Review Article

Web Service on Android Mobile Platform in Application of Tourism Infrastructure Information

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Abstract - *This study intends to innovate an application of information system infrastructure to support the tourism of the city of Semarang. This application is developed for the community that needs information on tourism. This is based on the findings that a large part of the community is not aware of the infrastructure of tourism available in the city of Semarang. To produce a good application that meets the needs of users, this research method uses the Software Development Life Cycle. The system analysis model uses Unified Modelling Language (UML). This model facilitates the development and understanding of applications to be developed. The application uses web service because these web services are the best choice for web applications and mobile applications in general. Web service is built as an information gateway for tourists to travel to the city of Semarang. The benefits of this research can provide convenience in knowing the tourism infrastructure available to the community, especially tourists of Semarang city. In this application, we obtained an analysis and visualization of the integrated information infrastructure of tourism. This application is in the form of a mobile application.*

Keywords - *Infrastructure, Information system, Semarang, Tourism, Web service.*

I. INTRODUCTION

The city of Semarang, the capital of Central Java, is a tourist attraction with its own character and uniqueness compared to other cities in Indonesia. Geographically and sociologically, if managed and developed properly, it can be a tourist attraction that can experience a high number of tourist visits, both domestic and foreign, and potentially make the city of Semarang become one of the top tourist destinations on a national, regional, and even international level.

In developing a tourist destination, it should pay attention to various factors that affect the existence of a tourist destination. These factors consist of five elements that must exist in a tourist destination area: tourist objects and attractions, tourist infrastructure, tourism facilities, and conditions of the community or environment [1].

Information on tourism infrastructure has actually been prepared or provided in developing the tourism industry. However, the information of tourism infrastructure is still not fulfilled maximally to this day in the city of Semarang. Therefore, it is necessary to supplement the information system of tourism infrastructure in an integrated and maximal way to meet the needs of tourists to sustain the tourism industry.

With the recent advances in hardware and software technologies, the Internet is quickly evolving towards wireless adoption. New mobile applications running on these devices provide users with easy access to remote services available anytime and anywhere. At the same time, web service is used as a facility provided by a web to provide services (in the form of information) to other systems so that other systems can interact through services provided by a system that provides web services. Web service itself can be implemented in various fields, one of which is tourism information application. [2][3]

Thus it can be concluded that the information needs of tourism infrastructure are an important component as a supporter of tourist activities. Therefore the innovation of information system application of infrastructure supporting tourism Semarang city is designed and built. This application will use web services. With this application, the information needs of tourism infrastructure in the city of Semarang can be met and is expected to be a recommendation for the tourism developers.

Based on this background, the innovation of the information system of tourism infrastructure can be elucidated as follows: "How can we design the innovative application of information system for the tourism infrastructure in Semarang city and its geographical position, while ensuring that the database connected to the webserver?"

II. LITERATURE REVIEW

In this section, we present some of the related works done in the field of information system application of tourism infrastructure. Tourism facilities is a facility that provides services to tourists either directly or indirectly. Tourism infrastructure encompasses all the main facilities that enable the service provider to tourists. Implementation of tourism activities depends on the interaction between tourists and attractions, which is supported by various facilities and infrastructure of tourism [4].

As stated in [5], Tourism development can be done by improving the quality of tourism infrastructure as well as improving services conducted by structured, organized, and in one system integrated among the components of tourism development. Tourists need to be equipped with infrastructure to spur the economic growth of tourist destinations. Because of the economic incentives, the tourism development needs to consider the infrastructure because it will affect the quality of the object and the response of tourists in terms of tourist visits

Tourism development is also part of the development of the region, as realizing and developing the potential of tourist destination will help the regional economy. Tourism activities will not run smoothly if without any supporting role, such as the availability of means of infrastructure. The availability of such infrastructure means that tourists will have no difficulty having their needs met [6].

Research conducted by [7] states that personal tourism services are key to increasing the volume of tourists to an area. The service referred to by Gretzel et al., among others, provides a catalog of natural or cultural nuances in the local area, information on entertainment, attractions, sports activities, shopping centers, history related to the local area, transportation facilities, and infrastructure.

The availability of facilities needed by a tourism area is inseparable from information and communication technology that contributes economically to several regions proposed by [8]. Information and communication technology factors conveyed by Braun include the use of the internet as a tool for marketing in companies engaged in tourism, thus increasing tourist interest.

Braun's research [8] pointed out that tourist attraction and infrastructure have an effect on the satisfaction of tourists. Research Braun [8], supported by Sigala & Sakellaridis [9], states that Internet information technology in the form of the web contributes to the increase of regional tourism. The web is used to market existing products in an area and can be used for information facilities and infrastructure. Information systems tourism infrastructure is one indicator of tourism development. Facilitating the data processing infrastructure can be done with a computer-based system. This information system is designed for the process of collecting and storing tourist data. This information system can integrate spatial data (vector maps and digital images), attributes (database), and so forth. Braun [8] observes facilities and infrastructure in the form of information technology: the number, variety, easy access, and security as well as the mobile network easily accessible in the city.

