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DESIGN OF WEB-BASED VIRTUAL TOURISM INFORMATION SYSTEM AT GEOPARK CILETUH SUKABUMI

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Abstrak

Geopark Ciletuh Sukabumi merupakan taman bumi yang memiliki keanekaragaman hayati seperti unsur geologi, sosial dan budaya, hingga lokasi yang dapat dijadikan sebagai penelitian dan pariwisata. Destinasi wisata yang ada di Geopark Ciletuh ini meliputi: curug (air terjun), pantai, puncak pegunungan, pulau, wisata budaya serta keanekaragaman hayati yang tersedia. Dikarenakan minimnya media informasi mengenai objek wisata di Geopark Ciletuh ini menyebabkan belum banyak wisatawan yang berkunjung untuk menikmati keindahan objek wisata alam dan kearifan lokal budaya yang masih terjaga di Geopark Ciletuh tersebut. Berdasarkan permasalahan tersebut, dilakukan penelitian guna merancang dan membangun sistem informasi wisata dengan fitur virtual tour berbasis website Geopark Ciletuh Sukabumi. Dalam penelitian ini, penulis melakukan perancangan sistem tersebut menggunakan metode pengembangan sistem Zachman Framework dan dibangun menggunakan CMS Wordpress dan Page Builder serta bahasa pemrograman PHP dan MySQL. Pengujian Sistem Informasi Wisata Virtual di Geopark Ciletuh Sukabumi menggunakan Blackbox Testing. Hasil dari perancangan sistem informasi wisata virtual berbasis web di Geopark Ciletuh Sukabumi ini dapat dijadikan media informasi wisata bagi masyarakat luas serta pengunjung yang akan berwisata ke tempat objek wisata tersebut.

Kata kunci: Wisata, Virtual Tour, Sistem Informasi, Zachman Framework, Blackbox Testing

Abstract

Geopark Ciletuh Sukabumi is an earth park with biodiversity such as geological, social, and cultural elements, to locations for research and tourism. Tourist destinations in the Ciletuh Geopark include waterfalls, beaches, mountain peaks, islands, cultural tourism, and biodiversity. Due to the lack of information media about tourist objects in the Ciletuh Geopark, not many tourists visit to enjoy the beauty of natural attractions and local cultural wisdom still maintained at the Ciletuh Geopark. Based on these problems, research was conducted to design and build a tourist information system with a virtual tour feature based on the Geopark Ciletuh Sukabumi website. In this study, the author designed the system using the Zachman Framework system development method and was built using CMS WordPress and Page Builder as well as PHP and MySQL programming languages. Testing the Virtual Tourism Information System at the Ciletuh Sukabumi Geopark using Blackbox Testing. The results of the design of a web-based virtual tourist information system at the Ciletuh Sukabumi Geopark can be used as a medium of tourist information for the general public and visitors who will travel to the tourist attraction

Keywords: Tour, Virtual Tour, Information System, Zachman Framework, Blackbox Testing

INTRODUCTION

Geopark is a geographical area that preserves world heritage sites, which are not only a place of conservation but also a means of insight and knowledge and improve the economic development of the surrounding community through tourism (Rachmasari, 2020). One of the Geoparks in

Indonesia is located on Java Island, southwest of Sukabumi Regency, West Java which is recognized as a UNESCO Global Geopark, namely Geopark Ciletuh on December 22, 2015, and inaugurated as the National Geopark Ciletuh - Palabuhan Ratu on June 21, 2016 (Periyadi, 2019). At this time, the Ciletuh Sukabumi Geopark is being developed by the government, especially to improve infrastructure



facilities and encourage community economic development from the tourism and social life aspects (Putri, Deliarnoor, & Nurasa, 2020). There are still many obstacles experienced by tourists and managers of these attractions in improving the tourism sector at Ciletuh Geopark. The lack of information causes tourists to be confused in getting information about the tourist objects they will visit (Juandi, 2021). From the side of the tourism object manager, there are also obstacles to increasing the tourist attraction they manage. So the author will design and implement a **Web-Based Virtual Educational Tourism Information System at the Ciletuh Sukabumi Geopark**.

