

ICT NUSANTARA: AN ANDROID BASED TOURISM SUPPORTING AND ADVERTISING APPLICATION USING GOOGLE MAPS

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ABSTRAK

Aplikasi penunjang wisata perlu untuk dikembangkan pada platform mobile untuk membantug mobilitas wisatawan. Sesuai dengan data statistik dari Gartner dan IDC (International Data Corporation), Android adalah system operasi untuk smartphone yang paling banyak digunakan di dunia tahun 2011, dan Gartner memprediksi jumlah pengguna Android akan meningkat hingga 48,8%. Oleh karena itu, maka platform mobile yang paling sesuai untuk dikembangkan untuk memenuhi kebutuhan pengguna tersebut adalah Android. Aplikasi “ICT Nusantara” adalah aplikasi berbasis Android yang bisa ditujukan membantu wisatawan menemukan tempat-tempat tujuan wisata. Makalah ini juga menyajikan proses pengembangan aplikasi ICT Nusantara Mulai dari Bahasa pemrograman hingga database. Pada pembahasan Bahasa pemrograman, beberapa teori dasar dalam pembuatan aplikasi termasuk Bahasa pemrograman yang dipakai seperti java, javascript, dan HTML untuk layout dibahas secara ringkas. Selain itu, teori dasar tentang basis data seperti mySQL, Sqlite dan jQuery juga dibahas secara ringkas. Kebutuhan perangkat lunak dan keras juga disajikan untuk bisa dikembangkan lebih lanjut. Pengujian terkait wisatawan dan tujuan wisatanya, pemilik tujuan wisata, pemasangan iklan, dan fasilitas public juga dibahas pada makalah ini. Aplikasi baik dari sisi user dan admin sebagai back-end juga dibahas secara rinci namun ringkas. Aplikasi user menggunakan android sebagai platform yang mempunyai fungsi utama untuk melihat peta wisata, mencari lokasi, memberikan petunjuk arah, dan menampilkan gambar-gambar terkait. Sedangkan aplikasi admin menggunakan server berbasis XAMPP yang mempunyai fungsionalitas untuk melakukan operasi perubahan data. Aplikasi admin bisa melakukan operasi penambahan dan perubahan lokasi wisata, operasi terhadap data iklan, dan melakukan verifikasi data lokasi. Karena fungsionalitas tersebut jugalah, aplikasi ini juga bisa digunakan sebagai sarana advertising. Aplikasi ini juga menyediakan rekomendasi tempat tujuan wisata terdekat dengan sesuai dengan lokasi pengguna.

Kata Kunci: Wisata, Android, Iklan

ABSTRACT

Tourism support applications need to be developed on a mobile platform to assist tourist mobility. According to statistics from Gartner and IDC (International Data Corporation), Android was the operating system for smartphones that was most widely used in the world in 2011, and Gartner predicts the number of Android users will increase by 48.8%. Therefore, the most suitable mobile platform to be developed to meet the needs of these users is Android. The “ICT Nusantara” application is an Android-based application that can help tourists find tourist destinations. This paper also presents the process of developing Nusantara ICT applications, starting from programming languages to databases. In the discussion of programming languages, some basic theories in making applications including the programming languages used such as java, javascript, and HTML for layout are briefly discussed. In addition, the basic theory of databases such as mySQL, Sqlite and jQuery is also briefly discussed. Software and hardware requirements are also presented for further development. Tests related to tourists and their tourist destinations, tourist destination owners, advertising, and public facilities are also discussed in this paper. Applications from both the user and admin side as back-end are also discussed in detail but concisely. Application users use Android as a platform that has the main function for tourist maps, finding locations, providing directions, and displaying related images. While the admin application uses an XAMPP-based server that has the functionality to perform data change operations. The admin application can perform operations for adding and changing tourist locations, operations on advertising data, and verifying location data. Because of this functionality, this application can also be used as a means of advertising. This application also provides recommendations for nearby tourist attractions according to the user's location.