Research conducted by [4] categorizes three tourism infrastructures, namely attractions, entertainment, and activities. Attractions referred to by [4] are the first buildings in the form of art galleries, historical buildings, and museums; second, tourist park, an agricultural area, zoo; third entertainment in the form of sports area, garden area; the four natural attractions.

Research conducted by [] that applications regarding tourism belonging to various countries This paper also focuses on various specific features set of the application that make it eligible for helping the people which ultimately help in making a good application for a smart city. On the basis of that, [] found out some common parameters that the good tourism application should have to embed in itself for a smart city purpose.

Various research information on tourism facilities and infrastructure as presented [10], [11], and [12] have conducted research on mobile search application locations that can guide and provide information about tourist destinations that can be accessed anytime and anywhere. Centris et al. [6], in their research, discusses mobile applications for multiplatform tourists that can be accessed online and offline.

Previous literature reviews are in contrast to these article's related works because this paper aims to analyze and design complete database applications of information system tourism infrastructure in Semarang stored on web servers. However, we strongly support web services researchers in terms of utilizing the GPS and LBS.

III. RESEARCH METHODS

The research methodology is the steps needed to carry out the research from the beginning until the research is done. The methodology that we use in this research is as Figure 1.
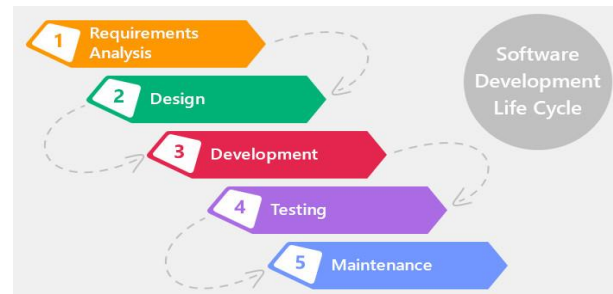

Fig 1. The methodology to develop application of infrastructure tourism

Each phase is described as follows:

Phase 1: Requirement Analysis. This phase of application analysis is aimed to identify the various needs of the application to be built. We performed three activities as follows: User needs analysis, Analysis of application architecture, and User identification applications.

Phase 2: Design Phase. The design phase aimed to model applications of the design activities, namely: Create Use Case diagrams, Design Class diagram with attributes, Arrange the tables in a database, and Design the user interface.

Phase 3: Development Phase. The Development phase is aimed at establishing the appropriate application software from the design stage. At this stage, there are two stages, namely: Make the user interface coding and Test user interface.

Phase 4: Testing. Stages of testing are a step done to ensure the system has worked well. Testing using black-box testing or commonly called behavioral testing, focusing on the functional requirements of the software.

Phase 5: Maintenance Stage. In this stage, the application is built and ready to be used by the user to perform the installation on the user's mobile and maintenance.

IV. RESULT AND DISCUSSION

This section describes the result of the research and consist of 3 parts which is the application architecture, the designing of the database, and the user interface design.

A. The Application Architecture

Physical architecture application refers to a three-tier model. The physical architecture of the application consists of three main components, namely client (Frontend), application servers (Web Admin and Web Services), and Database Servers [13]. The application architecture is shown in Figure 2.
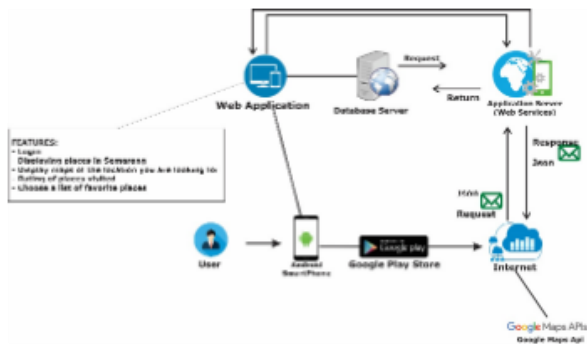

Fig. 2 The Application Architecture

This application can be downloaded at Playstore. After logging in to this application, then a variety of menus appear with information about the location of tourism infrastructure,

location map, and so on. The user selects the menu by sending data requests to the application server that stores the application database. The request will be sent to the application server with web services technology in the form of JavaScript Object Notation (JSON) using internet services.

