

# PUBLIC ONLINE TRANSPORT APPLICATION IN CIBODAS PARIGI VILLAGE BASED ON ANDROID

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## ABSTRACT

Public transportation is a means of transportation that is still used by the people of Indonesia. One of them is public transportation Cibodas Parigi village - Cipanas in Cianjur district. This research tries to solve the problems that occur in Cibodas - Cipanas village public transportation with an android application. The problem is the difficulty of drivers finding passengers and the difficulty of drivers finding passengers in the village. The technology used in the construction of the village transportation application is the Google Maps API, the Google Direction API, and the Firebase service. This application detects other users within a specified radius, with the aim of facilitating the driver and passenger in carrying out their activities. Based on the evaluation results, the overall results of the respondents' assessment of this are in the positive category, meaning that overall respondents view the application of the village public transportation to help users in terms of daily transportation.

**Key Word** :Public Transportation, Google Maps API, Android, Firebase

## 1. INTRODUCTION

### 1.1. Problem Background

Public transportation is a means of transportation which from the past until today is still used by the people of Indonesia. In principle, the function of transportation is to connect transportation users with land use or a place, activity and provide the use of the place and time used by transportation users [1]. One of them is rural public transportation in the Cibodas Parigi area of Cianjur, West Java. The phenomenon that occurs among other things, as many as 84% of villagers still rely on village transportation services as the primary means of transportation. Another phenomenon is that 80% of village public transport drivers who operate claim to have difficulty getting passengers in Cibodas Village.

Based on interviews and questionnaires conducted on January 9, 2019 with residents of the Cibodas-Cianjur village who relied on village public

transportation, information was obtained because of the phenomena mentioned above. The problem that occurs is because the driver does not know exactly where and when the passenger will use his services, this is due to too many branches on the village road which makes it more difficult for drivers to find passengers, and also the driver is difficult to find passengers at times other than working hours. That caused the driver to rotate the village repeatedly to get passengers until the transport conditions were felt to be filled with passengers. Apart from being caused by a limited public transport fleet, because passengers do not know when this transportation time passes through the road / house, so residents whose activities or businesses require punctuality are often late or losers because their business is hampered.

Based on previous research conducted by Ricky R.H [2]. Google Maps API is a solution that is deemed suitable or appropriate to resolve this problem, because Google Maps can speed up the search for passenger and driver locations and can be accessed anywhere. These things are deemed suitable to be one of the solutions to the problems experienced in this study.

Android mobile devices make it easy for drivers to run their applications anywhere. In addition, Android is a free open source operating system, which means it can be developed freely by anyone, including researchers. The Android platform is also one platform that provides a Location Base System (LBS) system. The mobile system (mobile) will become a receiver or receiver from satellite and send latitude and longitude data which will be stored in a database [3]. The database used is the Firebase realtime database which is expected to help optimize transportation drivers and passengers in the use of this transportation service easier.

Therefore, based on the problems that occur, researchers intend to provide solutions to these problems, namely by building a mobile application of rural public transport based on Android mobile that utilizes realtime tracking technology using the Google Maps API.

## 1.2 Android

Android is an operating system for smart phones and tablets. The operating system can be described or likened to a 'bridge' between the device (device) and its users, so users can interact with the device and run applications available on the device. In the world of technology and information throughout the world, the operating systems that are widely used are Windows, Mac, and Linux [4].

In the world of mobile devices (smartphones and tablets), the operating system that dominates the market today is Android. According to market share data from Gartner, Inc., in 2017, Android holds an 85.9% smartphone market share worldwide.

## 1.3 Google Maps API

Google Maps API is a webservice API provided by the Google company to application developers (developers) to take advantage of the map features on Google Maps in developing applications. Google Maps API provides several features such as manipulating maps, finding locations and storing location data / map data in the application. Some of the goals of using the Google Maps API are to see the location, find an address, get driving instructions and others [5].

## 1.4 Firebase

Firebase is a backend service provider for application developers. The main product of Firebase is a database that provides an API to enable developers to store, synchronize data through multiple clients stored in the cloud [6].

