DEVELOPMENT OF APPLICATIONS IN CIMAHI CITY BASED ON MOBILE USING GEOFENCING

Muhammad Furqon, Taryana Suryana, S.T., M.Kom.[2]

[1,2] *Informatic Engineering – Indonesia Computer University*
Dipatiukur *Street* 112-114 Bandung
E-mail : furqonwdj@gmail.com[1], taryanarx@email.unikom.ac.id[2]

ABSTRACT

Cimahi City Government Tourism Office is a government agency that has the task of assisting the Mayor to carry out the affairs of Governance in the field of culture and tourism as well as serving and providing information for the public in areas related to licensing and development of culture and tourism. The problem that often occurs in the Cimahi City Tourism Department is the lack of effective way of delivering information due to the lack of officers and resources available so that the impact is difficult to provide the latest information related to promoting tourist attractions in the city of Cimahi through electronic media.

The purpose of this research is to assist the Tourism Office of Cimahi City in facilitating and promoting the tourist attraction in Cimahi City to the wider community. And help the community as information to know the location of any location contained in the City of Cimahi.

Based on the results of testing the system by using the method of functionality (black box) and beta (interview), it can be concluded that Geofencing Application can facilitate the City Tourism Officer Cimahi in promoting Cimahi City. And facilitate the public to more quickly find out the latest information available in the City of Cimahi.

1. PRELIMINARY

Cimahi city is one of the dense cities. Almost every year the city of Cimahi always experience increased population. According to M. Suryadi, quoted from www.prfmnews.com as Head of Population and Civil Registry (Disdukcapil) Cimahi City estimates the population in 2017 will increase about 1,000 people. Automatically Cimahi City will always increase population in every year.

Cimahi City Tourism Office is a government agency engaged in culture and tourism in the city of Cimahi. This agency is established to serve and provide information to the public in areas related to licensing and cultural and tourism development. Lack of officers and resources in the Tourism Office of Cimahi City Government made the parties a little difficult to promote the city of Cimahi through electronic media.

The ease and speed with which information is acquired is essential in the presentation of information, especially for information that provides location-based services. These attractions and culinary places are the most popular thing now. Many people who seek tourist attractions or culinary places in their respective regions - or looking out of town. But not all that people seek realized, because their lack of knowledge will be the place to go. Sometimes to find the closest needs, people have little difficulty in getting information because the available availability can't be published publicly to the public. Lack of media to provide such information makes people a little difficult to get the information they want to get.

Bandung City and Cimahi City are two very close cities. But the outside community or Cimahi community itself is still

Tend not to know the development in the city of Cimahi and still dependent on the city of Bandung. Many historical sights can be visited in this city as well as a variety of culinary. But the community itself is less up-to-date with the existing tourist attractions in the city of Cimahi. So there are still a few enthusiasts who visit the tourist attractions in the city of Cimahi.

Geofencing is a mobile service by sending a message to smartphone users who enter a predetermined area and directly connected via Android smartphone. Application of geophysics technology that is built will be used as a supporting application user to reach the existing tourist attractions in the city of Cimahi. The support in question is to include notification where the location of the tourist is located, the direction of the nearest destination to be addressed, notification of restaurants or culinary spots scattered in the city of Cimahi, the station and ATM closest, the latest event to be held around the city Cimahi, the location of the hotel, as well as places that promote to customers and visitors. According to the Ministry of Communication and Information of the Republic of Indonesia, quoted in www.kominfo.go.id, the level of liveliness and interest of smartphone users in Indonesia is high. Based on internet users' statistics articles in Asia and Indonesia, more than 90% of smartphone users are looking for information through their smartphones. With that number,

Indonesia will become the fourth most active smartphone in the world after China, India and America.

Therefore, the development of geofencing applications in Cimahi city based mobile will be used as a solution to the existing problems. Because with this geofencing technology can make it easier for people to know what is around Cimahi city.

1.1 *Identification Of Problem*

Based on the background explanation that has been described, it can be identified problem that is:

1. Lack of officers and resources contained in the Tourism Office of Cimahi City Government.

2. Community Cimahi still depend on the city of Bandung.

3. People find difficulties in finding information about the location located in the city of Cimahi.

4. People are less responsive with event and promotion information held in Cimahi city.

1.2 *Purpose and Objectives*

The purpose to be achieved in this research is to build Geofencing application in Cimahi city based mobile. While the objectives to be achieved in this study are as follows:

1. Facilitate the related agencies to promote the city of Cimahi.

2. Facilitate the community inside and outside the city of Cimahi to obtain information location location in the city of Cimahi.

