Location-based Service Application as Workshop Search Engine in Yogyakarta

Rafif Rizki Aminoto
Yogyakarta University of Technology
Yogyakarta, Indonesia

Agus Suhendar
Yogyakarta University of Technology
Yogyakarta, Indonesia

ABSTRACT
Workshop is a business entity engaged in the sale of goods and services. The focus of the workshop business in general is to sell all the needs of both two-wheeled and four-wheeled vehicles, as well as providing vehicle repair services. In the future lightweight construction will play an even greater role in increasing product efficiency and the reduction of emissions in the automotive industry [1]. With the existence of a workshop, people will find it easier to repair or maintain their vehicles. This research utilizes Location Based Services (LBS) technology to provide information about the nearest workshop to users. Location-based services (LBS) have gained a lot of attention and popularity due to the constant advancements in Information and Communication Technologies (ICT) [2] so this workshop search application will be very useful for everyone. This application development uses the Kotlin programming language. The increased use and the frequent accesses to the Internet make smartphone an attack target for some information collectors [3] because mobile technology offers a promising approach to improving the relationship between customers and workshops to obtain desired information.

General Terms
Android Studio, Kotlin, Java, XML, Firebase

Keywords
Android Application, Workshop, Automotive, Location Based Service (LBS).

1. INTRODUCTION
The automotive manufacturing sector was carried out to find out the level of disruptive technology in the global automotive manufacturing industries [4]. Most owners of two-wheeled and four-wheeled vehicles are not immune to the problems they face. Busy routines and little time make vehicle owners forget to perform routine servicing on their vehicles. Maintenance activities are crucial for all manufacturing industries [5]. Therefore, the design of this application will provide convenience and awareness to the public of the importance of performing vehicle maintenance.

The work of this paper provides a practical and meaningful methodology for real-life assessment of power system reliability and performance quality levels [6]. The user of this application is someone who owns an automotive vehicle, the role of the admin in this application is to provide information on the nearest workshop and road access to the workshop. In its application, the function of each menu and display is designed so that users can easily understand the application system. Most vehicle owners generally have sophisticated smartphones, therefore smartphone mobile applications are very important to support the functions and appearance that have been designed [7].

2. RESEARCH METHOD
This research is designed to carry out the functions of its use. The system running on the application can be visualized in the architecture model in Figure 1.

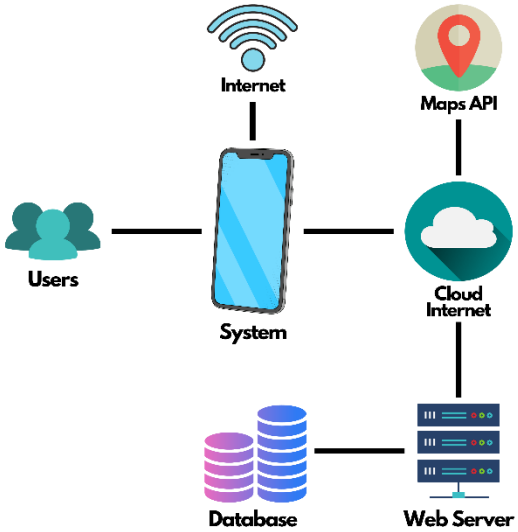

Fig 1: Architecture Model

The system will be used by all users, especially automotive vehicle owners. The data in the mobile application is stored in the database through the Application Programming Interface (API). Application Programming Interface (API) itself is an interface that can connect one application with another application. The use of APIs in digital ecosystems formulates dynamic API networks that evolve with the emergence of APIs and their updates [8]. Android Firebase is a cloud service provider as well as a backend business that allows you to obtain organized data for mobile apps [9]. Firebase can be preferred instead of SQLite when (1) the data of the application is shared amongst different types of clients, and (2) the local storage is limited in terms of available space [10].

2.1 Data Collection Procedure
Data is obtained through 2 stages, namely the observation stage and the literature study stage.

2.1.1 Observation
Researchers made observations to official web pages such as Honda, Wuling, Yamaha, and Mitshubisi to obtain information related to the object of research. Any information from these various pages is recorded as a form of data collection needed to create the application.

2.1.2 Literature Study
Researchers collect data through literature such as journals, books, and official documentation on the website concerned.

The data collected is useful for obtaining orientation and basic concepts regarding the chosen research topic.

2.2 System Design Logic

In this logical design, the design design is a description of the data processing process and a description of the system presented through UML (Unified Modeling Language). UML is a unique and most popular modeling language which has been used by various researchers for producing the object oriented designs [11]. In this research we used Use Case Diagram, Activity Diagram, and Sequence Diagram. Use case diagram is useful in software application development in order to capture functional requirements and to manage robust system complexity [12]. In Figure 2 Use Case Diagram has 2 actors, namely user and admin. Users can access all processes in the Use Case Diagram flow except the Workshop Data Input process which can only be accessed by admin.

