Application Development Guide And Recommendations Toll Gate Mobile-Based Android

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ABSTRACT

The highway is a cross the street which is an alternative to the existing public road traffic, having the specification of highways and toll roads reserved only for the road user who uses a motor vehicle wheel 4 or more by paying the toll. There are 25 toll gates on Purbaleunyi Toll and Jakarta-Cikampek.

Based on the results of an online survey of 42 respondents, 76.2% stated the difficulty of figuring out the gate tolls to be able to get to a destination that has never been visited before. This shows that there is still the presence of difficulties in finding and obtaining information about routes and recommendations toll gates that must be passed from the user's location. With the technology of GPS, Location Based Service (LBS), and the Google Maps API can be used to display the route and toll gates recommended by the system of locations currently rates along with information, distance, time, and the vehicle. The utilization of the technology can run on Android-powered mobile devices.

Kata kunci : *Toll Road, Rekomendation, GPS, LBS, Android*

1. INTRODUCTION

The highway is a cross the street which is an alternative to the existing public road traffic, having the specification of highways and toll roads reserved only for road users who use motor vehicles with 4 or more wheels pay tolls [1]. The highway aims to shorten the distance and travel time from one place to another. With the many toll gates and pathways offered by travel on toll roads exist, then there is a possibility the toll road users lack information toll gate.

The results of an online survey conducted on 42 respondents, amounting to 76.2% stated the difficulty of figuring out the gate tolls to be able to get to a destination that has never been visited before. This shows that there is still the presence of difficulties in finding and obtaining information about routes and recommendations toll gates that must be passed from the user's location.

Therefore, the application guides and recommendations toll gate was built with the aim of can meet the needs of the information highway must be passed along the route, toll gates, distance, time and price of the toll-based Android mobile. This application utilizes Google Maps API technology, the Global Positioning System (GPS) and Location Based Service (LBS). This application can also recommend toll gates along the best route to get to the destination.

2. CONTENT

The cornerstone of the theory used in drawing up the final project report and application development Guide and recommendations-based Android Mobile toll gates are as follows:

2.1 Highway

The highway is a cross the street which is an alternative to the existing public road traffic, having the specification of highways and toll roads reserved only for road users who use motor vehicles with 4 or more wheels pay tolls [1]. Providence Highway aims to improve the efficiency of distribution services to support increased economic growth especially in the area of the already high level of its development [2].

2.2 Recommendations

According to the recommendations of the great Indonesian Language Dictionary is a suggestion or argument that justifies or strengthened. A recommendation is given with the purpose of supporting an information so it can be utilized as a consideration in determining a person's choices would be something.

2.3 Android

Android is an operating system for Linux-based mobile devices. Android provides an open platform for developers create create app merekasendiri for use by the various mobile device. Initially, Google Inc., bought Android Inc., a newcomer to create software for mobile phones. Then to develop Android, an Open Handset Alliance, a consortium of 34 corporations hardware, software and telecommunications,

including Google, HTC, Intel, Motorola, Qualcomm, T-Mobile, and Nvidia. At the time of the release of Android, November 5, 2007, along with the Open Handset Alliance Android States support the development of open standards on a mobile device. On the other hand, Google released the Android code under the Apache license, a free software license and open standard mobile device. In this world there are two types of distributors operating system [3].

2.4 *Global Positioning System* (GPS)

GPS is a satellite infrastructure serving the placement position of various objects (Speikerman 2004). GPS was first used for the benefit of the military, but in the years 1980-90s Born States Government decided to make the system freely and positioning and is available for a wide range of industry in the world. According to the (Roth 2004) GPS system consists of three segments, namely [4]:

1. The User Segment consists of the mobile device from the user (GPS receivers).
2. Space Segment composed of satellites. Each satellite has a heavy falling between 1.5 to 2 tons and had an autonomous energy which is supplied by solar cells.
3. Control segment required administration by satellite as a correction of the satellite internet data (time systems and orbital).

GPS can do calculations and determine the position of the user and displays it in the maps. If it can save the position of the next GPS users can count on other information, such as speed, direction go, routes, travel destinations as well as distance goals. GPS is also used to build an application guides and recommendations toll gate.

