Design and Implementation of Geographic Information System on Tourism Guide Using Web-Based Google Maps

Agus-Sudarma[1], Nyoman-Piarsa[2] and Wira-Buana[3]

**[1] Department of Information Technology, Udayana University
Bali, 80361, Indonesia**

**[2] Department of Information Technology, Udayana University
Bali, 80361, Indonesia**

**[3] Department of Information Technology, Udayana University
Bali, 80361, Indonesia**

Abstract

Tourism is one of the world appeal to come to the State of Indonesia, especially Bali. The government was aware of the potential of the tourism so that the government continues to campaign to introduce tourism in Bali to the public. But the promotion which is done by government is still using conventional method. That promotion is promoted by distributing brochures, pamphlet, billboards, etc. The weakness of that method is the tourists cannot access information in real time. Therefore, it need a system that contains information on tourism as a tour guide for travelers who want to visit to Bali so that the information obtained about the tourist attractions are complete. This system will be able to help travelers to determine their location and tourist destination. In addition, this system can also be accessed anywhere with an Internet connection. Sources of data in this system is informant, event or activity, and the document or archive. While the research methods used are as follows : literature review, interviews, and collect the necessary data. Implementation of system will be created use the PHP programming language, while the DBMS used is My SQL.
Keywords: Tourism, Google Maps, Google Maps API.

1. Introduction

There are many advantages increase in gained by the state from tourism activities, such as: national income and foreign exchange, a lot of available jobs, and cultural preservation can work together to build Bali. Therefore, the government continues to engage in many activities that support the promotion of tourism.

The way to support and promote tourism activities is to introduce tourism products directly to tourists, both domestic and foreign tourists. Promotion may be in a form of tourism product info, history, location, maps, accommodation information, transportation, etc.

Nevertheless the promotion is still done traditionally. So to solve this problem, this paper will be design geographic information system on tourism guide using a web-based

google maps. Moreover, Bali is a tourist destination of the world, therefore geographic information system on tourism guide using a web-based google maps system is needed to support the tourism activities.

2. Methodology

This section, will explain about the methodology used in research that's titled Design and Implementation of Geographic Information System on Tourism Guide Using Web-Based Google Maps.

2.1 Collaborative GIS

The development of GIS dates back to 60's, with the apparition of GIS as computational tools for capturing, managing and transforming data of spatial references to be used in planning and decision-taking processes. Other work that followed after these, was trying to provide a support for the integration between groups of people and for the decision-taking based on geo-referential data, studying also the impact of them on its users. The development of these systems continued and took advantages of the Internet era, in which the Web maps has a fundamental situation. [4]

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2.2 Definition of Google Maps

Google Maps is an application made by Google group. Google Maps associated with digital maps. Digital maps displayed by Google Map are various such as map and satellite. Currently, the number of users of Google Maps is growing rapidly because the information provided by Google Maps is very complete. In addition, when there is changing of data in a location, Google Maps will quickly make corrections and update data.

Google Maps can be accessed using a stable Internet connection. The user interface of Google Maps is also very user friendly. So, for those who are new in using Google Maps surely will be interested in this digital map system. Therefore, no wonder if many people in the world use Google Maps to locate and specify a location. [8]

2.3 Definition of Google Maps API

So many features that could be developed by the Google Maps that make the Google Maps is growing very rapidly. Based on these ideas, the founder of Google Maps was made an API (Application Programming Interface) for Google Maps which later was named Google Maps API.

Google Maps API is very useful in the creation of a geographic information system because it does not need to make a digital map for these systems since the digital maps that will be used is provided by Google that can save time and effort. Thus, we can focus on the data and information that will be displayed by the geographic information system. The understanding of the Google Maps API requires a basic knowledge of HTML and javascript. [9]

Using Google Map to work on a geographic information system provides several benefits including the following :
1. Simplify storage system map.
2. Can be accessed anywhere with an internet connection.
3. No need to create a new map.
4. Change of map data faster.
5. The system is going to be lighter.

2.4 System Overview

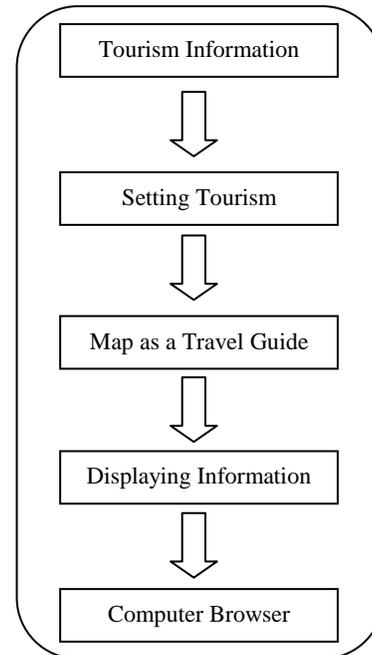The overview diagram of this research is shown in Fig 1.