B. The Designing Of Database

The database is an important component of our system. We have used the Microsoft SQL Server database as a database management system (DBMS). The DBMS stores the following entities:

- Admin (id, username, password, email, image)

- Category (cid, category_name, category_image, path)

- Places_gallery (id, username, password, email, image)

- Places (p_id, p_cat_id, place_name, place_iamge, place_video, place_address)

- User (id, user_type, name, email, password, phone, confirm_code, status)

C. The User Interface

The user interface describes the interaction between the user and the applications in the form of Graphical User Interface on mobile.

a) Splash Screen

The first time the application is run, the splash screen page is displayed as the opening page of the application. This view displays the logo Semarang City Tourism Infrastructure along with the application title (Figure 3).
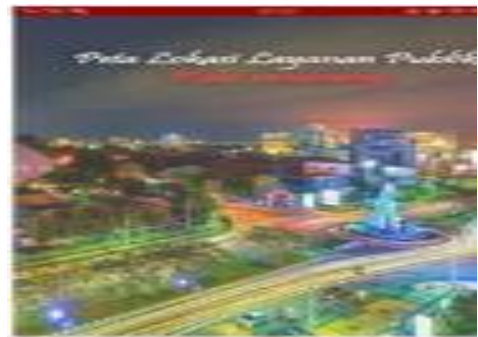

Fig. 3 The Splash Screen

b) Login Screen

After the splash screen, the next screen was the login screen (Figure 4) which will be used as a gateway for the user to access the system.

Fig. 4 The Login Screen

c) The display of the Main Menu

This main menu page (Figure 5) uses ListView to display tourism infrastructure categories. In this view, there are categories namely "Airports," "ATMs," "Banks," "Bars," "Beaches," "Bus Stations," "Churches," "Cinema," "Cafes," "Malls," and other information for the main needs of tourists.
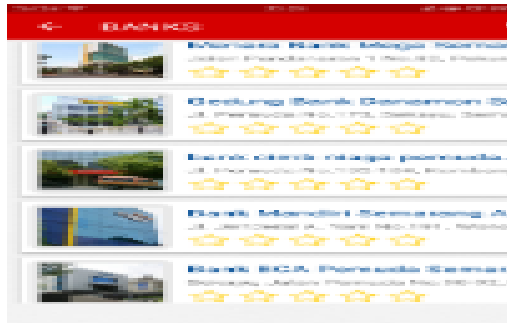

Fig. 5 The Main Menu

d) The display of Subcategory page

If the user selects a subcategory, for example, a Bank, the application will display the subcategories of the bank (Figure 6). Also, the user could get the detail of the subcategories by tapping them (Figure 7).

Fig. 6 The List of Subcategories

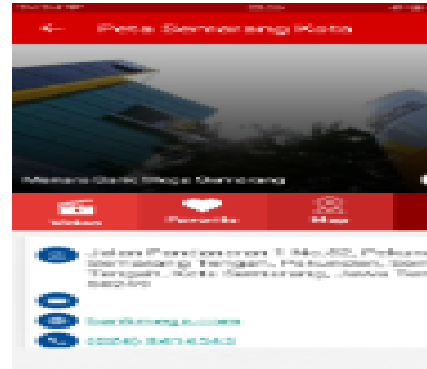### e) The Map Display of Semarang City and Marker of Tourism Infrastructure

Fig. 7 The Details of the Subcategories

If the user selects a subcategory, then pressing the Map button will display a map of the city of Semarang (Figure 8).

Fig. 8 The Semarang City Map

Route Map page shows the purpose of the current user position to the point location of a previously selected tourist destination (Figure 9). This navigator page can be accessed if the user presses the "Get Direction" page containing details of tourism infrastructure. The route shown is the shortest route (Figure 10). This is performed utilizing the Haversine formula[14].
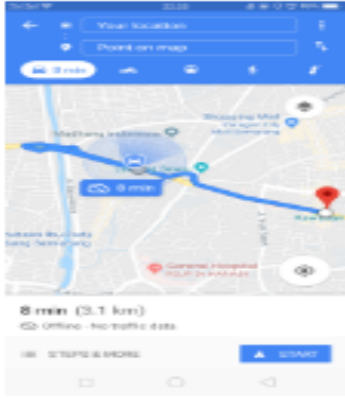

Fig. 9 The Subcategories Map

Fig. 10 The Navigator

f) Snippet source code for connection with server using a web-service based JSON API

```
package com.example.util;
import java.io.Serializable;
public class Constant implements Serializable{
//server url
 public          static          final          String
    SERVER_URL="http://lokasiku.kotapintar.id/";
 //images url
 public          static          final          String
    SERVER_IMAGE_UPFOLDER=SERVER_URL+"imag
    es/";
//images gallery url
public          static          final          String
    SERVER_IMAGE_GALLERY=SERVER_URL+"image
    s/gallery/";
……………..
//category url
 public   static   final   String   CATEGORY_URL
    =SERVER_URL+"api.php";
 //category list
 public          static          final          String
    LISTING_URL=SERVER_URL+"api.php?cat_id=";
```

V. CONCLUSION AND FUTURE WORK

Through the information system of tourism infrastructure application, the public will be more well equipped to easily and precisely find the locations within tourism infrastructure that are spread across the city of Semarang. The application is expected to provide accurate information on the tourist attractions in every area of the city of Semarang. Hence, it hopes to be useful and to provide convenience for people interested in finding the destinations and attractions.

Future work will focus on adding a folder representing a model for map offline, connecting to social media, and augmenting reality features.

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