

DESIGN AND CONSTRUCTION OF MOBILE-BASED ONLINE MOTORCYCLE SERVICES

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Abstrak

Service sepeda motor merupakan kegiatan para montir untuk memperbaiki kendaraan yang mempunyai masalah pada bagian tertentu. Jarak adalah permasalahan yang membuat orang ingin membetulkan sepeda motor harus berjalan jauh untuk sampai ke tempat service sepeda motor. Tujuan dari Jasa service motor online ini ialah membantu atau mempermudah orang-orang yang mempunyai masalah pada kendaraan sepeda motor yang mempunyai jarak cukup jauh dari rumah ke tempat service sepeda motor dengan smartphone agar mudah untuk melakukan pemesanan dan pembayaran pun bisa dengan menggunakan metode pembayaran yang disediakan, Metode analisa dan perancangan yang digunakan dalam penelitian ini adalah Object Oriented Analysis and Design (OOAD) dengan dibantu tools yaitu Unified Modeling Language (UML). Hasil dari analisis dan perancangan ini akan diimplementasikan ke aplikasi berbasis mobile dengan fitur pemesanan, pembayaran, riwayat transaksi, penentuan titik lokasi, mengirim atau menerima pesan berdasarkan hasil uji yang baik sehingga fitur berjalan dengan sesuai.

Kata Kunci: Jasa service, Mobile, Lokasi.

Abstract

Motorbike service is an activity of mechanics to repair vehicles that have problems in certain parts. Distance is a problem that makes people who want to repair a motorbike have to walk long distances to get to the motorbike service place. The aim of this online motorbike service is to help or make things easier for people. People who have problems with motorbikes that have quite a distance from home to the motorbike service place with a smartphone so that it is easy to make orders and payments can also use the payment method provided. The analysis and design method used in this research is Object Oriented Analysis and Design (OOAD) with the help of tools, namely Unified Modeling Language (UML). The results of this analysis and design will be implemented into a mobile-based application with features for ordering, paying, transaction history, determining location points, sending or receiving messages based on the results test well so that the feature runs properly.

Keywords: Service, Mobile, Location.

1. Introduction

In Indonesia, many people use motorbikes, more than 100 million people. In Indonesia, motorbikes are widely used for activities, whether for work, going out, going to school, etc (Saputri et al., 2024). But these users do not necessarily fulfill the requirements that must be fulfilled, such as the most important thing, namely having a driver's license or driving permit. Why is a SIM important traffic on the roads and driving safety must be used whatever.

When using a motorbike, we also have to understand the condition of the vehicle we want to use. Before using it, so that there are no obstacles or accidents that will endanger ourselves and others (Ningrum et al., 2023). But when problems or problems occur, some people who don't understand the problems with motorbikes will definitely go to a motorbike service center to find out what really happened to their motorbike (Nasution & Nusa, 2021). Even though there are service places that can help fix the problem, There is another problem, namely the distance between the motorbike service place and the person who has

problems with their motorbike is not necessarily close (Nasution, 2020).

Due to the distance problem between the motorbike service location and the location of the person who wants to service their vehicle, it is very appropriate to create a mobile-based motorbike service application (Putra et al., 2020). The aim is to make it easier for people who want to service their motorbike but can't get to a service place that is far from where they are, by ordering this service on their smartphone there will be a mechanic ready to come to help with problems with your motorbike (NASUTION & Nusa, 2022).

This application will later be equipped with determining the location of the point where the user is located to make it easier for mechanics who want to go to the customer's location to help repair their motorbike. With the Global Positioning System (GPS), it can provide the exact location between the mechanic and the customer (Nasution, 2022). This application also helps customers to service motorbikes without having to go to a long-distance service location, just by using a smartphone you can order and wait for a mechanic to come to the customer's location. Everyone who owns a vehicle will definitely be happy with this application (Farizqi et al., 2024). This application was designed using Object Oriented Analysis Design (OOAD) and assisted with Unified Modeling Language (UML) tools (Farizqi et al., 2024).

