TEPIAN Vol. 4 No. 1 (March 2023) p-ISSN 2721-5350 e-ISSN 2721-5369
doi.org/10.51967/tepian.v4i1.2220

Location Based Service for Important Locations in the Paser Belengkong District

Azahari
STMIK Widya Cipta Dharma, Samarinda, 75123, Indonesia
azahari@wicida.ac.id

Tommy Bustomi
Polytechnic of Samarinda, 75131, Indonesia
tbustomi@gmail.com

Angga Setiawan *
STMIK Widya Cipta Dharma, Samarinda, 75123, Indonesia
ankga19@gmail.com
**Corresponding author*

Submitted: 2023-02-20; Accepted: 2023-02-28; Published: 2023-03-01

***Abstract*—** Location-based service systems or better known as Location-Based Services (LBS) are information services in the form of geographic information accessed using a smartphone via a mobile network connection for precise mapping. This research focuses on profile information and routes for office locations, places of worship, health, schools, emergency places, markets, sports facilities and infrastructure, companies and ATMs in Paser Belengkong District with location points that utilize the Location Manager Application Programming Interface technology. API maps and Location Provider (API Location) from Google. The data collection method used was interviews by asking questions related to important location data in Paser Belengkong District. By way of observation, namely by making direct observations of the villages in Paser Belengkong District. In this research the system development method uses the waterfall and the testing techniques used are Black Box and Beta Testing. The supporting software used is Android Studio, Xampp, Sublime Text, Google Maps and software design using the Unified Modeling Language (UML) modeling system, Use Case Diagrams, Activity Diagrams, Sequence Diagrams and Class Diagrams. Test results by utilizing Location Based Service Technology which combines Geographic Information System, Internet Service,

***Keywords*—** Location Based Service, Android, Maps API, Belengkong Paser.

I. INTRODUCTION

Paser Belengkong District is a sub-district located in Paser district, East Kalimantan. Geographically, Paser Belengkong District is located between 116°12'29.19" East Longitude and 01°57'22.7" South Latitude which has 15 villages. There are several important locations in the Paser Belengkong sub-district that are often sought after by the community, both the local community itself and those from outside the Paser Belengkong sub-district. Important locations in Paser Belengkong sub-district include offices, places of worship, health, tourist attractions, schools, shops, emergency areas, sports facilities and infrastructure (SARPAS), companies and ATMs. However, the problem that often arises when looking for important locations in the Paser Belengkong sub-district is the difficulty of the terrain and village areas that are far from each other from one village to another. Sometimes many people outside the Paser Belengkong sub-district don't understand the location they want to go to, sometimes someone will ask the surrounding community. However, it is possible that the information provided by the person being questioned is wrong. The public can also use the Google Maps application which is connected to the internet but sometimes problems arise, namely there is no data about the location being addressed (Safaat, 2019). To simplify this condition, we need an application that can be used to identify and find paths to these places. The LBS application is one solution to overcome this condition (Husna, 2018)

But at this time there is no application on mobile devices that utilizes technology to search important locations in the Pasir Belengkong sub-district. So with the development of technology, the implementation of the Location-Based Service (LBS) system is able to detect where the user is so that he can provide services according to the location of the user. This application works by first finding the user's position. With LBS, it is hoped that important locations in the Paser Belengkong sub-district can be accessed easily by users from outside the sub-district and within the sub-district. (Ichwan. 2013).

For this reason, the author is interested in creating content as a public service on Android in the form of a Location-Based Service (LBS) application for searching important locations in the Paser Belengkong sub-district. Namely a content service to obtain a list of important locations by utilizing GPS facilities on Android to display a map that can show the route to the destination location from where the user is, as well as other features about the application.

