Geographic Information System Route Travel Planning using Google Maps API

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Abstract

Travelers who vacation in Bali can be divided into two characteristics, the first were tourists who vacation by using a travel agent services, and the second characteristic is independent travelers who traveled independently without the help of a tour guide or often referred to as a backpacker. However, not all backpacker obtain information about the route that can be taken to get to the attractions that exist. Normally such information may be in consultation with travel agents who spend considerable cost. One solution that can be used in the search problem and information about tourist attractions in Bali is by using a geographic information system on tourist route search. In this system, there are two routes the first search process is automatic search with the help of the radius is entered by the user and the second is to determine to what the user can own path anywhere we want to pass the object to choose their own way of attractions anywhere who wants passes. With this application is expected to show tourist information and travel route desired by tourists.

Keywords: Google Maps API, Travel Planning, Rout Planning, Web

1. INTRODUCTION

Tourism is a real form of a journey as a global deploying promising. today, and travel became complement factor in human life in the enjoyment of the cultural and natural shades. Discussions on the development of tourism, we can take the example in the area of Bali. Tourism development, especially on the island of Bali greatly affect economic upswing. However, this development has not been thoroughly or touching all levels of society. Until today the development of tourism in Bali is more concentrated in the region of South Bali.

This study carried out in 2014 and the data reported by Statistics Province of Bali in 2013 the number of foreign tourists coming to Bali reached 3,278,598 people while domestic tourists reached 6,976,536 people. Travelers who vacation in Bali can be divided into two characteristics, namely: the first is the tourists who vacation by using the services of travel agents and second characteristics are independent travelers who traveled independently without the help of a tour guide or often referred to as a backpacker. Tourism Office of the survey in 2009 which took a sample of 20 countries that travelers often travel to Bali, as many as 25.8% of travelers use the services of travel agents and turned out a large number of backpacker much as 74.2%.

However, not all backpacker obtain information about the route that can be taken to get to the attractions that exist. One solution that can be used in the search problem and information about tourist attractions in Bali is by using a geographic information system. Information system is expected to improve the performance of an organization or institution to make it more effective and efficient and easy in receipt of information to be conveyed. From the above it appears an idea to create an application that can assist travelers in finding the tourist track and obtain information about the sights you want to target. Applications are made is a web-based geographic information system by using Google Maps API.

II. LITERATURE REVIEW

2.1 Overview of Advanced

Research on geographic information system using google map API has been done several times before. Utami (2010) in his research using the Google Maps API to find a boarding house in Surabaya can display detailed information about the boarding house located in Surabaya and show the quickest path from the starting point the user to the point of boarding houses who want to look and can calculate the distance from point of origin to point of destination [1]. Other research conducted by Suwardana (2013) using the Google Maps API find the shortest route Ambulance. In this study Suwardana looking for the quickest path ambulance by weighting each intersection there. Weighting herein is not intended to ambulance passes through the intersection that has a high weight to avoid congestion at the time of pick-up of patients from the starting point to the hospital [2]. The other study that uses the Google Maps API is like that done by Saputra (2013) Geographic Information System Pharmacy is based on Android. In this system Saputra use your Google Map API just to ask questions along the points of pharmacies scattered in Denpasar [3].

Of the few studies that have been done will be made an application that utilizes the Google Maps API to find a route of travel in Bali by adding the radius of the search feature of the starting point to the destination point. This radius will be the differentiator between this study with previous research.

2.2 Review of Literature

2.2.1 Geographic Information Systems

Geographic information system (GIS) is a computer-based system that is used to input, store, manage, analyze and re-enable the data has a spatial reference for various purposes related to mapping and planning. (Burrough, 1986) [4]

2.2.2 Web-Based Programming

Internet development is inseparable from the web or the World Wide Web, abbreviated as WWW. Web as a source of information that is contained within the internet has facilities for information seekers to access it, without being limited by space and time. But keep in mind is that the World Wide Web is not the Internet, and vice versa, the internet is not the web. Web consists of cross-linked documents called the page, which is managed by the Internet (Charter, 2004). Many of the benefits provided by the Web-based applications from the desktop-based application, so that the web-based applications has been adopted by the company as part of its information technology strategy, for several reasons: [5]

1. Access to information easier.
2. The server setup easier.
3. The information is distributed.
4. Free platform, information can be presented by a web browser on any operating system because of the standard documents of various types of data can be presented.
5. Web-based programming using several different languages are mutually supportive of one another.