Firebase has many libraries that make it possible to integrate this service with Android, iOS, Javacript, Java, Objective-C and Node.JS [6]. The Firebase database can also be accessed via the REST API. Developers use the REST API to post data, and then the Firebase client that has been applied to the application retrieves data in realtime or real time [6].

## 1.5 Geofire Library

Geo-Fire is an open source library intended for Java / Android. This library allows and allows users to store and query sets of keys based on geographic location [7].

Basically, the Geo-fire library makes it easy to store locations (latitude, longitude) using a String key or key. The main advantage of using this library is that it allows processing keys at specific locations in real time or real time [7].

## 1.6 Geofence API

Geofencing API is one of the APIs that allows developers to determine the boundaries of the area, also referred to as geofences Applications that are equipped with geofence can determine the boundaries of the work area and create conditions when inside or outside the area. Geofence API technology uses

sensors on the user's smart device to detect or track the location of the device. [10]

## 1.7 Problem Identification

Based on the background description of the problem in the previous section, the following is an identification of the problem the researcher identified:

1. Drivers of village public transportation do not know exactly where and when passengers will use their services
2. Passengers do not know when the time of this transportation passes the road / house, so residents whose activities or businesses require punctuality are often late and lose money because their business is hampered, because passengers must wait for the next public transportation or look for the public transportation.

## 1.8 Purpose dan Objectives

Based on the identification of the problem above, the purpose of this study is to build a rural transportation system with the title of research "Online Public Transport Applications in the Android-Based Village of Cibodas Parigi".

The objectives of this study are as follows:

1. Helping rural transport drivers make it easy to find out the location and time of passenger transport request.
2. Helping passengers know the time and whereabouts of rural public transportation and order public transportation services so that they can then be approached / picked up by public transportation.

## 1.9 Software Development Method

The software development method used is referring to the Waterfall model according to Pressman. "The waterfall development model is very well used for generic systems or software, meaning that the system can be used all its needs from the start with specifications that have the aim to build from scratch that collects system requirements." [9].

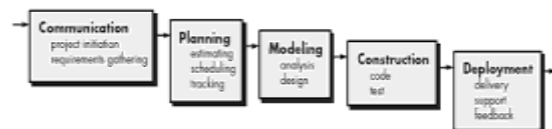


Figure 1. Waterfall Method

## 1.10 Research Methodology

The research method used in this study is applied qualitative research methods. Qualitative research deals with qualitative phenomena, namely phenomena that are interrelated with or involve quality or type [8]. Whereas applied, aims to find solutions to the direct problems faced by society or industry / business organizations [8].

