The use of mobile technology for tourism development (case study: banyumas regency)

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Abstract. Banyumas is regency in Central Java Province and Purwokerto Capital City. Banyumas has a lot of tourism areas, but not all of the areas are known by tourists because the lack of information. The information on Banyumas government’s website is not updated and uncomplete, so that it needs other information services for the tourism information in Banyumas. An android-based application Banyumas Travel Guide (BMSGuide) is a location-based application to help the people can access the information whenever and wherever they are. The service in this application is using Android which is platform that is now developing rapidly with interface User Friendly and the price is affordable. The application will access Google Maps and show the user location, destination location along with the information, and the navigation to the location. The information is gotten by accessing the satellite with GPS (Global Positioning System) tool of the user’s headset. By using BMSGuide application, the information service of tourism location and the supporting place around is served.

1. Preface
Banyumas is regency located in East Java Province and Purwokerto Capital City. It consists of 27 sub-districts and in the north of Banyumas there are Tegal and Pemalang regencies. Regency of Purbalingga, Banjarnegara and Kebumen are in the east. Regency of Cilacap is in the south, Regency of Cilacap and Brebes are in the west. The population of Banyumas Regency at the end of 2014 is amounted to 1,986,735 people; the total area is 132,758 ha, and the most famous tourism attraction is Baturaden located in Purwokerto.

Number of existing hotels in Banyumas is 174 for star and non star hotels, and specifically 110 hotels are in the area of Baturaden. It can be seen that the natural attractions of Baturaden is the most popular tourism by tourists from many natural attractions in Banyumas. Based on the report of the Regional Development Planning Board (BPPD) of Banyumas Regency in 2014, there is a decrease in the number of tourists as much as 9% (85,403) from 2012 [1]. Currently, tourist information in Banyumas can be gained from the government website Banyumas, but the displayed information is not complete and less attractive for tourists. The government has promoted tourist attraction in Banyumas, but the promotion is less reaching tourists. Some promotions have been ever done through online media or through print media.

Nowadays, with the rapid development of integrated information and telecommunication technology in the device and the ability to identify the location, mobile device has become something important. Mobile device has been used in various fields such as m-banking, m-government and m-
learning as well [2]. With the current technology developments, the government of Banyumas can see the opportunities of technology use to be able to reach new tourists and help them to get complete and accurate tourism information.

Tourists can also gain other information that supports the tour, for example: hotel information, transportation, bank / atm, etc. Complete information can help travelers to plan and make decisions to travel in Banyumas regency. It is expected that Banyumas regency government can also cooperate with private parties to promote tourism object in Banyumas regency. A synergetic relationship between government and the private sectors can assist travelers in gaining detailed information.

2. Literature Review

2.1. Previous Research

The relationship between tourism and technology has been always very intensive [3]. The developments on the internet system in relation to mobile technology have been influenced by the tourism sector both as a whole and particularly every tourism actor. For example, research about location-based services and tourism, that location-based service is a new challenge for tourism, as they will serve important information and communications for business parties, customizing the services for customer’s locations [4].

Location-based service can be used in searching information and services faster than traditional location-based communications [5], while Buhalis & Law argued that tourists have become more sophisticated, more selective and more sensitive for price, and reducing energy in tour planning due to the dissemination of information technology for tourism [6]. People can record their travel routes using GPS devices and then share their travel experiences between each other by sharing this GPS tracks in a Web community. Photos, comments, and tips also appear related to the location on the track [7]. Some of researches that have been done in this field have produced several results that are used now. Based on a research by Dadape in journal Smart Travel Guide: Application for Android Mobile, the purpose of the application is to help the tourists to get information of tourist attraction so that they can decide the destination precisely. The concept of this application is using GPS to determine user location, then to find the location on map using Google Maps and to display the surrounding of the tourist attraction using an existing database and Yahoo Travel, Other features included in this application are weather report, city distance, video service and maps [8].

Based on a research by Shu, in this study the author made an android based city guide application. Android Mobile Platform was developed by Google, developers for creating applications in Java on the platform, including some important features like 3D graphics, Media for audio, video, and image formats (MPEG4, H.264, MP3, AAC, AMR, JPG, PNG, GIF), GSM Telephony, Bluetooth, 3G, Wi-Fi, GPS. This application works for navigation, user location, reminders, adding place reviews, etc [9].

The application is connected with Google Maps, Google Calendar and Twitter. The application is built with java programming language with client server concept. The disadvantage in this study is that user who wants to activate the reminder menu must be connected with Google Calendar, so the user must have an account on Google.