2.2.3 Google Maps

Google Maps is an online mapping service provided by Google. This service can be accessed through the site http://maps.google.com. At these sites, users can see the geographical information on almost all regions of the earth. This service is interactive, because in it the map can be shifted as the user desires, change the zoom level, and change the map view (Anonymous, 2014d) [6]. Google launched the Google Maps API in June 2005 to enable developers to integrate Google Maps. Google is a free service, and currently contains no ads, but Google states in their terms of use that they have the right to display advertisements in the future. By using the Google Maps API, allowing developers to embed Google Maps website to external sites, where data specific sites can add overlay according to what they want. Although initially only a JavaScript API, API Maps has been expanded to include an API for Adobe Flash, a service to take static map images, and web services to perform geocoding, generating driving directions, and get the profile height. More than 350,000 web sites using the Google Maps API, making it the most widely used web application development API from Google Maps.

III. RESEARCH METHOD

3.1 Data Collection

In making the application of geographic information systems planning travel route using Google Maps API, there are methods to be used, among others:

1. Method of observation, which collects data by direct observation to the field to find some points of tourist attractions in the province of Bali.
2. The method of literature study, which collects data from reference books as well as sample reports relevant to the object of the issues raised.

3.2 Data Analysis

The analysis of data that can be done in making this geographic information system are as follows:

1. Perform well in the system design flow or structure or layout design system which will be used in web applications of geographic information systems.
2. Use of Google Maps, which conducted an experiment in using the features map provided by Google Maps.
3. Apply the use of markers in determining dots scattered sites in Bali.

3.3 Analysis System

Analysis of the manufacturing system of geographic information systems planning travel route that is done in this study are as follows:

1. Defining the problem of the system being designed, in this case related to the application of geographic information systems planning travel route using the Google Maps API.
2. Collecting and studying the data that will be used as a basis in the design and manufacture of the system, either through the study of literature as well as by directly surveying the field.
3. Studying, analyzing, and understanding the processes that occur in the design and manufacture of application of geographic information systems planning travel route using the Google Maps API.
4. Designing a system with the existing system modeling up to the drafting of the database.
5. Finding relevant literature Google Maps API, Javascript, mobile web, ruby on rails.

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6.   Planning display layout and process flow.
7.   Making a website (Development).
8.   Making the web with the set on the page.
9. Tests on the system that has been created by inserting some data attractions and testing the resulting route planning in the process of finding a route through the desired object or automatically.
10.   Conduct an analysis of the results of testing applications.
11.   Taking the conclusion of the whole process.
12.   Preparation of reports of applications that have been made.

IV. RESULT AND DISCUSSON

4.1 Results
Geographic information systems planning travel route is a geographic information system that will provide information to travelers travel route using Google Maps as map provider that will display routes and tourist information and there is a history feature that can be used to store the travel route has ever done by tourists. The geographic information system can also perform automatic route search by using the radius and determine manually by clicking on the place where the tourist who wants to pass.

4.2 Discussion System
Discussion of geographic information systems planning travel route will be divided into several sections: run the server, the initial display applications, Sign up, automatic route search using the radius, the search manually by specifying the attractions that want to go through, the addition of the data object.

4.2.1 Starting the Server
To run this application first must run the server admin of this application. To run the server can be done by opening a CMD or Command Prompt. In the Command Prompt entry to the directory where the web application you want to run is stored. Since web applications built using Ruby on Rails so syntax to run is "rails s" or "rails server".

4.2.2 Initial View Web Applications
Once the server is successfully executed, this application can be run by accessing the local server is running and can be entered into this application by writing "localhost: 3000" in the address bar of the browser. The main view of the application is able to login page or by selecting the Guest mode to access web pages without registration. If you are already registered on this application, simply log in to fill in the login form such as email and password registered. In the currently logged in user will be divided into two types, namely user and admin user. The initial view of a web application can be seen as Figure 4.1.
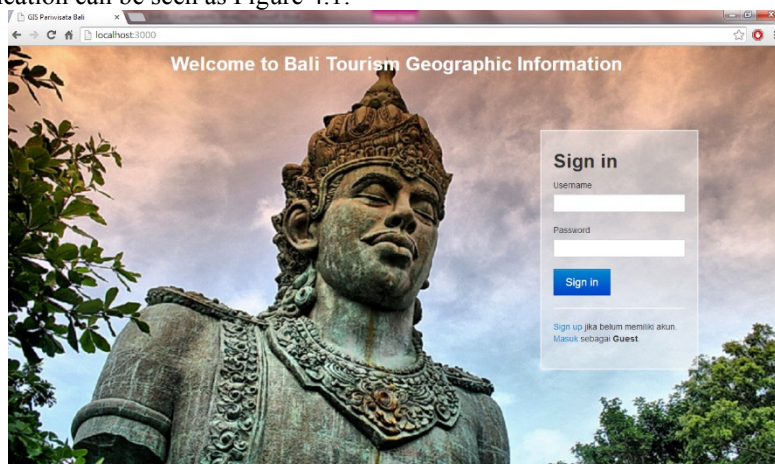

