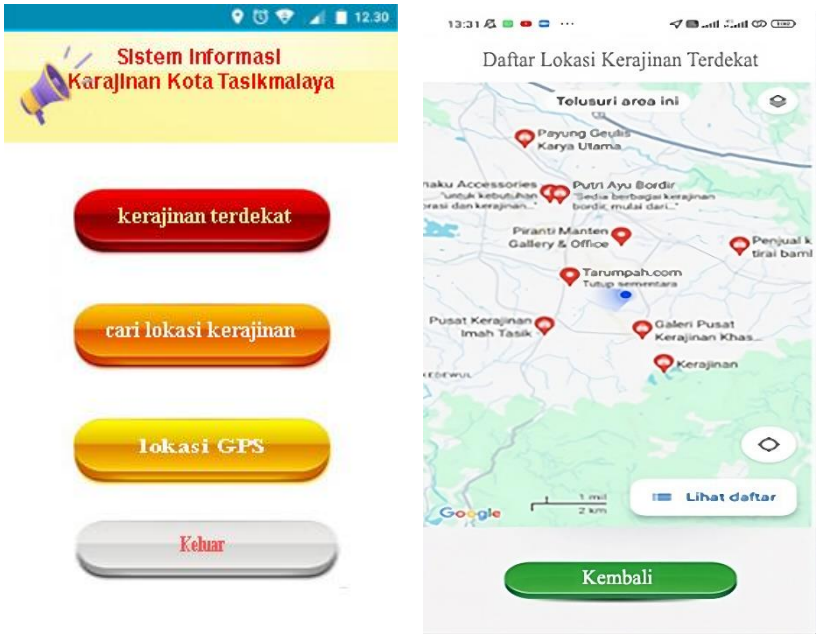


Figure 5. Class Diagram

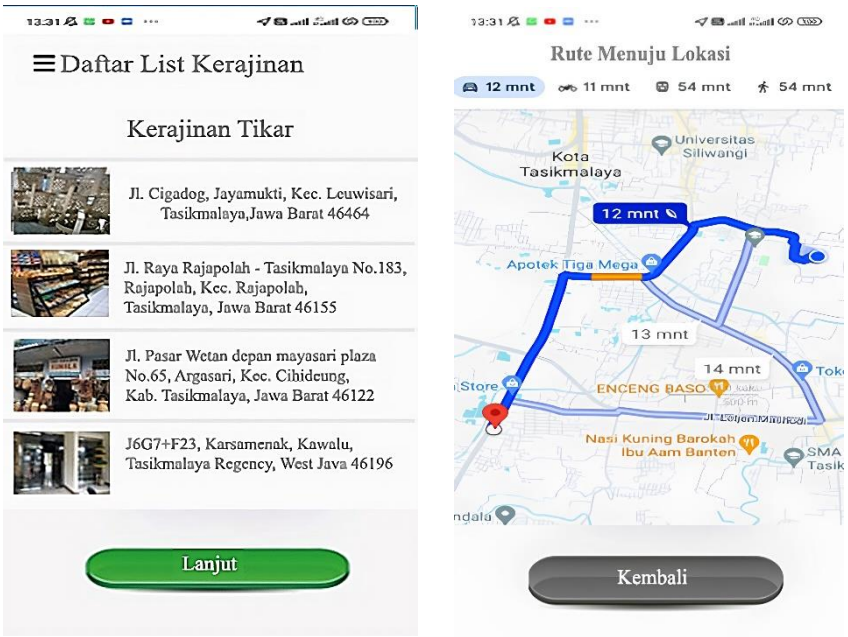
4. Result and Discussion

4.1 Menu User



(a) (b)

Figure 6. (a) Menu Utama User, (b) Crafts Closest to User



(a) (b)

Figure 7. (a) Craft List, (b) User position to a destination location

Furthermore, by using Python Programming, we can create more precise search features. For example, Longitude and Lattitude data of Siliwangi University, -734820, 108.22266, and Longitude and Lattitude data, one of the handicraft shops is on Jalan Cigadog, Jayamukti, Leuwisari, Tasikmalaya, west Java, with Longitude and Lattitude -7.30563 and 108.09378, we can use Python Programming.