2. Theoretical Basis

A. Service

Service is an effort to provide assistance or assistance to other people, either in the form of material or non-material so that the person can overcome the problem themselves (Sutomo & Vabiola Yanli, 2023). This motorbike service is a service business that can help customers repair motorbikes that have problems.

B. Mobile Application

Mobile application comes from two words, namely application and mobile. In terms of terms, an application is a ready-to-use program created to carry out a function for users or other applications, while mobile is movement from one place to another (Zulius & Daulay, 2019). Mobile applications are an improvement on the integrated software systems generally found on Desktop PCs. Mobile applications previously had limited functionality and avoided multitasking applications because they consumed a lot of hardware which was previously limited in size.

C. Unified Modeling Language (UML)

UML is a tool/model for designing object-oriented software development. UML itself also provides standards for writing a blueprint system, which includes business process concepts, writing classes in specific program languages, database schemas, and components needed in software systems (Sonata, 2019). UML has various kinds of diagrams, including use case diagrams, class diagrams, state diagrams, sequence diagrams, collaboration diagrams, activity diagrams, component diagrams, and deployment diagrams (Sutomo & Vabiola Yanli, 2023).

D. Object Oriented Analysis and Design

OOAD is an analysis method that examines requirements from the perspective of the classes and objects encountered within the scope of the problem that directs software architecture based on the manipulation of system or subsystem objects (Mahendra et al., 2020). The basic concept of OOAD is the analysis and design of a system with an object approach, namely object oriented analysis (OOA) and object oriented design (OOD) (Farizqi et al., 2024). OOA is an analysis that examines the requirements or needs that must be met by a system) from the perspective of the classes and objects encountered within the scope of the company. Meanwhile, OOD is a method for directing software architecture that is based on manipulating system objects or subsystems (Purba et al., 2021).

E. Global Positioning System (GPS)

GPS is not the name of a tool, but is the name of a satellite-based global navigation system (GNSS = Global Navigation Satellite System) developed by the United States Department of Defense (Wijaya, 2018)

3. Research Method and Materials

The methodology of designing this DCC application is RAD which is divided into several stages, namely planning, data collection, analysis and design, implementation.

1. Planning

Planning is the part where we want to find out what problems often make people feel lazy about repairing problematic motorbikes by giving questionnaires to people to fill out so they know what is needed to help them in servicing

motorbikes. After knowing what is needed, the next step is to carry out analysis and planning to create a mobile-based online motorbike service application.

2. Data Collection

This data collection uses a questionnaire and will later be given to the public directly in several areas. The data that has been collected will be immediately saved.

3. Analysis and Design

- Functional system requirements analysis and non-functional system requirements analysis
- Analysis of running systems and follow-up systems
- The design stage is developing a system that will be created using UML

4. Implementation

The results of this design will be implemented into a mobile application, namely a smartphone device which will later be used by customers to order this service via smartphone. This is the implementation of the results and design:

a. Mobile Application

1. Software

- Android Oreo operating system
- Memory 32 GB
- 4GB RAM A

2. Hardware

- Asus Zenfone Max Pro M1

b. Testing

Application testing using black box

Mobile Application Design

A. Logical Architecture Design

In logical architecture design there are 3 layers, namely:

- Presentation layer
- Business Layer
- Data Layer

The presentation layer contains User Interface components and components that also process them. Next there is a business layer where there is a workflow, business entities, and components. Finally there is a data layer consisting of data utilities, data access components, and also service agents.

B. Architecture Components

Mobile applications consist of user experience, business, and also data layers. The development of mobile applications in this application chooses to use a web-client because the client user interface can provide

a high-performance, interactive, and rich user experience for applications that operate in stand-alone, connected, sometimes connected, and disconnected scenarios. See the following image example.

