Tourism Information Systems with Grouping using Google Maps

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Abstract. During travelling, travelers usually have some sort of travels preferences such as its purposes, types or chosen categories and its destination/attractions. To ensure fully indulge travel, tourist usually needed instruction or guidance and travel map during those trips. A map is used to show the precise location of each destination. Some travelers travels without knowing the exact location of the places such as museums, restaurants, park or shopping district that yet hasn't been known to them before, therefore in need of a tourism map. As a fact, tourism maps are one of the most common groups of cartographic documents since it has lots of diversity in contents, subject and publication title due to the increasing popularity and diverse forms of tourism activities. In this research, coordinates values were taken and saved in a database using dd°mm'ss" (degree, minutes, seconds) format whereas Google maps reads value in the format of latitude and longitude which led the system to implement automatic conversions in order to be functional with Google Maps. PHP programming, JavaScript, MySQL database with other assisting software suitable in extracting and converting coordinates value to latitude, longitudes value was used in making this program. This system really helps travelers knowing the exact location and assist in determining the chosen destination.

Keywords: *destination tourism, maps, coordinates, database*

1. Introduction

Tourism brings good benefit for visitors, environments and local society around the tourism site. In order to ensure large quantity of visitors, environmental sustainability and cleanliness of the places are needed to be well treated and guarded. Economically, tourism opens high number of job opportunities by rising the number of employments. When travelling, travelers usually have some sort of travels preferences such as purpose of travel, types or categories of tourism, destinations, and location sites. At times individuals or group of travelers needed a guidance and maps during travels. A map is used as a guidance to show the precise location of each destination. They key to accelerate the thrive of tourism and to bring more visitors is providing easy access of information needed by traveler with a user-friendly tourism information extraction system. As of the advance information technology and communication available these days, different methods can be used in delivering tourism destination information to probable visitors. This research created a sustainable system that gives tourism information through Google Maps. Integration within database, website and Google Maps are needed in accordance to align the process interrelated. The use of electronic to gain information increases from year to year in Indonesia, as shown in figure 1 from the total population of 265 million people in Indonesia about 50% are internet users. 49% (about 130 million people) are active on social media. The most popular platform of social media in Indonesia is YouTube with 43% of

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active users followed by Facebook (41%), WhatsApp (40%), Instagram (38%) and LINE (33%) [1].

Fig. 1. The condition of Indonesia Digital Media January 2018 (source: Yahya, 2019)

Traveler holds an important role as primary cantilever strength for planning, enhancement, development, and management in tourism. Base on that statement, tourist needs to be given easy access information about their travel destination/location.

2. Method and data used

2.1. Method

Even though nowadays tourism destination information is accessible through social media and website, researcher didn't use those data instead researcher use prime data by gathering data straightly from the source of each destinations' location. Thus, information was collected through interview, gathered documents, and observation. Through observation, researcher could see the reality state of each location, take direct photos, record coordinate point utilizing geotagging or geolocation used in the main entrance of each location with the format of dd°mm'ss" to ensure the accuracy position. Gathered data was pre-processed through identification, analyzation and normalization in order to remove functional dependencies within the data. Next step was designing logical database to be implemented to the physical design through database management systems. Visualization of tourism information was implemented through Google maps by reading data from the database (in this case using MySQL) with PHP, JavaScript dan Google Maps API in order to integrate coordinates values to Google Maps.

2.2. Data used

In this research, data used for tourist destinations were obtained directly to each location by the researcher. Data obtained consist from 15 districts and cities. The districts which are Wonogiri, Karanganyar, Klaten, Boyolali, Semarang, Tegal, Magelang, Sleman, Gunungkidul, and Bantul. The Cities are Surakarta (Solo), Semarang, Magelang, and Yogyakarta. The information retrieve contains the name, address, facility, open hour, close hour, condition, and

other relevant notes. These destinations are clustered into 5 category which are heritage tourism, nature tourism, artificial tourism, culinary tourism and spiritual tourism.