2.5 *Location Based Service* (LBS)

Location based services or LBS is a general term used to describe the technology used to discover the location of the devices that we use. The two main elements of Location Based Services (LBS) are [5]:

1. Location Manager (FIRE Maps): Provide the source for the device or source for LBS. API (Application Programming Interface) Maps provides facilities for display or manipulate the map. The package is "goole. com. android. maps;".
2. Location Providers (Location API): provides the location of the search technology used by the device. PAI Location associated with dara GPS (Global Positioning System) and real-time location data. FIRE Location be on Android package that is in the package "android location". Location, displacement, as well as proximity to certain conveniently can be determined through the Location Manager.

   There are four main supporters in the technology component of the location-based services, such as: [6]

1. Mobile Devices, is one important component in LBS. Any serves as a tool for users to request information. The result of the requested information can be in the form of text, sound, images and other sebgainya. Mobile devices that can be used can be either a PDA, smartphone, laptop. In addition, the mobile devices can also function as a navigation tool in the vehicle as well as a GPS-based navigation.
2. Communication Network, this component serves as a connecting line that can send data by users of mobile devices to then intended to service providers and then the results of the request submitted by the service provider to the user.
3. The component Positioning (navigate position/location), each of the services given by the service provider will normally be based on the position of the user requesting the service. Therefore necessary components that serve as the processor/processor that will determine the position of the user services at that time. The user's position can be obtained through the network of mobile communication or also uses Global Positioning System (GPS).
4. Service providers and applications, merupakankomponen LBS which provide a variety of services that can be used by the user. For example when a user requests a service in order to know its position at that time, then the application and direct service providers processing such requests, from calculating and determine the position of the user, determine the route of the road, look for the Yellow Pages in accordance with the request, and much more.

Data providers, service providers and content do not always save all data and information he offered. Because it could be a wide range of data and processed information derived from third-party developers or who does have the authority to save it.

2.6 *Google Maps* API

Google Maps is a free virtual map services are online created by google. For integrating Google Maps with a site madiri must use application program interface (API) that the framework provides functions to manipulate and add content.

This application requires key API (Application Programming Interface) to access Google Maps server. The type required is the API key with restrictions for android applications. Implementation to get the API key from Android Studio will be explained below.

1. Copy the link that is provided in the file google_maps_api. xml and paste it into your browser. This link will bring to the Google API Console and provide the necessary information to the Google API Console via the URL parameters, thereby reducing manual input required.
2. Follow the instructions to create a new project on Google API Console or select an existing project.

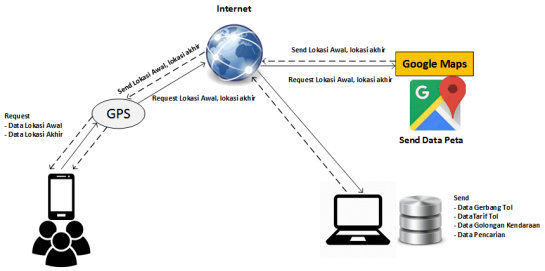
3. Create a limited API key-Android for the making of the application.

4 Copy the generated API key, go back into the Studio, and paste the Android API key into the <string> element in the file google_maps_api. xml.1.

Android Studio would call Gradle for building applications, and then displays the results on your device or on an emulator. Take a few minutes before the application is opened.

2.7 Design of the System Architecture

The design of the system architecture provides an overview of how each software and hardware that used mutually interact with one another.

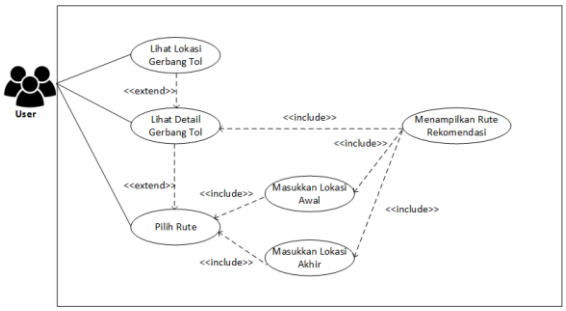


Picture 1. Design of the System Architecture

Android mobile application development uses a GPS system to get the location and coordinates of the earlier users. The initial location of the user is used to determine the route of the motorway entry and exit gates. The determination of these routes utilise the API from google, namely GoogleMap. This application can provide route recommendations toll gates that must be traversed to get to its final destination. This application system memanfaatkanGoogle Maps API by providing the coordinates parameter has been entered the toll route. After sending the parameter to the GoogleMap, then the GoogleMap server reply in the form of either a static map images folder. In the search for the route, the system sends a two-coordinate location of the start and destination address on a mobile device. After sending the parameter to the database server, then the server's reply in the form data along with information recommendation toll gate tariffs and vehicles as well as data searches on request by mobile devices.