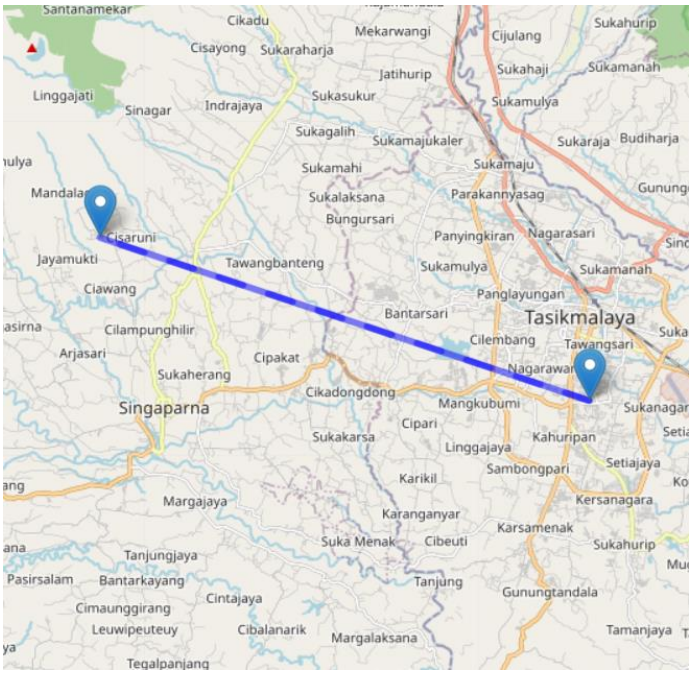


Figure 7. Point-to-point using Long-Lat data

```
import folium
from folium. plugins import AntPath

# Koordinat titik awal dan titik akhir
start_coords = (-7.30563, 108.09378)
end_coords = (-7.34820, 108.22266)

# Membuat peta dengan titik awal sebagai pusat
m = folium.Map(location=start_coords, zoom_start=5)

# Menambahkan marker untuk titik awal dan akhir
folium.Marker(location=start_coords, popup='Titik Awal').add_to(m)
folium.Marker(location=end_coords, popup='Titik Akhir').add_to(m)

# Menambahkan rute dari titik awal ke titik akhir
AntPath(
    locations=[start_coords, end_coords],
    dash_array=[20, 20],
    delay=1000,
    color='blue',
    pulse_color='blue'
).add_to(m)

# Menyimpan peta ke file HTML
m.save(r'C:\Users\Doc\Downloads\peta_rute3.html')
```

---------- Example Code to create a point or distance on the map ----------

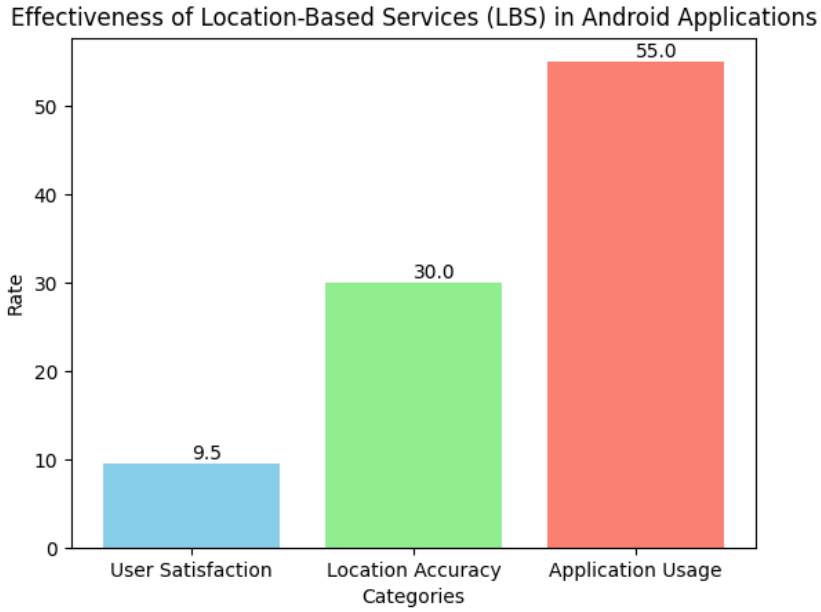


Figure 8. User Satisfaction (range 1-10), Location Accuracy Categories (30 meters (average error distance), and Application Usage (55 daily active users)

Figure 6 a and b are the user menus used and designed at the beginning. It consists of a button menu to search for the nearest craft shop and its location in real-time. Figure 9a is for more details in getting essential information such as photos of craft shops, what is being sold, along with photos of crafts and prices. Figure b. is a map directly to the location. It is usually a blue line from start to destination along with estimated speed and time in km/h and or hours. Accordingly, in Figure 9, The software has several categories including User Satisfaction, Location Accuracy Categories, and Application Usage. These categories are interrelated, the more this Android software is user-friendly, the User satisfaction increases, for User Satisfaction is 1-10, the value of 10 is the most perfect, while the accuracy used for location search This craft uses every 30 meters to determine the level of accuracy error, while Application Usage talks about how many users in one day do access.

5. Conclusion

The Android-based address search information system has several advantages, namely with this information system data can be accessed from anywhere, anytime via an Android-based cellphone and can increase the efficiency and effectiveness of the address information search process and for further research can be developed again into the iOS or Windows phone system and other features following technological developments.

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Conflicts of Interest: The authors declare no conflict of interest.

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