3. Facilitate the community inside and outside the city of Cimahi to know the event information and promotions held in the city of Cimahi.

1.3 *Method Of Collecting Data*

Data collection methods that support the development of geofencing applications in Cimahi city based mobile include literature study and field study described as follows:

1. Literature Studies

Literature study is a method of collecting data which is done by studying, researching and reviewing various literatures from libraries that come from books, texts, scientific journals, website sites on the internet, and readings that relate to the research topic.

2. Field Studies

Field study is a method of collecting data by obtaining information directly to the target site. The case studies that are built today are in the city of Cimahi. Field studies conducted are through interviews with the community and Tourism Department of Cimahi.

3. Interview

An interview is a conversation between two or more people and takes place between the speaker and the interviewer. According to Mr. Ares, as the Public Relations Department of Culture and Tourism Cimahi City states that the event is located in the city Cimahi takes place every week with a diverse event. The information provided is usually in the form of brochures, pamphlets or from print media.

1.4 *Method Development Software*

Method of software development in geofencing application development in Cimahi city based on mobile use paradigm of software in waterfall. The waterfall model is sometimes called the classic life cycle, which implies a systematic and sequential (sequential) approach to software development, beginning with user requirements specification and continuing through planning stages, modeling), construction (construction), and delivery of the system / software to the customers / users (deployment), which ends with ongoing support in the complete software generated [1]. Waterfall software paradigms include requirements definition, system and software design, implementation and unit testing, integration and system testing, and operation and maintanance, here are the explanations:

1. *Phase Requirements Definition is to identify the problems that exist in the current conditions such as conducting interviews to the city community Cimahi and related agencies and distributing quisioners to social media users. It aims to determine the main issue of the problem is the lack of information media that provides information about the city of Cimahi.*
2. *Stage System and Software Design is done is to design data on the structure of the table, design the menu contained in the system, describe the interface design for webservice and design for Android using tools Balsamic Mockups.*
3. *Stage Implementation and Unit Testing is done is to generate program codes using HTML5 programming language.*
4. *Stage Integration and System Testing is done to test the application whether it is running well or not.*
5. *Operation and Maintenance stage is performed if geofencing application development for event and promotion information in Cimahi city based on mobile has been implemented and has been tested, and to add feature and update existing information data.*

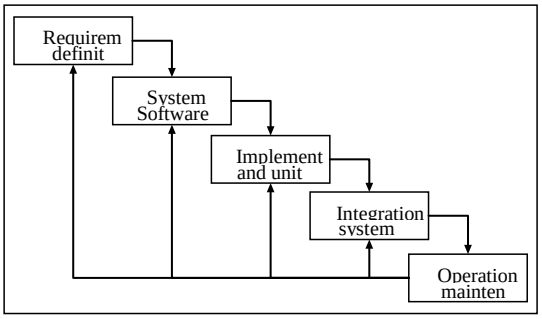


Image 1 Waterfall Model [1]

1.5 *Understanding Of Mobile Aplication*

Mobile app is an app that allows you to do mobility using equipment such as PDA, cell phone or Mobile. Mobile applications come from the word application and mobile. Application which means application, application, usage. In term of application is a ready-made program designed to perform a function for the user or other application and can be used by the intended target while mobile can be interpreted as moving from one place to another. Then a mobile app can be defined as an application program that can be run or used even if the user moves from one place to another and has a small size. This mobile app can be accessed via wireless devices, pagers, PDAs, cell phones, smartphones and similar devices.

1.6 *Android*

Android is a mobile operating system that grows in the middle of other operating systems are growing today. Other operating systems such as Windows Mobile, i-Phone OS, Symbian and many more also offer a wealth of content and optimization running on existing hardware devices. However, this existing operating system runs by prioritizing the built-in core application without seeing any substantial potential of third-party applications. Therefore, there is limited distribution of third-party applications for their platforms. Android offers a different environment for developers. Each app has the same level. Android does not distinguish between core apps and third-party apps. The Application Programming Interface (API) provided offers access to hardware, or even mobile data, or system data. Even users can remove the core application and replace it with a third-party app [3].

1.7 *Arsitektur Android*

Android architecture can be described as in Image 1 and the outline of Android Architecture can be explained as follows:

A. Application and Widgets

Application and Widgets This is the layer where we deal with the application only, where we usually download the application and then we do the installation and run the application. On the layer there are core applications including email client, SMS program, calendar, map, browser, contacts, and others. Almost all applications are written using Java programming language.