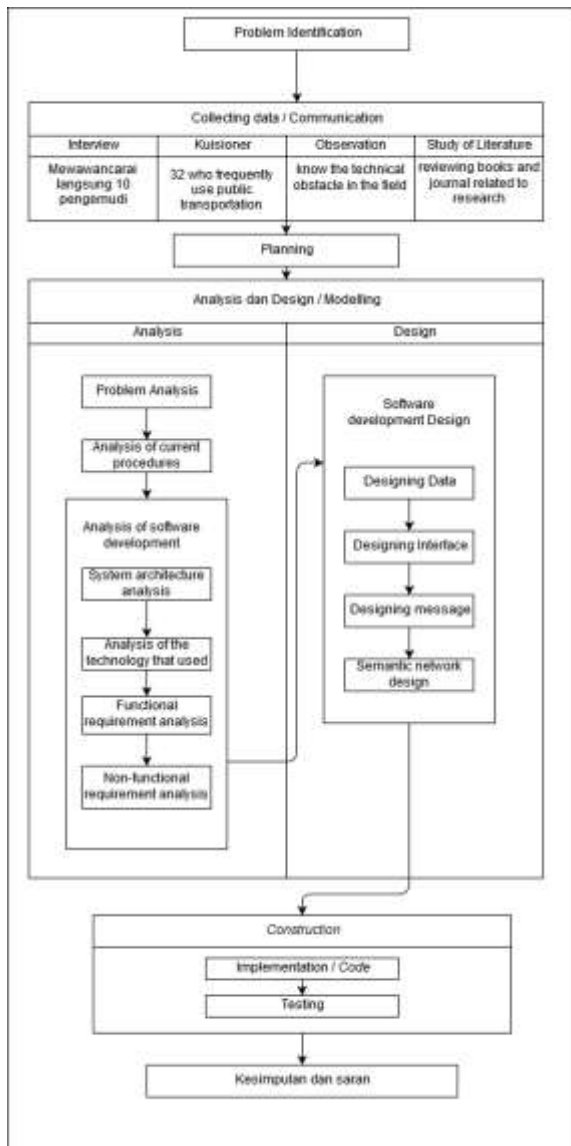


Figure 2. Research Framework

## 2. RESULT AND DISCUSSION

### 2.1 Problem Analysis

Problem analysis explains what problems exist and want to be solved by researchers before researchers build systems. There is currently no system or application that addresses complaints and problems that occur. Analysis of the problem in this study are as follows:

1. Residents find it difficult to know the time and existence of village public transportation.
2. Residents find it difficult to get information on drivers who are operating around the village.
3. Drivers find it difficult to know the time and whereabouts of requests for village public transportation services.

### 2.2 System Architecture analysis

Analysis of system architecture aims to describe how a system communicates, sends requests

and receives responses to data by system users. From the user side, the user uses a smart phone (smartphone) to run the application system. The system architecture in the study is illustrated by Figure 3 as follows:

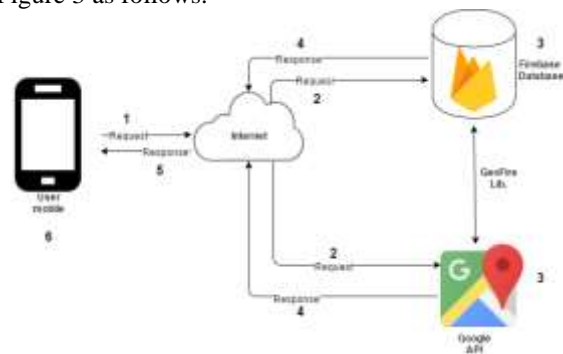


Figure 3. System Architecture

### 2.3 Analysis of the technology used

The following are technologies that will be used in the research and development of this application:

#### 1. GPS

With the use of A-GPS technology, the application to be built can receive latitude and longitude information from the GPS user. Thus, application users both passengers and drivers are obtained. With the case of the village transportation application, the Activation of A-GPS maximizes the accuracy of the passenger and driver coordinates. These things are very influential on the driver and passengers.

#### 2. Google Maps API

Google maps displays passenger or driver coordinate information obtained from GPS. The coordinates are also adjusted to the research needs. In this case the driver is given a car icon, and the passenger is given the default icon from the google maps API. In addition, the Google maps API is used to create lines or images to show direction or directors from one coordinate point to another coordinate. In this case it is used in providing road information from the driver to the passenger and from the driver's current location to the destination location.

#### 3. Geofence

The application of Geofencing in this study is used to limit the work area of this application. The area given the Geofencing function is Cibodas Village, which has an area of 509 Ha. The coordinates used as the midpoint of this geofencing area are -6.731268, 107.066399. The radius (diameter) of the geofencing circle is 5000 meters or 5 kilometers from the center point. Other areas, namely the city of Cipanas with coordinates are -6.731562, 107.0441168 with a radius set of 7 kilometers from the center point.

#### 4. Firebase realtime database

This public transport application data stored in the Firebase realtime database is stored in the form of JSON (JavaScript Object Notation). JSON objects

are formatted as key-value data which are usually rendered in curly braces. The arrays in JSON are indicated by square brackets.

## 2.4 Case Analysis

Case sample analysis is an analysis conducted by researchers to explain or find out what kind of case process will be completed in this study.