2.8 ***Use Case*** **Diagram**

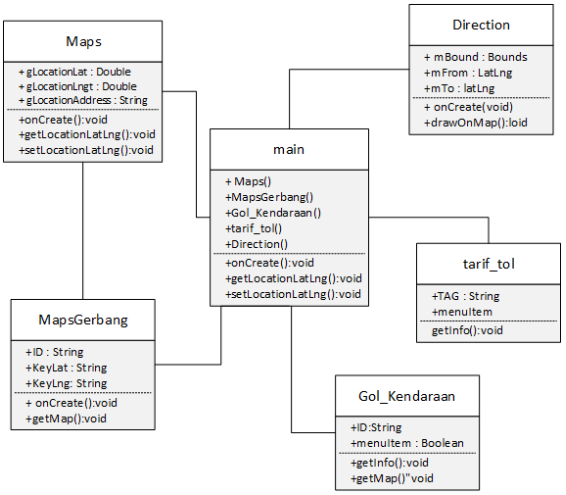
Use Case Diagram is a construction to describe relationships that occur between actors with activity that is present on the system. The target use case modeling such as defining the functional needs and operational systems that will be built.Use Case Diagram is a construction to describe relationships that occur between actors with activity that is present on the system. The target use case modeling such as defining the functional needs and operational systems that will be built.



Picture 2. ***Use Case*** **Diagram**

2.9 Class **Diagram**

Class diagram shows the relationships between classes in the system to be built and how they collaborate to achieve a goal.Class diagram shows the relationships between classes in the system to be built and how they collaborate to achieve a goal.



Picture 3. Class Diagram

3.0 Functional Software Requirements Specifications

The following table is a description of functional software requirements specifications.

Table 1. Functional Software Requirements Specifications

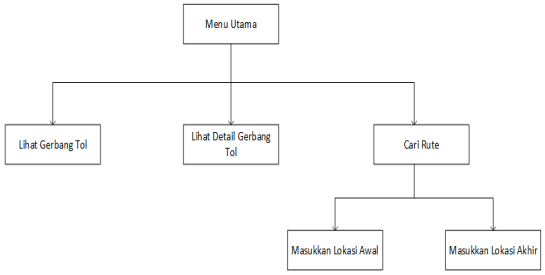
Kode	Keterangan
Functional	
SKPL – F – 001	The system displays the location of the toll booths for the user.
SKPL – F – 002	The system provides a detailed look at the toll gates.
SKPL – F – 003	The system displays the choose a display location.
SKPL – F – 004	The system provides the initial location of the input form for the user.
SKPL – F – 005	The system provides the final location of the input form for the user.

Kode	Keterangan
SKPL – F – 006	The system displays the route recommendations to users.

3.1 Design of the Architecture Menu

The design of the structure of the menu is designed to provide the functions that will be used in information systems will be built.

The design of the architecture menu from the application guides and recommendations toll gates can be seen below. Here is the design of the architecture of the user's application menu.



Picture 4. Design of The Architecture Menu

3.2 The Hardware Implementation

Implemented in hardware on the application development recommendations Purbaleunyi toll gate of Jakarta-Cikampek and utilizes GPS, Location Based Service, and the Google Maps API. Here is the hardware device that is used to support a system that goes by will in the process. As for the hardware in the hardware that is implemented on a computer and hardware on the mobile phone.

Table 2. The Hardware Implementation

Perangkat Keras Mobile		
No	**Perangkat Keras**	**Spesifications**
1	Processor	Quad-Core 1.2 GHz
2	RAM	1 GB Ram, 8GB ROM
3	Harddisk	4G LTE
4	Monitor	4 inch

3.3 The Software Implementation

The software here is a device used to support a system that goes by will in the process. As for the software that is implemented in namely software on computers and software on the mobile phone.