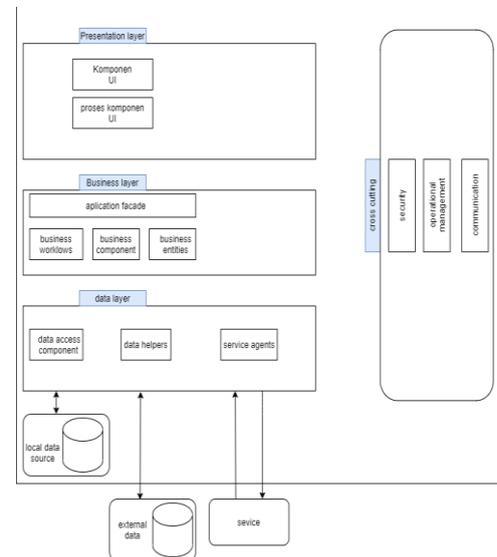


Figure 1. System Architecture

C. Architectural Design Elements

In architectural design elements, there are several considerations for building mobile applications, namely:

- Determining the size of the application according to the desired device
- Creating scenarios for connection quality in various different places
- Beautifying the appearance of the user interface to the target client
- Choosing the right navigation between elements on the screen

With the above, several considerations of the elements needed for the architectural design of mobile applications. Below are the elements in question:

1. Application size

In this application, the decision is to use a rich client, because this rich client application is more complex for installation and maintenance.

2. Device

This application requires criteria, namely this application requires a mobile device specification that has 2GB of free ROM and 2GB of RAM. On Android, it must have a minimum of the Android Nougat operating system. Because this application is still newly designed for Android, it cannot be installed for iOS. This application also requires access to the Global Position System (GPS).

3. Bandwidth

This application requires an internet connection, usually the problem with the internet connection is intermittent or the connection is not available. This is needed to design caching, status management, and data access with intermittent network connectivity. Each region must have a different internet connection, with this the problem will arise if the audience is far away which is certain that the internet connection is also different. In order to provide a good user experience, speed and battery usage must be considered.

4. User Interface

Mobile devices require a simple and simple UI design and architecture as well as a special design to work on their hardware limitations. The UI on the mobile application must give the best impression, by following the design wishes of the audience, it will load the UI on the application successfully.

5. Architectural Design

This architectural design uses the concept of layers to maximize separation of concerns and also to improve reuse and application maintenance

6. Device Resource

The design takes into account the resource constraints of the device such as memory size, battery life, and processor speed. Design decisions must take into account the memory, CPU, storage capacity, and battery life of the mobile device.

D. Enterprise Mobile Application Security

Development opens up innovation of interaction scenarios, involving new users and communication behaviors. Therefore, companies can manage policies, security, and support for mobile devices. The following is a summary of security challenges:

- Data sharing
- Access points
- Sensitive device data
- Application content
- Company data access
- Malware software
- Social media usage
- Bring your own device
- Online and offline availability
- Headlines

The summary above will lead to physical security risks such as lost mobile devices, access risks, usage risks and memory risks.

A. Analysis of Current System

When users want to order online service, they are asked to register or sign up to create an account, after validation the user will log in, when logged in, the user can order a motorcycle service, after ordering the total price will be given to the user, if the user agrees with the price, the mechanic will go to the user's location, and if it is complete, the payment is made in cash to the mechanic which will later be handed over to the company.

B. Proposed System

Analysis In this proposed system, it is like a running system, namely first registering or signing up, after that logging in to enter the main menu in the main menu there are several features including ordering service services, messages to contact mechanics to make it easier, there are also notifications about orders, and there is an account settings feature, when you have ordered a service, you will be asked to enter an address either manually or via GPS, after the address is entered, the mechanic who is ready to go to the location is searched for, if you have found a mechanic who is ready, the total price and details about the mechanic are given to the user, after being given to the user and agreeing with the order, several payment methods are provided such as OVO, BCA virtual account, mandiri klik pay, BRI virtual account, and can also be done in cash through the mechanic, proof of order will be given after paying and just waiting for the mechanic to come. The following is a diagram of the proposed system activity