Azahari, Bustomi, T., & Setiawan, A. (2023). Location Based Service for Important Locations in the Paser Belengkong District. TEPIAN, 4(1). 24-31. https://doi.org/10.51967/tepian.v4i1.2220

II. LITERATURE REVIEWS

A. Android

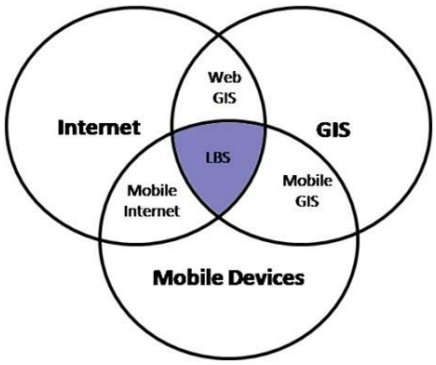
Android is a java based system that runs on Linux Kernel 2.6. Android was released by Google, under the Open Handset Alliance, in November 2007. Along with this launch, Google created a central Development Tool and guide for becoming a developer on the system. Software Development Kit (SDK) guide files, and the developer community can be obtained on the official Google Android website. (Adi Nugroho. 2010)

Android offers a different environment for developers. Each application has the same level. Android doesn't differentiate between core apps and third-party apps. The Application Programming Interface (API) provided offers access to hardware, even cellphone data, or system data itself. Even users can delete core applications and replace them with third-party applications. (Billy. 2011.)

B. Location Based Service (LBS)

According to Safaath (2012), Location-Based Services or better known as Location-based services (LBS) are general terms used to describe the technology used to locate the devices we use. LBS is an information service that can be accessed via a mobile device using a mobile network, which is equipped with the ability to take advantage of the location of the mobile device. (Andi Juansyah. 2015)

The user therefore informs the service provider to obtain the required information, with reference to the position with that user. Location-based services can be described as a service that is at the confluence of three technologies, namely: Geographic Information system, Internet Service, and Mobile Devices. (Winarno, eddy. 2011). Technology location-based services can be seen in the picture 1.



Picture 1. *Technology Location based service*

C. Google Maps API

According to Ellian (2012), the Google Maps Application Programming Interface (API) is a library in the form of JavaScript which is useful for modifying existing maps on Google Maps as needed. In its development the Google Maps API is given the ability to take static map images. Perform geocoding, and provide direction determination. The Google Maps API is free to the public.

D. Global Positioning System (GPS)

According to Riyanto (2011), the Global Positioning System (GPS) is a radio navigation system for determining position using satellites. GPS can provide the position of an object on the earth accurately and quickly (three-dimensional coordinates x, y, z) and provide time information and continuous moving speed around the world.

To be able to know someone's position, a device called a GPS receiver is needed. The position is changed to a point known as a way-point which will later be in the form of latitude and longitude coordinates of a person's position or a location then displayed on the screen on an electronic map. Since 1980, GPS services, which were only for military purposes, have begun to open to the public. (Mala, Quirinus, 2015).

E.MySQL

According to Budi Raharjo (2015), MySQL is actually a product that runs on the Linux platform. Due to its open source nature, it can be run on a platform, both Windows and Linux. In addition, MYSQL is also a database access program that is networked so that it can be used for Multi User applications (multiple users). Currently MYSQL database has been used by almost all database programmers, especially in web programming. (Riyanto. 2011).

F. PHP (Hypertext Preprocessor)

According to Anhar (2011), PHP stands for "Hypertext Preprocessor". PHP is a server-side Web programming language (PHP is executed on the server side) HTML as embedded scripting, where the script is integrated with HTML and resides on the server but is included with regular HTML. PHP is known as a scripting language that integrates with HTML tags, is executed on the server and is used to create Web pages. The concept of PHP is very simple, even simpler than CGI. So that in creating a PHP document, it is enough to create an ordinary PHP file, only adding the program code enclosed in <?..?> signs. (Kusuma. 2012).

G. CodeIgniter

According to Betha Sidik (2012), CodeIgniter is a php framework that is open source and uses the MVC (Model, View, Controller) method to make it easier for developers or programmers to build a web-based application without having to make it from scratch.

H. MVC concept

According to Badiyanto (2013) "MVC is a method for creating an application by separating data or queries (Model) from the display or user interface (View) and how to process it (Controller). Programs that use MVC are usually packaged in a framework, so application developers just have to use the framework that has been provided.