Information systems are a collection of components related to collecting, processing, storing, and disseminating data and information (Utarki, Pratama, & Hellyana, 2020). In this modern era, travel activities do not need to be visited in person because virtual tours are now popular or commonly called virtual tours. Virtual Tour is virtual reality by having the ability to obtain information and pictures in exploring a place using a computer or smartphone (Safriadi, Sastypratiwi, & Tamara, 2018). This virtual Tour can display the situation in a place and obtain information without needing to visit the place first (Putriani & Prasetyo, 2021). A website is a collection of pages including text, moving or still images, sound, animation, or a combination of these that are useful for displaying information. The website has 2 (two) properties, namely static and dynamic, by forming a building chain that is interconnected and linked by hyperlinks (network of pages) (Romdoni, 2018).

Here are some related studies to support research that will be carried out among research from Muhammad Irwan Aras in 2018 by creating a web-based Virtual Tour Application using the waterfall method in developing the system to be a medium of information for visitors about objects in the Ammatoa Customary Area. Kajang, Tana Toa Village, Kajang District, Bulukumba Regency (Aras, 2018). In their research, Dio et al. 2019 provide information through a virtual tour application for recreation locations in Pontianak using the MDLC method (Safriadi et al., 2018). Furthermore, from the research of Indri Tri Julian et al. in 2021 by designing and building web-based Virtual Reality Photography with 3D virtual tours using the MDLC method to provide tourist information on recreational areas in Pontianak (Julianto, Cahyana, & Tresnawati, 2021). Next, research by Maria Ursula Kawulur et al. in 2018 created a Virtual Tour e-Tourism website for natural tourism objects in Biak Numfor Regency to facilitate public access to obtaining information on tourist attractions in Biak

Numfor Regency in developing the system using the Rapid Application Development (RAD) method (Kawulur et al., 2018). The previous research from Ni Putu Sulistyadewi et al. in 2021 in developing the **Taman Ayun Temple Virtual Tour Application** based on Interactive Multimedia to educate the public by adding insight and knowledge about the history of Taman Ayun Temple in the design and construction of the system using the MDLC method (Sulistyadewi et al., 2021).

Based on the description above, the design and development of this virtual tour information system use the Zachman Framework method that this virtual tour information system is a means of information and education to increase understanding and insight and attract the interest of the public and tourists to visit tourist objects at Geopark Ciletuh.

RESEARCH METHODS

Types of research

This research uses a qualitative descriptive approach to research the **design of a virtual tourism information system**.

Research Target / Subject

The target of this research is a tourist attraction in the Ciletuh Geopark, Sukabumi

Data Collection Techniques

Data collection techniques used in this study include:

1. Observation
Observation is a technique of collecting data systematically and intentionally through observation and recording of data required by research..
2. Literature Study
A literature study is a literature search by reading, analyzing, concluding, and citing literature for references such as books, articles, research journals, and the like related to the studied aspects.
3. Online Data Search / Internet Searching
Internet Searching is a data collection technique through technology in the form of a search engine on the internet where all the information needed is available.

System Development Zachman Framework

Zachman Framework is a system development method that displays a clear and structured way to describe an enterprise. Here's a 6x6 matrix from the Zachman Framework.

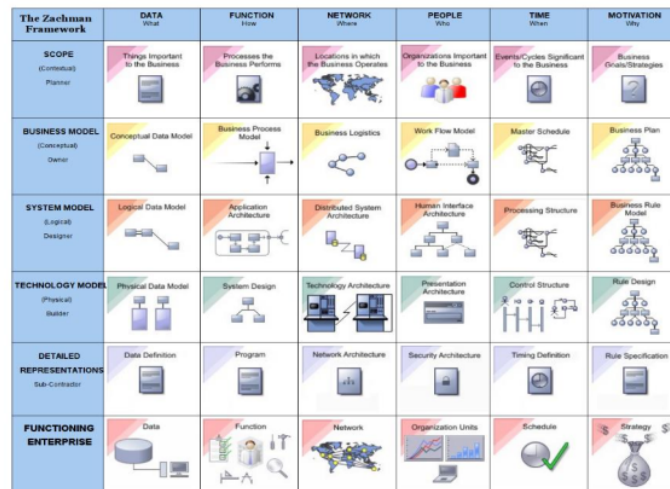


Figure 1. Zachman Framework

Using the Zachman Framework, developers can make system designs clear, easy to understand, structured and complete (Januhari, 2015).