5. Research Results And Discussion

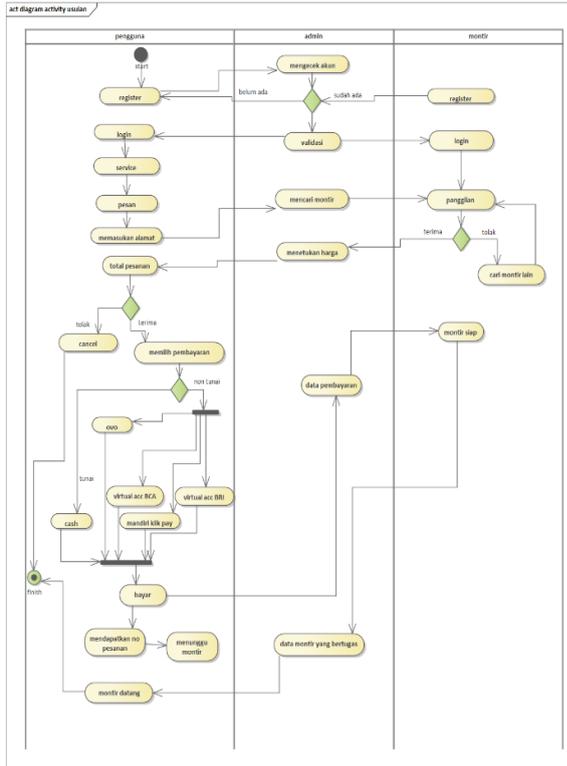


Figure 2. Activity diagram of proposed system

C. Needs Analysis

At this stage, needs analysis is used to define the needs of the system to be developed. This needs analysis is divided into 2, namely functional and non-functional needs analysis.

1. Functional Needs

Needs that contain what service processes the system must provide, including how the system should react to certain inputs and how the system behaves in certain situations. This system must have user data, the system must have order data, and the system must provide the nominal price that the user must pay. This analysis is done by creating several United Modeling Language (UML) diagrams.

2. Non-Functional

Needs Needs that focus on behavioral properties owned by the system. Functional needs are also often referred to as service limitations or functions offered by the system such as time constraints, process development limitations, standardization and others. Non-functional needs include for Android smartphones must have Android Nougat, have 250MB of memory to store applications, and also

have an internet network when accessing applications. For Apple smartphones must have IOS 13.0, have 300MB to store applications, and also have an internet network to access applications.

D. Software Design

1. Use Case Diagram

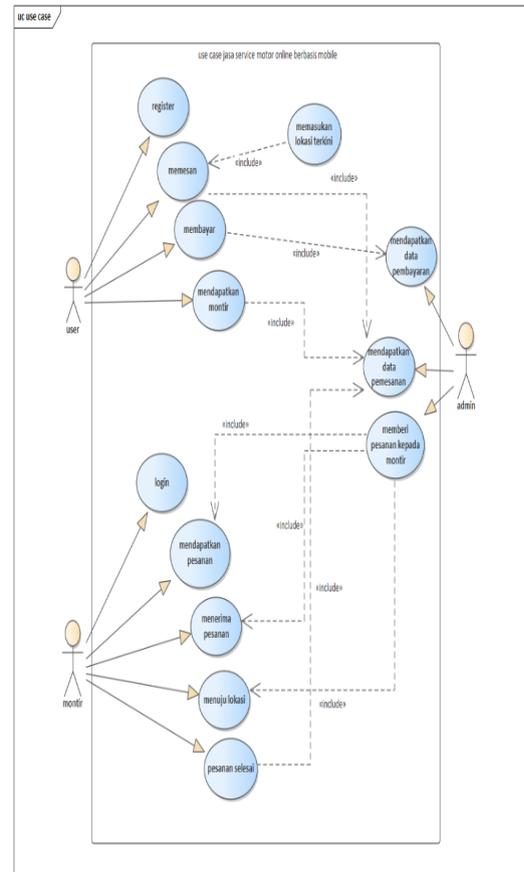


Figure 3. Use Case Diagram

E. Sequence Diagram

Sequence Diagram is one of the diagrams in UML, this sequence diagram is a diagram that describes dynamic collaboration between a number of objects[5]. There are 5 sequence diagrams created, namely in figure 3 it is a sequence diagram login for users, in figure 4 it is a sequence diagram when users order service, figure 5 is a sequence diagram login for mechanics when they want to take orders, figure 6 is a sequence diagram when the mechanic will receive an order, and figure 7 is a sequence diagram when the admin wants to see the stored data.