Azahari, Bustomi, T., & Setiawan, A. (2023). Location Based Service for Important Locations in the Paser Belengkong District. TEPIAN, 4(1). 24-31. https://doi.org/10.51967/tepian.v4i1.2220

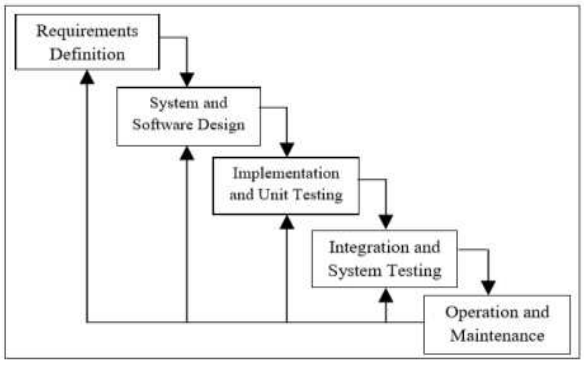
I. JSONs

According to Detiel (2012), JSON (Javascript Object Notation) is a format
easy data exchange, easy for humans to read and write, and easy for computers to translate and generate. JSON is a text format that does not depend on any programming language because it uses the language styles commonly used by C family programmers including C, C++, C#, Java, JavaScript, Perl, Python and others. Because of these properties, it makes JSON ideal as a data exchange language.

III. RESEARCH METHOD

A. Waterfall Model

The waterfall model is a traditional software development process that is commonly used in most software development projects. It is a sequential model, so that the completion of one set of activities causes the start of the next activity. It is called a waterfall because the process flows systematically from one stage to another in a downward model. (Anhar. 2011). Forms a framework for software development. Several variants of the model exist, each using a different label for each stage. In general, however, this model is considered to have six distinct stages as shown in the software process model which is a simple description of the software process that provides a view of the process. Model Waterfalls can be seen in the picture 2.



Picture 2. Model *Waterfalls*

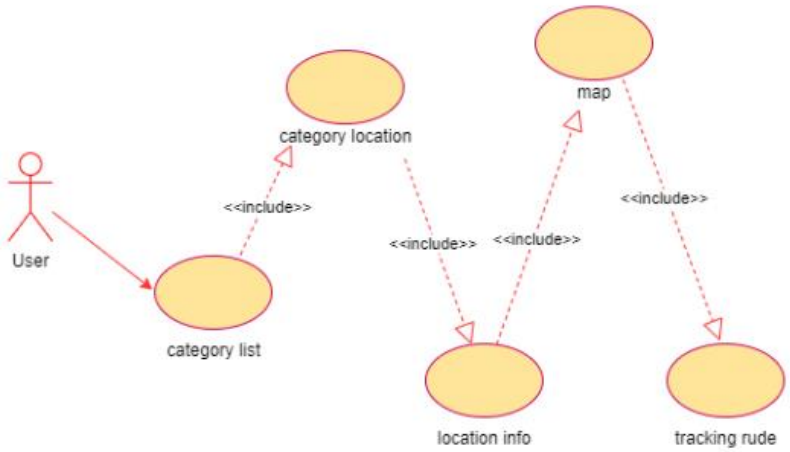
B. Application Development Stage

The application development stage has the goal of designing a new application system that can solve the problems faced by an organization or company. Software Development Live Cycle (SDLC) is the process of developing or changing a software system using models that people used to develop previous software systems. The model used in the LBS application design research for this location-based service information technology is the waterfall model. (Andria. 2018) The waterfall model consists of 5 stages, namely Requirements Analysis, Design, Coding, Testing and Maintenance.

IV. RESULTS AND DISCUSSION

A. Use case Diagrams

Use case Diagrams shosws, th users can see that the system design procedures for user actors can search lists of place categories, location categories, location info, location maps and routes to locations. (Safaat, Nazaruddin, 2012) User use case can be seen in the picture 3.