In this research, the development of the Zachman framework system used is a 4x6 matrix covering the Scope (Planner) point of view, Business Model (Owner), System Model (Designer), and Technology Model (Builder), with each column consisting of What, How, Where, Who, When and Why.

System Implementation

System implementation merges all documents collected as data and information objects into a system aligned with the design. This stage is implementing the creation of a web-based virtual tourist information system at Geopark Ciletuh Sukabumi, which was built with WordPress CMS and

page builder and using the PHP and MySQL programming languages.

System Testing

System testing is a method carried out to test or check the level of the quality system to operate correctly and that there are no errors (Haykal, 2020). The system testing method used in this research is Blackbox Testing. Blackbox testing is a test method that only pays attention to the functional statements of the system (Romdoni, 2018).

RESULTS AND DISCUSSION

Research Result

Table 1 shows the Zachman Framework matrix's results in this research.

Table 1. Research Result with Zachman Framework

	Data What	Function How	Network Where	People Who	Time When	Motivation Why
Scope/ Planner	Information data of Ciletuh Geopark tourism object	Share information and knowledge about tourism objects	Tourism Web at Ciletuh GEOPARK	General Public	Time to share information and knowledge	Tourism with Virtual Tour
Business Model/ Owner	Use Case Diagram	Illustration of the activity process model	Geopark Ciletuh Tourism Web Network	Potential User	System development plan	Maximization of information system technology

	Data What	Function How	Network Where	People Who	Time When	Motivation Why
System Model/ Designer	Class Diagram	Activity Diagram	Design Network Configuration System	People related to system development	System model design schedule	Desain pengembangan model sistem
Technology Model/ Builder	Relationships between tables	Sequence Diagram	Web Network Configuration	System Interface overview	Website System Design Schedule	System development rules

Zachman Table Discussion

1. Column What

Explaining the data required by the system is as follows.

a. Planner

The data needed in this system is information data on tourism objects at Geopark Ciletuh and the human resources needed in system development.

b. Owner

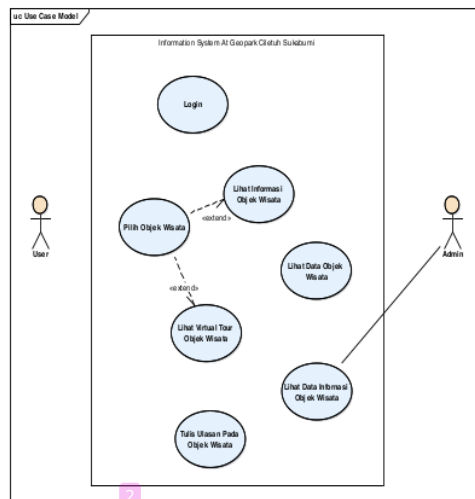


Figure 2. Use case Diagram

Based on Figure 2, the use case diagram above is seen from the user's side, you can see the main system page, but to access other menus, you must register/login first. After that, the user can enter the username and password to log in to the website. Users can view various information, and Virtual Tour selected tourist attractions.

From the admin side, the admin can enter a username and password to log in to the CMS dashboard to view and manage information data and Virtual Tour attractions by adding, changing, saving, and deleting data.

c. Designer

Figure 3. class diagram depicting a process in the system where each class will depend on and relate to each other with the attributes in it.

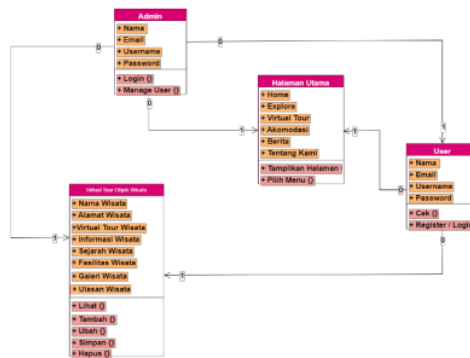


Figure 3. Class Diagram

d. Builder

In Figure 4, below is the relationship between tables which is the relation tables related to the system.