.

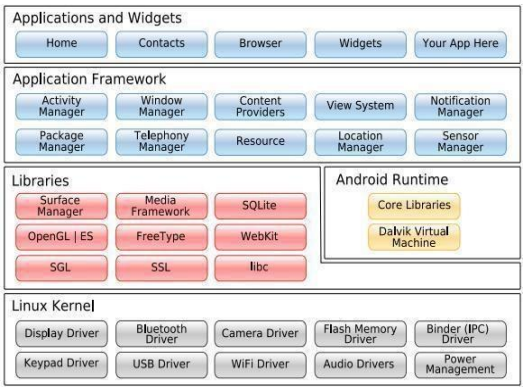


Image 2 Android Arsitecture [8]

a. Aplication Framework

Android is the "Open Development Platform" that Android offers to developers or give developers the ability to build good and innovative applications. Developers are free to access hardware, access resource information, run background services, set alarms, and add status notifications, and so on. Developers have full access to the API framework as done by core category applications. The application architecture is designed so that we can easily reuse the used components (reuse). So that we can conclude the Application Frameworks is a layer where the application developers to develop / manufacture applications that will run on the Android operating system, because at this layer the application can be designed and created, such as content providers in the form of sms and phone calls. The components included in the Application Frameworks are as follows:

1. Views
2. Content Provider
3. Resource Manager
4. Notification Manager
5. Activity Manager [3]

b. Libraries

These libraries are the layers where Android features are located, usually the application developers access the libraries to run the application. Running on top of Kernel, this layer includes various C / C ++ core libraries such as Libc SSL, as well as:

a.Media libraries for playback of audio and video media
b.Libraries for display management
c.Libraries Graphics include SGL and OpenGL for 2D and 3D graphics
d.SQLite Libraries for database support
e.SSL and WebKit libraries are integrated with web browsers and security

f. LiveWebcore Libraries includes a modern web browser with embedded webview engine

g. 3D libraries that include OpenGL ES1.0 API's implementation [3].

c. Android Run Time

Layers that make Android app run where in the process using Linux Implementation. Dalvik Virtual Machine (DVM) is a machine that forms the basis of the Android application framework. Inside Android Run Time is divided into two parts:

a.Core Libraries: Android apps are built in Java language, while Dalvik is the virtual machine instead of Virtual Machine Java, so it takes a libraries that function to translate Java / C language handled by Core Libraries..

b.Dalvik Virtual Machine: Virtual register-based engine optimized to perform functions efficiently, which is a development that is able to make Linux Kernel for threading and low-level management [3].

c.Linux Kernel: Linux Kernel is the layer where the core of the Android operating system is located. It contains system files that manage processing systems, memory, resources, drivers, and other Android operating systems. The Linux kernel that Android uses is Linux Kernel release 2.6.

1.8 *Geofencing*

Geofencing allows remote monitoring of geographic areas surrounded by virtual fences, and automatic detection when tracked moving objects in or out of area [5]. Geofence is a virtual parameter for geographic regions in the real world. The specified virtual parameters can either be static or dynamic. One typical example of dynamic geofence is the surrounding radius or location point. Static geofence can be set from predetermined limits, such as school attendance zones or environmental boundaries. Digital geofencing costumes can also be used, if devices that provide location based services (LBS) users enter or exit geofencing, the device will receive a notification message. This notification may contain information about the location of the device. Geo-fence notifications may be sent to the phone as an example of increasing every other form of action. We can describe geo fencing as proactive LBS. In many cases a proactive system is much more convenient than a reactive one, in which the user must explicitly request data for the location. There are different types of Event locations to fix a testable GPS position. For example, whether the user is near the destination (POI) or to other users. Geofence is now one of the new faces in Location Based Services. Now the original development for LBS itself is more or less completed. We can see some common standards and applications (think about various service implementations Places like Foursquare, Twitter places, Google places, Facebook places, etc.) All of them make it easy for you to share info locations or get some things nearby. And geo-fence opened the door for some personalization. You can get some customized customized data in the right place, especially when both the data stream and the place (area) to receive it are dynamically generated. In the second, geo-fence will be integrated in the nearest future with the sensor and M2M applications [6].

