

## The Designation and Construction of Webgis-Based Information System for Pongkor National Geopark Tourism Event Promotion

### *Perancangan Pembangunan Sistem Informasi Berbasis Webgis bagi Acara Promosi Pelancongan Geopark Nasional Pongkor*

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#### ABSTRACT

The Pongkor Geopark in Bogor Regency is a new geopark area so that its supporting facilities and information systems have not been developed optimally. Currently, the delivery of tourism information is still carried out conventionally through brochures, pamphlets, and direct communication, without a centralized database system. This condition causes event information to be less effective, not updated in real-time, and makes it difficult for tourists to obtain information without coming directly to the location. This research aims to develop a WebGIS-based Pongkor National Geopark tourism event promotion information system that is able to provide event information in a digital, structured, and easily accessible manner by the public. The development method used is a waterfall model which includes the stages of Communication, Planning, Modelling, Construction, and Deployment. The system is built using the PHP programming language with a MySQL database for event data management. The results show that the developed application runs well, with the features of Upcoming Events, Search and Filters, Reviews and Ratings, Statistics, and Event Distribution Maps functioning optimally. These findings show that digitizing information through WebGIS can increase the effectiveness of event promotions and ease of access to information for tourists. Implicitly, this system has the potential to be the basis for further development for the management of the Pongkor Geopark towards a more modern and integrated tourism information management.

*Keywords: Events; Pongkor Geopark; Tourism; Information Systems; Webgis*

#### ABSTRAK

*Geopark Pongkor di Kabupaten Bogor merupakan kawasan geopark yang masih baru sehingga fasilitas pendukung dan sistem informasinya belum berkembang optimal. Saat ini, penyampaian informasi wisata masih dilakukan secara konvensional melalui brosur, pamflet, dan komunikasi langsung, tanpa*



*adanya sistem basis data terpusat. Kondisi ini menyebabkan informasi acara menjadi kurang efektif, tidak terbaru secara real-time, serta menyulitkan wisatawan dalam memperoleh informasi tanpa datang langsung ke lokasi. Penelitian ini bertujuan mengembangkan sistem informasi promosi acara pariwisata Pongkor National Geopark berbasis WebGIS yang mampu menyediakan informasi acara secara digital, terstruktur, dan mudah diakses oleh masyarakat. Metode pengembangan yang digunakan adalah model air terjun yang mencakup tahap Komunikasi, Perencanaan, Pemodelan, Konstruksi, dan Penyebaran. Sistem dibangun menggunakan bahasa pemrograman PHP dengan basis data MySQL untuk pengelolaan data acara. Hasil penelitian menunjukkan bahwa aplikasi yang dikembangkan berjalan dengan baik, dengan fitur Acara Mendatang, Pencarian dan Filter, Review dan Rating, Statistik, serta Peta Distribusi Acara berfungsi secara optimal. Temuan ini menunjukkan bahwa digitalisasi informasi melalui WebGIS dapat meningkatkan efektivitas promosi acara dan kemudahan akses informasi bagi wisatawan. Secara implikatif, sistem ini berpotensi menjadi dasar pengembangan lebih lanjut bagi pengelolaan Geopark Pongkor menuju manajemen informasi pariwisata yang lebih modern dan terintegrasi.*

*Kata kunci: Event; Geopark Pongkor; Pariwisata; Sistem Informasi; Webgis*

## INTRODUCTION

Pongkor Geopark is a geopark area located in Bogor Regency and is still very new in its management process, so its facilities and supporting systems are not as optimal as other geoparks. This area has the privilege of being a geosite and a diversity of geology, biological, and cultural sites that have great potential to be developed as sustainable geotourism destinations (Habibullah, 2022). This diversity makes the Pongkor Geopark an ideal candidate for the implementation of a digital information system that is able to support the development of tourism in an integrated manner. The Pongkor Geopark itself was determined through the Regent's Decree Number: 556/177/Kpts/Per-UU/2018 on March 26, 2018. After going through a verification process and fulfilling various requirements, this area was then recognized as a National Geopark which includes 15 sub-districts, 172 villages, and 33 potential tourist locations. The area is divided into four geological clusters—Pongkor, Tenjolaya, Leuwiliang, and Parung—based on its geological characteristics and topographical conditions (Bogor, 2019). To encourage tourism development in the four clusters, the local government established the Pongkor Geopark Management Agency as an institution authorized to manage the potential of the area (Aristy, 2021).

As part of regional autonomy, the government is given the authority to develop tourism potential in order to make an economic contribution to the local community. A well-managed tourism sector has been proven to be able to produce positive growth and improve people's welfare (Nugraha, 2022). However, the information management system at the Pongkor Geopark is currently still conventional. Tourism information is disseminated through brochures, pamphlets, or direct communication (person to person), without a centralized database. This condition makes information difficult to obtain, not updated in real-time, and makes tourists have to come directly to the location to look for information. This situation emphasizes the need to develop an attractive, structured, and web-based information system that is able to be an alternative to the official website of geopark managers. In this context, WebGIS integration is an important component because it allows the presentation of spatial information about geosite locations, accessibility, travel routes, tourist facilities, and event distribution in an interactive and easy-to-understand manner. WebGIS is able to provide a comprehensive visual representation of the distribution of tourism potential, so that tourists can plan their visits more effectively, while managers gain tools to monitor and manage spatial data centrally.

The development of a similar system has previously succeeded in applying the waterfall method because each stage is sequential and comprehensive (Fitriani, 2018; Ariandi, 2022). This study adopts the same methodology because the waterfall model is considered suitable for the development of systems with needs that can be clearly defined from the beginning, and proven to produce a system that is well documented and has measurable quality (Natasia, 2024). In its implementation, the waterfall model also allows the integration of WebGIS modules through the spatial database planning stage, designing interactive map interfaces, and testing geospatial services in stages. Based on the results of interviews with young planners of BAPPEDALITBANG, a web-based information system equipped

with WebGIS is considered very important to improve the quality of tourism management and attract more tourists to the Pongkor National Geopark. In addition, this technology can also expand public understanding of the potential of geoparks through the presentation of information that is more comprehensive, interactive, and easily accessible to various groups.

## **PROBLEM STATEMENT**

The formulation of the problem in this study is: How to design and build a promotional event information system for tourism of Pongkor Geopark National based on WebGIS?

## **LITERATURE REVIEWS**

### **Information Systems**

The various definitions of information systems are not necessarily related to computers, however, in practice the most commonly used is computers.

1. Turban, McLean, and Wetherbe (1999)  
Information Systems are information systems that have the function of collecting, processing, summarizing and disseminating information for specific purposes.
2. Bodnar and HopWood (1993)  
Information Systems are a collection of hardware and software designed to turn data into useful information.
3. Alter (1992)  
Information Systems is a combination of work procedures, information, people, and information technology that are organized to achieve goals in a company.

### **Tourism**

In the context of the development of a destination, tourism is not only understood as a travel activity, but also as a strategic sector that is able to encourage economic growth, improve the welfare of local communities, and strengthen the cultural identity of a region. As information technology develops, the need for the provision of fast, accurate, and easily accessible tourism information is becoming increasingly important, especially for areas with geotourism potential such as the Pongkor National Geopark. The diversity of geosites, geological richness, and cultural values contained in the area requires an information system that is able to present data in an interactive and integrated manner. Therefore, the development of a WebGIS-based tourism event promotion information system is considered very relevant, because it not only supports the effective dissemination of information, but is also able to provide spatial visualization of event locations, accessibility, and geotourism potential that can improve the tourist experience and support digital-based tourism promotion strategies.

### **Waterfall Model**

The Waterfall method is a software development model that is sequential, systematic, and sequential, where each stage must be completed completely before moving on to the next. This model was chosen in the WebGIS-based Research on the Design and Construction of the Pongkor National Geopark Tourism Event Promotion Information System because of the characteristics of the research that require detailed planning, clear system needs, and strong development documentation. In addition, Waterfall has been proven to be effective in the development of tourism information systems and digital mapping in previous research.

### **Unified Modelling Language (UML)**

Unified Modelling Language (UML) is a visual modelling standard used to describe the structure and behaviour of systems systematically. UML serves to visualize the requirements, architectural design, and workflow of the system before the implementation process takes place. In the research on the Design and Construction of a WebGIS-Based Tourism Event Promotion Information

System for the Pongkor National Geopark, UML is used to ensure that the system is built based on user needs and describes the relationships between components, processes, and data in a clear and structured manner. UML modelling is important because it has many features, such as event management, WebGIS-based event location visualization, search and filters, reviews & ratings, statistics, and admin management. Using UML, the entire process can be analyzed and described before it is developed, minimizing errors during implementation.

### **Data Flow Diagram**

There is a WebGIS-based Pongkor National Geopark tourism event promotion information system, the data flow is depicted through a Data Flow Diagram (DFD) that shows how information flows between users, admins, system processes, and databases. Admins act as the party that manages all data, ranging from event data, tourist location data, to photo galleries that support promotional materials. Every data input by the admin is processed and stored into several databases, such as event databases, tourist site databases, and media databases. The system then processes the data to produce information that can be accessed by users through the WebGIS view. Users can see a list of events, activity details, event locations on the map, and other supporting information. WebGIS displays coordinate points and location descriptions visually, making it easier for users to understand the distribution of events and tourist attractions in the Pongkor National Geopark area. Thus, DFD describes how data is managed, stored, processed, and presented in an integrated manner to support tourism promotion needs effectively and interactively.

### **Hypertext Preprocessor (PHP)**

In this study, the PHP programming language is used as the main component in building a WebGIS-based tourism event promotion information system in the Pongkor National Geopark. PHP was chosen because it has good capabilities in managing backend processes, including event data processing, location information storage, content management, and integration with databases such as MySQL. Through PHP, the system is able to handle the process of input, update, and deletion of event data carried out by the admin of the Pongkor Geopark Management Agency. In addition, PHP also functions to bridge spatial data that has been processed using QGIS so that it can be displayed dynamically on the WebGIS interactive map display. With PHP support, event data stored in the database can be pulled and presented in the form of markers, information popups, and spatial layers on map pages. The advantages of PHP being open-source, easy to develop, and compatible with various web mapping libraries such as Leaflet or OpenLayers make this programming language very suitable for building a dynamic, structured, and user-accessible tourism information system. The use of PHP in this study ensures that the WebGIS system is not only able to display geographic information, but also provides interactive, real-time, and integrated event promotion features.