Keywords: Tourism, Android, Advertising

I. INTRODUCTION

TOURISM is a means to refresh the mind by momentarily escaping from the daily routine. Because of their short-lived nature and running away, tourists usually go to places they may not know well at all. Take for example the city of Bandung which is famous as a natural tourist destination and shopping by both local and foreign tourists. To support tourist mobility, applications need to be implemented on mobile devices. In

accordance with statistical data from IDC (International Data Corporation) and Gartner [1] for the most users of the smartphone operating system in the world in 2011 is Android, and according to analysis from Gartner Android users will increase to 48.8% [2]. Based on the results of the analysis above, the application that is qualified to be developed is Android.

Several tourism applications have been developed. Hai-ninh et al [3] evaluated tourism apps. Mathayomchan and Taecharungroj [4] use google map reviews for evaluate customer experience. Pan et al [5] assessed the security of android applications. Rago et al [6] reviews several applications using GPS. It can be noticed that Indonesian tourism app has been thoroughly explored. More enhancement using machine learning methods can be seen in [7,8] using standard machine learning and in [9] using recurrent architecture.

The main contribution of this paper is to present the development of the application "ICT Nusantara" which is one of the earliest applications on the Android mobile platform that can help find tourism spots. Because of these advantages, this application can also be developed as a means of advertising. This application provides recommendations for the nearest destination based on the user's location. Based on the formulation of the problem, the application aims to build a tourism application using Google Maps on the Android platform that can provide information about tourist destinations and the location of public facilities and can display ads from tourist places.

II. RESEARCH METHODOLOGY

A. Programming languages

1. Java was developed in 1991 by James Gosling, et al at Sun Microsystems. The initial target of java was to create software that was platform independent, but now java has penetrated the internet world [10,11].

Java in each platform must be installed 3 main components:

- a. Programming language
 - b. Java class libraries and interfaces
 - c. Java Virtual Machine (JVM).
2. PHP is one of the most widely used dynamic web programming languages [13]. The following items are advantages of the PHP programming language:
 - a. Programs made with PHP can run on all OS, meaning that all OS that has a web browser can use this application, and all OSes of course always have a web browser, Windows with Internet Explorer, Linux with Firefox, Macintosh with Safari, and mobile phones with Opera. Mini.
 - b. Very suitable and easy to implement on networked computers, the PHP MySQL program is simply installed on one of the server computers. On the client computer, we do not need to install any program anymore. On the client computer we simply open the program via a web browser.
 - c. Programs made with PHP are virus free. Until now the php program can not be infected with a virus. Most viruses infect files with *.exe and *.dll extensions, and files with other extensions. This proves that php files are very reliable and secure.
 - d. PHP is very stable and the level of security is quite high.
 - e. PHP is published for free. So that program users do not need to buy a license from PHP to use the program.
 3. Hyper Text Markup Language (HTML) is a markup language used to build a web page that display various information in an Internet browser [14,15]. HTML in the form of tag codes instructs the browser to produce the desired display.
 4. JavaScript is a scripting language that can be embedded in HTML code and processed by the browser on the client side. Therefore, the script is interpreted and executed by the browser at the client [16,17].

B. Database

The following is the theoretical basis of the database used in making this research.

1. *My SQL* is a multi-threaded, multi-user, SQL database management system software or DBMS (data base management system) with around 6 million installations worldwide. MySQL provides facilities for managing and managing databases, as well as providing a programming language (StructuredQuery Language) for managing client-server databases [18].
2. *SQLite* is an ACID-compliant relational database management system developed with relatively small code

library size in C. D. Richard Hipp maintains SQLite public domain project [13].

3. jQuery is a JavaScript framework / library that can help us simplify and speed up DOM (Document Object Model) processing. pada web page. With jQuery we can make the web more attractive and interactive easily. jQuery already automates common tasks and simplifies complex code. This library is very small and has a lot of plugins that can make it easier for us [18].