Tourism is an important industry in the world. When tourists visit a country, city, or other tourist attractions, they will need to handle things related to accommodation, restaurants, landmarks, and even destination travel information. The features and capacities of cellular LBS can be one of the best troubleshooting for travelers [10].

Based on Mishra & Patvardhan’s writing, they ever made an application named ATMA (Android Travel Mate Application). This application provides tourism information, hotels and others by utilizing Optical Character Recognition (OCR) technology. It can also be used as a language translator tool [11].

Based on a journal Location Based Services using Android Mobile written by Kushwaha & Kushwaha, the authors developed application that was originally desktop applications to be mobile
applications. The function of this application is to provide information for users about the place around. This LBS application can help users to find hospital, school, gas station, and other facilities that are around the user [12].

2.2. Location Based Services (LBS)
Location Based Service (LBS) is a technology that able to provide a geographical location of a person or an object in a way to give the customers a valuable way, especially through the using of GPS and mobile technology. Thus, the development of LBS can be used for the advancement in mobile communications [13]. The advances in location acquisition and mobile communication technology have helped to support the use of location-based services that enable people to use location data with existing social media networks such as Facebook. For example, leaving a comment on an event directly where the event was being held, recording travel routes with the global system positioning to share travel experiences in online community. Zheng and friends conducted a research on geo-life and found that advances in location acquisition technology will facilitate location connections in the physical world as well as bridge the gap between users and location [7]. Figure 1 illustrates LBS as an intersection of three technologies [14].

![Figure 1. LBS as an intersection of three technologies](image)

2.3. GPS
The Global Positioning System (GPS) is a space of satellite navigation system based that provides location and time information in all weather conditions, anywhere on or near the earth where there are unobstructed straight lines from the view of four or more GPS satellites [15]. GPS consists of three important parts, the control which is responsible for overseeing the performance of the satellites in its orbit. Space is space for satellites to operate or it can be called as orbit. There are 24 satellites surrounding the orbit at 11,000 miles. The User is part of the system because the user is the one who uses the GPS system service so that this system works [16]. This triangulation method is used by GPS satellites to determine the receiver's location point. To support triangulation calculations, the receiver must know two things: the location of at least three accessible satellites and the distance between you and the satellites [17].

2.4. Google Maps
Google Maps is a Google service that offers user-friendly mapping technology and local business information - including business locations, contact information, and travel directions, while Google Maps API allows development to integrate Google Maps into websites. Google Maps API consists of the code blocks used to modify the map according to the user's needs [18]. Using the Google Maps API makes it possible to embed Google Maps site into an external site and makes it possible to change and add contents to the maps [19]. What used in the Google Maps API is there is GeoPoint, the main class that are representing latitude and longitude. Google Maps is very simple to customize, one of which is it can do zooming, dragging and other options which are also easy to use. To use Google Maps, we only need a user registration to gain a secret Google Maps API key [20].

2.5. Research Methodology
In this research, the author uses several research methodologies with literature study to develop this software, the author searches for literature or library resources related to the software that will be created. This literature sources will assist the author in writing existing theories, and those can be used as a comparison with research that has been made. Then the author used the method of observation, which is done to collect data by conducting direct observation in the field and doing a systematic recording for the object. It observes all aspects that match to the needs of creating the application. After observation and data collection, the author uses method of software development; the method used in creating this project is by prototyping method.

According to McLeod the stages that must be implemented on prototype model are first to identify the needs of the user which is to define the entire software format, to identify all the needs, and the outline of the system. The result of this software requirement analysis is a document of Software Requirements Specification. The second is to develop Prototype (Quick design) by creating temporary design that focuses on the presentation to the user (e.g. by making input and output format). The result of this software design is in the form of a document Description of Software Design. The third is to determine the acceptance of the prototype by detecting and identifying the extent to which the modeling system acceptable or not, what improvements desired by the customers or even it has to be remodeled for the whole. The fourth is to hold an operational system through system programming, in this stage prototyping that has been agreed is translated into the appropriate programming language and is applied in the form of mobile application. The fifth is to test the operational system, in this stage the system will be tested by testing the software functionalities by the application creator. Sixth is to determine the operational system, this stage is the stage of determination, whether the operational system that has been built is acceptable or must be done some improvements, or even must remade everything and start all over again. The last is system implementation; the system implementation stage is the stage of system implementation that will be done if the system is approved [21].