### **Quantum GIS**

In this study, QGIS is used as the main software to process spatial data related to event locations and geosites in the Pongkor National Geopark area. QGIS plays a role in the mapping process, starting from collecting event location coordinates, digitizing tourist area boundaries, to creating spatial layers such as event points, access routes, and geosite areas. The processed spatial data is then converted into WebGIS-compatible formats, such as GeoJSON or shapefiles, so that it can be integrated directly into web-based systems. Through QGIS, simple spatial analysis such as the distribution of event locations and proximity between tourist points can be carried out to support the system design process. In addition, QGIS is also used to generate basemaps that are displayed on WebGIS, so that event promotion information is not only presented in the form of text, but also in interactive geographical visualizations. Thus, QGIS is an important component in providing accurate spatial data that is ready to be used in the development of a WebGIS-based tourism event promotion information system at the Pongkor National Geopark.

### **Google Maps API**

Google Maps is a free service that Google loves so much. The Google Maps API is an easy-to-use JavaScript library, so you can save time and money by creating a powerful digital map-based

application that focuses more on the data processing to be used. Currently, the Google Maps API version 3 is the latest. It's better than the previous version, especially for smartphone browsers. There is the ability to use it to create a map-based web system that runs on both iPhone and Android operating systems.

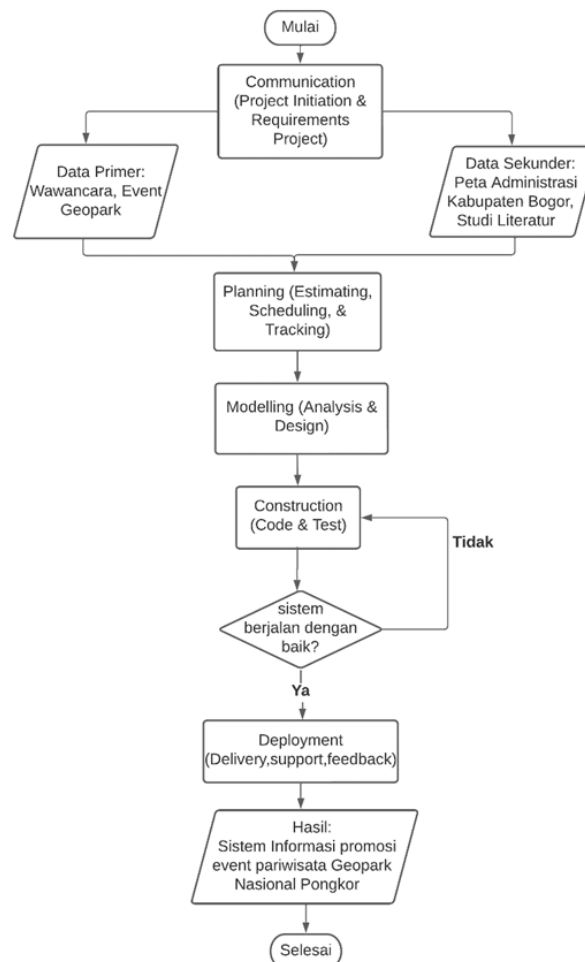
### Black-box Testing

Black-box testing is designed to uncover errors in functional requirements without ignoring the internal workings of a program. The black box testing method focuses on the software information domain, by conducting test cases by partitioning the program's input domains in a way that provides in-depth testing coverage. Custom testing methods cover a wide range of software capabilities and application areas. The GUI, client/server architecture, documentation and help facilities and real-time systems each require specific guidelines and techniques for software testing.

## METHODOLOGY

The research method used by the author uses the waterfall model system development method, which includes Communication, Planning, Modelling, Construction, and Deployment. The research method can be seen in Figure 1.

Figure 1: Research Methods



### Communication (Project Initiation & Requirements Gathering)

The communication stage is carried out by collecting primary data and secondary data. Primary data was obtained by conducting interviews and existing event data. Meanwhile, secondary data can be

obtained by searching sources from the internet in the form of administrative maps of Bogor Regency and Literary Studies in the form of books and related journals.

### **Planning (Estimating, Scheduling, Tracking)**

The planning stage is a planning process to form the needs of a system. This stage is done by analyzing and considering all system requirements, including system requirements analysis, system architecture analysis, ongoing system analysis, and proposed system analysis.

### **Deployment (Delivery, support, and feedback)**

At this stage, the author conducts periodic system maintenance, software evaluation, and software development based on user feedback. This allows the system to run and evolve according to the needs of the user.

## **FINDINGS AND DISCUSSION**

### **Communication (Project Initiation & Requirements Gathering)**

The results of the research at this stage are:

#### 1. Interview

The results of the interview have been conducted with Mr. Denny Mulyadi as a young planner from BAPPEDALITBANG. To get information about the problems that occur, and what is needed to overcome these problems.

#### 2. Data events

The results of event data have been carried out by searching for data related to events in the Pongkor Geopark Area through the internet.

#### 3. Literary Studies

The results of the Literature Study have been carried out by looking for references from related journals that discuss information systems, events, tourism, and methods used.

#### 4. Bogor Regency Administrative Map

The results of the existing Bogor Regency Administrative Map were obtained from BAPPEDALITBANG for event data mapping

### **Planning (Estimating, Scheduling, Tracking)**

The Planning stage in this study includes System Needs Analysis, System Architecture Analysis, Running System Analysis, and Proposed System Analysis.

### **System Needs Analysis**

System needs analysis consists of user needs analysis, functional needs analysis, and non-functional needs analysis. The purpose of these functions is to find the actors that will interact with the system because this system generates user data.

### **User Needs Analysis**

The analysis of user needs aims to measure the number of users who are directly involved with the Pongkor National Geopark tourism event system for the community. The User Needs Analysis can be seen in Table 1.

Table 1: User Needs Analysis

No.	Actor	Description
1	Community	It is an actor as a user of the website, who can view the information available and register for the event.
2	Admin	It is an actor in charge of managing data, viewing data, entering data, changing data, and deleting data.

### Functional Needs Analysis

Functional needs determine the things that are needed by the system in serving the needs of users (Society). This functional needs analysis includes:

1. The ability of the system to present information on the objects of the Pongkor National Geopark tourism event in detail.
2. The ability of the system to display the latest information.
3. The ability of the system to provide feedback by reviewing and assessing completed events.
4. The system's ability to display statistical information about the number of events and categorize by year.

### Non-Functional Needs Analysis

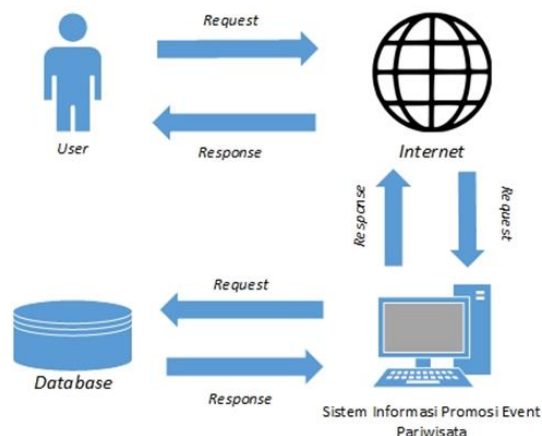
Non-functional needs are needs that describe how the system will work in the future. The following are non-functional needs:

1. The information system for the promotion of tourism events can be easily accessed by the public.
2. The tourism event *promotion information system* can be operated according to its function well.
3. The tourism event *promotion information system* has adequate database *storage*.

### Systems Architecture Analyst

System architecture analysis refers to the client-server model in which clients send and request services from the server. An analysis of the system architecture can be seen in Figure 2.

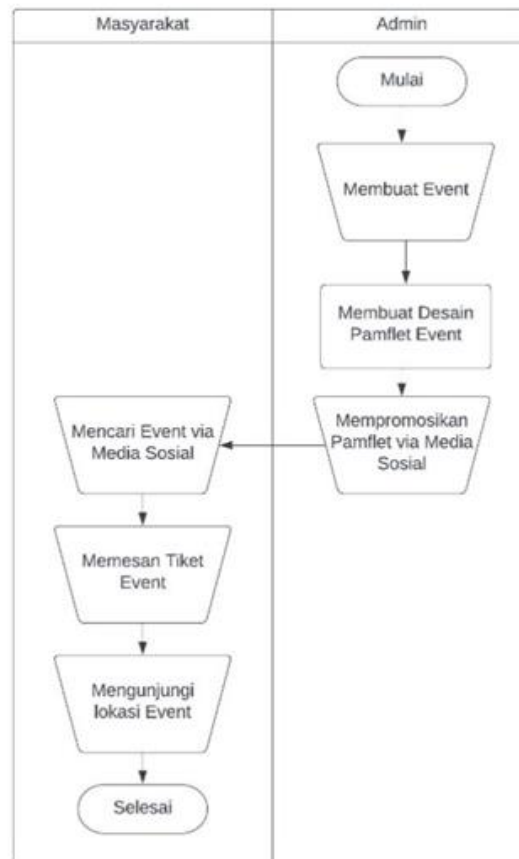
Figure 2: System Architecture Analysis



## Running System Analysis

Analysis of the current system is carried out to find out the flow of the existing system and currently running. The purpose of this analysis is to find the problems experienced by the community when looking for tourism events. An analysis of the running system can be seen in Figure 3.

Figure 3: Running System Analysis

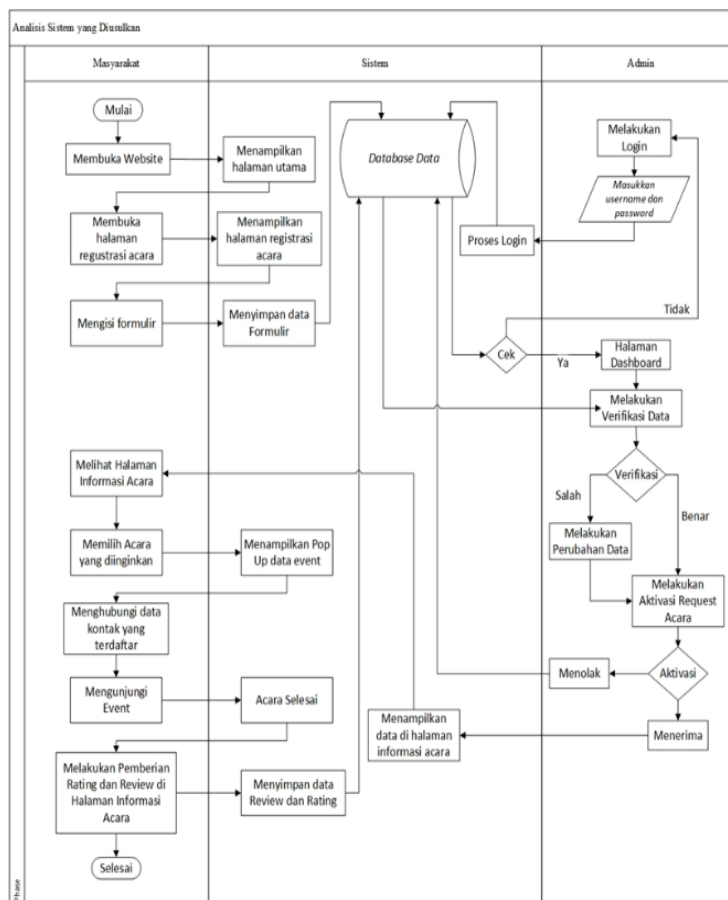


The image above depicts a running system, illustrated with a flowchart. First the admin starts to make an event without a computer, then the admin makes an event pamphlet design using a computer, after the pamphlet becomes an admin promoting the pamphlet that has been made through Social Media, then the community starts looking for events on Social Media, after getting what events they will visit then booking tickets by contacting the contact on the pamphlet, finally the community visits the event location.