The features offered by jQuery are:

- a. Facilitate access and manipulation to certain parts of the page. jQuery offers a robust and efficient selector for retrieving specific sections of a document yang can then be manipulated.
 - b. Make it easy to change the appearance of the document. jQuery can change CSS appearance easily.
 - c. Respond to user interaction with the webpage. jQuery has a very elegant way of inserting an event into a section of a webpage.
 - d. Add animation. We can animate our webpage with jQuery.
 - e. Simplify the use of AJAX.
4. System Modeling Tools. In this case, the method used is the Object Oriented Method, which is a method that focuses on defining classes and the way in which they collaborate to meet customer needs. In other words, object-oriented methods are methods that focus on what objects are in the system. This system modeling tool is Unified Modeling Language (UML) which is not just a diagram, but also tells the context [19,20].
 - a. Use case diagram is a modeling tool to illustrate the behavior of the information system to be developed.
 - b. Sequence diagrams is a modelling tool to describe the behavior of objects in the use case by presenting the lifetime of the object and the messages sent and received among objects. Therefore, to describe a sequence diagram, it is necessary to know the objects involved in a use case along with the methods sent by the instantiated class into that object [21,22].
 - c. Class diagram is a diagram that enable the developer to visualize the structure of the classes of a system and is the most common type of diagram encountered in object-oriented system modeling. A class diagram consists of a set of classes, interfaces, and collaborations in addition to the relationships that exist within them [23,24].
 5. Database Design: The data system is an important component of a system because it functions as a provider of information. The database is a collection of interconnected data that is stored together and without unnecessary repetition (redundancy), to meet various needs [25,26]. Following items are the terms in the database:
 - A. ER diagram (entity-relationship diagram) is a database design model based on real-world conditions. This diagram consists of a set of objects and the relationships between them and can be used to describe the relationship between two or more entities [28,29].
 - B. *Cardinality* indicates the maximum number of entities that can relate to entities in another entity set [30,31]. The cardinality of the relationship between the two entity sets A and B is as follows:
 - a. One to one (1-1): Each entity in A is related to at most one entity in B and each entity in B is also associated with only one entity in A.
 - b. One to many (1-N): An entity in A can be associated with multiple entities in B whereas each entity in B can only be associated with one entity in A.
 - c. Many to one (N-1): An entity in A can only be associated with one entity in B while an entity in B can be associated with multiple entities in A.
 - d. Many to many (MN): An entity in A can be associated with multiple entities in B and an entity in B can also be associated with multiple entities in A.

III. RESULTS AND DISCUSSIONS

A. Developed System

System analysis is an activity to see systems that are already running, see which parts are good and which are not, and then document the requirements that will be met in the system [32,33]. The system built is a system that is used as a source of information for tourists, providing recommendations for the nearest place to go by knowing

the distance [34.35]. Tourists can also find out an overview of the tourist attractions they will go to by looking at the pictures of tourist attractions and find out the advertisements on these tourist attractions.

