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"Design and Development of Geographic Information Systems in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang Web-Based"

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Abstract *– The purpose of this study is to create a Tourism Geographic Information System to expose tourism information in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang to the wider community. This GIS is useful for people who need information on tourist attractions to help and is also useful as a design analysis media in the process of building facilities and infrastructure in Desa Mekar Buana. Desa Mekar Buana has a large area of 18.63 km². Desa Mekar Buana has coffee plantations, bananas, durian, mangosteen with an overall plantation area of 6.01 km². This village also has tourist attractions that are not less interesting than other tourist attractions. Tourism in Desa Mekar Buana consists of natural attractions namely Bandung waterfalls, Cigentis waterfalls and Gunung Sanggabuana. Artificial tourism, namely the bridge of love and fishing Tuana Tirta. Desa Mekar Buana also has a culinary tour and an inn called a tourist village, because this village was chosen to be the Desa EMAS which means Entrepreneur, Mandiri, Adil and Sejahtera. Kabupaten Karawang from 20 selected villages in West Java to use the pilot village. In this research the analysis method used is the SWOT method and the system builds up using a prototype method. The programming language used is JavaScript. The database used is MySQL and the tools used are XAMPP, Note C ++, Adobe Dreamweaver. The results of this study are designing a web GIS that can help increase tourism visitors for the welfare of the people of Desa Mekar Buana.*

Keywords*: Tourism Geographical Information System, Cigentis Waterfall, Desa Mekar Buana*

I. INTRODUCTION

, Kabupaten Karawang is located in West Java Province which is adjacent to the National Capital, Jakarta and the Capital of West Java Province, Bandung. , Kabupaten Karawang consists of 30 Kecamatans and there are 309 villages and 297 villages. According to BPS, the total area of , Kabupaten Karawang is 1,753.27 km².

According Javapostonline.co.id Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang is a village that has superior tourism and plantation potential. Therefore, the village of Mekar Buana was chosen to be the Gold Village which has the meaning of Entrepreneur, Independent, Fair and Prosperous. Mekar Buana Village is a representative of , Kabupaten Karawang from 20 selected villages in West Java to become a pilot village.

Mekar Buana Village has an area of 18.63 km². Mekar Buana Village has coffee plantations, bananas, durian, mangosteen with an overall area of plantations owned by residents which is 6.01 Km². This village also has tourist attractions that are not less interesting than other tourist attractions. Tourism in the village of Mekar Buana consists of natural attractions namely bandung loji curug, cigentis waterfall and sanggabuana mountain. Artificial tourism, namely

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the bridge of love and fishing, Buana Tirta. Mekar Buana Village also has a culinary tour named tourist village. And also Agro-tourism, namely durian plantation, coffee, banana, mangosteen.

But the number of tourist attractions in the , Kabupaten Karawang is largely unknown to the wider community from the location and access to transportation. Therefore we need a system of identifying tourist sites that can provide web-based information that is easily digested and integrated with both the community, investors who want to develop or the local government to carry out development.

With the Geographical Information System (GIS) can help the availability of information facilities for the people of the , Kabupaten Karawang and other areas that are in need of information on tourist attractions and their locations, GIS is also useful as a medium for planning analysis in the process of developing tourism facilities and infrastructure.

Based on the description above, then a website was made to facilitate the search for places and tourist sites with the topic of the final project "GEOGRAPHICAL INFORMATION SYSTEM OF TOURISM IN DESA MEKAR BUANA, KECAMATAN TEGALWARU, KABUPATEN KARAWANG WEB BASED".

Identification of problems

The identification problems that will be discussed in the design of this geographic information system for tourism are as follows:

1. 1. How to find out tourism places in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang?
2. 2. How to design a website for the needs of increasing tourism potential in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang ?
3. 3. What is the impact of the web design in improving the economy and welfare of the community around Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang ?