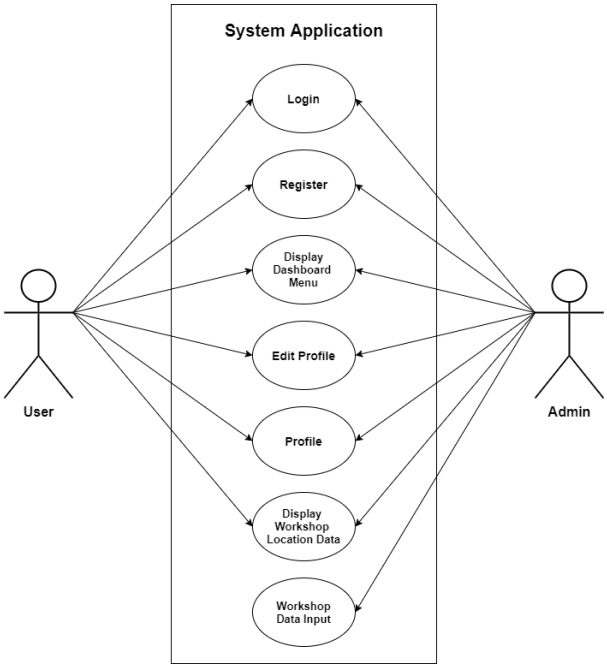

Fig 2: Use Case Diagram

Activity diagrams are used to model workflow systems, service oriented systems and business processes [13]. The process flow of the user doing activities with the system and then the input requested by the user is responded to and processed by the system is the relationship between the user, the system, and the admin. After the input is approved by the admin, it is depicted in an Activity Diagram in Figure 3.

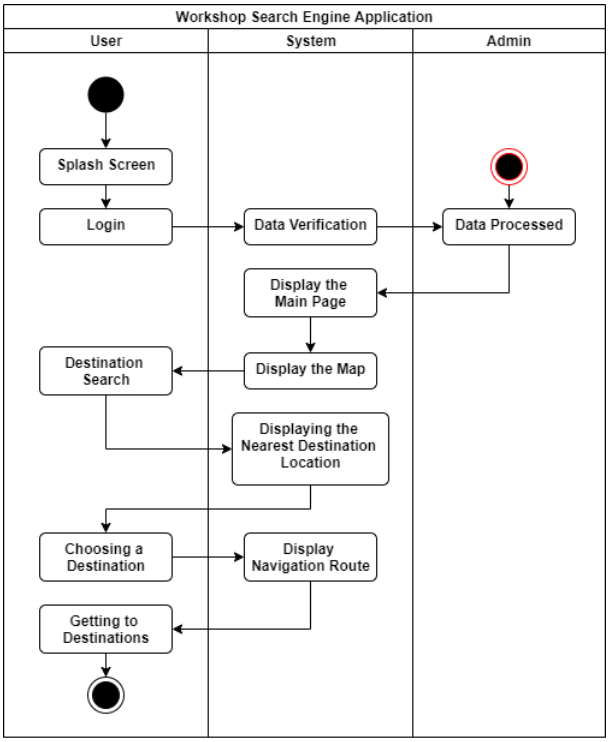

Fig 3: Activity Diagram

UML sequence diagrams describe interaction among objects, which shows the sce-narios of system behaviour [14]. In the Sequence Diagram of this system displays user behavior when searching for workshops, the inputted data will be processed and returned to the user as visualized in Figure 4 Sequence Diagram below.

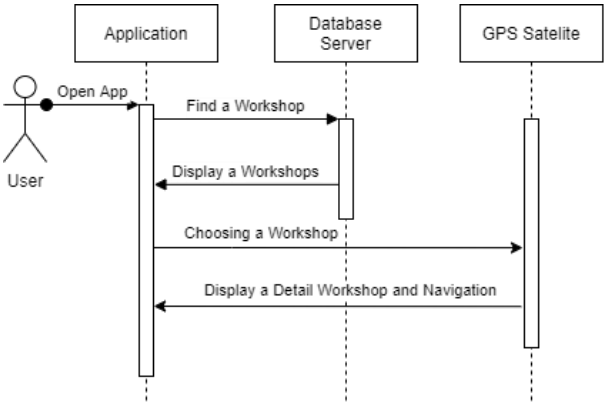

Fig 4: Sequence Diagram

2.3 Physical Design

At this stage ERD (Entity Relationship Diagram) is used to describe the relationship between entities contained in the application to be made. Entity-relationship diagram (ERD) is one of the used in modelling the domain information [15]. Several proposals have emerged for speeding up and improving the software development process by either automatically or semi-automatically obtain the ERD [15]. The workshop search application has entities that are interconnected. The user entity has a one to many relationship with the entity and workshop data visualized in Figure 5.