3. Literature review

Management destinations aims to involve in working together with all shareholder in order to achieve the same goals to plan dan develop product through efficiency and sustainability which are supporting the advance social economic, ensure environmental conservation, and satisfy travelers needs and hope during each visit [2]. Tourism destination is a geographical region which vacant in one or more administrative territory that holds tourist attractions, public facilities, tourism facilities, accessibility, interrelated communities and complement the realization of tourism within [3], physical space with or without administrative and or administrative restrictions where visitors able spend the night [4]. Tourist is someone who does a tour [5], according to Cohen which was cite in Zeglen's paper foretold that tourist typology is divided into 4 section that are drifter, explorer, organized mass, individual mass [6], and it is important to acknowledge tourist category that are elite tourist, alternative tourist [7]. Drifter and explorer are a part of non-institutionalized tourists different from mass tourists and individual mass tourists are a part of institutionalized tourists. Drifters are traveler who live with the local people and adapting to their community. Explorer likes to configure their own journey and finds the way out on their own. Mass tourists unable to arrange their own travel plans instead they depend on the tour operator unlike individual mass tourist who could rely on their own travel plan schedule. Elite travelers are willing to pay extra in order to get exotic destinations, accommodations and foremost culinary. Alternative travelers focus on specific purpose like heritage tourism and historic places consisting customs, arts, crafts, ceremonies and local lifestyles. Tourism map is an important source to visitors who travelers to an unfamiliar city since it helps to visualize landmark and interesting travel spots such as museums, restaurants, park and shopping districts [8], one of the common groups of cartographic documents. The diversity in its content, subject and publication title due to the increasing popularity and diverse forms of tourism activities [9]. Utilize the core engine and map/satellite images hosted by Google in order for JavaScript to help visualize locations' icon, coordinates and metadata Google Maps [10]. Database is a tool to store collected data for retrieval when in needs. A database is a complex object that form a set of data which are stored and interconnected to serve the needs of several users in one or more organization, is an inter-related collection of various types of tables [12]. Database known as a set of interconnected logical data and designed to produce information inside one's organization [13]. In designing a system, one of the components needed to be fulfilled is normalized database. Normalizing database is needed to remove functional dependency that consists of partial dependency and transitive dependency.

4. Discussion of design

The system created through this research has a purpose to provide user information, visualization about tourism destination utilizing Google maps and website. Figure 2 illustrate conceptual architecture extraction process and transformation from operational data to enable user gain probable tourism information.

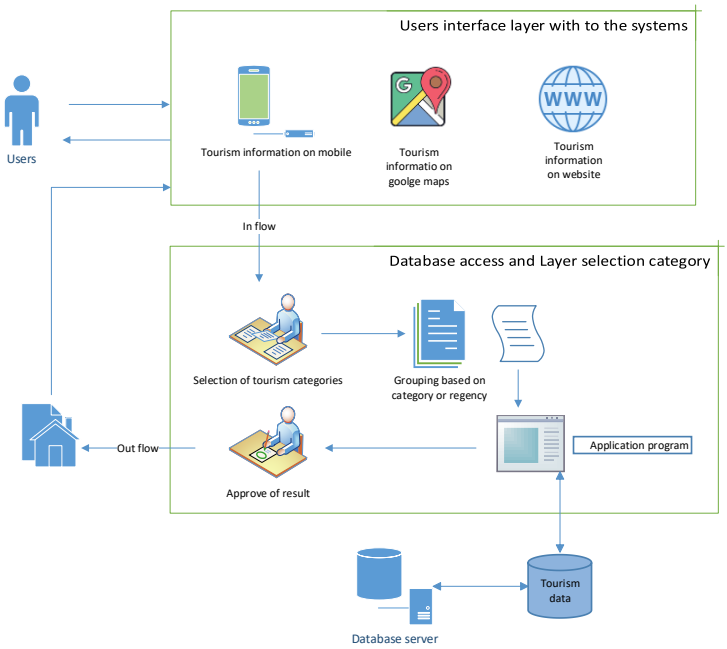

Fig. 2. Architecture of Tourist Information Systems

The internal level operational data source are database and tourism data. The following Figure 3 show the database design in storing operational data as a logical entity relational schema model. During implementation, researcher used MySQL database management server to store completely detailed information of those tourism destination. Data corelated with tourism destination are stored in a 3rd normalize table form that has removed any transitive dependencies. Figure 3 also show each relation between tables, there are 8 tables in order to store tourism category, place, distance between destination, management, available activities within the district, photos, sub-districts and districts.

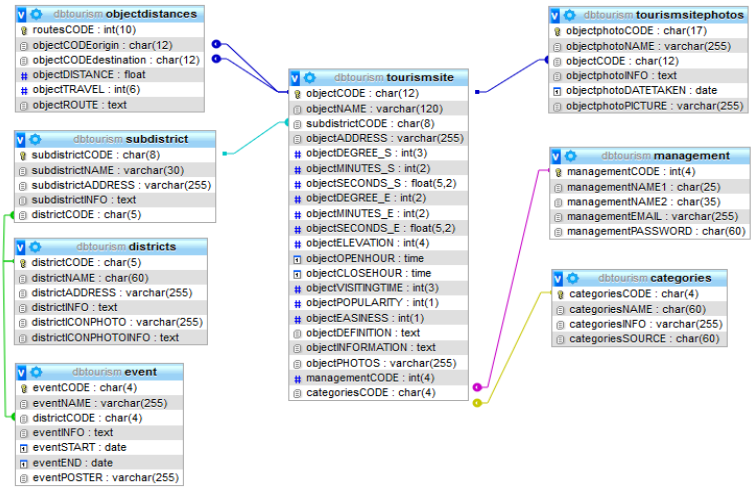

Fig. 3. Logical Entity Relationship Model Database for Information Systems Tourism

Selection category layer manipulate and define data using Query language from database. Based on user preferences, traveler could choose destinations clustering that is established by category or city/district or combination of both. Interface layer in view layer display destination tourism information through website or Google Maps layout. These tours could show destination information as a whole or by system preferences through choosing categorical clustering on tourism category and city/district.