Figure 4.1 Web GIS Applications Travel Planning

4.2.3 Home
After successfully logging in or opt in with Guest mode which means the user access the site without registering will appear early or home display to the user as shown in Figure 4.2 below.
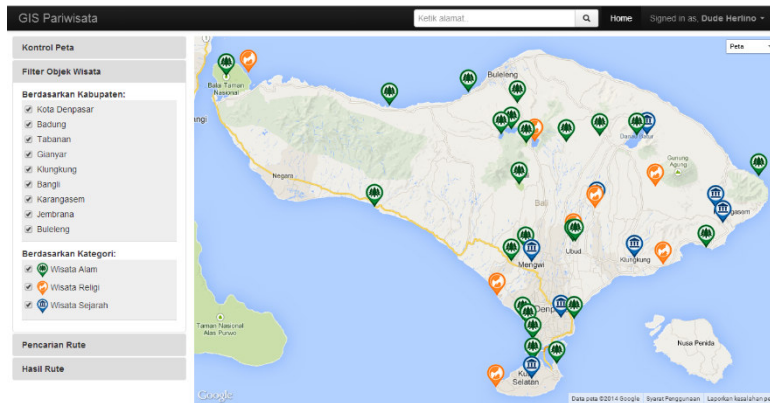
Figure 4.2 Display Home Page for Users

4.2.4 Search Rout

4.2.4.1 Using the Auto Search Radius

After successful login, the user will be redirected to the page of the search process. On this page there are two route search process, the search process is automated by using the radius and the search process to choose their own route with the object anywhere who wants to pass. The main display on this page is in the form of a map that will display the marker attractions. This map will describe spatial data that will provide information to the user about the search for the route to be searched. The main view of this page can be seen in figure 4.3 below.
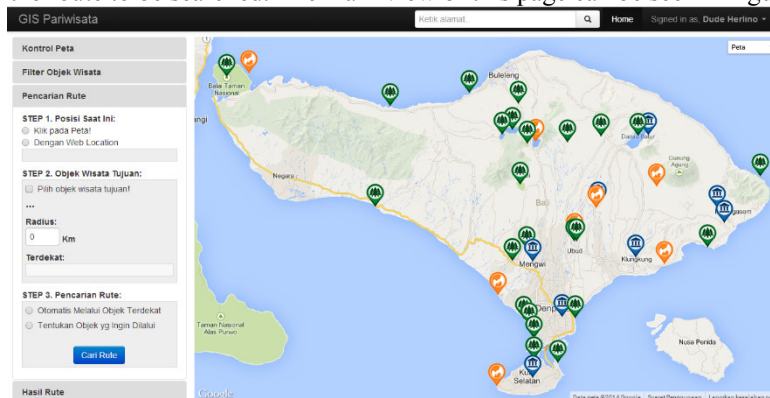