Fig. 1 General Overview System

This system has two types of user, admin and user (public user). Two types of users have different access rights depending on the user level. Admin has the right to access more than the user (public user).

The tourism information is added by admin. Then the system will bring up the map information from Google Maps, and the tourism information will appears as digital map by category. For example, if the tourists want to search for information based on tourism attractions category, it just need to select attraction category. When the category has been selected then the next step is to find information or the location of the selected category. Locations can display the desired information as a tour guide.

This system not only has advantage on the selection of category, but also has other advantages, as the map can become digital maps and normal maps (street maps). The travelers are highly facilitated by the selection of maps so the system can be used as a tourist guide for tourists. The following is an explain of the process that occurs in the geographic information system on tourism guide using a web-based google maps and illustrated by the context diagram described in Fig. 2.
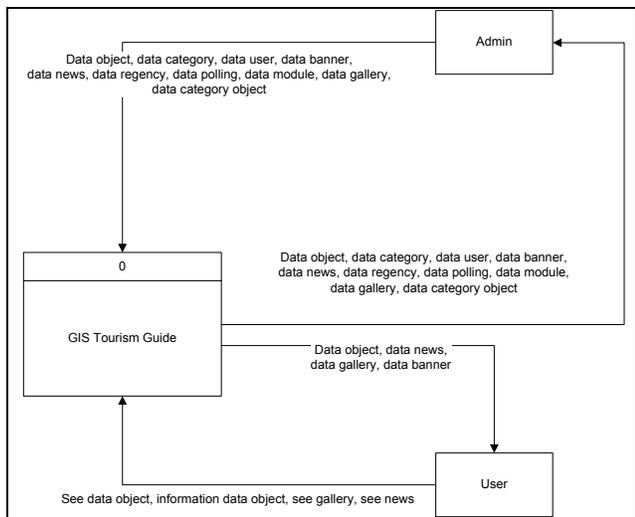
Fig. 2 Context Diagram

In Fig. 3 will be explain about the business processes that occur in the geographic information system on tourism guide using a web-based google maps.

Business process is demonstrated through entities called data flow diagrams. Entities on data flow diagram level 0 is login, view object, view news, create object, and management master data.
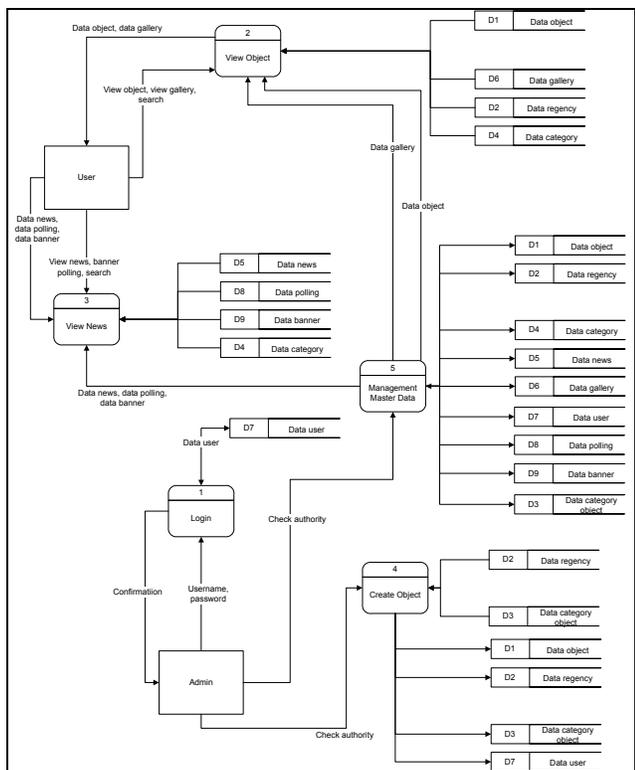

