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Multi Module System in Development of Information Location Based School Application

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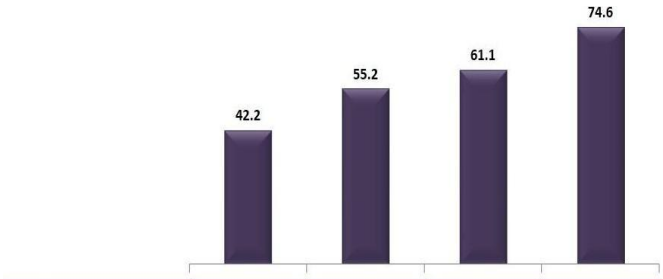
Abstract— Internet as a medium of communication and interaction are grown fast. Supported by the hardware and software that is currently growing more sophisticated, making the Internet accessible easier for every user including mobile internet. The availability of software application and the operating system and other hardware inaccessibility makes the Internet penetration superior than the desktop. It is inevitable with the operating system Android boost the development of the internet in the mobile line. Android allowss developers to innovate in the realm of software by developing a variety of application, one of the popular and has significant is the location-based functionality. Location-based application is used as a determinant of the location of the address of a public open space or closed or individuals or groups, such as the location of schools, buildings/offices, business space and others. In this research developed a location-based android application with local content comes with the distinguishing characteristics with existing application. The content in this application is school information and supported by the management application (back end) and the front display application (front end) with characteristic features such as maps and routes and types of public transportation (public transportation). This application was developed with multi modules compiled into one unified application. The data is taken from the source directly concerned schools and data from relevant agencies. The Application aims to provide comprehensive information about the school to help users get the location and other information from the user's location.

Keywords- location-based; application; android; multi-module; mobile.

I. INTRODUCTION

Internet as a medium of communication and interaction are grown fast. Supported by the hardware and software that is currently growing more sophisticated, makes the Internet, including mobile internet accessible easier for every user. The internet user growth every year, most of them accessed by mobile device. Based on Indonesia Netizen Survey 2013 by MarkPlus Insight, Internet users in Indonesia has increased from the previous year, [1] from 62 million to 74,57 million in 2013 and almost 95% user access through mobile device as seen in (Fig. 1).



In million	2010	2011	2012	2013
Urban Population	121.16	123.24	123.57	133.73
Urban Family	30.29	30.81	31.61	34.72
Urban Internet User	37.56	50.53	56.38	62.19
Internet User	42.16	55.23	61.08	74.57

Figure 1. Internet Penetration Base Indonesia Population [1]

The availability of software application and the operating system and other hardware inaccessibility makes the Internet penetration superior than the desktop. It is inevitable with the operating system Android boost the development of the internet in the mobile line [2]. Android allows developers to innovate in the realm of software by developing a variety of application, one of the popular and has significant is the location-based functionality

Location-based application is used as a determinant of the location of the address of a public open space or closed or individuals or groups, such as the location of schools, buildings / offices, business space and others. A wide variety of location-based application built by developers in the form of Android which is in general , but application that contain local content has not been developed.

In this research developed a location-based android application with local content comes with the distinguishing characteristics with existing application. The content in this application is school information and supported by the management application (back end) and the front display application (front end) using AR technology with characteristic features such as maps and routes and types of public transportation (public transportation). AR allows interaction with 3D virtual objects and other types of information superimposed over 3D real objects in real time [3], [4]. There are some researches that using AR technology. [5], [6] and [7].

This application was developed with multi modules compiled into one unified application. The data is taken from the source directly concerned schools and also from relevant agencies. The Application aims to provide comprehensive information about the school to help users get the location and other information from the user‘s location.

II. METHODOLOGY

This research focused on development of mobile application which contain Data of School information. Research data consists of primary and secondary data. The primary data obtained from the survey results directly related to the school to give a form field survey to a representative of the school. Secondary data is data obtained from Depok city education office (depok.go.id) and Google maps for data latitude and longitude coordinates of the location of the school.

This research uses experimental research laboratory also testing and evaluation in the some school location to get a real test results.

Application development in multi-module system by developing module application such as back end application and front end application .