1.9 *GPS (Global Positioning System)*

GPS stands for Global Positioning System, which is a navigation system using satellite technology that can receive signals from satellites. This system uses 24 satellites that transmit microwave signals to the earth. This signal is received by the receiver on the surface, where the GPS receiver will collect information from GPS satellites, such as:

a. Time. The GPS receiver receives time information from atomic clocks that have very high accuracy.

b. Location. GPS provides location information in three dimensions:

1.Latitude

2.Longitude

3.Elevation

c. Speed. When switching, GPS can indicate the speed of the switching information.

d. The direction of the trip. GPS can indicate the direction of destination.

e. Save location. Places that have been or wish to be visited can be stored by a GPS receiver.

f. Data computing. The GPS receiver can store track information, such as total trips already made, average speed, highest speed, lowest speed, time / hour to destination, and so on [7].

1.10 *Latitude dan Longitude*

Latitude and longitude are the coordinates that exist on the earth and are used to determine our position on earth [8].

Latitude is the transverse line of the north pole and the polarity. Point 0 is the equator angle, the + sign indicates an upward direction toward the north pole, while the minus sign at the Latitude coordinate goes to the south pole. The point used from 0 to 90 degrees north pole direction, and 0 to -90 degrees to the south pole.

Longitude is the latitude. The number of horizontal round horizontal angles. The starting point is from 0 to 180 degrees, and - in reverse direction. Point 0 starts from the UK country line. Directing to Indonesia will be a positive number.

The opposite coordinates of Longitude minus are the inverse direction.

1.11 *LBS (Location Based-Service)*

Location Based Service is a service that works to search with Global Positioning Service (GPS) technology and Google's cell-based location. Map and location-based services use latitude and longitude to specify geographic locations, but as users we need our realtime address or position instead of latitude and longitude values. Android provides geocoder that supports forward and reverse geocoding. Using geocoder, you can convert latitude longitude into real world address or vice versa.

Location based services is a generic term used to describe the technology used to locate the devices we use. The two main elements of LBS are:

a. *Location Manager (API Maps)*
   Providing tools / resources for LBS, Application Programming Interface (API) Maps provides the facility to view, manipulate maps and other features such as satellite view, street, or combination. This package is at com.google.android.maps.com.

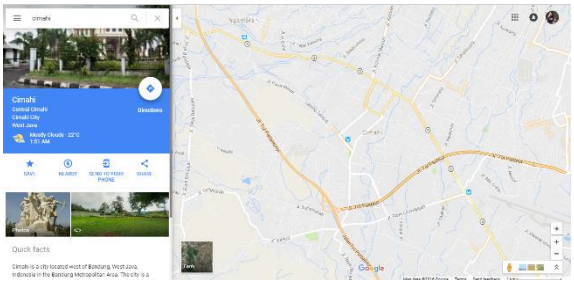
b. *Location Providers (API Location)*
   Provide location search technology used by device / device. Location API is related to GPS data and realtime location data. The Location API is on the Android package which is in the android.location package. With Location Manager, we can determine our current location, Track movement / movement, as well as proximity to a specific location by detecting displacement.

1.12 *Google Maps*

GoogleMaps is online map or online map opening, it can be done easily through free service from Google. In fact, this service provides API (Application Programming Interface) that allows other developers to take advantage of this application in a homemade application. The GoogleMaps view can also be selected, based on the original photo or the route image map only.

GoogleMaps is a free service provided by Google and is very popular. GoogleMaps is a world map that we can use to view an area as in figure 2. In other words, GoogleMaps is a map that can be viewed using a browser. We can add GoogleMaps features in the web that we have created or on our blogs are paid or free even with the GoogleMaps API. GoogleMaps API is a JavaScript-shaped library.

How to make GoogleMaps to display on a web or blog is very easy just by requiring knowledge of HTML and JavaScript, as well as a very stable Internet connection. By using the GoogleMaps API, we can save time and money on building a powerful digital map app, so we can focus only on the data that will be displayed. In other words, we only create a data while the map to be displayed is owned by Google so we are not troubled by mambuat map a location, even the world.



Gambar 3 Google Maps

1.13 *HTML5*

HyperText Markup Language (HTML) is another programming language for building a web page. By using HTML programming language that has tags or markup, it can build the structure and layout on the web page so it can be displayed in the browser [4]. HTML5 is a markup language for structuring and displaying content from Waring Wera Wanua, a core technology of the Internet.