THEORY BASIS

Analisis Strength, Weakness, Opportunity, Threat (SWOT)

(Wheelen & Hunger, 2012) SWOT is a step to be able to identify internal and external factors that influence the achievement of organizational goals. The external environment contains opportunity and threat variables that are outside the organization and are not things that can be controlled by the leadership of the organization in the near term. The internal environment of the organization consists of strength and weakness variables (strengths and weaknesses) that are within the body of the organization itself and are usually not in control of the organization's leadership in the near future. Included in this variable are the structure, culture, and organizational resources. SWOT analysis includes:

- Strength, Resources (finance or financial, human, energy, machinery, buildings, etc.) specific skills or advantages possessed by other individuals or organizations. Strength or strength is also called distinctive core..
- Weakness, Limited or lack of resources, skills, capabilities that hinder the progress of the company, both in the performance (competency), profits income, managerial & product improvement.
- Opportunity, Important situation favorable for the company. The possibility of these opportunities does not come twice, but companies that are able to see a variety of opportunities both from the perspective of business, very big role in achieving the company's targets and goals.
- Threat, Important situations are not profitable, can be eliminated and can be fixed. However the company handles it. These obstacles certainly have the ability to inhibit and is something that is not profitable.

I. PROTOTYPE METHOD

The prototype method definition is software prototyping or life cycle using prototyping. (Salah & Syarat, 2017) understanding prototype method is one of the system life cycle methods that is based on the concept of a working model. The purpose of the prototype method is to develop the model into a final system. So this system will be developed quickly and the costs will be lower.

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A distinctive feature of this prototype method is that system developers, clients and end users can see and conduct experiments from the beginning of the development process. There are several methods for working on prototypes.

The following are some stages of the prototype method :

1. Requirement Analysis

The first step that must be done in the prototype method stage is to identify all devices and problems. The most important stages of the prototype method are the analysis and identification of the outline requirements of the system. After that, it will be known what steps and problems will be made and solved. Requirement Analysis is very important in this process.

2. Prototype Developing

The next step is the prototype method building step of the prototype offered at the customer's presentation. Suppose making input and output of system results. Meanwhile only prototypes that will be continued do not have to be continued which must be done.

3. Prototype Evaluation

Before moving on to the next step, it is mandatory to examine step 1, and because this is a very important determinant of success and process. When steps 1 and 2 are missing or incorrect in the future it will be very difficult to continue the next step.

4. System Coding

Before coding or we usually call the coding process, we need to know in advance coding using a programming language. This process is very difficult, because it applies needs in the form of program code.

5. System Testing

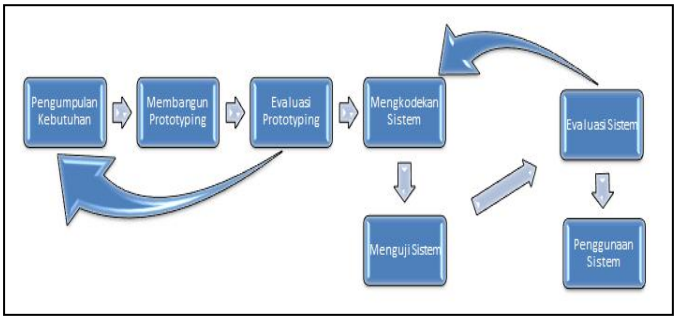
After coding or coding will certainly be tested. There are so many ways to test, for example using a white box or black box. Using a white box means testing the code while black box testing the display functions whether it is correct with the application or not.

6. System Evaluation

Evaluate all the steps that have been taken. Already in accordance with needs or not. If there is not yet a revision then it can be repeated and returned in stages 1 and 2.

7. Use System

The system is complete and ready to use and don't forget to maintain it so that the system is finished and operated as it should.