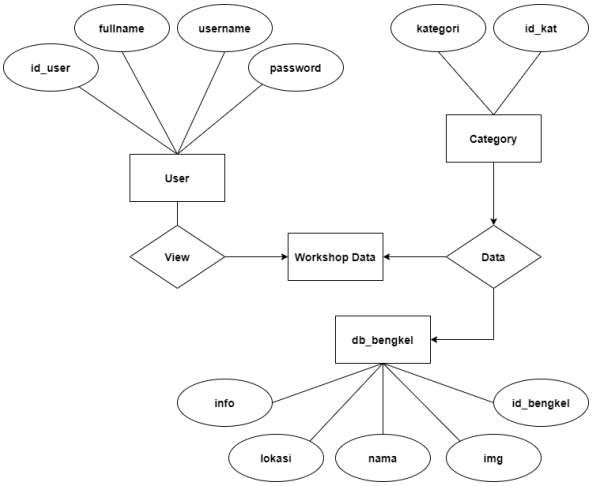

Fig 5: ERD (Entity Relationship Diagram)

2.4 Interface Design

The interface design of the app was developed using Whimsical to create low fidelity. While it is clear that other methods can easily create images of much higher quality, especially by using textures and simple shading techniques, the wireframe method is still very powerful didactically [16]. The interface to be used was designed as best as possible to aid user convenience.

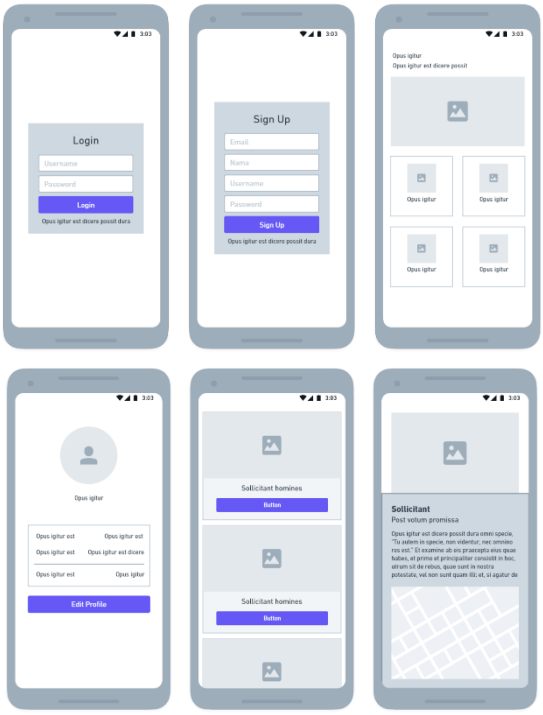

Fig 6: Wireframe Mobile Apps

3. RESULT AND DISCUSSION

3.1 Assumptions

Application users are motor vehicle owners who have smartphones. Users can search and get information about workshop locations. Users who have searched will get information or navigation to the location of the workshop that has been selected.

3.2 Hypothesis

This hypothesis is made based on the assumptions obtained. This study has a hypothesis that "This Workshop Location Search Application can make it easier for someone to carry out routine vehicle maintenance".

3.3 Feature

There are features in the system that are made to make it easier for the admin to serve users in searching. The following is a table containing parts of the Workshop Location Search Application.

Table 1. List Feature

No	Actor	Description
1	User	Login Page, Register Page, Home Page, Profile Page, Workshop Information Page, Workshop Detail Page
2	Admin	Login, Register, Workshop Data Input, User Data

3.4 Run an Experiment

This application was created using the Android Studio tool with the Kotlin programming language. Kotlin is a modern programming language, appeared in 2011, which represents an alternative to Java, with which it can seamlessly coexist [17]. Many pieces of evidence are available in the literature underlining that Kotlin is gaining traction among Android software developers [17]. Then also uses Firebase as a database, Users also test the application by creating a new account and then searching for workshop locations.

3.5 Implementations

The implementation of the system that has been designed and completed is made or coded in the form of a mobile application. The following is the design of the application.

3.5.1 Login and Register Page

In this login view, users need to enter email and password data that previously had an account on the application. While on the register view, users need to enter email, name, username, and password to create a new account. The data input menu on the login and register views is also connected to Firebase.