Figure 4.3 Display Search These Overall Process

Figure 4.3   shows the user page with marker attraction displayed. Attraction marker function to locate the attractions and this marker will be selected by the user in determining the route either automatic or manual to determine its own object passed. In the object marker is also information that will appear on the info window of the marker. So a user who wants to know the information of each attraction can click the marker and choose "more" to get detailed information about tourist attractions ranging from drawing, history or anything contained in these sights.
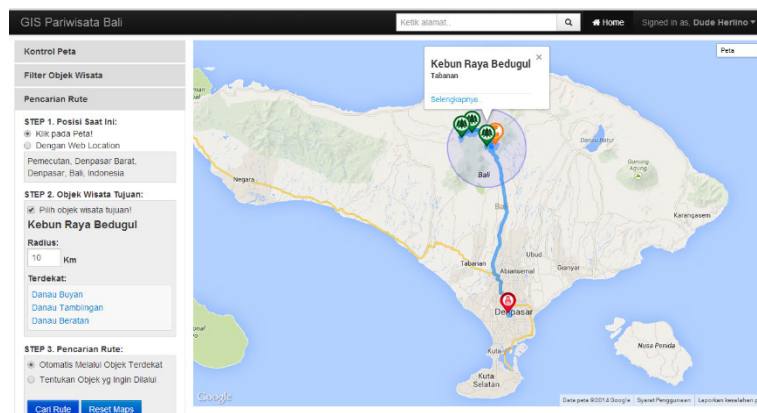

Figure 4.4 Display by Using These Radius Search

Figure 4:4 shows the results of the tourist route from Denpasar to Bedugul Botanical Gardens automatically by using the radius. The radius search that is used around 10 miles from the destination object and get 3 closest object as can be seen in the sidebar or in the map view. Users can record it as a guiding path from the starting position to

the destination object. And the user can save the route by clicking the "Save Route". The system will store the route of the user into the history of each user. History is stored in the form of data starting from the date of the search, the initial position, the object of interest, and what objects are passed as found.

2.4.4.2 Search Manual Route by Selecting Objects

The second stage in which the search by selecting a route search object anywhere that wants to pass. In search of this route there are several steps that must be done. The steps can be seen in the Figure 4:5.
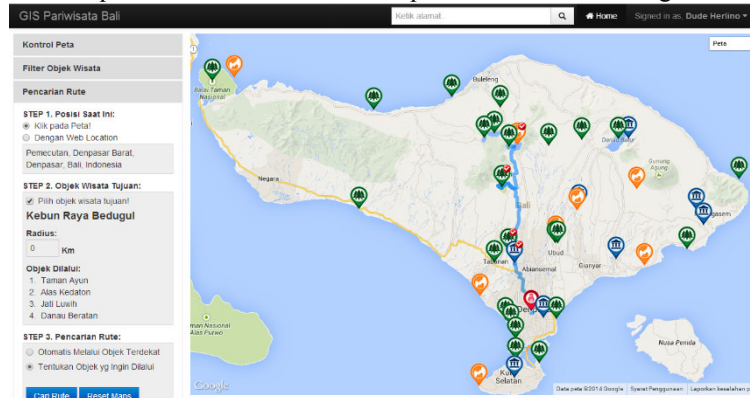

Figure 4.5 Determine Individual Route Objects

The output of running program can be seen in Figure 4:5, that determine by their own route with attractions anywhere who wants to go through before heading main object is the goal. The trick is almost the same as the radius of the search, which made the differences that the user does not need to fill in the radius of the second step and the third step after the user selects the "Specify Objects Want Crossed", the user must click on objects marker anywhere who wants passed on the map. And finally click the "Find Route" then the system will process all the input and display it to the user filled the screen.

4.2.5 Page Admin

To access the admin page is still the same way the previous log, but the account used is an account that has a role id as an admin. Here is a view home on the admin page. Approximately the same admin home page view with the main view user, that made the difference admins have admin main page which can be accessed via the menu fitur and select "Admin".

V. CONCLUSION and SUGGESTIONS

5.1. Conclusion

Conclusions that can be drawn from the study of geographic information systems planning in Bali travel route using the Google Maps API.

1. Google Maps is able to provide spatial data for precise mapping and real. Google Maps search service routes (Google Maps API Directions Service) able to integrate very well with the system and support system by providing the information very helpful travel tourists in traveling to the desired attraction coupled with the history feature in this application can help tourists in storing the travel route has ever done before.

2. Search routes can be done in two ways, namely by an automatic search process with the help of its own radius or by determining which objects you want to visit before heading main goal object.

3. Display the interface of the application is made responsive so make the application can adjust the screen resolution of the device used to access the application without changing the look of the system with Google Maps. It is very helpful tourist when they want to access geographic information systems through mobile devices.

5.2 Suggestions

In geographic information systems, there are some shortcomings that could be developed include:

1. It is expected that the Department of Tourism can utilize this application in promoting tourism potential and add to the attractions of alternative that can be visited by tourists from outside and within the country.

2. In a further development of this system is expected to be developed in mobile-based applications with navigation features that can make it easier for users to get to the destination object.

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