HTML5 is the fifth revision of HTML (first created in 1990 and its fourth version, HTML4, in 1997) and until June 2011 is still under development. The main purpose of HTML5 development is to improve HTML technology to support the latest multimedia technology, easy to read by humans and also easy to understand by the machine. HTML5 is a work of the Waring Wera Consortium Wanua (World Wide Web Consortium, W3C) to define a single markup language that can be written in HTML or XHTML. HTML5 is the answer to the development of HTML 4.01 and XHTML 1.1 which has been running separately, and is implemented differently by many web-maker software [9]. Examples of HTML5 common structure scripts are as follows:

Skrip HTML

```
<!DOCTYPE html>
<html>
    <head>
        <title>Web Warung Tegal</title>
        <style type="text/css">
        </style>
        <!--[if lt IE 9]>
        <script src="http://html5shiv.googlecode.com/svn/trunk/html5.js"></script>
        <![endif]-->
    </head>
    <body>
        <div class="wrapper">
        </div><!-- .wrapper -->
    </body>
</html>
```

Image 4 Skrip HTML5 [11]

1.14 *PHP*

PHP is a server-side language designed specifically for web applications. PHP can be inserted between HTML, and because the server-side language, the PHP language will be executed on the server, which is sent to the browser is the "result so" HTML form, and PHP code will not be seen [4].

```
<?php
        header('Access-Control-Allow-Origin: *');

        require_once("../class/about.php");

        $obj = new About();

        echo json_encode($obj); ?>
```

Image 5 Skrip PHP

1.15 ***UML (Unified Modeling Language)***

UML is a family of graphical notations supported by a single meta-model, which helps the descriptions and design of software systems, especially systems built using object-oriented programming (OO). At this stage of the analysis using the UML (Unified Modeling Language) tool is the standard language used to describe and visualize the artifacts of the object-oriented analysis and design process. UML provides a standard on notation and diagrams that can be used to model a system. UML was developed by 3 'object-oriented' people, namely Grady Booch, Jim Rumbaugh, and Ivar Jacobson. UML is a language that can be used to communicate in the perspective of anatara object users with developers, between developers with developers, between developer analyst with developer design, and between developer design with developer programming.

UML allows develover to model visually, ie, emphasis on drawing, not dominated by narration. Visual modeling helps to capture the structure and behavior of objects, facilitating the interaction between elements in the system, and maintaining consistency between design and implementation in programming

1.16 ***Use Case Diagram***

Use Case Diagram explains what the system will do and who interacts with the system. Use case diagrams are graphical images of some or all of the actors, use cases, and interactions among them that introduce a system to be built. Use case diagrams explain the benefits of a system when viewed in the view of people who are outside the system. This diagram shows the functionality of a system or class and how the system interacts with the outside world, usually created early in the development. Use case diagrams describe the expected functionality of a system, emphasized as "what" the system does and not "how". A use case represents an interaction between the actor and the system. Use case diagrams can be used during the analysis process to capture system requirements and to understand how the system should work. During the design phase, the use case diagram plays a role to define the behavior (Behavior) of the system when implemented.

1.17 ***Activity Diagram***

Activity diagrams describe the various activity flows in the system being designed, how each flow begins, the decisions that may occur, and how they end. Activity describes the parallel processes that may occur in some executions. Activity diagram is a special state diagram, where most states are action and as big transitions in trigger by the completion of previous state (internal processing). Because of that the activity diagram does not describe the internal behavior of a system exactly, but rather describes the processes and paths of activity from the top level in general. An activity can be realized by one or more use cases. Activity describes the running process, while the use case illustrates how the actor uses the system to perform the activity.

1.18 ***Class Diagram***

Class diagrams are the set of similar objects. An object has a state state and behavior, so it can explain the relationships between classes in a system that is being created and how to get them to collaborate to achieve a goal. Class diagrams also have three main areas: names, attributes and methods. The name serves to give an identity to a class, its function attribute is to give characteristics to data owned by an object in the class, while the function method is to provide a function to an object. Attributes and methods can have any of the following properties :

a. Private, can't be called from outside the class
b. Protected, can only be called by the class in question and the children who inherit it
c. Public, can be called by anyone

1.19 ***Sequence Diagram***

A sequence diagram specifically describes the behavior of a single scenario. The diagram shows a number of sample objects and messages passing through objects in usecase [2]. Sequence diagrams describe in detail the sequence of processes performed in the system to achieve the objectives of the use case interactions that occur between classes, what operations are involved, the sequence between operations, and the information required by each operation. Making a squence diagram is the most critical activity of the design process because it is the guideline for the programming process and contains the flow of control from the program.