Fig. 3 Data Flow Diagram Level 0

Figure 4. illustrating table design geographic information system on tourism guide using a web-based google maps. Table formed of the design were 10 tables : tb_gallery, tb_object, tb_category_object, tb_polling, tb_banner tb_module, tb_regency, tb_category, tb_user, and tb_news.
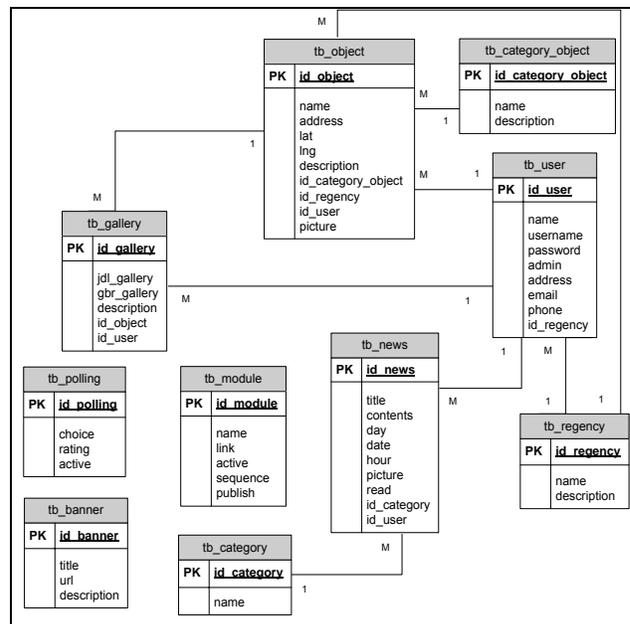

Fig. 4 Desgin Table

The system consist of 10 tables :

1. tb_gallery used to store data about picture.
2. tb_polling used to store data and information about polling such as rating, choice, etc.
3. tb_banner used to store data and information about banner.
4. tb_category used to store data and information about category of news.
5. tb_module used to store data and information about module such as name, link, publish, etc.
6. tb_news used to store data and information about news such as title, contents, picture, etc.
7. tb_object used to store data of attractions such as data or information a beach, park, etc.
8. tb_category_object used to store data about the attractions of category.
9. tb_user used to store data and information about user such as name user, address user, email, etc.
10. tb_regency used to store data and information about regency such as name and description.

The degree of relation indicates the maximum number of entities that can be filled with other entities in the entity set. The degree of relationship that occur in sets of entities on the system :

1. tb_category with tb_news
   The degree of relation that occurs between tb_category and tb_news is 1: M (one to many) because a *category* can have a lot of *news*.
2. tb_object with tb_gallery
   The degree of relation that occurs between tb_object and tb_gallery is 1: M (one to many) because a *object* can have a lot of *gallery*.
3. tb_regency with tb_object
   The degree of relation that occurs between tb_regency and tb_object is 1: M (one to many) because *regency* can have a lot of *object*.
4. tb_category_object with tb_object
   The degree of relation that occurs between tb_category_object and t_object is 1: M (one to many) as a *category_object* can have many *object*.
5. tb_user with tb_object
   The degree of relation that occurs between tb_user and tb_object is 1: M (one to many) because *user* can send or have a lot of *object*.
6. tb_regency with tb_user
   The degree of relation that occurs between tb_regency and tb_user is 1: M (one to many) because *regency* can have a lot of *user*.
7. tb_user with tb_gallery
   The degree of relation that occurs between tb_user and tb_gallery is 1: M (one to many) because user can have or send a lot of *gallery*.
8. tb_user with tb_news
   The degree of relation that occurs between tb_user and tb_news is 1: M (one to many) because user can have or send a lot of *news*.

3. Experiments and Results

Once the system design is completed, the next will be the trial process. This step holds an important role in programming. It lets the programmer do trial and error fixing before it launched officially for the viewers.

Fig. 8 Homepage

Menu on Fig. 8 contains recent news about tourism in Bali as well as the homepage menu search button, polling, and banner.

Fig. 9 Gallery Album

Gallery is a page that displays album contains image galleries of attractions in the island of Bali. Initially the gallery menu will display gallery album if the gallery album is clicked to it will display a gallery of images.

Fig. 10 Gallery Images

On Fig. 10, there are two album pictures related to Bali Bird Park, labeled as "Bali Bird Park" and "Koleksi Bali Bird Park".
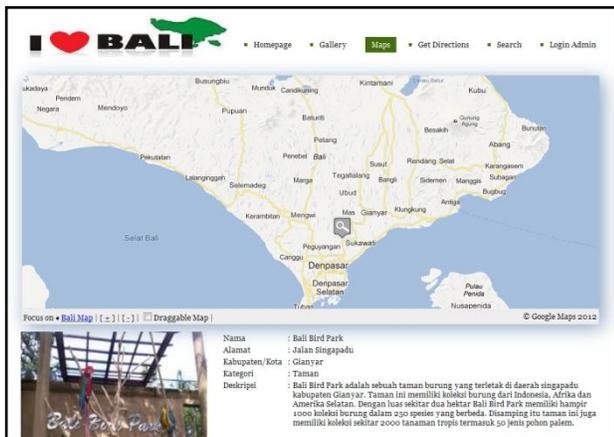