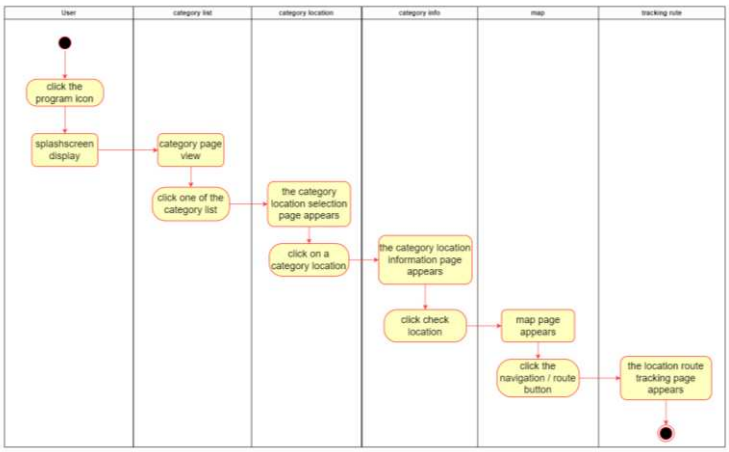


Picture 3. User Use case Diagram

Azahari, Bustomi, T., & Setiawan, A. (2023). Location Based Service for Important Locations in the Paser Belengkong District. TEPIAN, 4(1). 24-31. https://doi.org/10.51967/tepian.v4i1.2220

B. User Activity Diagrams

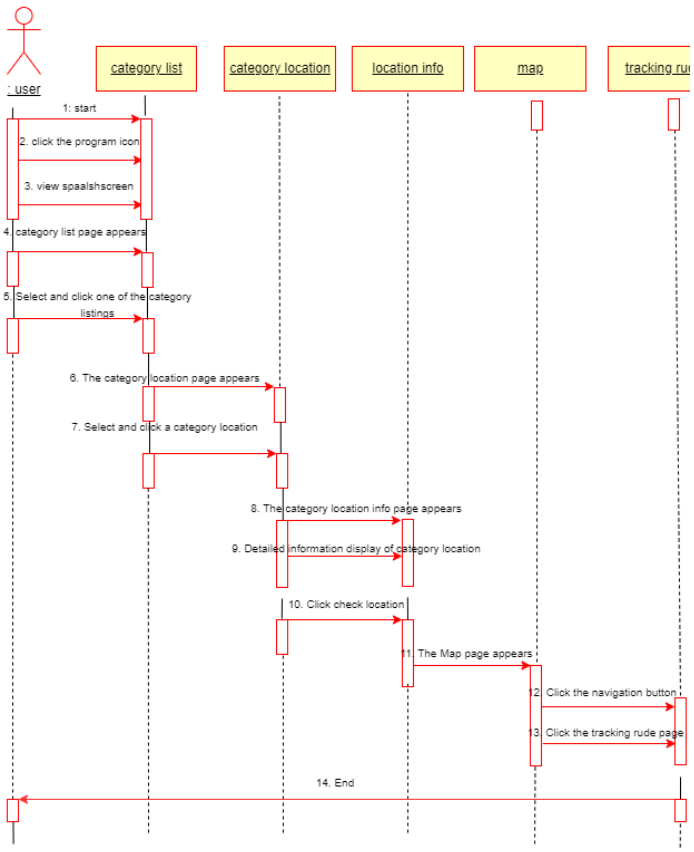
The User Activity Diagram describes the events of the user or users on the category page menu in Android. Where the user clicks on the program icon then the program splash screen image appears after that the user can select the category menus in the Android program including place categories, location categories, category location information, maps, then routes or navigation maps. (Safaat, Nazaruddin 2013). User activity diagram can be seen in the picture 4.



Picture 4 User Activity Diagram

C. Sequence Diagram

Sequence Diagram describes the events of a user accessing the LBS application. Where the user starts clicking the application icon then a splash screen appears then the category list page appears, the user clicks a category list, then the category location page appears, the user clicks a category location, then the detailed information page appears from the category location selected by the user, then if the user wants to check the location, the user can click check location, then the maps page appears which is connected to the gmaps application then the user clicks the navigation button it will display the tracking route from the user's position to the location of the intended category. (B, Indra Yatini 2011). User Sequence Diagram can be seen in the picture 5.