3. Discussion
The information that both domestic and foreign tourists need now can be easily gained through online media. Besides from the official government website, the information can also be gained from the blogs of domestic and foreign travelers. From the government website, the information is only in the form of tourism location, while on the blog there is some more complete information, because in addition to tourist location information there is also other supporting information, such as transportation, hotel prices, culinary around the location and others. These kinds of supporting information are needed by the tourists, because with the complete and accurate information it can make tourists consider whether to visit the location or not. Besides, inaccurate price issues also an obstacle for tourists. With complete information, it is expected that tourists can consider the costs incurred during the tour in Banyumas. This supporting information is not owned by the government of Banyumas Regency, there is no synergy between the government and private parties.

Based on the needs above, the system will provide menus that contain all the supporting information to help tourists in making decisions to travel in Banyumas Regency. The required information is including hotel information, culinary, atm, transportation, emergency telephones, activities or events in Banyumas Regency.

The construction of this system uses Client-Server concept. Figure 2 shows the architecture of BMSGuide. The user who wants to access this system will access the data contained on the web server, then from the database, the system will show the user according to the user’s choice.
3.1. Usecase Diagram
Usage BMSGuide application looks like in figure 3. There is an actor who is the user of BMSGuide application and there are some functions in the application that can be chosen by the actor.

3.2. Class Diagram
Figure 4 illustrates the class diagram of BMSGuide application and Figure 8 illustrates the design of BMSGuide application architecture.
3.3. Interface Description
Some of the menu contained in the Travel Guide application Banyumas is Android-based as in table 1:

| Menu                  | Description                                      | Menu                  | Description                                      |
|-----------------------|--------------------------------------------------|-----------------------|--------------------------------------------------|
| Natural Attraction    | Information of natural tourist attraction in Banyumas | Entertainment        | Information of entertainment place like café, theatre, salon, etc. |
| Hotel                 | Hotel information                                | Searching            | The function is to find location                 |
| Culinary Tour         | Restaurant Information                           | Nearby                | The function is to find nearest location         |
| Atm                   | Atm Information                                  | Event                 | Event information in Banyumas                    |
| Transportation        | Transportation Information                       | Help                  | Helping information to operate the application  |
| Emergency Call        | Information for emergency call like police station, hospital, etc. | About                | The information about Android-based Banyumas Travel Guide application |

4. System Implementation

4.1. Main Menu
The page in figure 5 is the interface that is displayed when the application first runs on mobile device. With the existing buttons, the user can choose to go to each interface that has different functions.

4.2. List Category
This page is a list view which displays the options of the selected category from the main menu as shown in Figure 6. The user can select on the available list and then will display the location details.

4.3. Location Details
The page in figure 7 is a detailed location view that contains location information in more detail. In this page there is also a "Map" button for the location map and "Navigation Route" to show the route to the location from the user's position. To run the "Navigation Route" menu, the GPS must be enabled first.

4.4. Display Map
Figure 8 is Google Maps view where the location is displayed in the form of an icon. Then, it is provided a button to zoom in and out the map view.

4.5. Route Navigation
Figure 9 is a view of navigation route from a user's position to the location position.

Figure 10 is a process that occurs when the user selects the navigation and the system will call the function "GetServerLocationData (locationName)". Once it is connected to internet, it will call php
function "LocByName.php" and take the coordinates that are in the database. If the coordinates are found, the system will create two coordinates for the user position and the destination. After that, it will call the Google navigation function to bring up the navigation path from the user position to the destination position.

4.6. Nearby Page

![Nearby Page](image)

Figure 11. Nearby Page

The page in figure 11 is the List view of the nearest location to the location where the user exists. To enable this menu the user must enable GPS on mobile device to know the user position. The results of the searching will be displayed in the form of List.

Once the application is built then it is tested to 30 samples using questionnaire. Test results for the BMSGuide app display category show data that 16 people rated very well, 12 gave good ratings, and 2 gave a good enough assessment. For category ease of use using BMSGuide application, 16 people provide very easy assessment, 12 people provide easy assessment, and 2 people provide easy enough assessment.

5. Conclusion

Based on the result of the research conducted on modelling android-based BMSGuide application, it can be taken some conclusions, BMSGuide application is successfully built as a search application for tourist sites and supporting locations on mobile devices equipped with GPS module. The built design for BMSGuide application fits to the needs and it follows the GUI (Graphic User Interface) design. BMSGuide mobile application is easy to use by the users, and with this application the information needs of tourist attractions and surrounding places in Banyumas can be fulfilled.

In the future, it is hoped that this research can complete the application, such as adding comments and suggestion features of tourists for a tourism location. It can also add features to know the number of tourists who have visited a tourist attraction and connect the application to social media, so that the promotion of the place is involving the visitors.

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