2. CONTENT OF THE STUDY

2.1 System Analysis

System analysis aims to describe the problems that exist in the system and determine the needs of the system to be built. Thus, it can be concluded that the analysis is a set of activities and processes by summarizing a number of data information that can be interpreted. System analysis includes problem

analysis, running system analysis, procedure analysis, non-functional requirements analysis, and functional requirements analysis.

Before building the application system, ongoing system analysis is done by observation and interview method to Mr. Ares Rudhiansyah, S.Pd, as the Cimahi City Government Tourism Office and Cimahi City community to get a complete picture of current system which then result will be described in the form of activity diagrams according to the problem. Operations performed include the location search procedure in the city of Cimahi.

1. *Location search information procedure*

The scenario of the location finding procedure is:

a. Visitors come to Cimahi city.
b. Visitors to find the location of the destination.
c. If found, visitors go directly to the place.
d. If not, visitors ask to find information.
e. Visitors to that location.

Location search procedure can be seen in the picture below

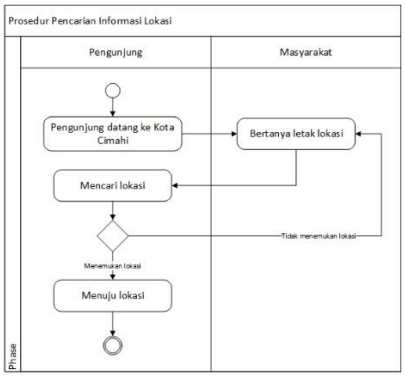


Image 6 Location search information procedure

2.2 System Architecture Analysis

Stage Analysis of system architecture is the stage to get an overview of the system to be built. Whether it is the description of the backend admin system as well as the picture of the mobile user's frontend system. Description of system architecture can be seen in the picture below

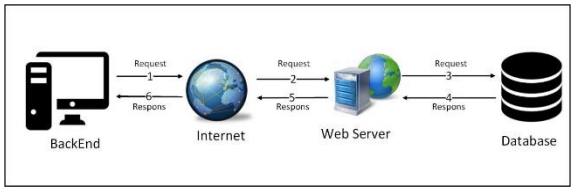


Image 7 Backend System Architecture

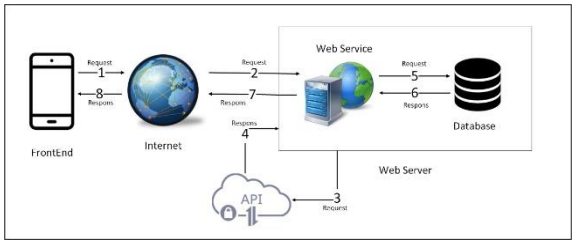


Image 8 FrontEnd System Architecture

2.3 Use Case Diagram

Use case diagram define the operations contained in the system. Use case diagram describes an interaction between one or more actors with the system being created. For geofencing applications in Cimahi city based mobile can be seen in the picture below

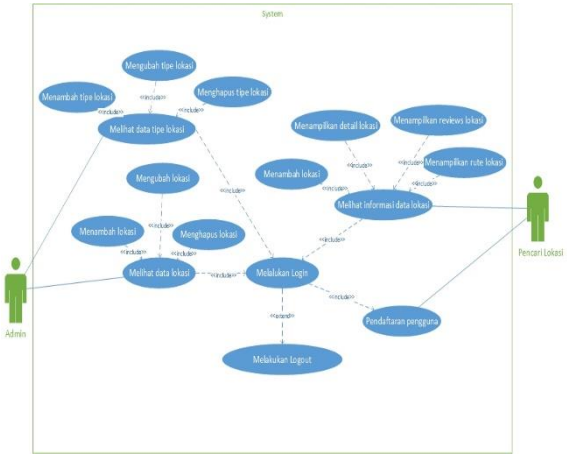


Image 9 Use Case Diagram

2.4 Activity Diagram

Activity diagram describes the flow of activity on the system being built. Activity diagram of geofencing application development in Cimahi city based mobile is made based on several use case which can be seen in the picture as follows:

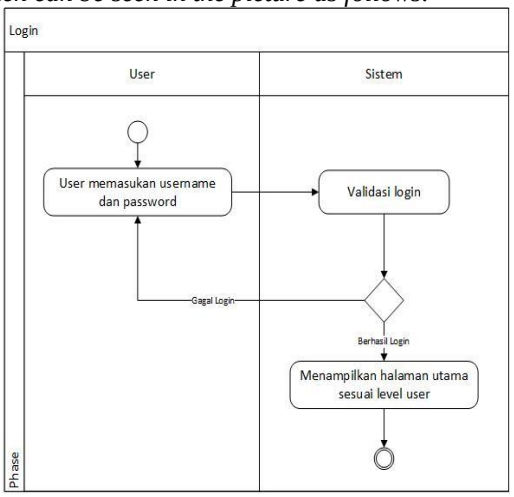


Image 10 Activity Diagram

2.5 Class Diagram

Class diagram Class diagrams describe the structure and description of classes, packages, and objects and have a relationship between one object with another object. Class diagram of geofencing application development in Cimahi city based mobile is made based on the classes contained in the program. For more details can be seen in the following picture

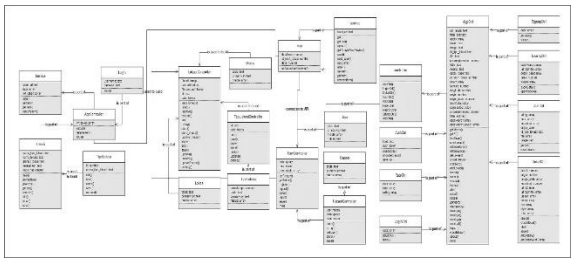


Image 11 Class Diagram

2.6 Sequence Diagram

Sequence Diagram describes the dynamic collaboration between a number of objects to show a series of messages sent between objects. Sequence Diagram of geofencing application development in Cimahi city based on mobile is made based on interacting objects.

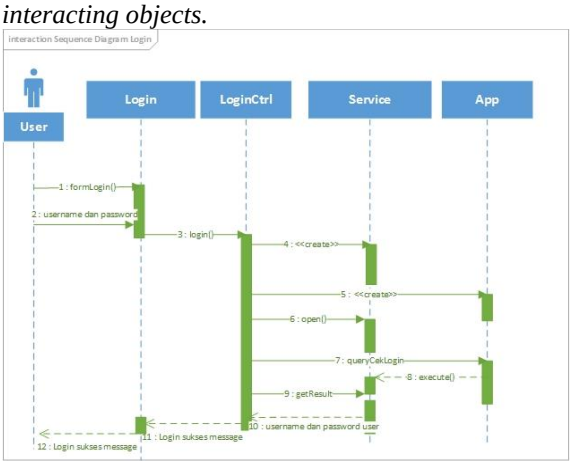


Image 12 Sequence Diagram

2.7 Relation Scheme

The relation schema is a way of arranging a relation by specifying the relation name, the name of each field (columns and attributes) and the domain of each table that has a set of values and keys that can be connected to each other. Here is a relation scheme on the Geofencing application database Cimahi city.

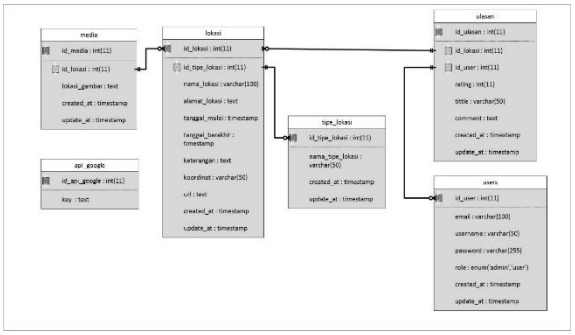


Image 13 Relation Scheme

2.8 Structure Menu

The design of menu structure is a function that aims to facilitate the operation of the program. Menu structure contained in geofencing application in Cimahi city based on mobile Android can be seen in the picture below

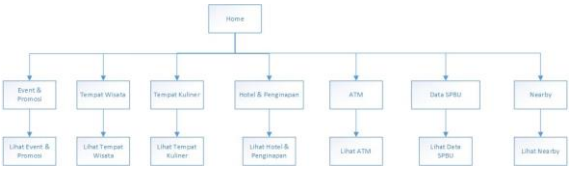


Image 14 Structure Menu

2.9 Interface Design

Interface design is a communication medium used when the user will interact with the system. The design of geofencing application interface in Cimahi city based mobile consists of designing interface for admin and interface design for user.