Picture 5 Sequence Diagram

Azahari, Bustomi, T., & Setiawan, A. (2023). Location Based Service for Important Locations in the Paser Belengkong District. TEPIAN, 4(1). 24-31. https://doi.org/10.51967/tepian.v4i1.2220

D. Class Diagrams

The user class diagram has attributes in the form of a username with primary key, password, name, photo, active_active, active_date, registered_date with admin and contributor levels, where the admin can edit profile data, add users, reset users, add categories, change categories, delete categories, add location, change location, and delete location while contributors can change profile data, add location, change location and delete location. (Rosa and Salahuddin, 2015). The category class has class attributes in the form of category_code with primary key and category name, Location Class has class attributes in the form of kd_location as primary key, location_name, description, address, no_hp, website, latitude, longitude, link_maps, images, and category code as foreign key.(Yuhefizar. 2013). Where 1 category can add 1 or more locations.

E. Database Structure

1. Tbl_categories
   Table name : tbl_categories
   Primary keys : kd_categories
   Information : this table is used for store category data. Table categories can be seen in the table 1.

Table 1. tbl_categories

Field name	type	Long	Information
Kd_categories	int	11	Contains kdcategories
Category	Varchar	50	Contains categories

2. Tbl_user
   Table name : tbl_user
   Primary keys :username
   Information : this table is used to store stored user or admin data. Table user can be seen in the table 2.

Table 2 tbl_user

Field name	type	Length	Description
username	varchar	100	Provide a username
password	varchar	100	Fill in the username and password
Name	varchar	100	Fill in the name
Photo	varchar	100	Include a photo
mobile phone	varchar	15	Enter the cellphone number
e-mail	varchar	100	Fill in the email number
nik	varchar	50	Fill in the employee identification number
s_active	varchar	5	give active status
levels	varchar	20	Gives admin or contributor status
active_date	date		Active date
birthdate	date		User's date of birth
tmt_birth	varchar	100	The place of the user's birth date

3. tbl_location
   Table name: tbl_location
   Primary keys :kd_location
   Description :used to store all location data. Table location can be seen in the table 3.

Table 3. Tbl_location

Field name	type	Length	Information
Kd_location	int	11	Provide location code
Location_ name	varchar	100	Enter the name of the location
Description	Text		Fill in a description
Address	Text		Fill in the address
Phone number	Varchar	25	Enter the cellphone number
Website	Varchar	100	Contains websites
Latitudes	Varchar	20	Fill in the latitude of the place
Longitude	Varchar	20	gives the longitude of the place
Link_maps	text		Contains a map address link
Picture	Varchar	100	Image address
Contributor	Varchar	50	Filled with contributor data
Verification	Varchar	20	Fill in the verification data

F. Splash Screen page

The Splash Screen page is the initial appearance of the application which contains the text "Welcome Important Locations in the Paser Belengkong District Area" which appears when the application is first opened. Splash Screen page can be seen in the picture 7.

Picture 7 Splash Screen Page

G. Category List Page

The category list page is the display after the Splash Screen, there is a list of categories that users can choose from, such as offices, places of worship, tourist attractions, health, schools, emergency, markets, SARPAS sports, companies and ATMs. Category List Page can be seen in the picture 8.

Azahari, Bustomi, T., & Setiawan, A. (2023). Location Based Service for Important Locations in the Paser Belengkong District. TEPIAN, 4(1). 24-31. https://doi.org/10.51967/tepian.v4i1.2220

Picture 8 Category List Page

H. Category Location Page

The category location page is displayed after selecting the desired category, then the location page appears as shown above. This is an example of the location page for the office category. Then the user can select and click on the desired location. Category Location Page can be seen in the picture 9.