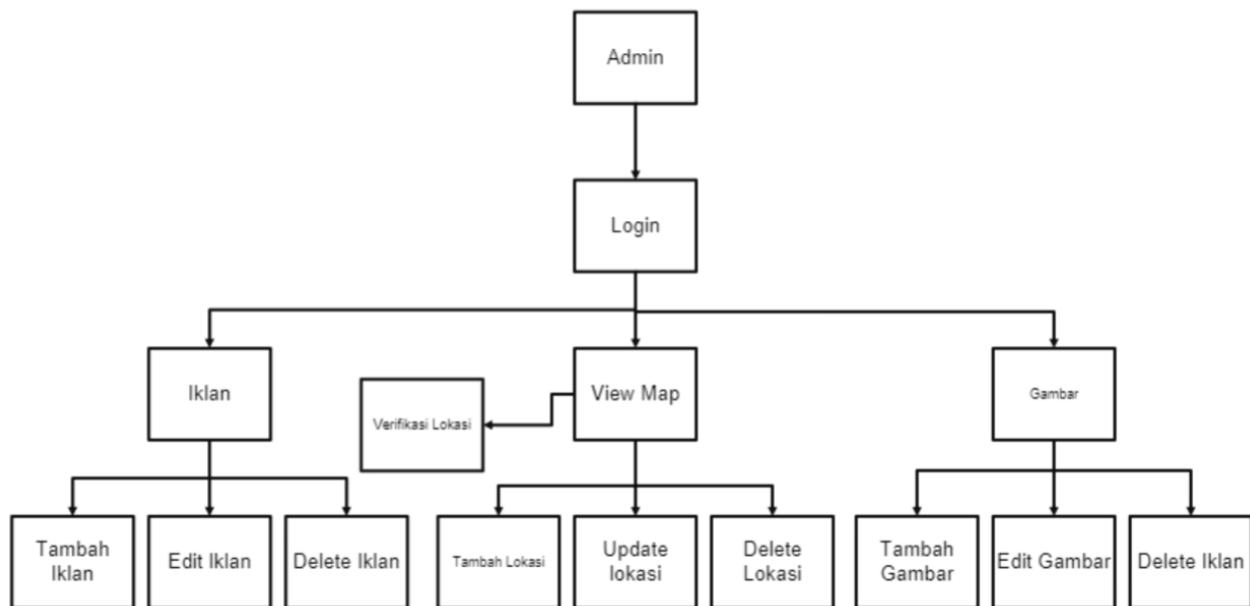


Figure 1. Main Functionality

The application developed consists of 2 applications, namely applications for tourists and applications for admins. The functionality of the application for tourists is as follows:

1. View tourist map: Tourists can view tourist attractions based on the selected category.
2. Search for tourist attractions: Tourists can search for desired tourist attractions according to predefined categories.
3. View tourist attractions by location: Tourists can search for tourist attractions by Radius and predefined categories.
4. Show current location: Tourists can find out where it is on the map.
5. *Get Directions*: Tourists can see the path to be taken.
6. Waypoint save: Tourists can save coordinates on a map of a location
7. *Get Info*: Get address information and telephone numbers of the specified tourist spots
8. Show Images: Displays pictures of tourist attractions along with their ads as specified
9. *Save to Servers*: Tourists can save the coordinates on a map of a location on the server computer and will be accommodated on the server to be verified by the admin

The functionality of the application for Admin as follows:

1. Add tourist attractions: This functionality is used by admins to add tourist attractions to the system database.
2. Update tourist attractions: This fusion is used by admins to change coordinates or change the content of images and advertisements for tourist attractions.
3. Delete tourist attractions: This functionality is used by the admin to delete tourist attractions stored in the system database.
4. Insert Ads: This functionality is used by admins to add ads to the system database.
5. Delete ads: This functionality is used by admin to delete ads that are in the system database.
6. Ad update: This functionality is used by admin to change the name of the ad or the image content of the ad in the system database.
7. Insert image: This functionality is used by admins to add data used for advertisements to the system database.
8. Image update: This functionality is used by the admin to change the image name or change the image in the system database.
9. Delete image: This functionality is used by admin to delete image in system database.
10. Location verification: This functionality is used by admins to confirm locations added by tourists.

2. System Requirements Analysis

Analysis of system requirements can be divided into two, namely analysis of hardware requirements and analysis of software requirements, below is an explanation of both [36,37]:

B. Hardware Requirements Analysis

The following are the hardware specifications used to develop this application at the Server side:

- Intel Pentium 4 Processor
- Random Access Memory (RAM) with 1024 MB of Memory
- Hard disk with 80 GB Storage
- Monitor
- Mouse and Keyboard
- Network Devices as needed

Whereas the following components are used at the client side:

- Android Mobile Phone Froyo 2.2
- RAM with 256 MB of Memory
- Internal storage with 10 MB capacity
- Internet Connection