## Proposed System Analysis

This research proposes an information system to promote tourism in the Pongkor National Geopark, so that the system can run according to the required functions. The analysis of the proposed system can be seen in Figure 4.

Figure 4: Proposed system



In the image above is an analysis of the system whose proposal is illustrated with a flowchart, first the community starts to open the website and opens the event registration page to fill out the form, then the form is submitted which will be stored in the database. The admin logs in first to the system to access the admin system, after the login the admin verifies the data first, if the input data is incorrect, the admin contacts the organizer who is input by the community will contact the organizer again. If the data entered is correct, the Admin can accept and reject the data, the rejected data will be stored in the database, but if the data is accepted, the data will be displayed on the event information page. Then the public sees and searches for information about the event they want to visit, then the system displays a pop-up event data input. After selecting an event, the community contacts the organizer by contacting the organizer. Then the community visits the event location and gets experience from the event which will later provide feedback in the form of providing comments and assessments of the event that has been visited. Comments and scoring data will be entered into a database that will appear in the pop up event.

### Modelling (Analysis & Design)

At this stage, the author designs the system to be created. This design is necessary to ensure that the system created will meet expectations. For example, here are the steps that have been taken to establish an information system designed to promote tourism events.

### UML (Unified Modelling Language) Design

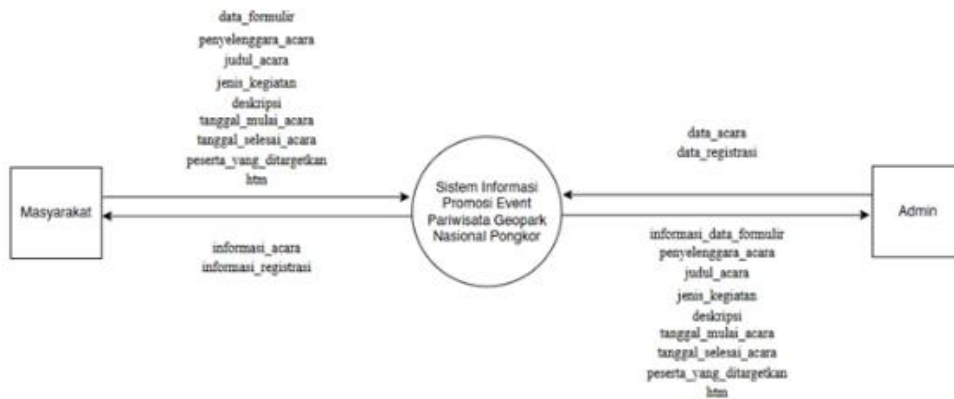
UML design is carried out to produce an illustration of a system design that works into a diagram form that refers to OOD (Object Oriented Design). A UML design that contains a use case diagram, an activity diagram, a component diagram, a class diagram.

#### 1. Diagram Context

The context diagram shows where Admins and communities communicate through the system. Admins manage event and registration data entered into the system, while public sends form data to the

system and receives information related to events and registrations. The context diagram in this study can be seen in Figure 5.

Figure 5: Context Diagram

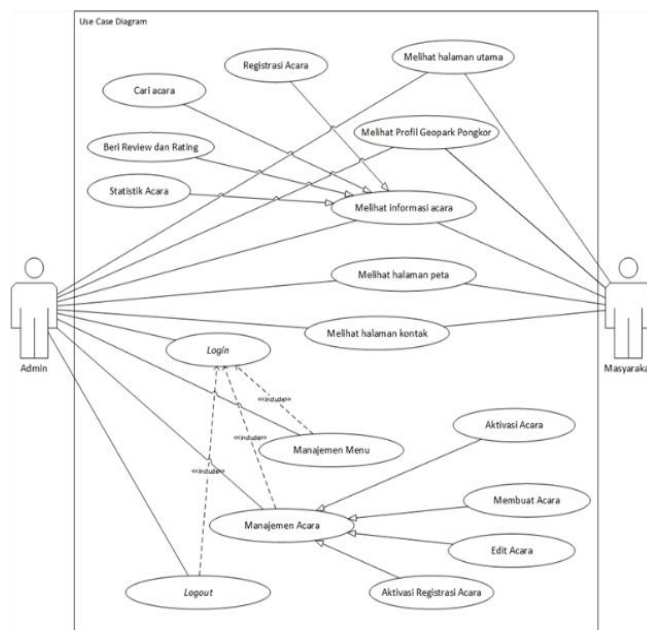


The image above shows the interaction between three main components, namely the Community, the Pongkor National Geopark Tourism Event Promotion Information System, and the Admin. The community plays the role of users or prospective visitors who need information related to events held at the Pongkor National Geopark. For this reason, the public can submit form data into the system. In return, the system will provide event-related information and registration information that is accessible to the Community. The Pongkor National Geopark Tourism Event Promotion Information System acts as a center that regulates the data entry and exit process between the Community and the Admin. The system receives the data provided by the Community, and the Admin manages the event information submitted by the user, and presents it back to the Community. Thus, this system becomes the main link between people looking for information and admins who manage event data. The Admin also receives information about the data of the form that is entered from the public through the system, so that the Admin can monitor or evaluate the data submitted by the Community.

2. Use Case Diagram

The use case diagram describes the interactions that occur between the actors and the internal systems to be created. A diagram of the use case can be seen in Figure 6.

Figure 6: Use case



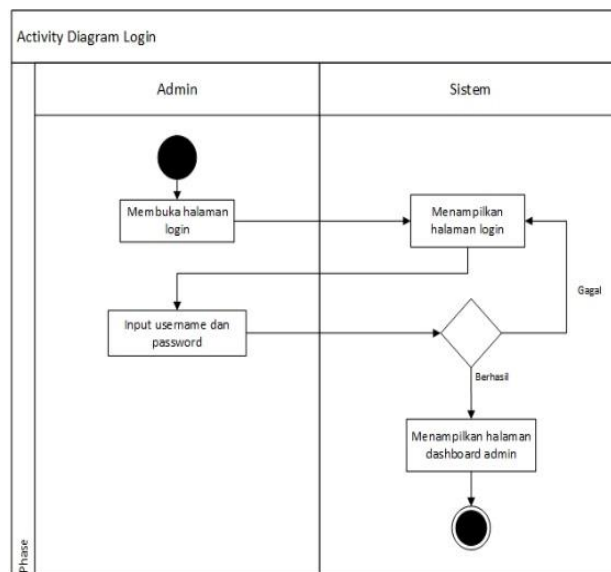
### 3. Activity Diagram

The activity diagram shows the multiple activities in the system that are being designed, which are performed from each flow of activities that are started and completed. The description of the Activity Diagram for each activity in this webgis-based tourism event promotion information system can be seen here.

#### 1. Activity Diagram Login

The login activity diagram describes when the activity will log in to the system. To be able to access its functionality, admins must enter a username and password. The login activity diagram can be seen in Figure 7.

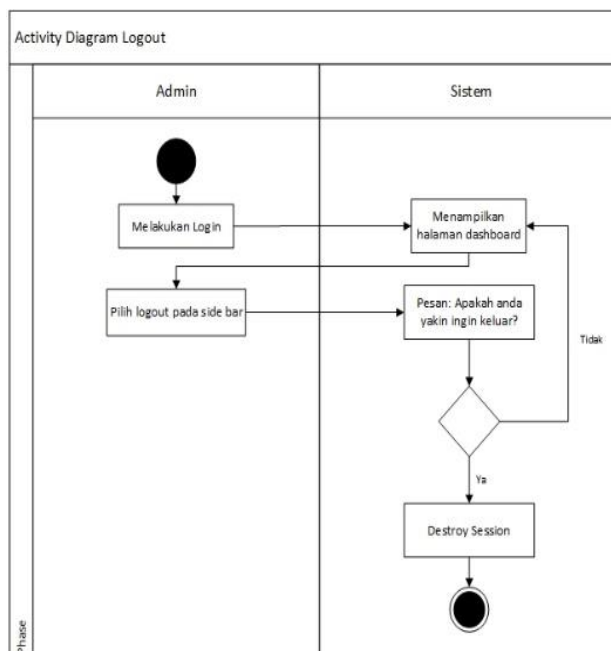
**Figure 7: Admin login activity chart**



#### 2. Exit Activity Diagram

The logout activity chart describes the activity when it will exit the system. A logout activity diagram can be seen in Figure 8.

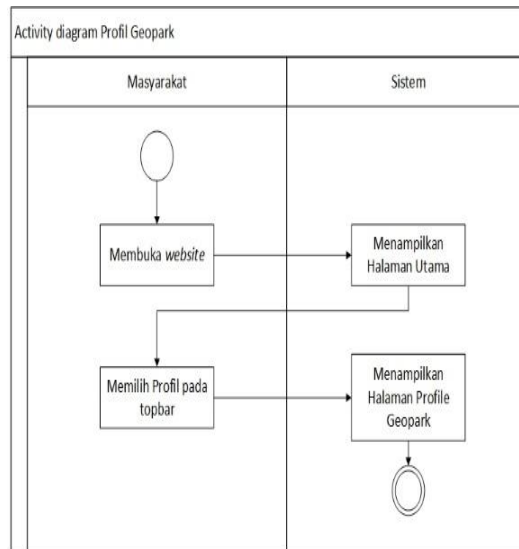
**Figure 8: Exit Activity Diagram**



3. Geopark Profile Activity Diagram

The Geopark profile activity diagram illustrates the user activity to view the profile of Pongkor National Geopark. The Geopark profile activity diagram can be seen in Figure 9.