Table 3. The Software Implementation

Perangkat Lunak Mobile		
No	**Perangkat Lunak**	**Spesifikasi**
1	Operation System	Android 5.0 Lollipop
2	Gps	A-GPS

3.4 Implementation of Interface

Implementation of interface do with each page created and pengkodeannya in the form of program files. The following is an implementation of the interface for the user.

Table 4. Implementation of Interface

No	Menu	Deskripsi	File
1	Main page	Application start page to see a list of the Purbaleunyi toll gate and the Jakarta-Cikampek	MainActivity.java
2	Toll Gate detail	Page to display detail Purbaleunyi toll gate and the Jakarta-Cikampek	DetailGerbang.java
3	The recommendations and guidelines of the route	Page to see the route along with distance and tariffs, the vehicles are recommended to be up to the destination.	RekomendasiActivity.java
4.	Destination Location	Page to display the destination location	TujuanActivity.java

3.5 Testing

System testing is the most important thing that aims to find any errors or omissions in the information system tested. Testing the system in question to know the performance of information systems that have been made in accordance with the objectives of the design of information systems. Testing the system using black box testing. Black box testing focuses on the functional requirements of the software.

Table 5. Testing *black box*

Item uji	Butir uji	Jenis pengujian
View toll gate	The process of displaying data and Purbaleunyi toll gate Jakarta-Cikampek.	*Black box*
Toll gate detail	Process see detailed information for each toll gate data.	*Black box*
Choose A Route Destination	The process of selecting the route destination.	*Black box*
Enter The Location Of The Beginning Of The	The process of entering initial data location	*Black Box*
Enter The Location Of The End	The process of entering data location end	*Black Box*
Display the recommendations and guidelines of the route	The process of displaying recommendations toll gates that must be traversed along with route information, rates, distance, time, and the vehicles that must be traversed.	*Black box*

3.6 Blackbox Testing Results

Table 6. Blackbox Testing Result

Kasus dengan hasil uji data benar			
Incoming data	The expected	Observations	conclusion
See The Location Of Toll Gate	The system can display the Purbaleunyi toll gate and the Jakarta-Cikampek toll road.	The user can see the toll gate	[V] Received [] rejected
See Location Details Toll Gate	The system can display Detail Purbaleunyi toll gate and the Jakarta-Cikampek toll road.	Jakarta-Cikampek and purbaleunyi	[V] Received [] rejected
Choose A Route Destination	The system can display the display for entering the destination route	The user can see Detail information toll gate	[V] Received [] rejected
Enter The Location Of The Beginning Of The	The system can receive data enter the beginning	Jakarta-Cikampek and purbaleunyi	[V] Received [] rejected
Enter The Location Of The End	The system can receive data enter final	The user can see the display select route destination.	[V] Received
Showing the route and gate recommendations	The system displays the route and gate recommendtions	Users enter the start location	[V] Received [] rejected

3. CONCLUSION AND SUGGESTION

3.1 Conclusion

Based on the results of software testing Pentoll on android platform so conclusions are obtained as follows.

1. Applications that are built to provide some route recommendations based on the existence of a user's current location. This can be done by utilizing GPS technology, Location Based Service (LBS), and the google maps API that can be implemented on Purbaleunyi toll road and the Jakarta-Cikampek.
2. By utilizing the API from google, this application is capable of providing detailed information toll gates along the route, distance, time and Purbaleunyi toll in vehicles and Jakarta-Cikampek to the user. Detailed information toll gate is entered through the back of the application called backend. The data entered via the backend include tariff data toll, toll gates, and the vehicle. These data will then be displayed to the user so that it can help users to find and use the route and toll gates recommendations from the existence of the current user to get to the destination user.

3.2 Suggestion

Pentoll is a software application that focuses on search route and toll gates Purbaleunyi Toll and recommendations in Jakarta-Cikampek toll road. Therefore the given advice which can be used as a guide for the development of the application, i.e. the application could be dikembangan and applied on other highways. As in the case of his journey is far more including West Java region and not unbounded on Purbaleunyi toll Jakarta-Cikampek and only

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