The stage of this research as seen in (Fig. 2):

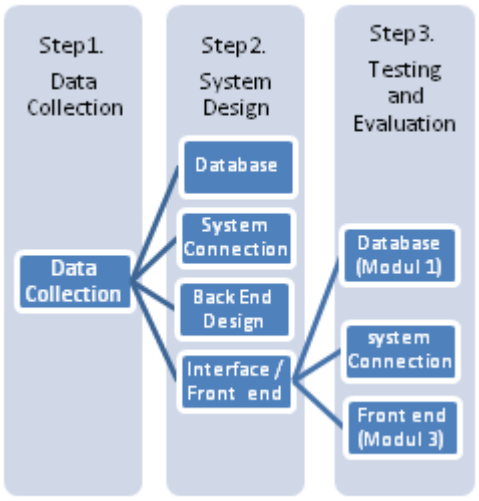


Figure 2. The stage of research

A. *Data Collection*

The Data consist of primary data and Secondary data. Primary data obtained from the survey results directly related to the school to give a form field survey to a representative of the school. Secondary data is data obtained from Depok city education office (depok.go.id) and Google maps for data latitude and longitude coordinates of the location of the school.

B. *System Design*

Application design using UML diagrams to explain the process and information flow system developed by applying three models form of diagrams: Use Case Diagram, Activity Diagram and Collaboration Diagram [8].

C. *Testing and Implementation*

The Application tested in laboratory and in the real school location also in the some location near the school. This step there are three modules that have to be tested: Database, system connection and front end module. In Database module, there are synchronize between data in Google map and the real location. The addition of a database and latitude and longitude coordinates are the advantages of module 2. The module 3 is the final module developed, with complete application module # 2 in terms of information content, connection, graphic user interface (GUI) that is more user friendly.

III. RESULT AND DISSSION

This application developed using the Java programming language and the Eclipse software as a text editor. The information display supported by programming language for running with good support systems, i.e. cascading style sheets, JavaScript, and PHP.

A. *System Design*

Application design using UML diagrams to explain the process and information flow system developed by applying

three models form of diagrams: Use Case Diagram, Activity Diagram and Collaboration Diagram [8].

In (Fig.3) the use case diagram illustrates how the flow of the interaction between user and search application this school. Users are divided into three groups, namely Public users, the school administration, and the Super Administrator. Public users who have a use case that is choosing three school level, search with AR (augmented reality) and are able to search by Map Info View School; while the school administration's right are they can retrieve and update School Info, and the last group is Super Administrators are able to do similar things like school administration but they can create a New school Account.

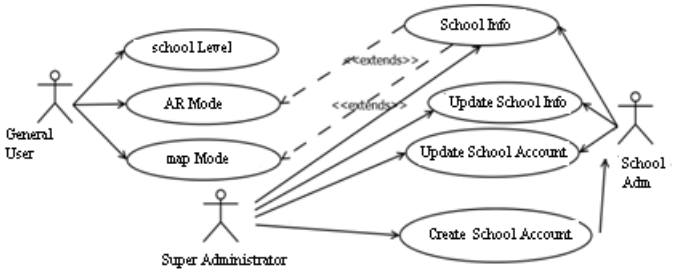


Figure 3 The Use Case Diagram

B. *Back-end modules*

Back-end modules are built to optimize the management and updating of data and related information on the school. The module is built online application on the server to do management related processes such as updating and creating data.

This application module can only be accessed by a manager who has the right with level as the Super Administrator who serves as the holder full rights and control of the overall system-level database and administrator can perform of limited the update and management

This application module can be accessed at the URL address http://arschool.web.id. The module view can be seen in (fig. 4).

Figure 4. School Database System at Depok

C. *Front-end modules*

Front-end module is an application developed as the interface that connects the user to the database system. This application is developed on the Android operating system. Front-end module is divided into three modules. In the initial design, each module is built separately, that the final stages of development will be integrated into one unified system. The relationship between the modules is able to be interconnecting or refinement of previous modules.

1) *Modul 1*

This module is the basic module of the front-end module. In this module provides the location coordinates to match the coordinates of the data field survey with survey coordinates to Google map. In this application module has the basic format is adaptable to map the location of school choice [9].