In the first process in this case example, it starts from the request for village public transport services. Passengers who want to make requests using Maps (Google Maps) on the application as input tools for processing. Location data in the form of Latitude and Longitude is stored in the Firebase realtime database using the help of the GeoFire Library. This passenger location data can later be retrieved by the driver's account to find out the location of the passenger request. After the process occurs the application outputs the driver's output detecting these requests on the driver's Maps. Detecting the location of both passengers and drivers is obtained by knowing the longitude and latitude coordinates. This is done by getting these locations using Google Maps as input and Firebase and GeoFire.

## 2.5 Functional Requirements Analysis

The analytical method used in this mobile system development research is OOAD (Object Oriented Analysis And Design). This OOAD method describes or explains its needs using the UML diagram. There are several diagrams on UML tools that are commonly used to describe functional systems, among others, Use Case Diagrams, Activity Diagrams, Sequence Diagrams and Class Diagrams.

### 2.5.1 Functional Requirements specifications

Functional requirements include a description and explanation of services on the system that must be provided to resolve this problem on public transport:

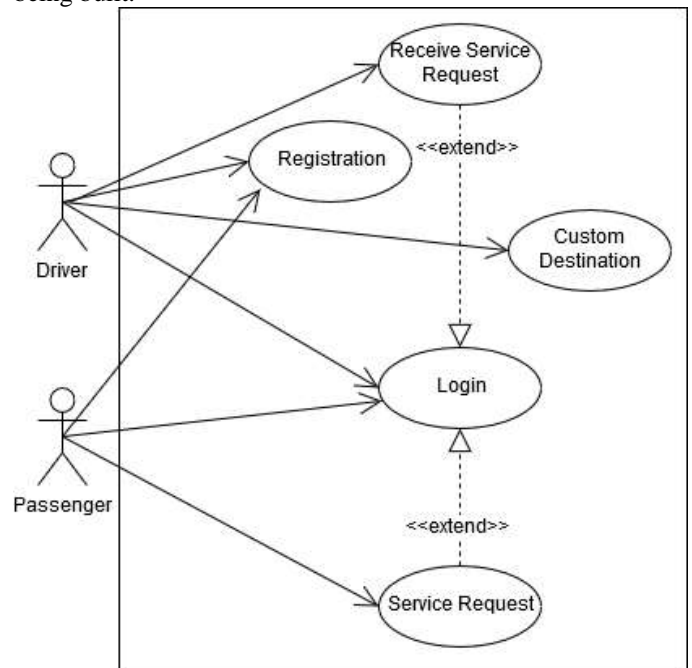
**Table 1.** Functional Requirements Specifications

SKPL Code	Functional Requirements Specifications
SKPL-F-01	The system provides facilities for users to register into the system
SKPL-F-02	The system provides a login facility for users to enter the application
SKPL-F-03	The system provides features for passengers requesting public transportation services

SKPL-F-04	The system provides facilities for users (drivers) to receive requests for public transport services
SKPL-F-05	The system provides facilities for users (drivers) to show the path to the destination outside the route

### 2.5.2 Usecase

Use Case Diagrams are used to illustrate the interaction between actors (users) involved in the application with the activities contained in the system being built.



**Figure 4.** Usecase diagram

### 2.5.3 Activity diagram

The activity diagram illustrates the process flow of an activity that was previously written in usecase. Below this is an Activity diagram that is designed according to usecase that has been made.