Gambar 1 Metode Prototipe

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Unified Modelling Language (UML)

(Munawar, 2018) UML (Unified Modeling Language) is one of the most reliable tools in the world of object-oriented system development. This is because UML provides a visual modeling language that allows system developers to make a blueprint for their vision in a standard form, is easy to understand and is equipped with effective mechanisms for sharing and communicating their designs with others.

II. RESEARCH METHODS

Desa Mekar Buana

Mekar Buana is a village located in Kecamatan Tegalwaru, Kabupaten Karawang, West Java, which has an area of 18.63 km². This village has several attractions consisting of natural attractions, artificial tourism, agro-tourism, restaurants and lodging. This village was chosen to be one of the villages declared as the golden village, namely the West Java regional government program. The village of gold has the meaning of Entrepreneur, Independent, Fair and Prosperous.

Gambar 2 Struktur Organisasi

Desa Mekar Buana is a representative of the Kabupaten Karawang of 20 selected villages in West Java to become a pilot village by the West Java Provincial Government because it has a very high tourism potential.

Kecamatan Tegalwaru, Kabupaten Karawang has the beauty and beauty that will sustain tourism, as well as plantations owned by Desa Mekar Buana. The industrial potential is 3 industries of wood, 3 industries of fabric and 5 industries of woven industry.

Organizational structural

Data analysis method

In compiling this final project proposal, to obtain data using several data collection methods, including the following:

1. Literature review

At this stage the literature study is conducted either coming to the library or online by reading various guidebooks and research examples related to the title of the research to be taken so that it can help in preparing this thesis.

2. Survey

In the survey conducted to obtain data there are 2 ways to do it, they are:

1) Observation

In this process, systematic observation and recording of the situation and condition of Desa Mekar Buana, Kecamatan Tegalwaru, , Kabupaten Karawang is currently underway..

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2) Interview

Data analysis technique with this method is done through question and answer to the village apparatus about tourism in Desa Mekar Buana.

3. Analysis Method.

At this stage the method will be determined what will be used in analyzing the running business processes, the analysis method that will be used is the SWOT method.

4. Development Method

At this stage determine the design method that you want to use in designing the system and will use the prototype method.

III. RESULTS AND DISCUSSION

I. RESEARCH RESULTS DATA

The data in this study were obtained by researchers through several methods, namely the interview method, the observation method, and the documentation method. The interview method is used to obtain data from the parties involved. The observation method is used to observe the condition of tourist attractions in Desa Mekar Buana.

Problem Analysis Using the SWOT Method

To analyze the problems that occur in tourism in Mekar Buana Village, Tegalwaru District, Karawang Regency, the SWOT method is used as a basis for obtaining clearer and more specific issues. Then based on the results of this analysis proposals can be designed to be applied in a geographic information system.

Tabel 1 Analisis *SWOT*

Analysis of Problems Faced

Problem analysis is an analysis that describes the main problems that occur then raised in
this study, later this problem analysis becomes a reference for deeper analysis using SWOT analysis. This analysis aims to determine the cause and effect of the problems that arise.

Based on the results of observations and interviews from the current business process in Tourism in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang there are several problems that occur. As for the analysis of the problem that will be described are as follows:

1. 1. There is limited information about tourism in Desa Mekar Buana Kecamatan Tegalwaru, Kabupaten Karawang.
2. The information provided is not in the form of a Geographic Information System.
3. The absence of information on the location and distance from tourist sites to other tours in Desa Mekar Buana.

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Troubleshooting Solution Plan

Based on the analysis of the problem that has been done, an application that can provide information about tourism in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang is needed in the form of GIS. By designing the Geographical Information System for Tourism in Desa Mekar Buana, Kecamtan Tegalwaru, Kabupaten Karawang as a pilot village, information can be provided easily in the form of a geographical web.