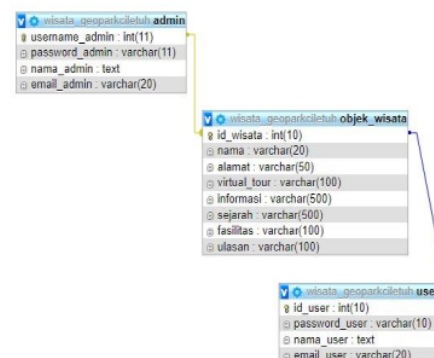


Figure 4. Relation Table

2. Column How

Explain how the procedure runs in the Ciletuh Geopark tourism web system.

a. Planner

Providing information and knowledge about tourist objects with virtual tours on a system managed by a web manager and accessed by users.

b. Owner

The processes in the system describe that the admin manages tourist attraction information data on the system by adding, changing, storing, and deleting the data. Users access information and virtual tours of tourist attractions that have been selected on the system

c. Designer

From the designer's point of view, in the column how there are login activity diagrams in figure 5. and user activity diagrams in figure 6.

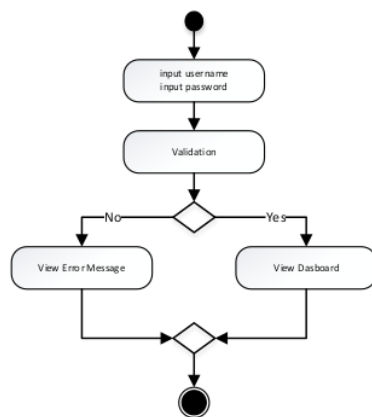


Figure 5. Activity Diagram Login

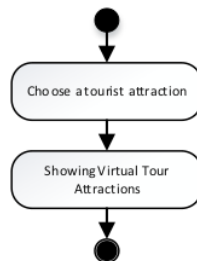


Figure 6. Activity Diagram User

d. Builder

From the builder's point of view, in the column how there are admin sequence diagrams in figure 7. and user sequence diagrams in figure 8.

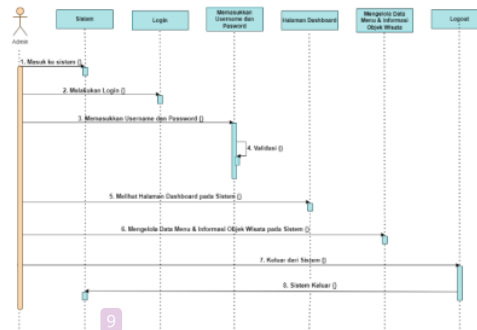


Figure 7. Sequence Diagram Admin

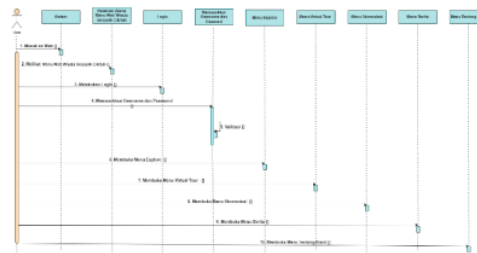


Figure 8. Sequence Diagram User

3. Column Where

The Where column describes the location of the information system and the network configuration of the system as follows.

a. Planner

Virtual Tour Website at Geopark Ciletuh Palabuhan Ratu Sukabumi

b. Owner, Designer, and Builder

In Figure 9. below is a network configuration that will be implemented on the system.



Figure 9. Network Configuration

4. Column Who

The Who column describes people who are related to the continuity of the design and development process in the system, as follows.

a. Planner

This tourism website is intended for the general public and potential tourists.

b. Owner

List of people related to potential users of the system are Admin and User.

c. Designer

The person involved in the development and management of the system is the admin.

d. Builder

The description of the tourist web system interface that will be built is in Figure 10. System interface design on the home page

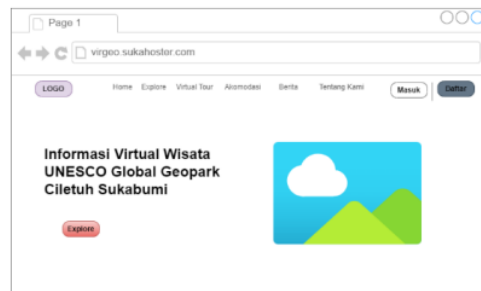


Figure 10. Home page

Figure 11. Next below is the user login interface design to access all the features on the system.