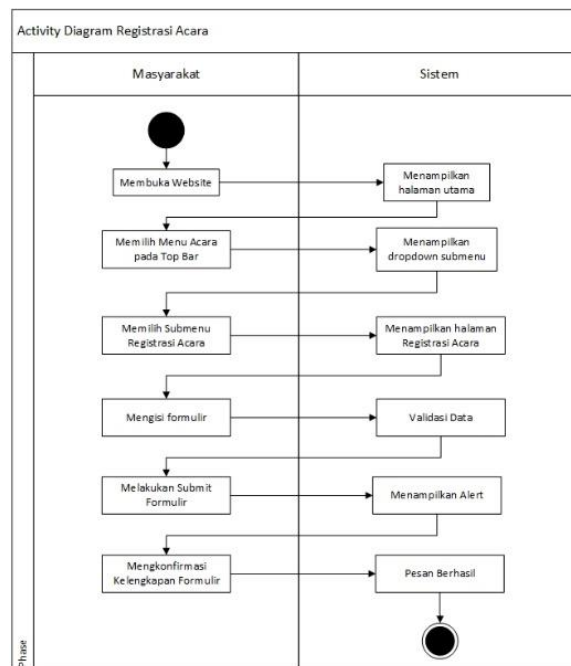
Figure 9: Geopark Profile Activity Diagram



4. Event Registration Activity Diagram

The Event Registration Activity Diagram describes the user's activity to fill out the registration form to register and to view the profile on the Geopark profile page that has been provided. The Event Registration activity diagram can be seen in Figure 10.

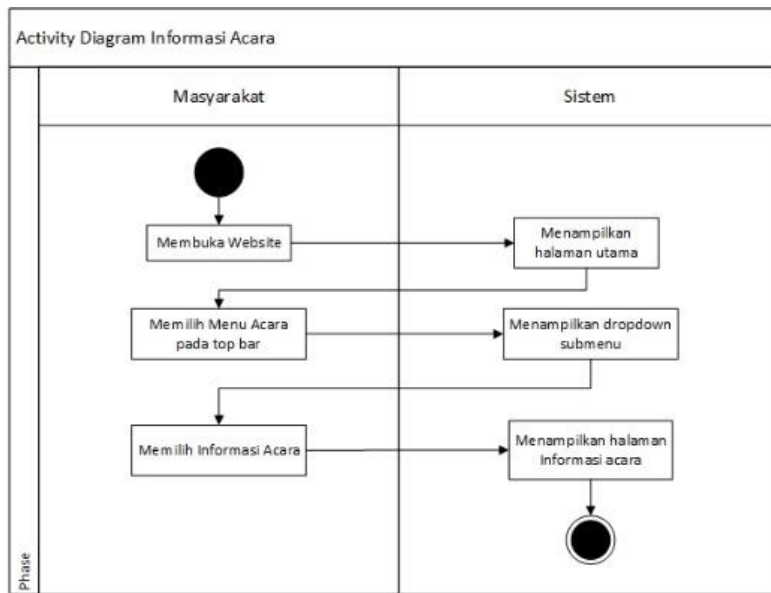
Figure 10: Event Registration Activity Diagram



5. Activity Chart Event Information

The event information activity chart describes the user activity to view existing event information. A diagram of event information activity can be seen in Figure 11.

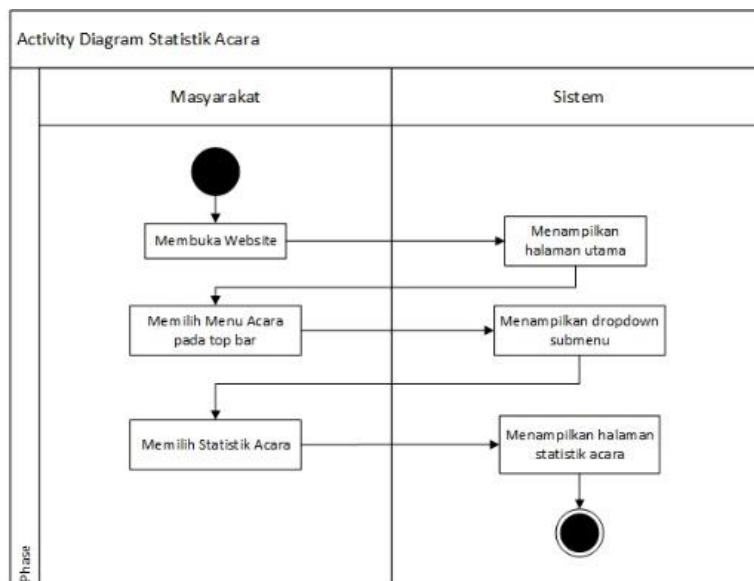
Figure 11: Activity Chart Event Information



6. Event Statistics Activity Chart

The event statistics activity chart describes the user activity to view the existing event statistical information. A statistical activity diagram of the event can be seen in Figure 12.

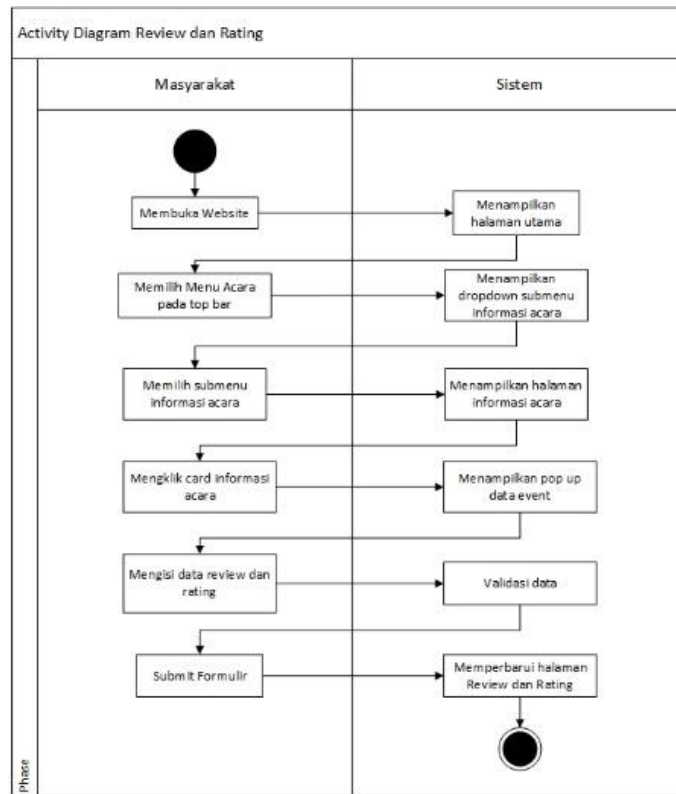
Figure 12: Event Statistics Activity Chart



7. Activity Diagram Review and Rating

The event Review and Rating activity diagram depicts the user's activity to provide input to the system and also the organizer, the results of the review and rating will appear on the pop up card of each event. A diagram of the statistical activity of the event can be seen in Figure 13.

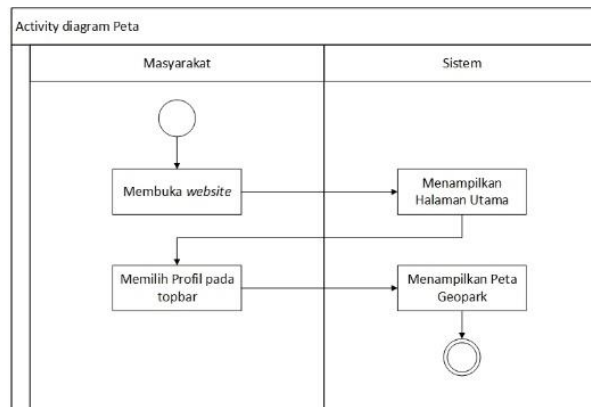
Figure 13: Activity Chart Review and Ranking



8. Map Activity Diagram

The activity map diagram explains the user's activities to view a map that contains a map of the Pongkor National Geopark Area. A diagram of the map activity can be seen in Figure 14.

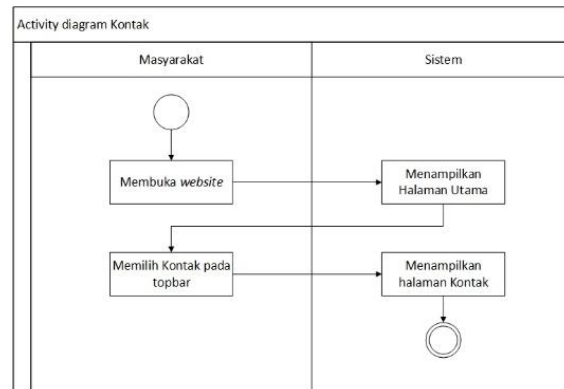
Figure 14: Activity Chart Map



9. Contact Activity Chart

The contact activity chart describes the activity to display the contact page. A diagram of the account registration activity can be seen in Figure 15.

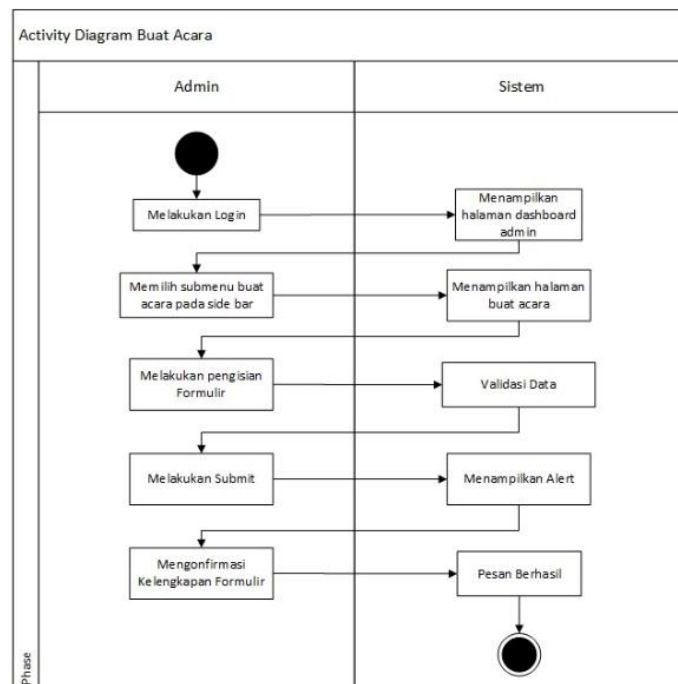
**Figure 15: Contact Activity Chart**



**10. Event Creation Activity Diagram**

An event creation activity chart that describes the activity of creating an event promotion through an existing form. A diagram of event registration activity can be seen in Figure 16.

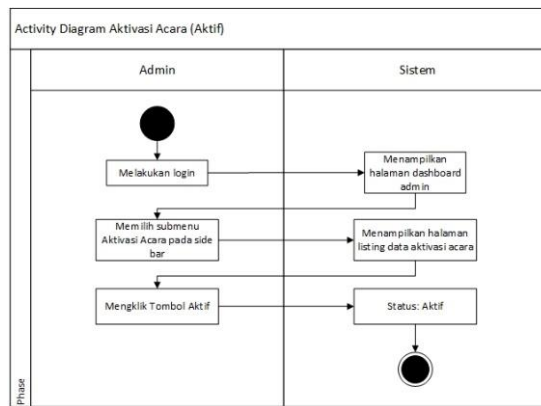
**Figure 16: Event Creation Activity Diagram**



**11. Event Activation Activity Diagram (Active)**

The event activation activity diagram depicts the event activation activity before it is displayed on the event information page by pressing the Active button. A diagram of event activation activity can be seen in Figure 17.

