

Designing A Gis Application As A Media For Visualizing The Natural Potential Of Tourism In The City Of Lhokseumawe And North Aceh Based On Android

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Abstract. Geographic Information System (GIS). GIS describes geographical phenomena in the form of a reduced surface of the earth and has broad uses when designed for purposes such as the tourism sector. In the tourism sector, Lhokseumawe and North Aceh have many natural tourist attractions and have a lot of reliable potential. with a geographical location on the beach, so it has many interesting beach attractions to visit. With the support of Google Maps and the development of a geographic-based information system, it is hoped that it will be easy to get information about the development and natural potential of tourism in the Lhokseumawe and North Aceh regions based on android. This study aims to create and implement an Android-based system application as a Geographic Information System that visualizes the natural tourism potential of the City of Lhokseumawe and North Aceh. The system development method uses the System Developvent Life Cycle (SDLC) method which describes the stages in system development. The results of the research are an Android-based application that disseminates information and visualizes the natural tourism potential in Lhokseumawe City and North Aceh widely with Google Maps digital maps. With the form of a Google Maps virtual map that is displayed in map and satellite mode, it can make it easier for tourists to read maps

Keywords: *Travel, Geographic, Android, Google Maps.*

1 Introduction

Information Technology (IT) is the most important part of the need to provide the information needed by users to store, manage and analyze and retrieve data. So that the required data becomes more effective and efficient, one of them is using it in a Geographic Information System (GIS). GIS describes geographic phenomena in the form of a reduced surface of the earth and has broad uses if designed for purposes such as tourism, natural resources, planning, and population or demography. As a tool, GIS has an important role for humans, especially in conducting field observations, research reports, or in studying various phenomena related to natural potential.

The tourism sector as an economic activity has become a potential mainstay and development priority for a number of countries, especially for developing countries such as Indonesia which has vast regional potential with quite large tourist attractions, lots of natural beauty, various cultural historical heritage and community life. The cities of Lhokseumawe and North Aceh are cities that have enormous natural resources, some of which are marine and fisheries, tourism and natural gas. In the tourism sector, Lhokseumawe and North Aceh have many natural tourist attractions and have a lot of potential that can be relied upon. With its geographical location on the coast, it has many tourist attractions for coffee roasting. However, this tool has a weakness, namely that it cannot be controlled remotely.

An interesting beach to visit. Apart from beach tourist attractions, it also has other natural tourist attractions, but overall, there are still many potential natural tourist objects that are not yet known by local and inter-local communities.

With the support of Google Maps and the development of a geographic-based information system, it is hoped that it will be easy to obtain information regarding the development and natural potential of tourism in the Lhokseumawe and North Aceh regions based on Android and the information displayed will be more interesting, because it uses digital maps. For this reason, the author is interested in taking up research entitled: Designing a GIS Application as a Medium for Visualizing the Natural Tourism Potential of the City of Lhokseumawe and North Aceh Based on Android

2 Research Methods

Geographic information system application as a medium for visualizing the natural tourism potential of the cities of Lhokseumawe and North Aceh which will later be built on an Android basis. The information provided is in the form of digital map images using the Google Maps Api facility which can be accessed via a connection to the internet network. Through the internet, information can be accessed by the entire public globally. In system design, several stages are used, such as analyzing system requirements, designing system flow diagrams, designing user interfaces, designing databases. The programming languages used are XML and Java. for the database later using MySQL.

2.1 Context Diagrams

Context Diagram describes in general terms the system being designed. The design can be seen in Figure 1 below:

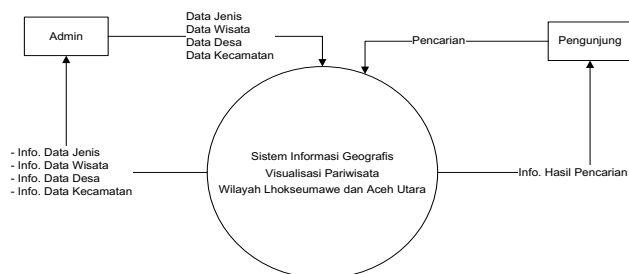


Figure 1 Context Diagram

The admin enters type data, tourism data, village data and sub-district data into the system, then processed, the results of the system process issued to the admin are information on type data, tourism data, village data and sub-district data.