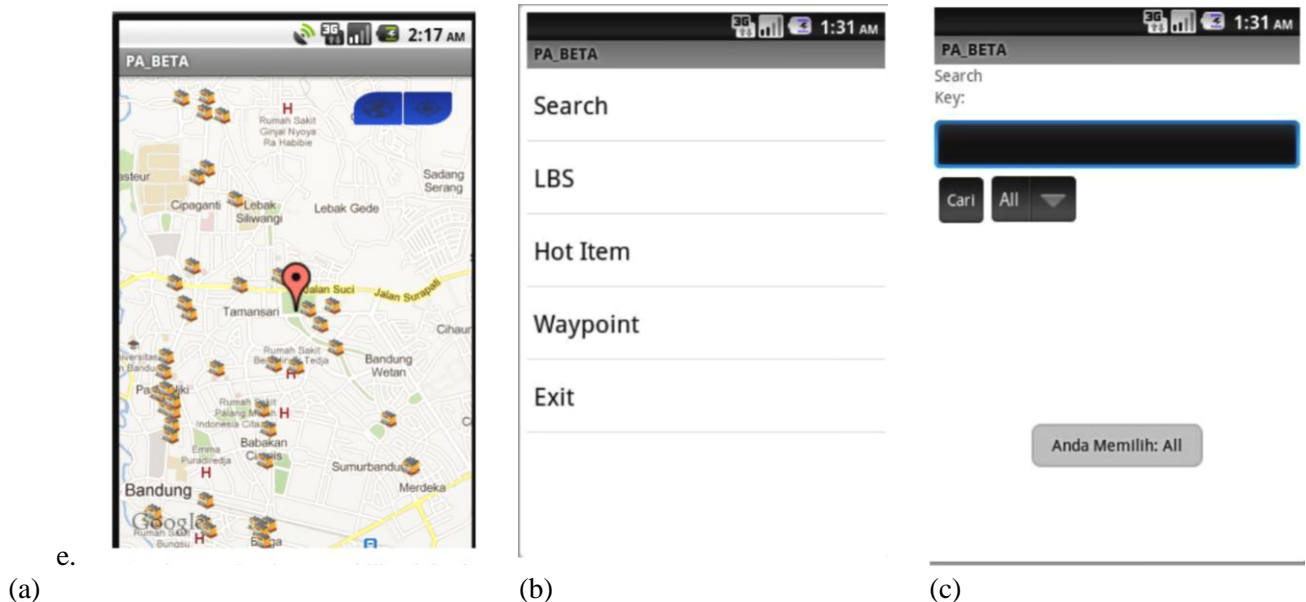


Figure 2. Mobile Application Display

C. Software Requirements Analysis

The following is a software specification yang needed to build this application:

The tools needed to build applications for customers are used:

- Windows XP operating system
- XAMPP 1.7.1, Apache 2.0, MySQL
- Java standard Development Kit (SDK) for windows version 1.6
- Android Standard Development Kit (SDK) windows version 4 r-08 and above
- IDE Eclipse 3.4 (Helios)
- Adobe Photoshop

To develop applications on the outlet and admin, this project uses:

- Windows XP operating system
- Adobe Photoshop CS3
- Macromedia Dreamweaver MX2004
- XAMPP 1.7.1, Apache 2.0, MySQL

The implementation stage is the implementation and realization stage of the design that has been made for the current system. The following is an explanation and discussion of system implementation which consists of software implementation and hardware implementation.

Table I.
System functionality

No	Functionality	Test result
1	Tourists can get information about tourist destinations	Passed
2	Owners of tourist attractions can display advertisements about their tourist attractions	Passed
3	Tourists get information about the location of public facilities	Passed

D. Software Specification

The software required by the server in implementing this application are:

- a. Windows XP SP 3 or above operating system
- b. XAMPP v 1.7
- c. Internet Browser (Mozilla Firefox)

while for the client, the software used for the implementation of this application is Android 2.2.