The problem-solving plan that is made is as follows:

1. Designing and building a Tourism Geographical Information System in Desa Mekar Buana, Kecamatan Tegalwaru , Kabupaten Karawang.
2. Designing a planning requirements system proposal.
3. Designing a business process application proposal that will be built using the Unified Modeling Language (UML) method.
4. Make a proposed problem solving by making software with the prototype method, namely:

1. Requirement Analysis System
2. Prototype Development
3. Prototype Evaluation
4. System Coding
5. System Testing
6. System Evaluation
7. Use System

II. DISCUSSION OF RESEARCH RESULTS

System Requirements Planning

NO	Aktor	Peran
1	Wisatawan	Login
		Melihat Home
		Melihat kategori wisata
		Melihat wisata
		Melihat peta/rute
		Membeli produk
		Memesan kamar
		Logout
2	Admin	Login
		Input kategori wisata
		Input wisata
		Input Produk
		Input Penginapan
		Logout

Opportunity	Threat
1. The condition of the village is still beautiful and original as well as the golden village jargon by the local government.	1. There is no information system to determine the location and distance of locations from tour to other tours
2. Tourism can be introduced nationally and internationally	
Strength	**Weakness**
1. Having beautiful natural beauty .	1. Lack of information about tourist attractions.
2. Has the advantage of plantations.	2. Lack of Insights regarding the marketing potential of tourism villages.

1. Admin

Functional Requirements are types of requirements that contain the processes that will be carried out by the system. Functional needs contain what information must be available and generated by the Tourism Geographic Information System in Karawang Regency to be built. The system requirements plan to be made are in the table below:

Tabel 2 Kebutuhan Fungsional

Data Analysis

Design

In the design of system design that will be built using the User Interface and UML as follows:

1. Use Case Diagram
2. Activity Diagram
3. Class Diagram

Gambar 3 *Use Case Diagram Admin*

4. Sequence Diagram

In designing this application system there are 2 (two) actors who are directly related to this system:

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The task is to input tourist categories, input the tourism subcategories.

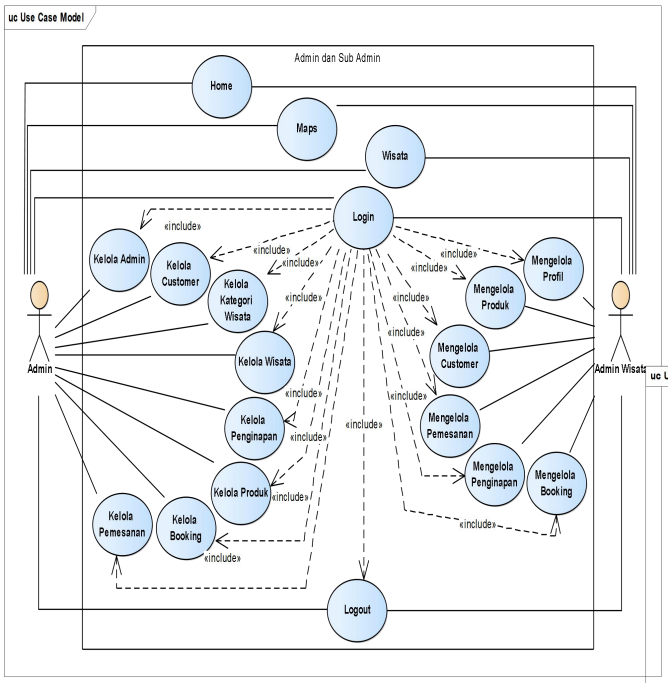
2. Tourists.

People who see the web as tourists are looking for attractions and receive information in geographical form.