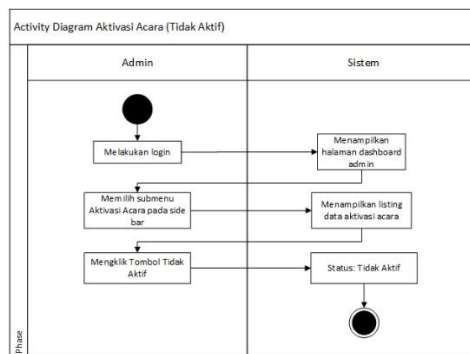
**Figure 17: Event Activation Activity Diagram (Active)**



**12. Activity Event Activation Diagram (Inactive)**

The event activation activity diagram depicts the event activation activity before it is displayed on the event information page by pressing the Active button. The Event Activation Activity diagram can be seen in Figure 18.

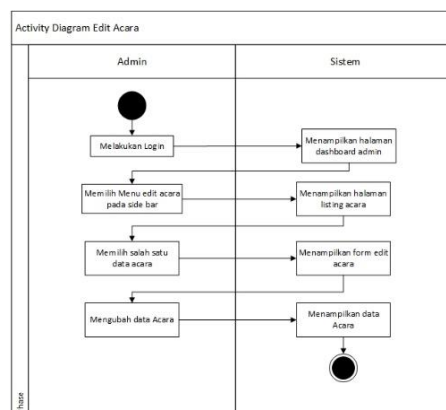
**Figure 18: Event activation activity diagram (inactive)**



**13. Event edit activity diagram**

The event editing activity chart describes the activity to make changes to the data that has been entered. A diagram of the event editing activity can be seen in Figure 19.

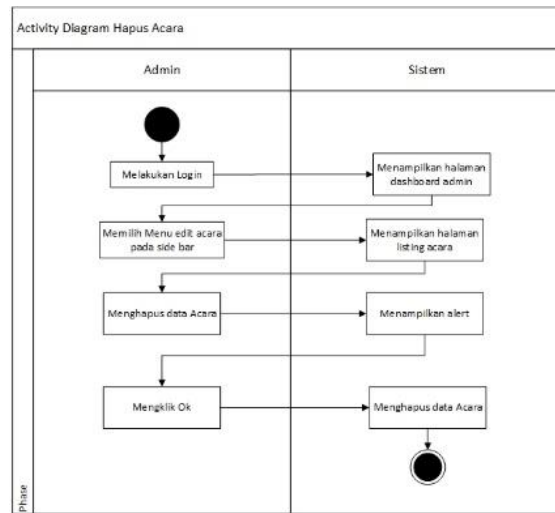
**Figure 19: Activity chart edit events**



**14. Activity chart deletion event**

The event deletion activity diagram depicts the admin activity to delete the data that has been entered. A diagram of the deletion event activity can be seen in Figure 20.

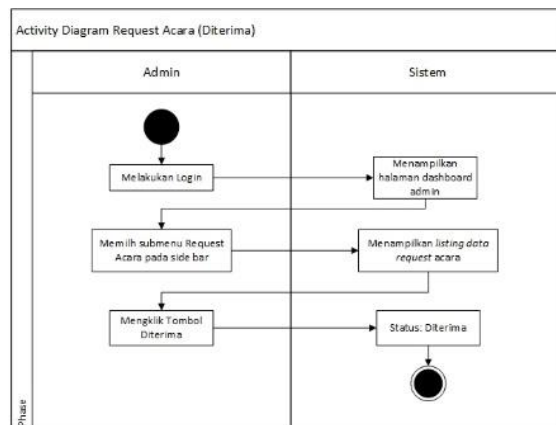
**Figure 20: Event Delete Activity Diagram**



15. Event request activation activity chart (Accepted)

The event request activation activity diagram (accepted) describes the activity to receive requests from Communities that registered their events through the form available on the Event Registration page. An event request activity diagram can be seen in Figure 21.

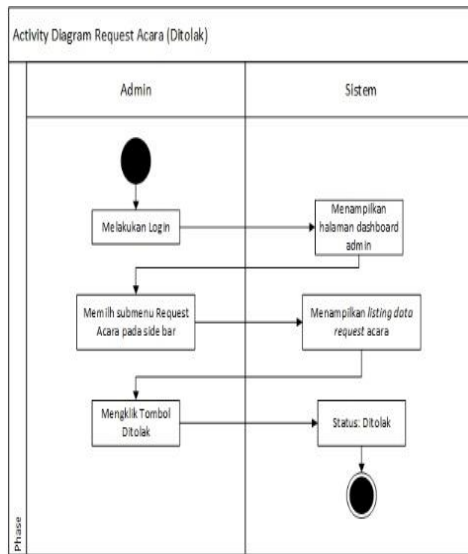
**Figure 21: Event request activation activity diagram (accepted)**



16. Event request activation activity chart (Denied)

The event request activation activity chart (declined) describes the activity to decline requests from Communities that registered the event through the form available on the Event Registration page. An event request activity diagram can be seen in Figure 22.

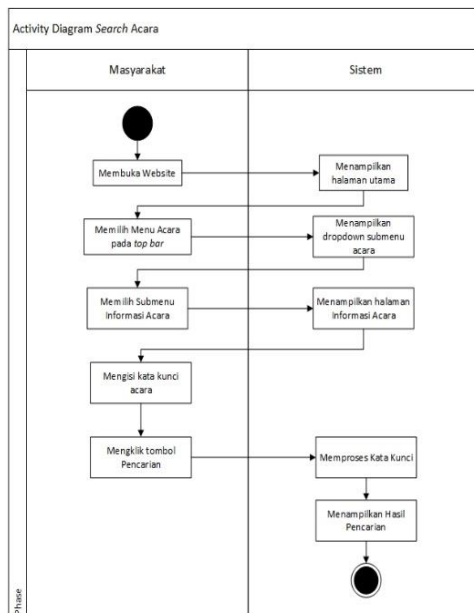
Figure 22: Event request activation activity diagram (Denied)



17 Activity Chart Search for Events

The event search activity diagram describes the event search activity using the search button to make it easier for users to search for events. A diagram of the event search activity can be seen in Figure 23.

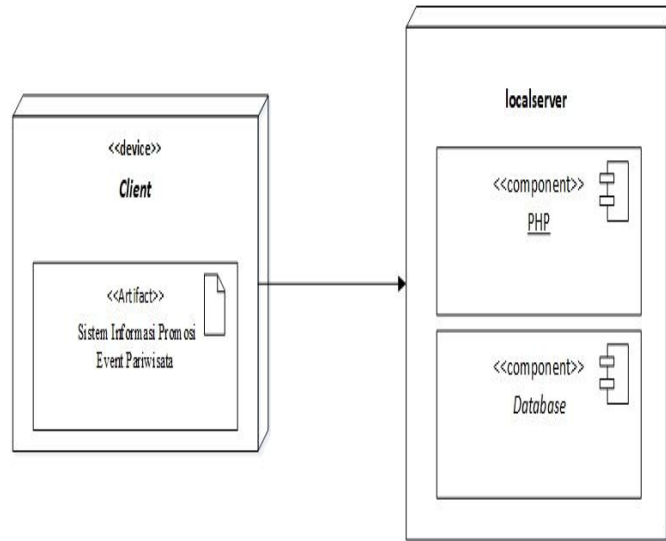
Figure 23: Activity Chart Search for Events



18 Deployment Diagram

In the process of executing the application, component settings are performed. The deployment diagram shows where the components work. A distribution diagram can be seen in Figure 24.

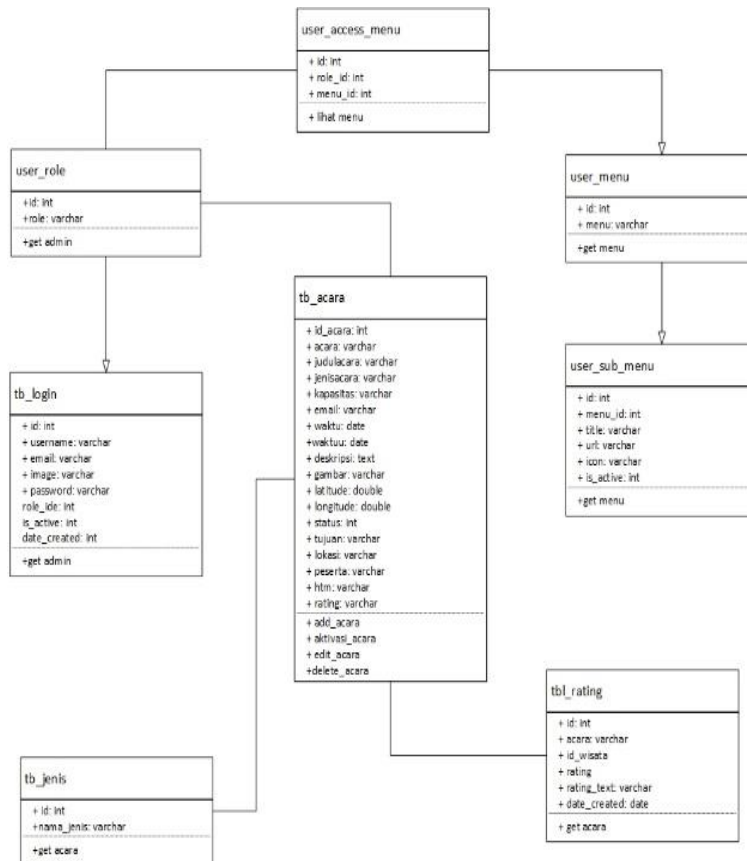
Figure 24: Deployment diagram



19 Class Diagram

The purpose of designing a diagram class is to figure out how to describe the entities that exist in the system as well as the relationships between the entities into the form of classes. Variables and methods are two characteristics of a class: a variable that shows a class property in the form of a line of text, while a method is a class function performed in a class diagram, represented by a symbol. The class of diagrams depicted on this system is shown in Figure 25.

Figure 25: Class Diagram



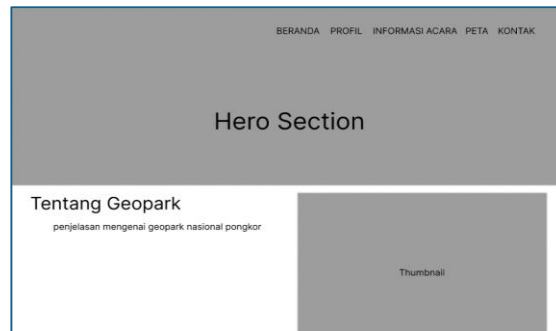
## Interface Design

The interface design is done to describe the display design for each page of the information system created and make it easier for users to operate the system.