Visitors enter location search data into the system, then it is processed, the results of the system process that are issued to visitors are search result information

2.2 Data Flow Diagrams

Data Flow Diagrams are a continuation of context diagrams that describe the details of the processes taking place in the system. The Data Flow Diagram can be seen in Figure 6 below.

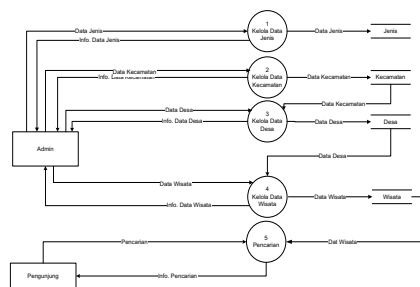


Figure 2. Data Flow Diagram (DFD)

Process 1 receives input from the admin in the form of type data which is then processed, the processing results are issued to the admin in the form of type data information and saved to type storage.

Process 2 receives input from the admin in the form of sub-district data and then processes it, the processing results are issued to the admin in the form of sub-district data information and saved to sub-district storage.

Process 3 receives input from the admin in the form of village data and then processes it, the processing results are issued to the admin in the form of village data information and saved to village storage.

Process 4 receives input from the admin in the form of tourist data which is then processed, the processing results are issued to the admin in the form of tourist data information and saved to tourist storage.

B. Database Design

In the database design that will be designed, there are 4 tables that will be used to store data resulting from system processes. Before designing the table structure of the database, the relationships between tables will first be designed with a diagram.

1. Table Type

This table is used to store data on tourist attraction types. The table structure is shown in table 1 below

Table 1 Type Table Structure

No	Name	Type Data	Size	Key	Description
1	kdjns	Varchar	4	PK	Object Type Code
2	nmjns	Varchar	30		Object Type Name

Table 1 is: in the type table there are 2 fields, the data type used is varchar where the characters stored can be letters and numbers, the size follows a limit that is adjusted according to the number of characters that can be accommodated and the PK key (primary key) is selected on kdjns so that the type code cannot be filled with the same characters.

2. Village Table

This table is used to store village data. The table structure is shown in table 2 below

Table 2 Village Table Structure

No	Name	Type Data	Size	Key	Description
1	kddesa	Varchar	6	PK	Village Code
2	nmdesa	Varchar	50		Village Name
3	kdkec	Varchar	4	FK	District Code

The description of table 2 is: in the village table there are 3 fields, the data type used includes varchar where the characters stored can be letters and numbers, the size follows a limit that is adjusted according to the number of characters that can be accommodated and the PK key is (primary key) is selected in kddesa so that the village code cannot be filled in with the same characters. The FK key, namely (foreign key) in kdkec functions to retrieve data from tables that have relationships

3. District Table

This table is used to store sub-district data. The table structure is shown in table 3 below

Table 3. Subdistrict table structure

No	Name	Type Data	Size	Key	Description
1	kdkec	Varchar	6	PK	Village Code
2	nmkec	Varchar	50		Village Name
3	kab	Varchar	30		District Code

Table 3. namely: in the sub-district table there are 3 fields, the data type used includes varchar where the characters stored can be letters and numbers, the size follows a limit that is adjusted according to the number of characters that can be accommodated and the PK key is (primary key) is selected in kdkec so that the sub-district code cannot be filled in with the same characters

4. Travel Table

This table is used to store tourist data. The table structure is shown in table 4 below

Table .4 Tourist Table Structure

No	Name	Type Data	Size	Key	Description
1	kdwisata	Varchar	4	PK	Tourism Code
2	nama	Varchar	50		Tourism Name
3	luas	Varchar	20		Area of Tourist Attractions
4	pemilik	Varchar	50		Ownership status
5	kondisi	Varchar	20		Tourism Conditions
6	fasilitas	Varchar	100		Facility
7	image	Blob			Tourism Image
8	ket	Text			Information
9	lat	Double			Location Latitude
10	lng	Double			Longitude of location
11	kddes	Varchar	6	FK	Village Code
12	kdjns	Varchar	4	FK	Type Code

Table 4 is: in the village table there are 12 fields, the data types used include varchar where the characters stored can be letters and numbers, text characters stored can be letters and numbers, double characters stored are decimal numbers, size follows the limits which is adjusted according to the number of characters that can be accommodated and the PK key (primary key) is selected in kdwisata so that the tourist code cannot be filled in with the same characters. The FK key, namely (foreign key) in kdkec and kdjns functions to retrieve data from tables that have relationships

C. Interface Design (Interface)

The interface is used as a face-to-face interface between the system and system users. Before creating the system, it is necessary to design an interface that can help in the process of creating the system later.