5. Result of implementation

One of the program screenshots as shown in Figure 4 display the main menu interface and its tourism destination grouping based on city/district. Selection tourism by category or district could be done not only in the map webpage but also available in the homepage. User could choose couple choices from the menu as shown in the available interface.

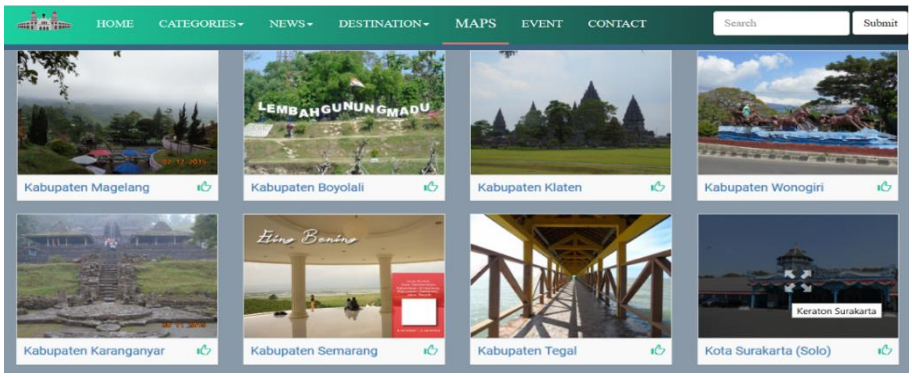

Fig. 4. Screenshots of a part of the systems main menu designed. The MAPS menu is shown with an underline that can be chosen to display.

When selecting the 'Maps' menu as shown in Figure 4, tourism map will then be displayed in Google Maps webpage as shown in Figure 5. The main Google Maps webpage prevail a search menu based on tourism category or search based on city/district and both could be used at once. Location of tourism destination unveil different markers which clustered based on 5 categories that are cultural heritage, nature tourism, artificial tourism, culinary tourism, and spiritual tourism. Tourism map is made by using PHP Programming, JavaScript, and MySQL database. Aside from those, other software like Bootstrap, jQuery, and CSS were used to help designing the interface.

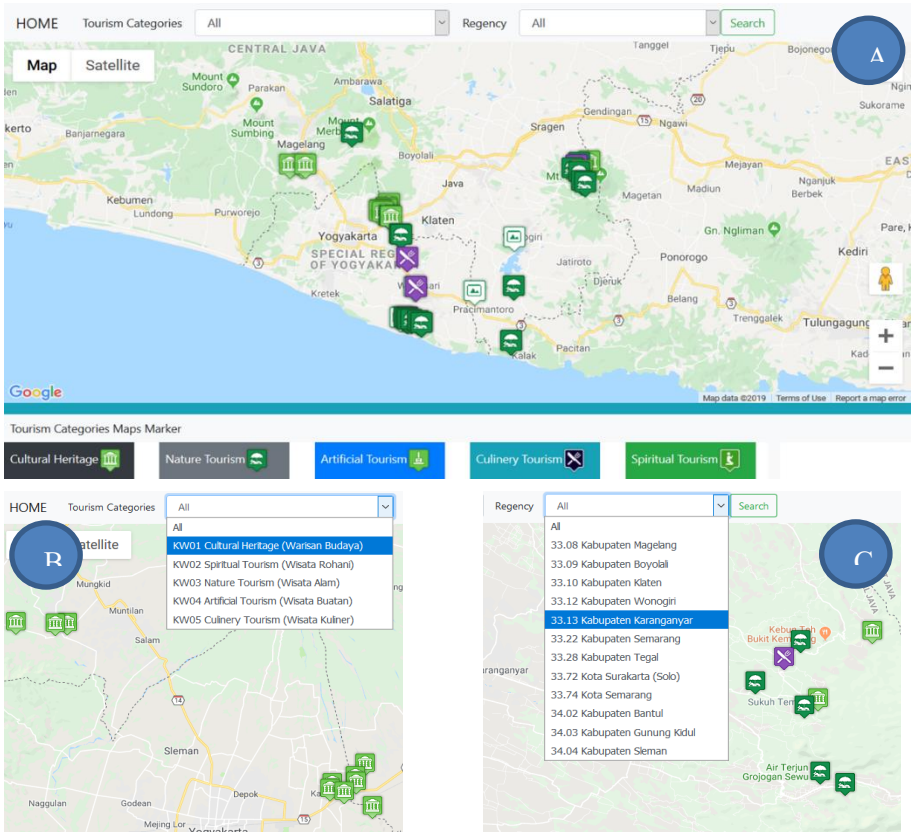

Figure 5. (A) screenshots of the main menu on the Google Maps page by displaying an icon or marker according to the category and location of the tourist destinations, (B) screenshots based on selected "cultural heritage" tourist destination category, (C) screenshots based on "kabupaten karanganyar" city/district selection.