Picture 9 Category Location Page

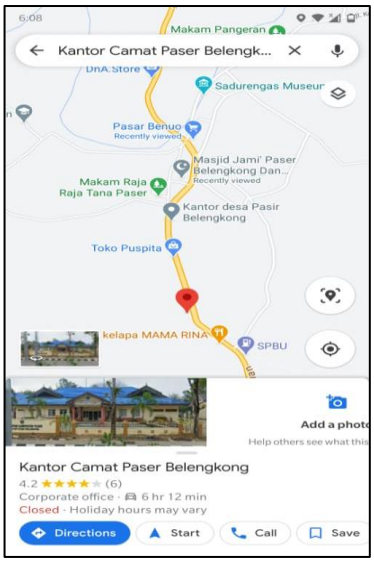
I. Location Info Page

The location info page is a display after the location of the category selected by the user will display the location info. In this view there is a photo of the location, a description of the location, the address of the location, the location's cellphone number, the web or social media from the location then there is also a mini gmaps view that displays a glimpse of the location, then there is a check location button to direct the location to Google maps. Location Info Page can be seen in the picture 10.

Picture 10 Location info page

J. Map info page

The map info page is a page display from Google Maps after previously clicking on check location. Then the system will automatically redirect from the location info page to the gmaps application. (Budiman, Edy. 2016) On the gmaps page it will display the coordinates of the location the user has chosen where there are many information buttons that the user can select such as directions which will track the route from the user's position to the selected location position then there is a start which will immediately show the location of the road from the user's location to the desired location. the user wants, can also change the map view or a satellite view.Map info page can be seen in the picture 11.



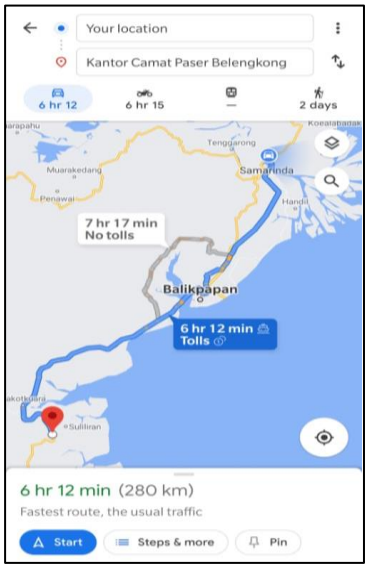
Picture 11 Info maps page

K. Route Tracking page

The route tracking page contains the position of the user's selected location and where the user is currently. The selected location is marked with a red icon and the user's current location is marked with a blue icon. In the

Azahari, Bustomi, T., & Setiawan, A. (2023). Location Based Service for Important Locations in the Paser Belengkong District. TEPIAN, 4(1). 24-31. https://doi.org/10.51967/tepian.v4i1.2220

location map section, there is also a travel route to the user's selected location, in the map section there is also the distance to the user's selected location and the distance to the closest turn to the current user, in addition to the distance to the map there is also information about the road you will pass if you go to the selected location and there is a travel time to the location that the user wants to visit. Route tracking page can be seen in the picture 12.



Picture 12 Route Tracking Page

L. Testing

In the Information Technology application Location based service Search for Important Locations in the Paser Belengkong District Area Based on Android, testing using the black box method focuses on the functional requirements of the software that seeks to find errors such as incorrect application functions, interface errors, structured data or database errors, errors performance. The test results can be seen in table 4.

Table 4 Testing

Name	Cases and Test Results Test Scenario	Expected results	Test result
Splash Screens	1. Open Application	Displays the text "Welcome Important Location in the Paser Belengkong District"	[✓]accordance [ ]
Category List Page	2. Finds the category list menu	Displays a category list menu and can select the desired category	[✓]accordance [ ]
Category Location Page	3. Find category locations	Switches to the category location view and can select the desired category location.	[✓]accordance [ ]
Location details page	4. Find location details	Displays detailed location views such as photos, descriptions, url maps, and check location buttons	[✓]accordance [ ]
Google Maps page	5. Pressing the check location button in the location detail view	Switch to the Google Maps application to show the route to the desired location	[✓]accordance [ ]

V. CONCLUSION

Information Technology Application Location based service (LBS) Search for Important Locations in the Paser Belengkong Sub-District Based on Android is built using the Google Maps API, making this application using Android Studio as the text editor, designing and manufacturing this application using the programming language Java, PHP, HTML, Mysql as a temporary website database.