Fig. 11 Gallery Map

Besides being able to display images in the selected album, gallery menu can also display maps of locations corresponding to the album. On Fig. 11 is corresponding map of the location of Bali Bird Park.
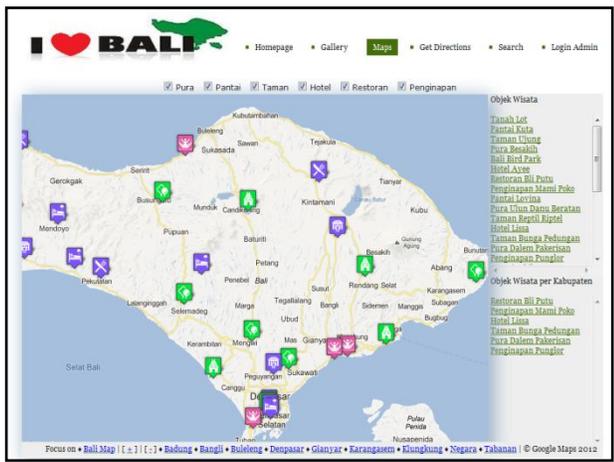

Fig. 12 Map

Fig.12 Map is a page that displays a map of attractions in the island of Bali. Attractions are displayed on maps, visualized with marker according to the category object. Maps using a check box that can be used to select categories of objects based on user desires such as *pura (temple), pantai (beach), taman (park), hotel, restoran (restaurant), penginapan (lodging).*

Fig. 13 Map Object Categories *Pantai (Beach)*

Fig. 13 is an example of the user who just wants to see the object categorized *pantai (beach).* There is only one marker is shown on the map.
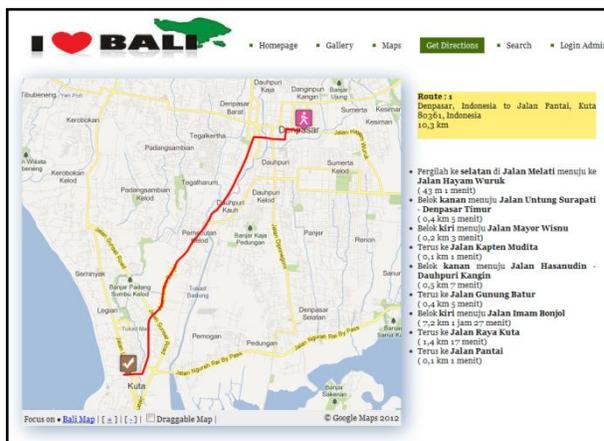

Fig. 14 Get Directions

Get directions is a page that will show you the road to the location of the existing tourist attraction on the island of Bali with a drag marker starting location to a destination location.

Fig. 14 is a view to using the get directions feature. Pink marker indicating the starting location with an image of people walking (walking) while a brown marker with pictures lawn signs are markers showing the location of the destination.

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Fig. 15 Search

Fig. 15 Search is a page that will display a searchable user attraction. Users need to type the area or location to search. After that, the system will bring up the location of the object by name or location of the area that has been input by the user.

Fig. 16 Login Admin

Fig. 16 Login Admin is special page for the user who has full access rights to the system admin. This page serves as the admin login page.

4. Conclusions

The result on this paper is a design data flow diagrams and tables. Data flow diagrams and tables have a strong relationship. Data flow diagrams and tables can be used as a basis and foundation to create a geographic information system.

The system will be created is a geographic information system on tourism guide using a web-based google maps. The system will help travelers to choose tourist destinations in Bali. The system can be accessed anywhere in real-time by using an Internet connection. Basically, making this system aims to help the government to promote tourism.

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I Putu Agus Sudarma studied Information Technology in Departement of Information Technology Udayana University since August 2008, and now working her research fo S.Ti. degree in Information Technology.

I Nyoman Piarsa, ST., MT received his ST degree in Electrical Engineering from Institut Teknologi Sepuluh Nopember University in 1998, and his MT received in Electrical Engineering from Gadjah Mada University in 2001. He is lecturer at Electrical Engineering Departement (major in Computer System and Informatics) and at Information Technology Departement of Udayana University.

Putu Wira Buana, S.Kom., MT received his ST degree in Informatics Engineering from Institut Teknologi Sepuluh Nopember University in 2005, and his MT received in Electrical Engineering from Brawijaya University in 2008. He is lecturer at Electrical Engineering Departement (major in Computer System and Informatics) and at Information Technology Departement of Udayana University.