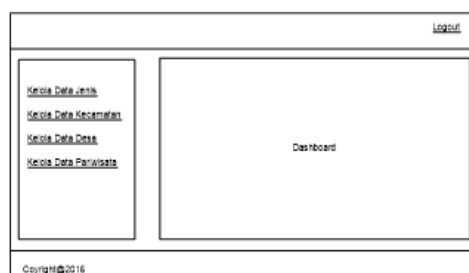


Figure 3. Server Web Page Design

1. Designing the Manage Data Type Page

This page is designed for admins to manage tourism type data. Design of the page figure 4

The form for 'Manage Type Data' contains two text input fields: 'Kode Jenis' and 'Nama Jenis'. Below these fields are four buttons: 'Simpan', 'Perbaiki', 'Hapus', and 'Batal'.

Figure 4. Design of the Manage Type Data Page

2. Designing the District Data Management Page

This page is designed for admins to manage sub-district data. The page design is shown in Figure 5.

The form for 'District Data Management' contains three text input fields: 'Kode Kecamatan', 'Nama Kecamatan', and 'Kabupaten / Kota'. Below these fields are four buttons: 'Simpan', 'Perbaiki', 'Hapus', and 'Batal'.

Figure 5. Design of the District Data Management Page

3. Designing the Village Data Management Page

This page is designed for admins to use to manage village data. The page design is shown in Figure 6.

The form for 'Village Data Management' contains three input fields: 'Kode Kecamatan', 'Nama Kecamatan', and 'Kecamatan'. The 'Kecamatan' field is a dropdown menu. Below these fields are four buttons: 'Simpan', 'Perbaiki', 'Hapus', and 'Batal'.

Figure 6. Design of the Village Data Management Page

4. Designing the Tourism Data Management Page

This page is designed for admins to manage tourism data. The page design is shown in Figure 7

Kode / Nama Wisata	<input type="text"/>	<input type="text"/>
Desa	<input type="text" value="▼"/>	
Luas	<input type="text"/>	
Pemilik	<input type="text"/>	
Kondisi	<input type="text"/>	
Fasilitas	<input type="text"/>	
Gambar	<input type="text"/>	
Berat	<input type="text"/>	
Keterangan	<input type="text"/>	
Latitude	<input type="text"/>	
Longitude	<input type="text"/>	
Jenis	<input type="text" value="▼"/>	
	<input type="button" value="Simpan"/>	<input type="button" value="Perbaiki"/>
	<input type="button" value="Hapus"/>	<input type="button" value="Batal"/>

Figure 7. Design of the Tourism Data Management Page

5. Android Home Page Design

This page is designed to be displayed for the first time when the Android application is run. The design is as shown in Figure 8

Menu Utama	
Pariwisata	Lokasi
Pencarian	About
Keluar	

Figure 8. Android Home Page Design

6. Designing the Tourism List Page

The design of this page aims to display a tourist list page. The design is as shown in figure 9

Daftar Wisata
Wisata 1
Wisata 2
Wisata 3
.
.
.
.
.
.
.
Wisata ...N

Figure 9. Design of the Tourism List Page

7. Search Page Design

The design of this page aims to display tourist locations. The design is as shown in Figure 10.

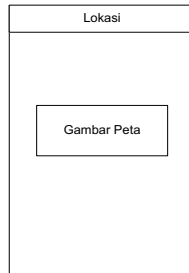


Figure 10. Location page design

8. Designing the About Page

The design of this page aims to display a search page. The design is as shown in figure 11



Figure 11 Search Page Design

System Design

System planning

The design of this system can be described through data flow diagrams or context diagrams which will describe the data flow towards the system being designed.

The use case diagram of the tourism geographic information system in the research contains 2 actors who interact with the system, these actors are admin and visitors. The use case diagram is shown in figure 3.