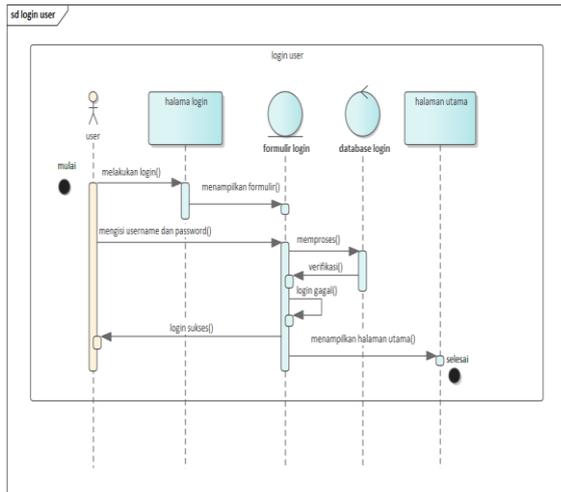


Figure 4. Sequence Diagram Login User

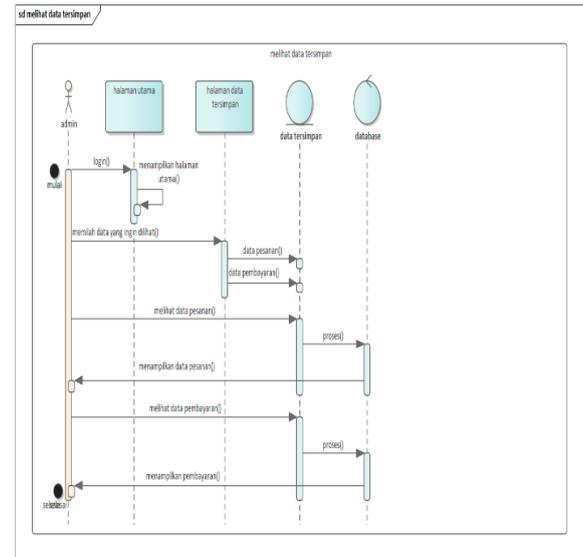


Figure 7. View Saved Data

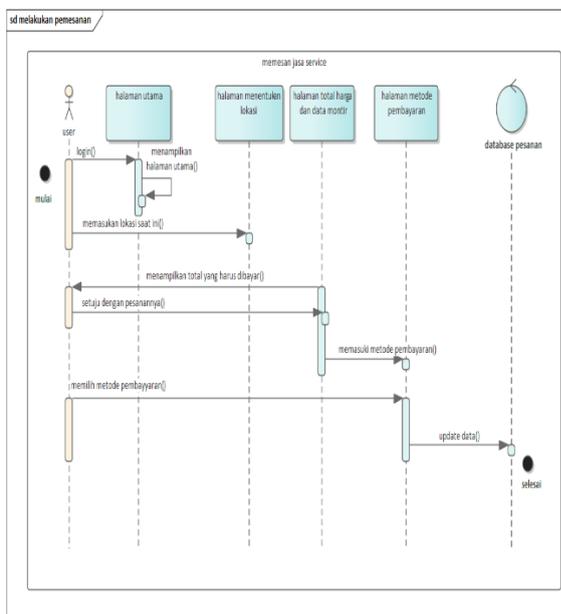


Figure 5. Login Montir

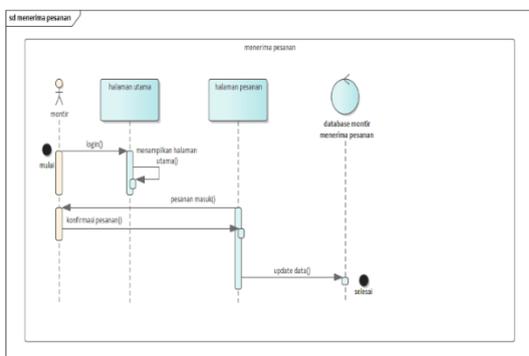


Figure 6. Receive orders

F. Class Diagram

In Figure 8 which is a class diagram, there are 5 classes that are visible, namely the prospective user class, user class, admin class, order class, and mechanic class. The methods or processes in the prospective user class are (+) Registration, the methods or processes in the user class are (+) login, (+) logout, (+) pay for orders, (+) create orders, the methods or processes in the admin are (+) get mechanic ID, (+) get order ID, (+) get user ID, the methods or processes in the order class are (+) order estimate, (+) order price, (+) order distance, (+) get mechanic ID, (+) get user ID, the methods or processes in the mechanic class are (+) get order, (+) confirm order, (+) login, (+) logout.

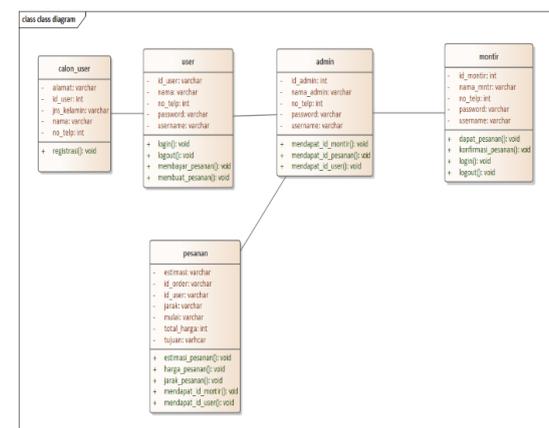