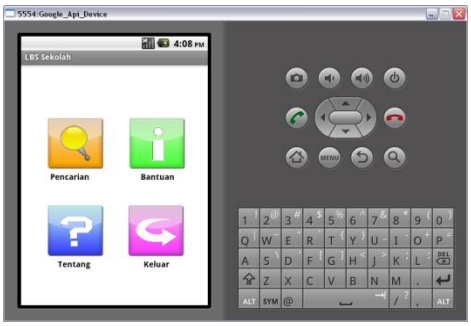


Figure 5. Menu Design on Emulator

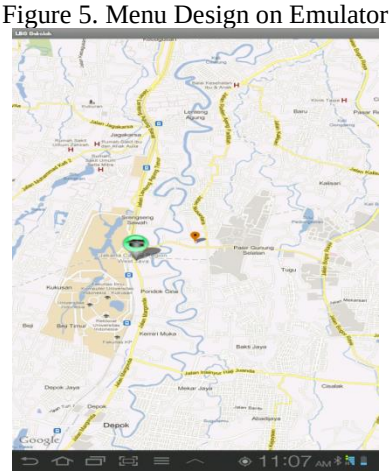


Figure 6. Design of University Marker on Mobile Device.

2) *Modul 2*

Module # 2 is a refinement of the previous module. The addition of a database and latitude and longitude coordinates are the advantages of module # 2 compared to the previous module [10]. Better interface design developed in this application module. The illustrated can be seen in the following pictures. Application module named the School AR application (Fig. 7). Application module named the # 2 School AR application.

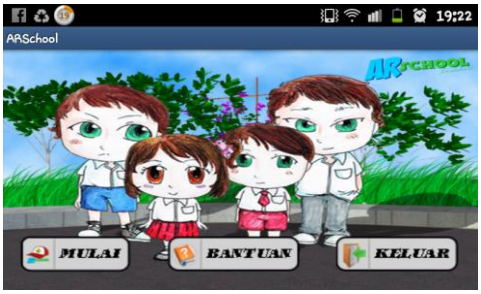


Figure 7. ARSchool Application

Figure 8. Choosing School on ARSchool

Figure 9. School Direction on ARSchool.

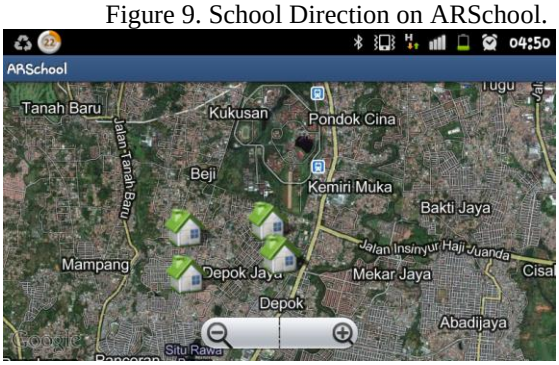


Figure 10. School Map on ARSchool

In application module # 2 school information display on the map already experiencing updating data and information than ever before.

3) Module 3

This module is the final module developed, with complete application module # 2 in terms of information content, connection, graphic user interface (GUI) that is more user friendly. The advantages of this module compared to the previous module is additional picture information better schools and amenities, coupled with the features of public transport / city from a certain point to the location of the intended school. Although the overall content and the system has not been optimal and complete, however this module displays application better than previous module. Fig..11. Direction Guide (Modul#3)

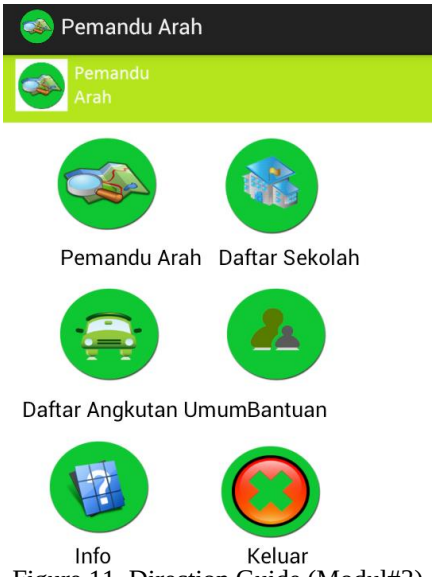


Figure 11. Direction Guide (Modul#3)