### 1. Home Page Interface Design

The main page interface design displays the starting page when you open the website. The interface design of the main page can be seen in Figure 26.

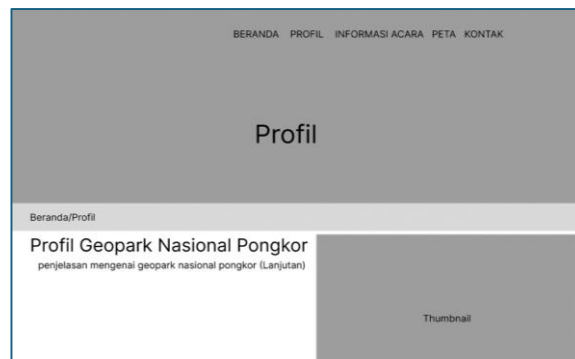
**Figure 26: Home Page Interface Design**



### 2. Profile Page Interface Design

The profile interface design displays the profile page of the Pongkor National Geopark which contains about the Geopark, vision and mission. The interface design can be seen in Figure 27.

**Figure 27: Profile page interface design**



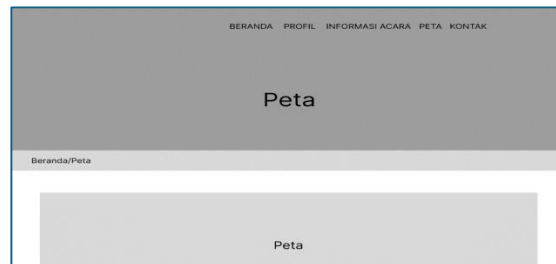
### 3. Designing the Event Information Page Interface

The event information interface design displays events that have been created in the form of cards. The interface design of the event information page can be seen in Figure 28.

**Figure 28: Designing the event information page interface**

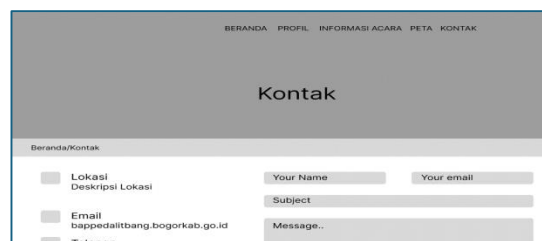
#### 4. Map Page Interface Design

The map interface design displays a map of the distribution of events in the Pongkor National Geopark area. The interface design of the map page can be seen in Figure 4.29.

**Figure 29: Design the map page interface**

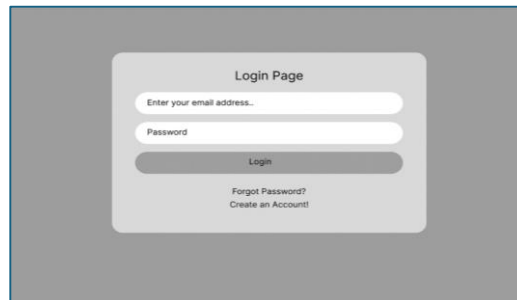
#### 5. Contact Page Interface Design

The contact interface design features location, email, phone, and forms to send feedback to the system. The interface design of the contact page can be seen in Figure 30.

**Figure 30: Designing the contact page interface**

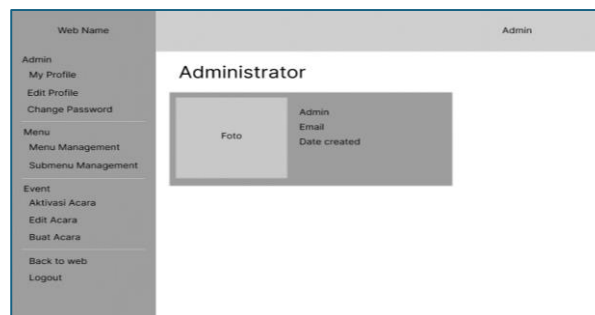
#### 6. Login Interface Design

The login interface design is displayed for logging into the system which can only be done by admins. The login interface design can be seen in Figure 31.

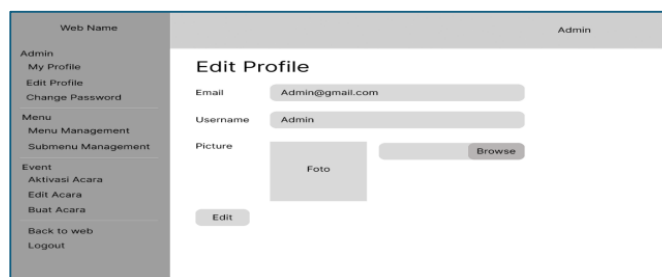
**Figure 31: Login interface design**

## 7. Designing the Admin Dashboard Interface ()

The admin dashboard interface design displays the admin dashboard page to manage the created system. The interface design of the admin dashboard can be seen in Figure 32.

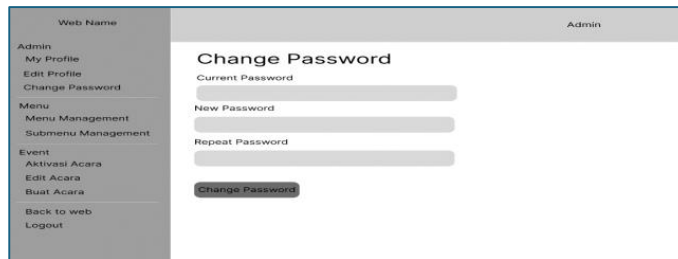
**Figure 32: Designing the admin dashboard interface**

The image above shows the interface design of the Administrator Profile page which contains admin identities such as Admin Name, Email, and Account creation date.

**Figure 33: Design the admin dashboard interface (Edit Profile)**

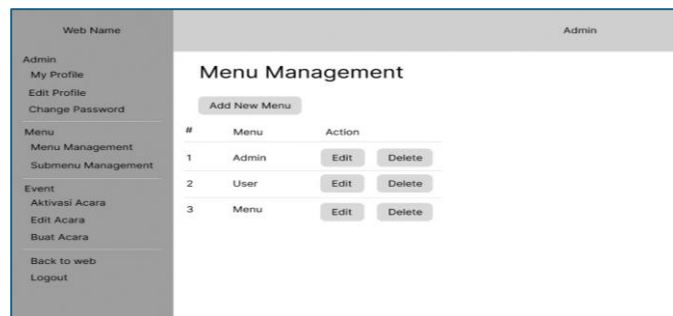
The image above shows what the interface design of the Administrator Profile page looks like for editing an admin profile.

**Figure 34: Design an admin dashboard interface**



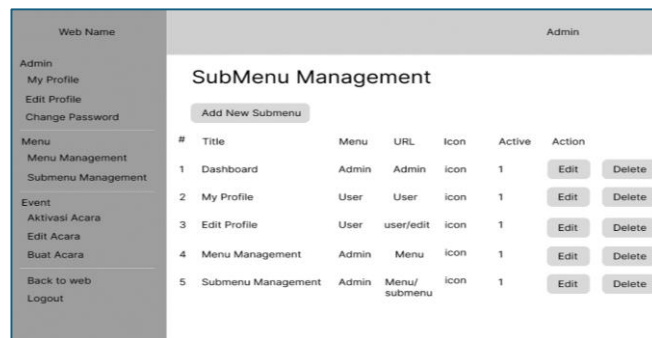
The image above shows the display of the account password change that has been made by the Admin.

**Figure 35: Designing an admin dashboard interface (Menu Management)**



The image above shows the management menu view to add a new menu.

**Figure 36. Designing an admin dashboard interface (Submenu Management)**



The image above shows the submenu view to add a new submenu of the menu you want to add.

**Figure 37: Designing an admin dashboard interface (Event Activation)**



The image above shows the event activation view to display events on the event information page.

**Figure 38: Designing an admin interface (Edit Events)**

#	Acara	Judul Acara	Telefon	Email	Latitude	Longitude	Action
1	acara 1	judul acara1	0813*****	email@gmail.com	Lat	Long	Edit Delete
2	acara 2	judul acara1	0813*****	email@gmail.com	Lat	Long	Edit Delete
3	acara 3	judul acara1	0813*****	email@gmail.com	Lat	Long	Edit Delete
4	acara 4	judul acara1	0813*****	email@gmail.com	Lat	Long	Edit Delete
5	acara 5	judul acara1	0813*****	email@gmail.com	Lat	Long	Edit Delete

The image above shows the edit event view to make data changes to event data that have previously been entered by the admin.

**Figure 39. Designing an admin interface (Create Event)**

Field	Input Type
Penyelenggara Acara	Text Input
Judul Acara	Text Input
Nomor Telefon	Text Input
Email	Text Input
Gambar	Image Upload
Tanggal Pelaksanaan	Date Picker
Tanggal Selesai	Date Picker
Deskripsi	Text Area
Latitude	Text Input

The image above shows the view of creating an event to add events that will be performed or have been performed as data stored in the database.

### Construction (Code & Test)

After completing the modelling step, the next step is to implement the pre-designed design into the system through coding and testing. The results of coding and testing of the information system used for the promotion of tourism events are as follows:

#### System Coding

At this stage, the system design is encoded into a programming language or a known computer language. This is done using the PHP programming language using the CI Framework (Codeigniter) and the MySQL database.

##### 1. House

The main page is the initial view when entering the website. This page features Upcoming Events, and FAQs. The main page can be seen in Figure 40.

Figure 40: Main Page System Implementation



2. Profile Page

The profile page displays information about the Pongkor National Geopark, such as an explanation of the Geopark, vision and mission. The Profile page can be seen in Figure 41.

Figure 41: Implementation of the profile page system.



3. Event Registration Page

The Event Registration page displays the registration form made by the user (Community) which contains the Event Organizer, Event Title, Activity Type, Activity Objective, Description, Event Start Date, Event End Date, Targeted Attendees, Expected Number of Participants, HTM, Person in Charge, Image Upload, Activity Location, X-Coordinate, Y-Coordinate.

Figure 42: Implementation of the Event Registration page system

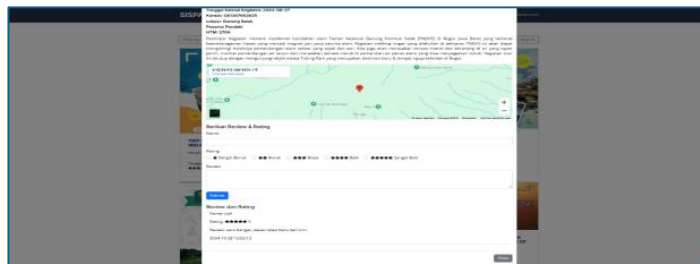


4. Event Information Page

The event information page displays event information data that contains information in the form of cards that will appear. The event information page can be seen in Figure 43 – Figure 44.