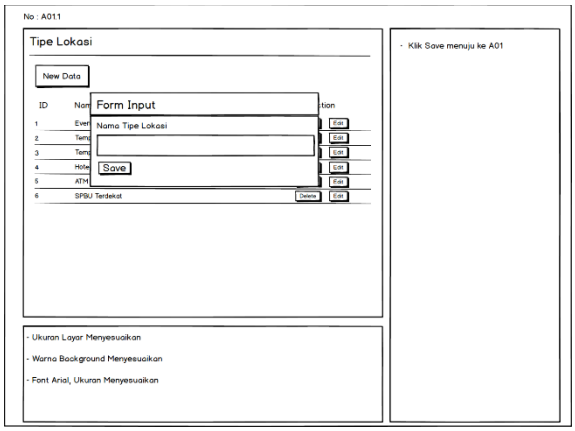


Image 15 Interface Design For Admin

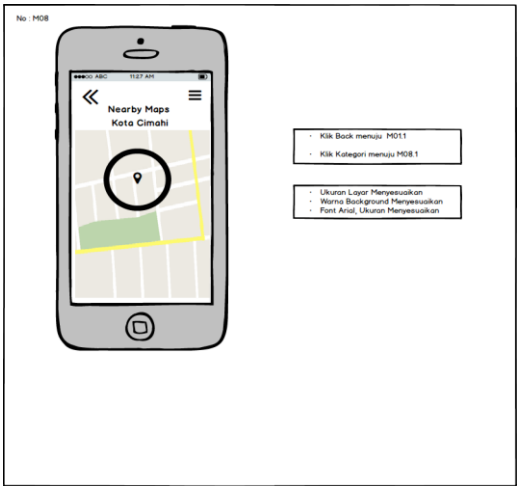


Image 16 Interface Design For User

3. CLOSING

3.1 Conclusion

Based on the results obtained in making this final project, it can be concluded as follows:

1. Geofencing application in the city of Cimahi very helpful Section admin Cimahi City Tourism

Department in managing the places - the place in the city of Cimahi.
2. Geofencing application in Cimahi city can help or facilitate the public to get information about the places - places in the city Cimahi
3. This application is already meet the needs of the department of Tourism
4. This application can simply provide an appropriate map picture
5. This app is very easy to understand and use
6. This app is quite interesting in terms of appearance

3.2 Advice

. In order for the system built to work better, should be done things as follows:
1. With the application of geofencing in this Cimahi city, it is necessary to have training for officers who work in the Department of Tourism Cimahi this City to manage it.
2. Development of geofencing application in Cimahi city based on this mobile to be material for further system development.

4. BIBLIOGRAPHY

[1] R. S. Pressman, 2002 "Rekayasa Perangkat Lunak Pendekatan Praktisi", ANDI Yogyakarta.
[2] M. Fowler, 2005 “UML Destiled Edisi 3: Panduan Singkat Bahasa Pemodelan Objek Standar”, ANDI Yogyakarta.
[3] N. Safaat, Pemrograman Aplikasi Mobile Smartphone dan Tablet PC Berbasis Android. Bandung: Informatika, 2011
[4] T Suryana, J Sarwono, 2001, “Ecommers Deangan PHP dan MySql Edisi Pertama”, diterbitkan oleh Graha Ilmu Yogyakarta.
[5] F. Reclus and K. Drouard, 2009 “Geofencing for fleet & freight management Intelligent Transport Systems Telecommunications,”. [Online]. Available: https://www.scribd.com/document/96504975/Application-of-Geofencing-in-Indian-Commercial-Transportation-Industry-A-Case-Study/.
[6] D. Namiot, 2014 "GeoFence Services," injoit.org (International Journal of Open Information Technologies). [Online]. Available: http://injoit.org/index.php/j1/article/view/51/48/.
[7] Whisnu, 2012 “GPS Pada Android”, Jakarta: Jasakom.
[8] “Android: Arsitektur Sistem” [Online]. Available: http:// astonugroho.wordpress.com /2010/08/07/android-arsitektur-sistem/.
[9] Phonegap, "Easily create apps using the web technologies you know and love: HTML, CSS, and JavaScript," [Online]. Available: http://phonegap.com/about/.
[10] “Lambang Kota Cimahi” [Online]. Available: http://cimahikota.go.id.
[11] “Membuat Skrip Sederhana Di Html 5” [Online]. Available: http://lilagln.blogspot.co.id/2015/05/membuat-skrip-sederhana-di-html5.html/.
[12] “GeoMarketing 101: What Is Geofencing?” [Online]. Available: http://www.geomarketing.com/geomarketing-101-what-is-geofencing/.