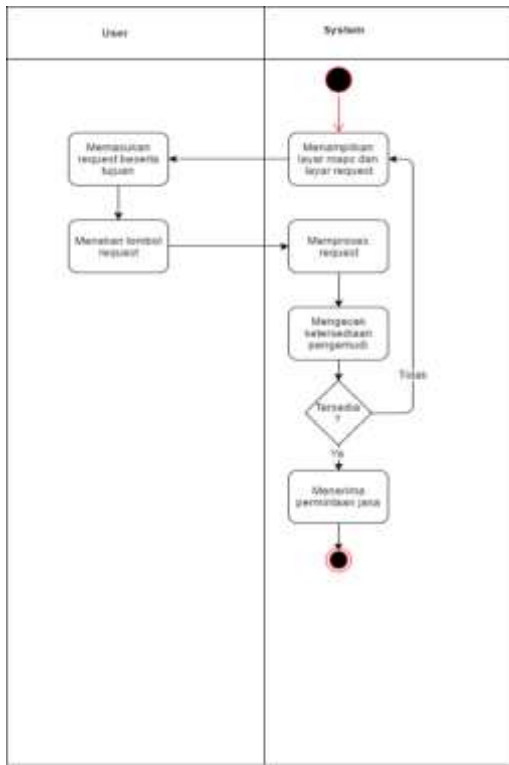


Figure 5. Activity diagram Service Request

The following is the class diagram (Class Diagram) analysis phase in this study. The class diagram is illustrated by Figure 7 below:

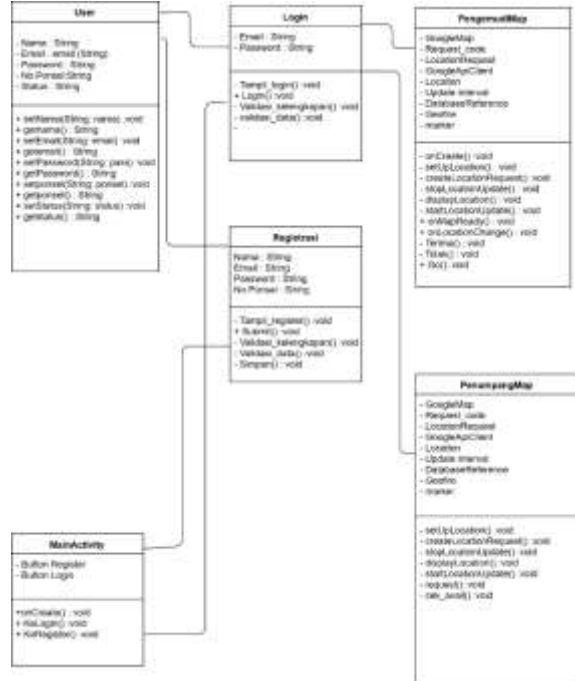


Figure 7. Class Diagram

### 2.5.4 Sequence Diagram

Sequence diagram aims to describe the interaction between objects and communication between objects that have been previously defined. Figure 6 shows the sequence diagram of Usecase Request Services.

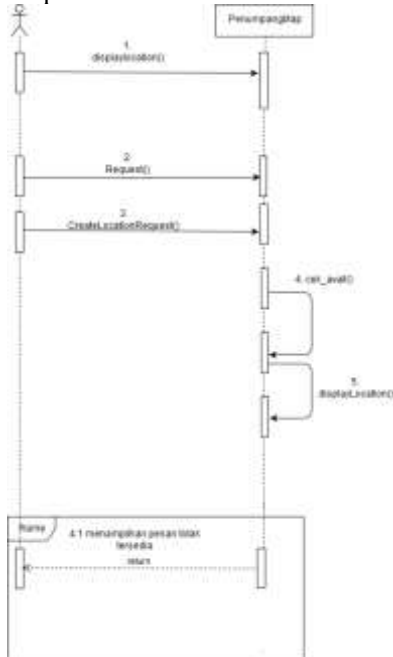


Figure 6. Sequence diagram request jasa

### 2.5.5 Class Diagram

### 2.6 System Design

The design phase is the stage where the results of the analysis are used in formulating what are the things that will be designed. The designs that will be made by researchers are, among others, data design, database design, interface design

#### 2.6.1 Interface Design

The following is the interface design or user interface design of the application to be built.



Figure 8. Registration Interface



Figure 9. Login Interface



Figure 10. Driver Interface



Figure 11. Notification Interface

### 3 PENUTUP

#### 3.1 Conclusion

Based on the results of the design that was made, then the design of the village transportation application using Google Maps API technology,

the Firebase service is in accordance with what is expected to be done next to be tested

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