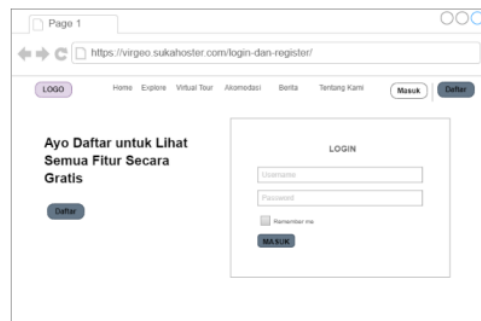


Figure 11. User Log in Page

display of various information facilities available on the system.

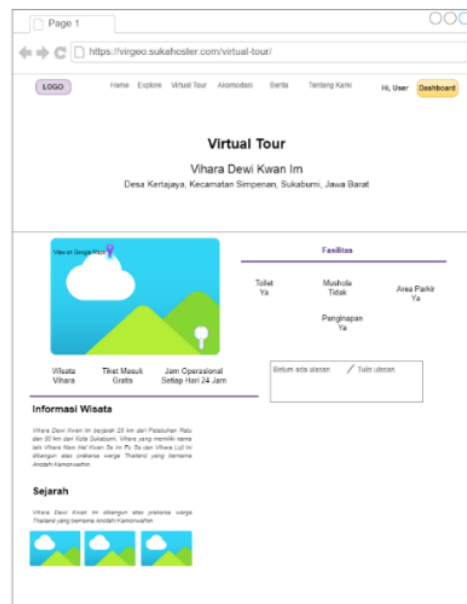


Figure 12. Tourism Description Page

5. Column When

This column discusses the schedule of activities in system development as follows.

a. Planner

System activities from the owner's point of view admin inputs and manages tourist attraction data. As well as users access all the features on the travel web by registering/logging in first.

And in figure 12. page description of attractions such as addresses, general information, history, and

b. Owner

Table 2. System Development Plan

No	Rencana Kegiatan	Target Output	Maret												April				Mei				Juni			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1.	Kegiatan Proyek	Pendefinisian masalah	■																							
		Penetapan jadwal proyek		■																						
2.	Analisis dan Penerapan ke dalam Zachman Framework	Pengambilan data			■	■	■																			
		Kebutuhan Sistem					■																			
		Membuat tabel permasalahan ke dalam matriks Zachman						■	■	■	■	■	■	■												
3.	Implementasi	pembangunan sistem website														■	■	■	■	■	■	■	■	■	■	■

a. Designer

Table 3 shows the System Model Design Schedule which was carried out from April to May. There are 7 tasks in this activity.

Table 3. System Model Design Schedule

No	Task	April				May
		1	2	3	4	1
1.	Entity Determination					
2.	Use Case Diagram Design					
3.	Class Diagram Design					
4.	Activity Diagram Design					
5.	Sequence Diagram Design					
6.	Database Design					
7.	Interface Design Design					

b. Builder

Table 4, shows the Website System Design Schedule which was carried out from April to June

Table 4. Website System Design Schedule

N o	Task	April		May			June
		3	4	1	2	3	4
1	Database Creation						
2	Interface Design						
3	System Build						

6. Column Why

Explaining the purpose, use of technology, and the rules applied in the design and manufacture of the system are as follows.

a. Planner

The design and development of a web-based virtual tourism information system at the Ciletuh Palabuhan Ratu Sukabumi Geopark to be able to provide information and knowledge about virtual tourist attraction before potential tourists visit the place.

b. Owner

Utilizing virtual tour technology with 360° photo panoramas to make it easier to share tourism information at Ciletuh Geopark to tourists and the general public.

c. Designer

The rules in the design of this system are entity or table constraints, value on attribute and the design of this tourism web system uses the Zachman Framework. Each access right is different, admin can manage and access all virtual tourism web features, while users can only access to view virtual travel web features

d. Builder

Rules in making the system:

In making this system using open source and more flexible software, namely Content Management System (CMS) and Elementor Page Builder from WordPress with PHP and MySQL programming languages

System Implementation

1. Home Page

The main system page display is shown in Figure 14. It is the main page that appears first when a user visits the website.