**Figure 43: Implementation of the event information page system**

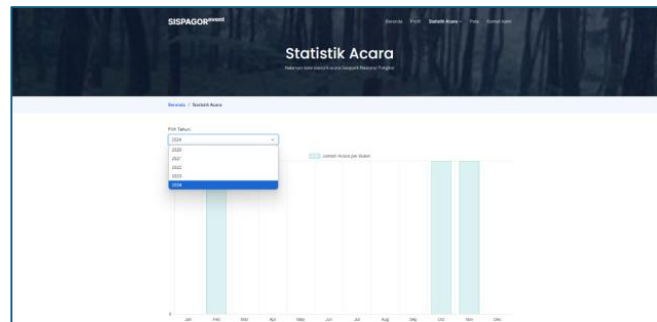
The image above shows the result display in the form of a card from the event information page that has been input by the Admin and Community.

**Figure 44: Implementation of the event information page system****Figure 45: Implementation of the event information page system**

The image above shows a pop up display containing information in the form of images, organizers, event descriptions, google maps of the event venue, and also rating and review features for website users after the event is over.

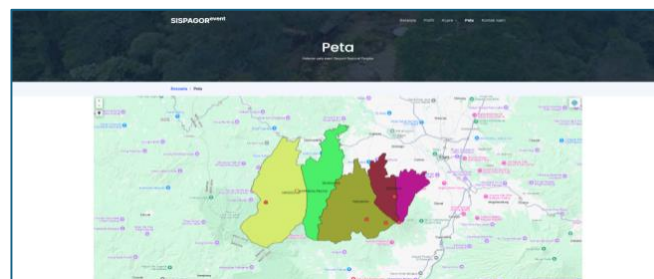
## 5. Event Statistics Page

The Event Statistics page displays statistical data in the form of a graph or chart of events that have been entered to find out the progress of events per month, which can be categorized by year. The Statistics page can be seen in Figure 46.

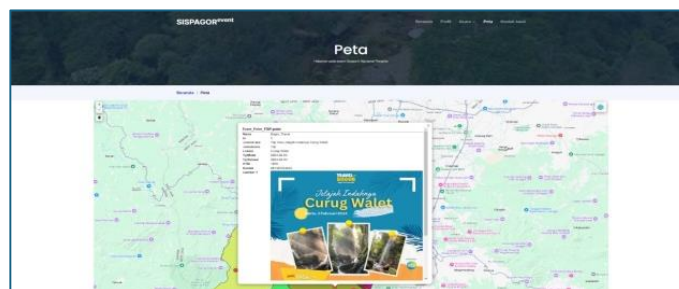
**Figure 46: Implementation of the event statistics page system**

#### 6. Map Page

The map page only displays map data of 5 sub-districts that are part of the Pongkor National Geopark area. The map page can be seen in Figure 47 and 48.

**Figure 47: Map page system implementation**

The image above shows a map page that displays a geodatabase map of the Geopark area consisting of 5 sub-districts, namely Nanggung, Leuwiliang, Pamijahan, Tenjolaya, and Tamansari.

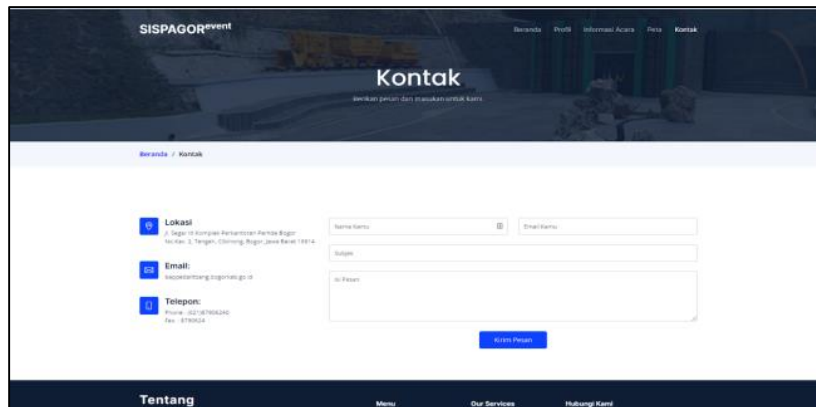
**Figure 48: Map page system implementation**

The image above shows the map page view which contains a geo-database of regional maps containing the organizer table, event title, event type, date, capacity, area, coordinates, photos, descriptions, and contacts.

#### 7. Contact Page

The contact page displays Geopark location information, Geopark emails, phone numbers and fax numbers, and forms for writing feedback messages to the system. The contact page can be seen in Figure 49.

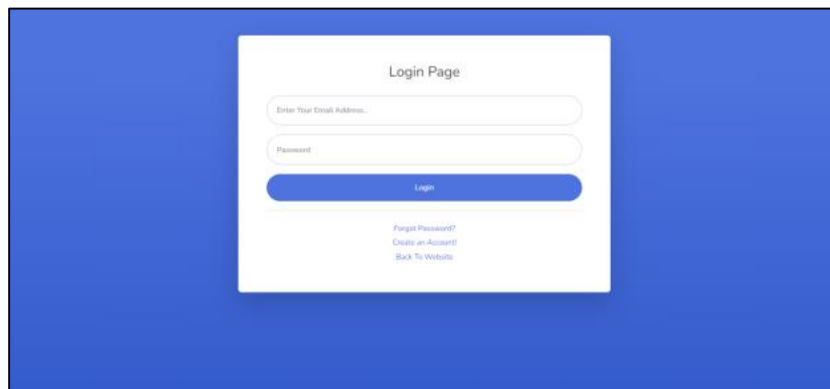
**Figure 49: Implementation of the contact page system**



8. Login Page

The login page displays the display when logging into the system, the Admin must fill in the e-mail form and password that has been provided on the login page. The login page can be seen in Figure 50.

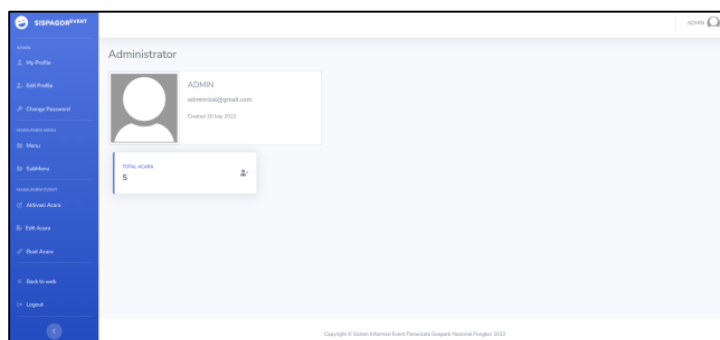
**Figure 50: Login system implementation**



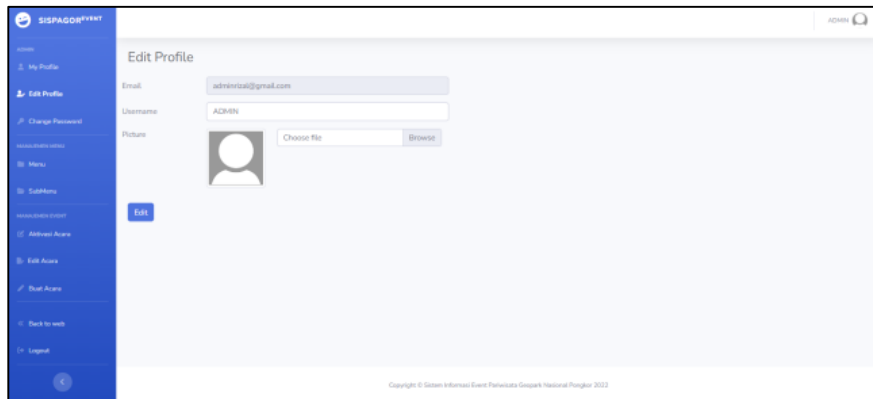
9. Dashboard Page

The admin dashboard page displays a custom admin dashboard that has more access to menu management, contains my profile, edit profile, change password, edit events, menu management, submenu management, return to the web, create events, and log out. The admin dashboard page can be seen in Figures 51 and 52.

**Figure 51: Implementation of the admin dashboard system**

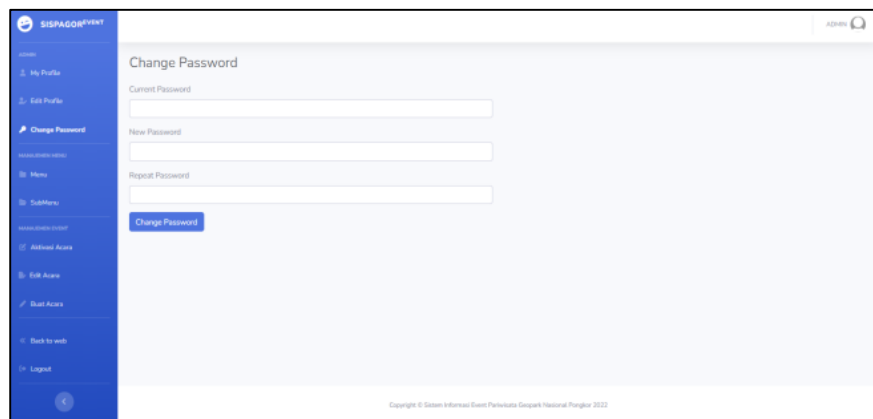


10. Admin dashboard page (Edit Profile)

**Figure 52: Implementation of the admin dashboard system (Edit profile)**

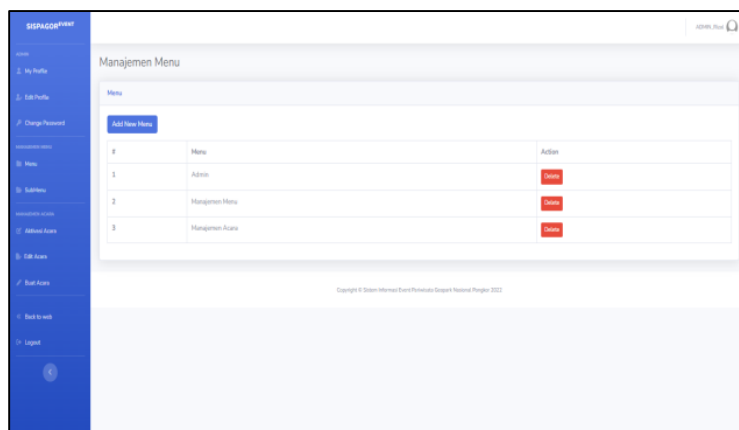
The image above shows what the interface design of the Administrator Profile page looks like for editing an admin profile.

#### 11. Admin dashboard page (Change Password)

**Figure 53: Implementation of the admin dashboard system (Change Password)**

The image above shows the account password reset page that has been created by the Admin.