Next process could be done by choosing one of the marker available to fabricate information about the place as shown in Figure 6.

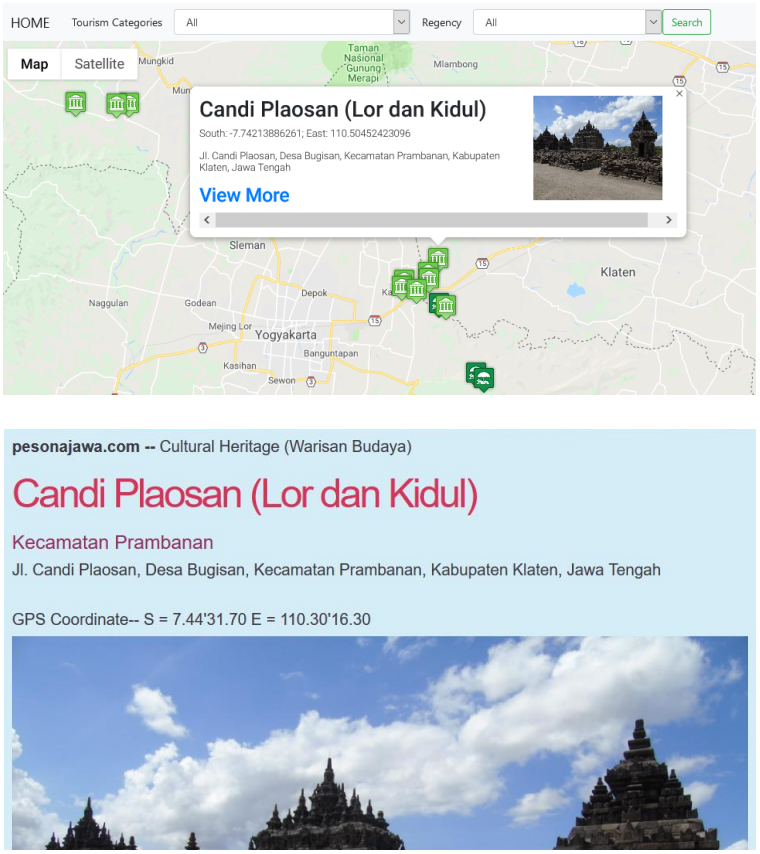

Fig. 6. (A) windows information appears when the icon/marker is clicked, (B) tourist destinations information when 'view more' is clicked.

As shown in Figure 6(A), destinations coordinate shown from Google Maps uses Decimal Degree (DD) format with latitude (-90 to 90) and longitude (-180 to 18). When gathering data through research, coordinate location was formatted using degree (0 to 59) minutes (0 to 59) seconds (0 to 59.999) as in dd°mm'ss" format. Local coordinate value of tourism destination as shown in figure 6(A) uses decimal degree consisting value of latitude: -7.74213886261 (South), longitude: 110.5045223096 (East). Subsequence to 'view more' displays detailed information for Candi Plaosan's coordinate value of South: 7°44'31.70", east: 110°30'16.30 different than Google Maps format (Figure 6B). Coordinate value are stored in the database table using the dd°mm'ss.ss" format while Google Maps reads format value of latitude and longitude which led the system to implement automatic conversions in order to be functional with Google Maps. PHP programming language was used to convert coordinate value stored in the database into latitude and longitude format. Conversion is done to retrieve coordinate value as decimal value of latitude: 7+(44/60)+(31.70/3600)= 7.74213885251. Since tourism location is within the south line equator, the coordinate value is minus (-7.742138866261). Longitude: 110+(30/60)+(16.30/3600) = 110.50452423096.

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6. Conclusion

The result of this research is a state-of-the-art system in helping travelers plans their travel to tourism destinations that aren't familiar to them yet along information within Google Maps clustered by category and city/district. We used data that are obtained from 15 districts and cities. The districts which are Wonogiri, Karanganyar, Klaten, Boyolali, Semarang, Tegal, Magelang, Sleman, Gunungkidul, and Bantul. The Cities are Surakarta (Solo), Semarang, Magelang, and Yogyakarta. Categorically divided as heritage tourism, nature tourism, artificial tourism, culinary tourism and spiritual tourism. This system gave concrete help to traveler/tourist in knowing the exact location and assist in determining the chosen destination.

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