Figure 13. Home Page

2. Register/Login Page

This User Register/Login page is for visitors who want to access all the menus on this website system, they must register an account first. After that, visitors can enter the username and password created during registration to log in into the web system is shown in Figure 14.

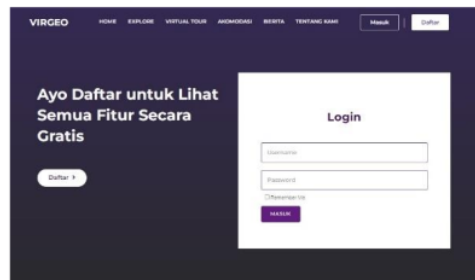


Figure 14. Log in Page

Then visitors can explore all the menus and features on the website system.

3. Virtual Tour Page

The Virtual Tour page is shown Figure 15. displays various choices of tourist attraction that visitors can choose to enjoy the information and Virtual Tours at each tourist attraction located in Ciletuh Geopark by displaying a street view of 360°.

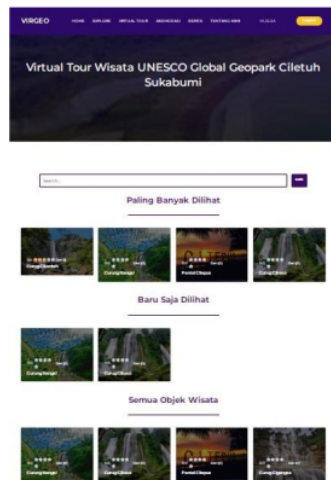


Figure 15. Virtual Tour Page

Some of the information contained on the Virtual Tour page can be seen in Figure 16. Each tourist attraction consists of a tourist address, a description of tourist information, tourist history, tourist photo galleries, and various kinds of facilities available at the tourist attraction. In addition, website visitors can provide reviews related to Virtual Tour attractions at Geopark Ciletuh.



Figure 16. Virtual Tour Information Detail Page

4. Admin Log in Page

On the login page is the shown Figure 17, the admin can fill in the username and password on the CMS WordPress system that has been registered to manage the website. If the entered username and password do not match, the login page will not move.



Figure 17. Admin Log in Page

5. Admin Dashboard Page

The admin dashboard page can be seen Figure 19, displays all the data and features needed and provided to be managed by the admin.

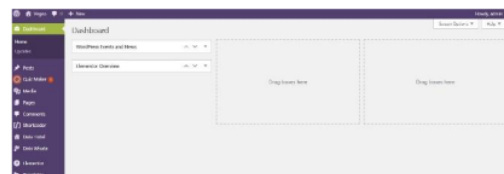


Figure 18. Admin Dashboard Page

Blackbox Testing

The system testing with Blackbox Testing was carried out to find out if the system was running well without any errors or errors on the Ciletuh Geopark Geopark Tourism Virtual Tour website system.

Table 5. System Testing

No	Test case	Expected Results	Test Results	Result
1	Button Home	The system can display the Home page	The system has successfully displayed Home page	Valid
2	Button Register/Login	The user will register and login to enter the correct username and password	The system has successfully logged in and entered the Home page of the website.	Valid
3	Button Explore	The system will display the Explore page.	The system has successfully displayed the Explore page	Valid
4	Button Virtual Tour	The system will display the Virtual Tour page	The system has successfully displayed the Virtual Tour page	Valid
5	Button Akomodasi	The system will display Akomodasi page	The system has successfully displayed Akomodasi page	Valid
6	Button Berita	The system will display Berita page	The system has successfully displayed Berita page	Valid
7	Button Tentang Kami	The system will display Tentang Kami page	The system has successfully displayed Tentang Kami page	Valid

CONCLUSIONS

Based on the results of research in the design and manufacture of a Virtual Tourism information system at the Ciletuh Geopark, it can be concluded the system design on the Virtual Tourism website at Geopark Ciletuh uses the Zachman Framework method which produces various points of view/perspectives that are applied to the matrix in the Zachman Framework for the process of building the system. System testing with the Blackbox Testing method resulted in the system running as expected. With the Virtual Tourism information system at the Ciletuh Geopark, can provide convenience for the public and tourists in obtaining various information about tourist objects in the Ciletuh Geopark.

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