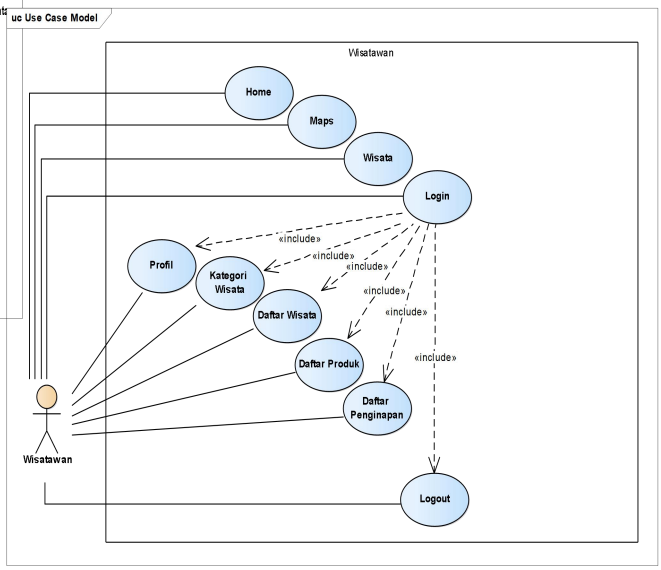
Use Case

Here is a Use case diagram used to describe the actors and use cases that meet the needs of this proposed system, the use case diagram shows the relationship between the user and the system.

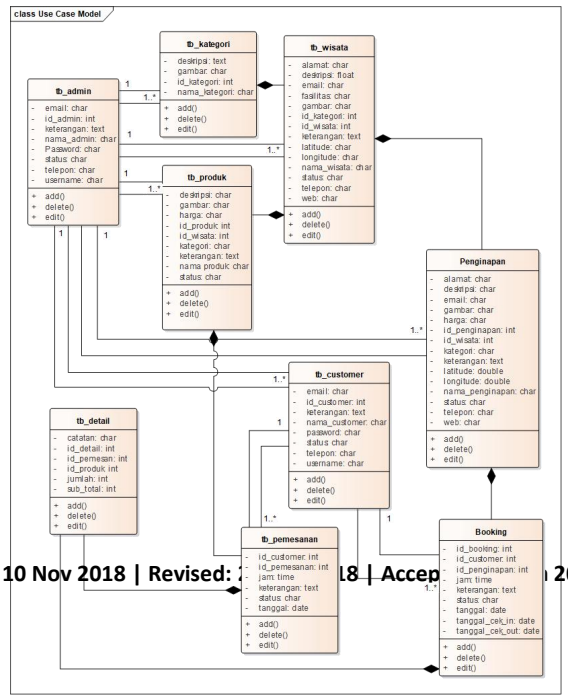
1. Use Case Admin



2. Use Case Wisatawan



Gambar 4 *Use Case Diagram Wisatawan*



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Class Diagram

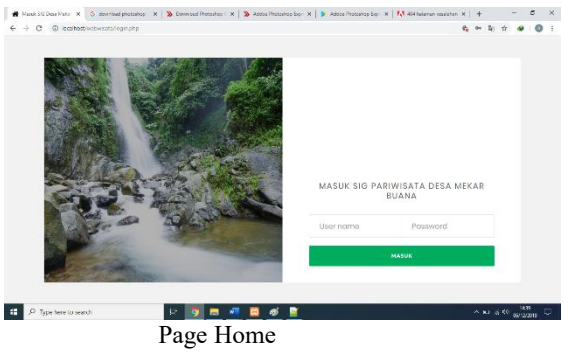
Information:

1. One admin can input many travel categories (one to many)
2. One admin can input many tours (one to many)
3. One admin can input many products (one to many)
4. One admin can input many lodging (one to many)
5. One admin can input many customers (one to many)
6. One admin can order products and book accommodation directly *(one to many)*
7. One customer can order many products (one to many)
8. 8. One customer can book a lot of lodging (one to many)
9. Tourism arranged by category (komposisi)
10. Products are organized by travel (komposisi)
11. The accommodation is arranged by wisata (komposisi)
12. Orders relating to products but stand alone (agregasi)
13. Booking related to lodging but stands alone (agregasi).
14. Details are inherited by order (inherintance)