Figure 8. Class Diagram



Figure 10. Registration Page

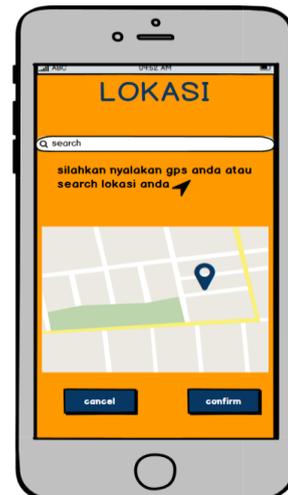


Figure 13. Location Page



Figure 11. Login Page

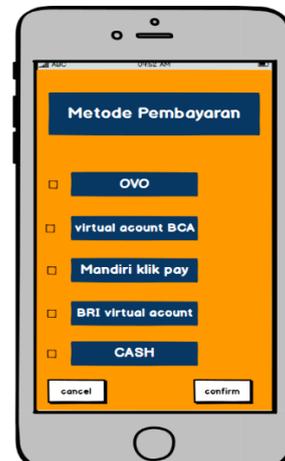


Figure 14. Payment Method Page



Figure 12. Home Page

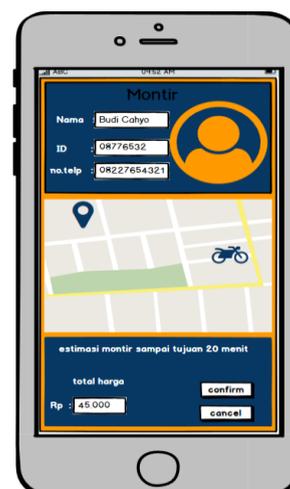


Figure 15. Distance and Price Page

4. Conclusion

The conclusion of the journal of the design of the online motorcycle service application based on mobile is to help the Indonesian people in terms of repairing their motorcycles. By not having to bring their damaged vehicles to a service center that may be far from where they live. The existence of this application is to help people who want to repair their vehicles by ordering through the application and just waiting for the mechanic to come. With GPS, it helps to get an accurate address so that the mechanic can easily find the user's location, and the payment method provided makes it easy for users to pay for this motorcycle service.

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