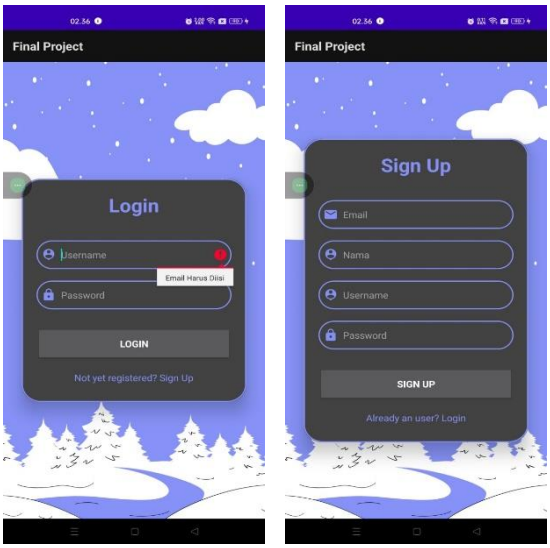

Fig 7: Login and Register Page

3.5.2 Home and Profile Page

The home page displays 4 menus, namely search, profile, about, and exit. The search menu is used by users to search for workshop location information, then the profile menu displays user account data information.

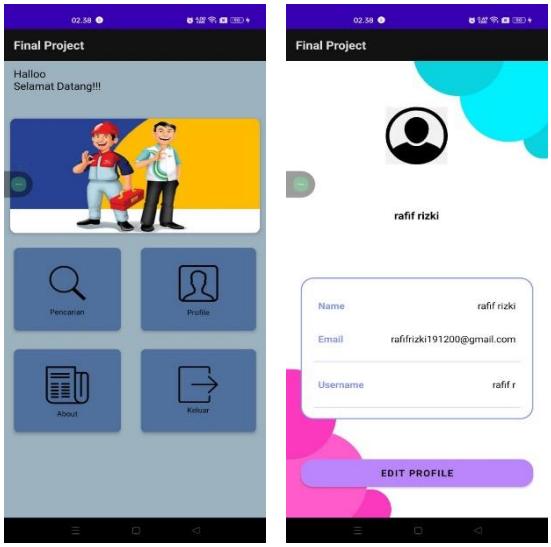

Fig 8: Home and Profile Page

3.5.3 Workshop Information and Workshop Detail Page

The workshop information page displays several workshop categories that can be selected to get the desired information. Then the workshop details page displays details about the intended workshop to get information and workshop location.

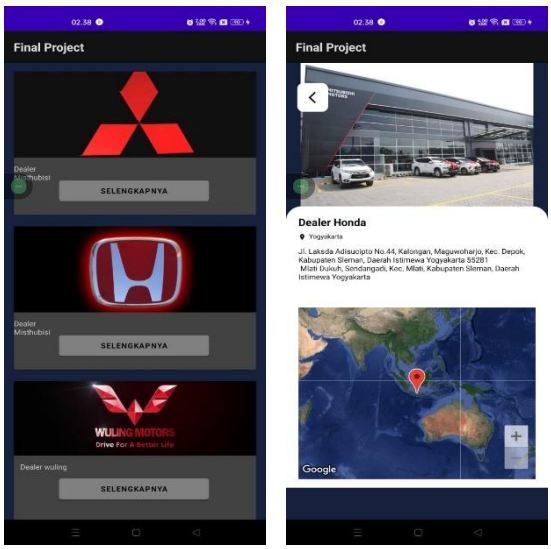

Fig 9: Workshop Information and Workshop Detail Page

3.6 Discussion of Result

The next stage is testing or testing the application which aims to ensure that every function in the system can run properly. This test uses black box testing to test each user activity in the application that is expected as expected. Testing this kind of API implementations is a very important task in the development process of complex systems. If the implementation of the specification is incorrect, components integration will fail causing system malfunctioning [18].

Table 2. Black Box Testing

Testing Activities	Expected realization	Testing Results	Conclusion
Registration	User can create a new account	Can login and registration and entering the registered email and password	Accepted
Display home page	Request data appears	Display user request data	Accepted
Display profile data	Can edit profile data	Successfully display and edit profile data	Accepted
Accessing about menu	Display detailed information	Display detailed information of workshop location.	Accepted

In this research, users are required to be tested in using the application. User-testing is an area that is often overlooked or not publicly documented [19] when applications are developed. Some studies argued that effectiveness, efficiency, and satisfaction were constituent assessments of mobile application usability instead of being an outcome of overall mobile application usability [20]. Based on black box testing, that "Location-based Service Application as Workshop Search Engine in Yogyakarta" is **Acceptable**.

4. CONCLUSION

Based on the research on this system, it is concluded that this workshop search application system is able to overcome the problems of people who have difficulty finding authorized workshops in Yogyakarta. By using LBS technology to find the location of the nearest workshop so that workshops that are less strategically located can be helped to get customers. Another expectation is that users can use the application and run the existing features well and understand the design applied to the application.

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