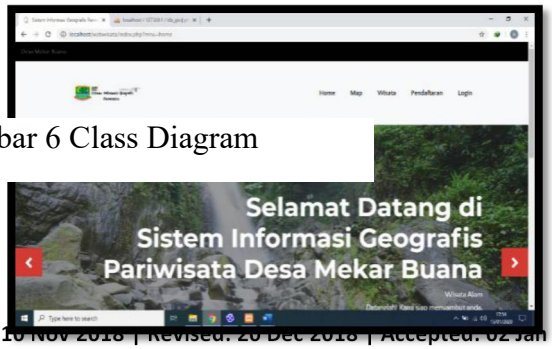
Tampilan User Interface

1. Login Admin dan Wisatawan

Display admin and tourist login pages to enter the web system.



Gambar 6 Class Diagram



2. Page Home

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Gambar 7 User Interface Home

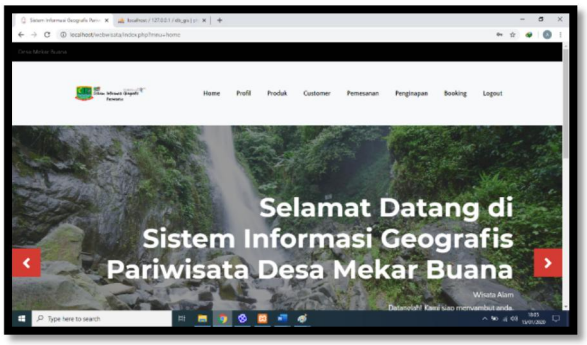
Display the home page there is a home, map, tour, registration that can and login.

3. Halaman Admin

Gambar 8 User Interface Admin

Display home admin that can display and manage admin, travel, customers, travel categories, products, bookings, lodging, booking and logout.

4. User Interface Admin Wisata

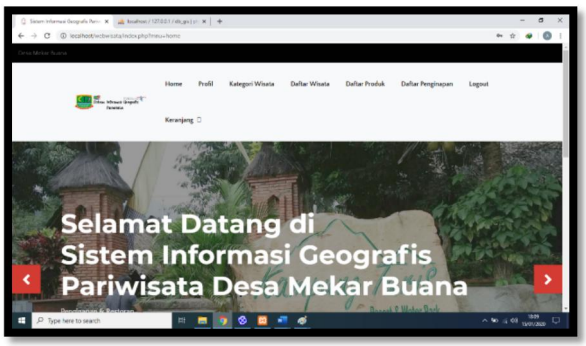


Gambar 9 User Interface Admin Wisata

Travel admin page that can display the travel admin home that can display and manage profiles, products, bookings, lodging, booking and logout.

5. User Interface Wisatawan

The tourist page consists of manageable profiles, travel categories, list of tours, list of products that can be ordered, a list of lodging that can be ordered, a basket to see the results of orders, and logout.



Gambar 10 User Interface Wisatawan

CONCLUSIONS AND RECOMMENDATIONS

III. CONCLUSIONS

The conclusions drawn from the research conducted are as follows:

1. 1. In this research has succeeded in making a web-based geographic information system for tourism in Kabupaten Karawang to provide information on tourism places in Desa Mekar Buana Kecamatan Tegalwaru , Kabupaten Karawang.

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2. This geographical information system can help tourists visiting Desa Mekar Buana, Kabupaten Karawang to find out the location of natural attractions, man-made tourism, lodging and restaurants in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang.

3. 3. With the web-based geographic information system can increase economic income and welfare of the people of Desa Mekar Buana, Kecamatan Tegalwaru , Kabupaten Karawang.

IV. RECOMMENDATION

The geographic information system design of tourism in Desa Mekar Buana, Kecamatan Tegalwaru, Kabupaten Karawang is certainly not perfect, there are still many things that can be done to develop this system to be better, among others:

1. This research does not develop a location search method using a more effective and efficient search algorithm.

2. It is better to produce a more reality look that can apply 3D models to GIS applications.

3. 3. To be able to run without an internet connection This system needs to be developed using Offline Maps.

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