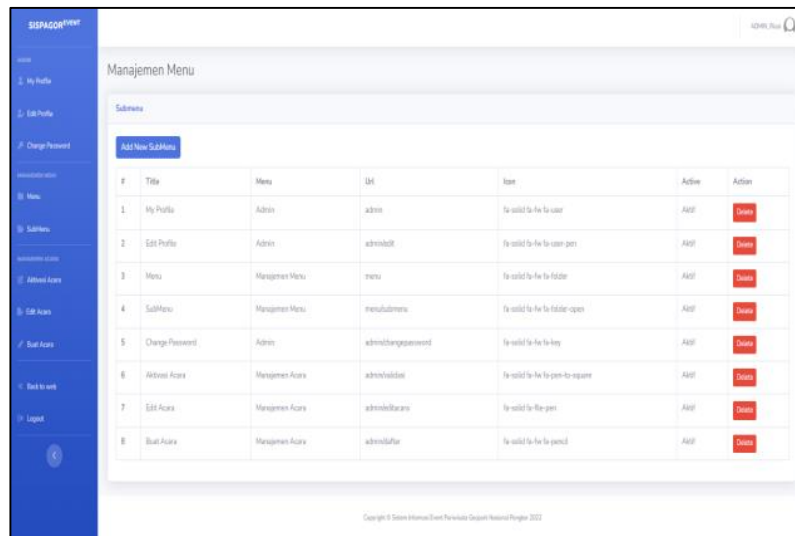
#### 12. Admin dashboard page (Menu Management)

**Figure 54: Implementation of the admin dashboard system (Menu Management)**

The image above shows the management menu view to add a new menu for the admin system.

13. Admin Dashboard Page (Management Submenu)

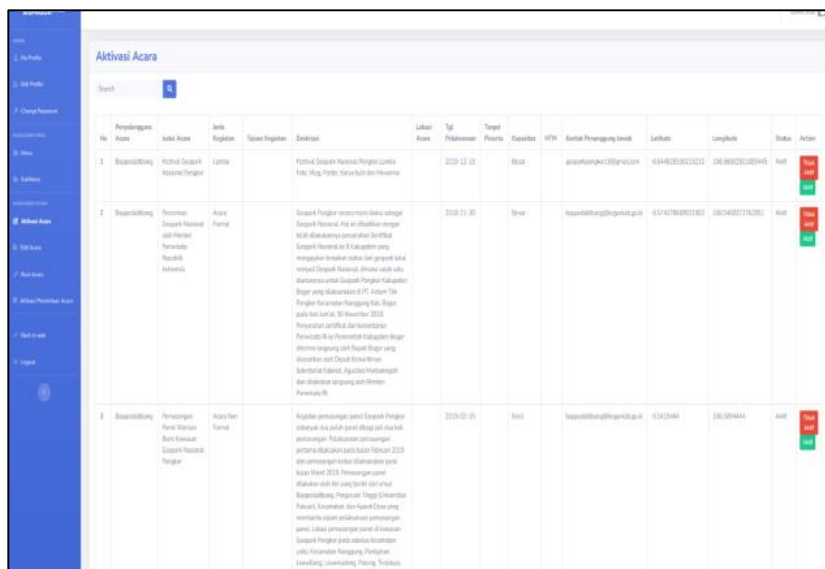
Figure 55: Implementation of the admin dashboard system (Submenu Management)



The image above shows the submenu view to add a new submenu of the menu you want to add.

14. Admin dashboard page (Event Activation)

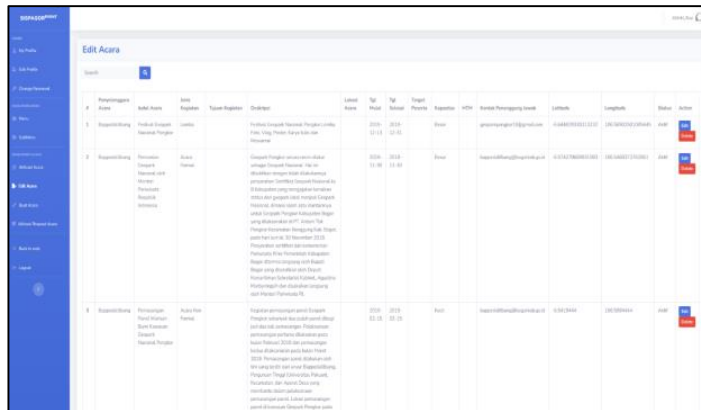
Figure 56: Implementation of the admin dashboard system (Event Activation)



The image above shows the event activation list view to display the event on the event information page.

15. Admin dashboard page (Edit Events)

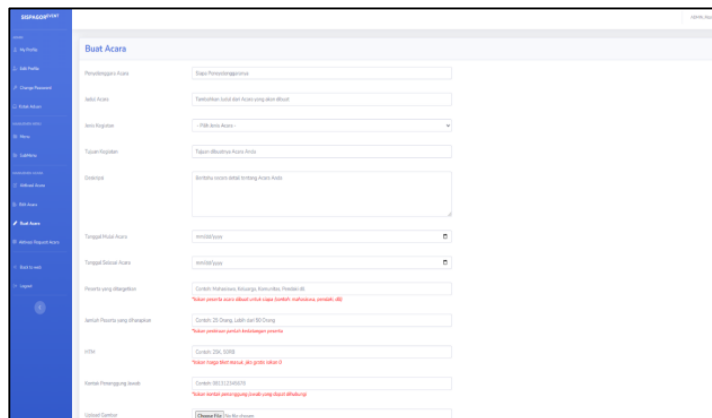
Figure 57: Implementation of the admin dashboard system (Edit events)



The image above shows the edit event view to make data changes to event data that have previously been entered by the admin.

16. Admin Dashboard Page (Create Events)

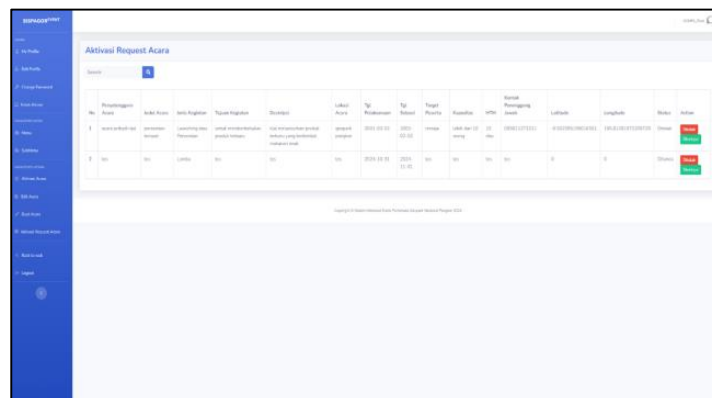
Figure 58: Implementation of the admin dashboard system (Create Events)



The image above shows the view of creating an event to add events that will be performed or have been performed as data stored in the database.

17. Admin dashboard page (Event Requests)

Figure 59: Implementation of the admin dashboard system (Event Request)



The image above shows the view of the event request to accept/reject the submission of the form that has been submitted by the user (Community).

### System Testing

In this step, a pre-created system test is performed to see if the results that the system outputs when the command is given are validated. This test is carried out using the black box testing method, which aims to find out if the system is running as planned. The system testing has been carried out directly by Bappedalitbang and the community. The results of the system test can be seen in Table 2.

**Table 2: System Testing**

No.	Function Name	Testing Scenarios	Expected output	Conclusion
1	Login	Try logging in by entering your email and password.	If the username and password are correct, the login is successful, if the login fails, the system will still display the login page.	Successful Testing
2	Logout	Try to log out by logging out of the system	Admins can log out of the system.	Successful Testing
3	Dashboard functions	The trial shows the functions that admins can perform.	Can display functions that can be used by admins.	Successful Testing
4	Event Registration	The trial user (Community) fills out the form by filling out all the forms that have been provided on the Event Registration page	All data that has been input by the user (Community) can be stored in the database, the data is then received by the admin and can be displayed on the event information page.	Successful Testing
5	Event Information	Trial Displays information data that has been filled out through forms for both public and admin.	Displays a card with the information that the admin has filled in, and when clicked, it will display a pop up containing the data that the admin has filled in.	Successful Testing

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No.	Function Name	Testing Scenarios	Expected output	Conclusion
6	Event Management	Experiment with managing events, such as enabling events, editing events, and creating events.	Can manage event data and fill out forms and data stored in database, data can be displayed on event information page.	Successful Testing
7	Profile Management	Trial of changeable admin profile data.	The admin profile data will be stored in the database and the system will display information about changes to the user and admin profiles.	Successful Testing
8	Menu Management	Try adding and removing menus in the sidebar on the dashboard page.	New menus and new submenus can be added by admins.	Successful Testing

---

## System Evaluation and Findings

The evaluation of the system is carried out through functionality tests, usability testing, and responsiveness tests to ensure that the WebGIS-based Pongkor National Geopark Tourism Event Promotion Information System can run according to user needs. Based on Blackbox's testing of 15 key features, such as event management, spatial data management, WebGIS view, location search, and admin dashboard, it was obtained that all features ran with a 100% error rate of success. In the usability testing stage involving 30 respondents, the system obtained an average score of 86.7% in the *"Very Feasible"* category, especially in the aspects of ease of navigation, clarity of information, and interactive map display. Performance evaluation showed that the average loading time of the map page was only 2.4 seconds, while the time of invoking event data reached 1.2 seconds, so the system was considered quite fast and responsive. The results of this evaluation confirm that the application of WebGIS and spatial data integration based on PHP–MySQL is able to produce a stable, efficient, and easy-to-use system for admins and tourists alike.

## Results and Discussion

The results of the study show that the application of WebGIS in the tourism event promotion information system of the Pongkor National Geopark has a significant impact on increasing the accessibility of tourist information. From the analysis of usage logs during the 14-day trial period, 412 user visits were recorded, with 68% of them accessing interactive map pages. The event search feature based on geosite location was the most widely used feature, with a total of 187 interactions, showing that spatial information plays an important role in helping tourists understand the distribution of events in the four geological clusters of Pongkor. In addition, the integration of QGIS to WebGIS allows for the precise presentation of regional boundaries, geosite points, and event locations, improving the quality of information delivery compared to previous conventional methods. These findings reinforce previous research that stated that the application of GIS technology in the tourism sector is able to increase tourists' understanding of potential destinations and increase interest in visiting. The system built also makes it easier for the Geopark Management Agency to update event data in real-time, so that promotions can be carried out faster, on target, and adaptive to field needs.

## CONCLUSION

This research has succeeded in developing an application, namely a webgis-based Pongkor National Geopark tourism event promotion information system, the features in this application work well, such as Upcoming Events to display the latest events that are ongoing, Search and Filter Events to search and filter so that users can more easily find the desired event, Review and Rating to provide experience and assessment of events that have been visited, Statistics to display the total event data that has been inputted that can be categorized per year, and Event distribution map to display the number of event data distributions that have been input into the system.

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