Figure 12. List of Schools

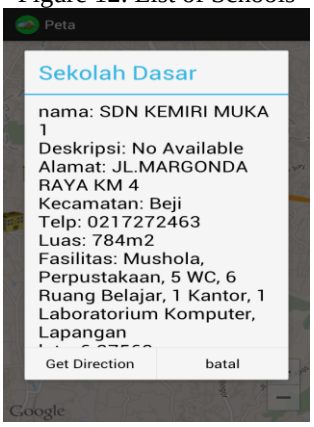


Figure 13. School Information

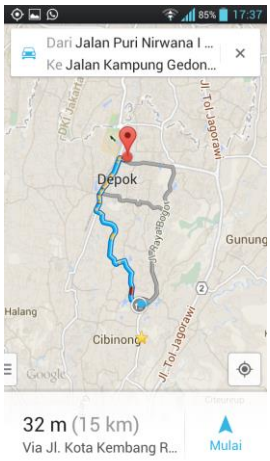


Figure 14. Navigation from User Location to School Location

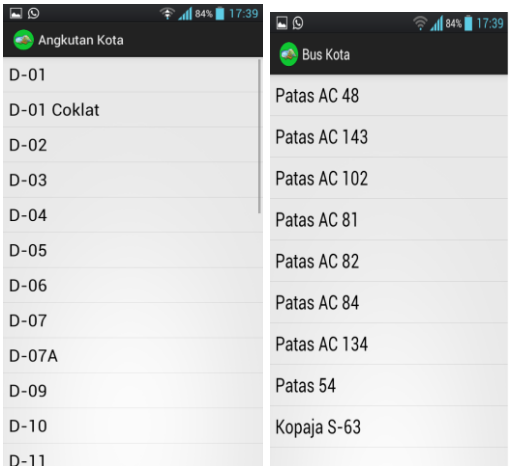


Figure 15. List of Public Transportation

IV. CONCLUSION

The implementation of the system multi module location-based application development on Android devices is expected to facilitate the work of the development of a variety of programmers. Multi module system in this research does not require that each programmer / developer interdependent of each module, but in the future is able to integrate with each other between the applications being built. The process of integration between applications still needed. However, the concept of openness between modules is expected to ease the process of integration and the achievement of the overall system interoperability. The challenge of this research is the adjustment between the latitude and longitude coordinates of the location of the field survey data with the coordinates of the data on Google map as a base map on which the application is developed.

ACKNOWLEDGMENT

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REFERENCES

[1] Marketers, "MarkPlus Insight: Pengguna Internet Indonesia 74 Juta di Tahun 2013", Marketeers Magazine, Nov 2013 Retrieved 8 December 2013 from http://www.the-marketeers.com/archives /Indonesia%20Internet%20Users.html#.UqT_OaCJiYS

[2] Ivan Michael Siregar, et all, "Mengembangkan Aplikasi Enterpise Berbasis Android", Bandung, 2010

[3] Azuma, R.T, "Survey of Augmented Reality, Presence: Teleoperators and Virtual Reality", 6(4), pp. 355-386, 1997.

[4] Azuma. R., Baillot. Y., Behringer. R., Feiner, S., Julier, S., MacIntyre, B, "Recent Advances in Augmented Reality", IEEE Computer Graphics and Animation, Nov/Dec, pp. 34-47J. Clerk Maxwell, A Treatise on Electricity and Magnetism, 3rd ed., vol. 2, Oxford: Clarendon, 1892, pp.68–73, 2001.

[5] Kato, H et al, "ARToolKit version 2.33 : A software library for Augmented Reality Application", Human Interface Technology, University of Washington, 2001.

[6] Hammad, A., B. Khabeer, E. Mozaffari, P. Devarakonda and P. Bauchkar, "Augmented Reality Interaction Model For Mobile Infrastructure Management Systems", CSCE Specialty Conference on Infrastructure Technologies, Management and Policy Canada, June 2-4, 2005.

[7] O. Bimber and R. Raskar, "Spatial Augmented Reality : Merging Real and Virtual Worlds", Wellesley: A K Peters, 2005.

[8] Schmuller Joseph, "Sams Teach Yourself UML in 24 Hours", Sams Publishing, 2004.

[9] Nuryuliani, Selvi Isni Hadi Saputri, Miftah Andriansyah, "Aplikasi Pencarian Lokasi Sekolah Menggunakan Metode LBS Berbasis Android", Kommit 2012, Universitas Gunadarma, 2012

[10] Fariz Ramadhan, Nuryuliani, "Aplikasi Arschool Menggunakan Telepon Genggam Berbasis Sistem Operasi Android", Repository of Universitas Gunadarma, 2012, Retrieved 2 December 2013 from http://repository.gunadarma.ac.id/bitstream/123456789/5147/1/APLIKASI%20ARSCHOOL%20MENGGUNAKAN%20TELEPON%20GENGGAM%20BERBASIS%20SISTEM%20OPERASI%20 ANDROID.pdf

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