With the development of the Location-based service (LBS) Information Technology application, Search for Important Locations in the Android-Based Paser Belengkong District can make it easier for the public and mobile users who already support the Android operating system to find important information and locations in Paser Belengkong District, such as offices, places worship, tourist attractions, health, schools, emergencies, markets, sports facilities and infrastructure, companies/factories, and ATMs.

With the development of the Location-based service (LBS) Information Technology application, Search for Important Locations in the Android-Based Paser

Belengkong District can help the community find routes to locations in the selected Paser Belengkong District and display them on Android mobile devices, along with route markers that can be taken.

In the Information Technology Location based service (LBS) application for Searching Important Locations in the Paser Belengkong Sub-district based on Android, there are 3 (three) users, namely admin as administrator, contributor as a user who can add location data and users as ordinary users, admins who are useful in manage location map data in Paser Belengkong District, whether it's information about the category or location or a photo of the location. For Contributors, they can add locations in Paser Belengkong District, both information about the location and photos of the location. Users can only view the location map, information about the selected location, location photos, and the route to the selected location.

REFERENCES

Adi Nugroho. 2010. Object Oriented Software Engineering with the USDP Method. Andi : Yogyakarta (UML 1)

Andi Juansyah. 2015. Development of Assisted Global Positioning System (A-GPS) Based Child Tracker Application with Android Platform. Indonesian Computer University. Bandung

Anhar. 2011. Self-taught PHP & MySQL. Agromedia Library. Jakarta

Andria. 2018. Domains and Hosting. Deepublish. Yogyakarta

Ardhana, YM Kusuma. 2012. PHP Completes 30 Million Website. Jakarta: Jasakom

B, Indra Yatini. 2011. Flowcharts, Algorithms and Programming Using the C++ Builder Language. Science House. Yogyakarta

Betha Sidik. 2012. Using the CodeIgniter 2.x Framework to Facilitate the Development of Web Application Programming with PHP 5. Informatics Bandung, Bandung.

Billy. 2011. Design and Development of Applications for Monitoring the Use of Android-Based Children's Mobile Devices. November Tenth Institute. Surabaya

Budiman, Edy. 2016. Utilization of Location-based service Technology in the Development of Mobile-Based Mulawarman University Campus Profile Applications

Budi Raharjo. May 2015. Easy to Learn C# (C# Programming and Visual C#). Bandung Informatics

Detail. 2012. Java: How to Program. Pearson Education, Inc

Ellian Alqad. 2014. Railway Information Services using GPS, Google Maps, and Android. Journal of Engineering POMITS ISSN. Vol.1 No.1. 2014

Husna, Asmaul. 2018. Design and build an application for finding ATM locations and information by using an Android-based location-based service in South Sulawesi Province. Thesis Thesis. Faculty of Science and Technology UIN ALAUDDIN Makassar

Mala, Quirinus. 2015. Location Based Service Application To Search Bus Agent In Yogyakarta Area Based On Android Using Web Service. Thesis Thesis. STMIK AKAKOM Yogyakarta

M. Ichwan. 2013. Definition of Control System. the National Institute of Technology

Riyanto. 2011, Making Your Own GIS Platform Mobile Application for Java ME, Blackberry & Android. Andy, Yogyakarta

Rosa and Salahuddin, M. 2015. Structured and Object Oriented Software Engineering. Bandung: Informatics. Bandung

Safaat, Nazaruddin. 2012. Android-based Smartphone and Table PC Application Programming. Bandung: Informatics. Bandung

Safaat, Nazaruddin 2013. Android Based Application. Bandung: Informatics. Bandung

Safaat, Nazaruddin. 2019. Design and build Android and Web Applications Implementation on Applications: Android and Web-based Market Resto Using Location based services with Java, Mysql, Laravel, and firebase notifications. Bandung: Informatics. Bandung

Winarno, eddy. 2011. Making Your Own Android Applications For Beginners. PT Elex Media Komputindo, Jakarta

Yuhefizar. 2013. Easy & Cheap Ways to Build & Manage Websites. Yogyakarta: Science Graha.