1. Use case

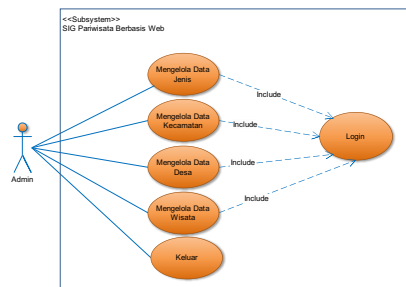


Figure 12. Web-Based GIS Use Case Diagram

2. Activities

The activity diagram in the tourism geographical information system in the research contains 2 diagrams based on the activities that occur in the system carried out by 2 actors.

Admin actor activity diagram This activity diagram shows the admin's activities in running the system, the admin actor activity diagram is shown in Figure 13

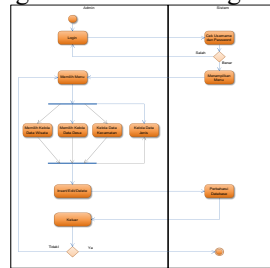


Figure 13. Admin Actor Activity Diagram

3 Result and Discussion

Implementation is the final stage carried out after the software development process has been completed. Implementation is intended for testing or explaining the steps taken to apply a system that has been created through the displays of the application that has been run. In order for the software implementation process to work perfectly, the software must first be tested to determine existing weaknesses and errors and then be evaluated.

1. Main page display

The main page is the initial page that is displayed when the program is first run. On the main page there is a tour list menu, about and exit search locations. The results of implementing the main page on the client side are as shown in Figure 14.



Figure 14. Main page display

2. Location page display

This page is a page that users use to view all tourist locations. This page is displayed when the user selects the location menu. The search page displays as shown in Figure 15.

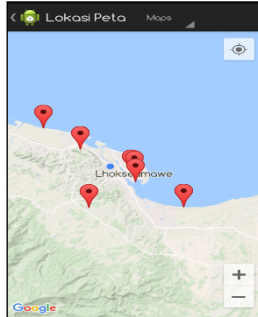


Figure 15. Location page display

3. Appearance of the About Application Page

This page is a page that users use to view information about the application. This page is displayed when the user selects the About menu.

6.Distance Page Display

This page is a page that users use to view distance information between the user's location and tourist attractions. This page is displayed when the user selects the check distance button. The distance page view is shown in the figure 16.

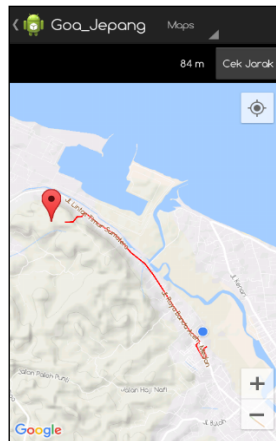


Figure 16. Distance Page View

5. Manage Tourism Data Page Display

This page is used by the admin to enter, correct and delete tourist data, this page is displayed when the user selects the tourist data menu. The display of the tourism data management page is shown in Figure 17.

No	Kode wisata	Nama wisata	Luas	Pemilik	Kondisi	Fasilitas	Keterangan	Latitude	Longitude	Gambar	Jenis	Desa	Actions
1	W001	Taman Riyadah	2.4 Km	Pemerintah	Baik	Tempat duduk, Tempat Olahraga	Taman Riyadah merupakan taman kota yang ada di tengah di kota Lhokseumawe, karena itu taman ini menjadi destinasi wisata utama bagi masyarakat lokal di Aceh khususnya Lhokseumawe, destinasi wisata ini siap untuk dikunjungi dan siap untuk dikembangkan ke arah yang lebih baik.	5,181912	97,1364746		Taman	Kuta Blong	<input type="button" value="G"/> <input type="button" value="X"/>

Figure 17. Tourist Data Page Display

4 Conclusion

Based on the results and discussion of the research that has been carried out, it can be concluded that:

- The GIS application Visualizing Natural Tourism Potential can provide information to tourists visiting the cities of Lhokseumawe and North Aceh and there are several tourism locations in the Lhokseumawe and North Aceh areas in the form of virtual Google Maps displayed in map and satellite mode making it easier for tourists in reading maps of tourist locations.
- In this GIS application, the visualization of the natural tourism potential in Lhokseumawe City and North Aceh facilitates the ease of determining the distance between the position of the user (tourist) and the tourist locations in Lhokseumawe City and North Aceh.
- GIS application for visualizing natural tourism potential in the cities of Lhokseumawe and North Aceh based on Android and integrated with GPS which can help and make it easier for tourists to find the location of tourist attractions.
- Users (tourists) can view information and tourist attractions by selecting the markers available on the tourist map.

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