Table II.
Testing Summary

No	Test Case	Result
1	View Map	OK
2	Save WayPoint	OK
3	View My Location	OK
4	Find Route	OK
5	Location Based Service	OK
6	View Tourism Spots	OK
7	View Image	OK
8	Exit	OK
9	Find Tourism Spot	OK
10	List WayPoint	OK
11	List LBS	OK
12	Event	OK
13	Advertisement	OK
14	Food	OK
15	Add Location	OK
16	Edit Location	OK
17	Delete Location	OK
18	Set Images	OK
19	Save Advertisement	OK
20	Edit Advertisement	OK
21	Delete Advertisement	OK
22	Set Photo	OK
22	Edit Photo	OK
23	Add Photo	OK
24	Delete Photo	OK
25	Log In	OK

E. Hardware Specifications

The hardware used to implement this application on the server is:

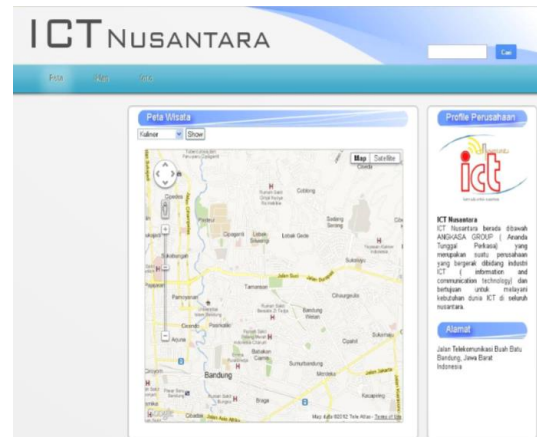
- a. Processor Intel Core 2 Duo 2.1 GHz
- b. Monitor, mouse and keyboard
- c. Storage of 320GB Hard Drive
- d. RAM 2 GB of memory
- e. Network devices as needed

The hardware used to implement this application in the client section is:

- a. Processor ARM 6
- b. RAM with 256 MB
- c. Internal Storage with 10 MB of capacity
- d. Network devices as needed



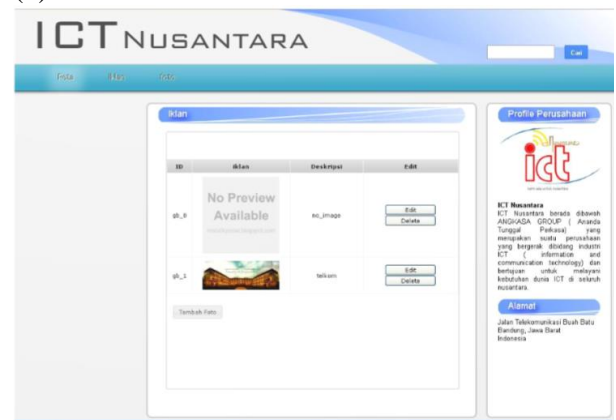
(a)



(b)



(c)



(d)

Figure 3. Implementation Display

F. Test Results

The admin menu diagram is shown in Figure 1. Meanwhile, the main feature test results are shown in table I. More results on blackbox testing is listed by Table II. Figure 2(a) shows the implementation of the location display. Figure 2(b) shows the main menu display. While Figure 2(c) is the search menu display.

Figure 3(a) shows the implementation of the login page. Figure 3(b) is an implementation of the location page. Then figure 3(c) is the implementation of the ad page. Finally, 3(d) is the photo page implementation.

IV. CONCLUSION

The conclusions that can be drawn from the development of this research are as follows. Applications can help tourists to get information about tourist destinations. Applications can also help tourist attractions to display advertisements about their tourist attractions. Finally, the application can help tourists to get information about the location of public facilities. The suggestions for the development of this research application are as follows. Applications require improvements to the interface to make it more interactive, such as using an image view. In addition, the application also requires additions to add location categories so that the application becomes more dynamic.

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