Design and Development of *Sidajaya* Tourism Village Information System as a Mobile-based Information and Promotion Media

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Abstract: The potential of *Sidajaya* Tourism Village in Subang Regency is still not widely known by the people of Subang, which has hindered the development and progress of the tourism village. The limited availability of information has made people reluctant to seek further details, leading to a lack of widespread knowledge about *Sidajaya* Tourism Village. Therefore, a mobile system is needed to facilitate public access to information about this tourism village. This study aims to build a mobile-based information system that can serve as a medium for disseminating information and promoting *Sidajaya* Tourism Village. The information system will be developed using Android Java programming language and MySQL database. Data will be collected through observation and interviews, which will then be processed into a system analysis of the current system and the proposed one. The system development stages include analysis, system design, implementation, and testing. The application that is developed will allow the public to access tourism information and book tickets for the various tourist spots in *Sidajaya* Tourism Village.

Keywords: *sidajaya* villages, tourism, information system, promotion, mobile apps

1. Introduction

Sidajaya Tourism Village, located in Subang Regency, West Java, possesses extraordinary tourism potential but has not yet received widespread attention. The natural wealth, culture, and local traditions of *Sidajaya* Tourism Village remain largely unknown to the broader public, causing the village to face challenges in its development [6]. Limited access to information is one of the main obstacles in promoting and developing *Sidajaya* Tourism Village. The difficulty in obtaining comprehensive and easily accessible information about this tourist destination makes people reluctant to learn more, resulting in limited awareness of the village's potential [7]. The importance of access to information and promotional media in the development of *Sidajaya* Tourism Village cannot be overstated. The research methodology used includes surveys and interviews with residents and tourism stakeholders. The research results show that limited access to information is the primary challenge in promoting *Sidajaya* Tourism Village [8]. Therefore, efforts are needed to enhance tourism information accessibility through various media and communication platforms [9].

Moreover, to address this issue, a mobile application system is required to help the public easily and efficiently access information about *Sidajaya* Tourism Village. Currently, nearly everyone in the world uses mobile phones, and mobile applications are widely used for various transactions. Therefore, this study aims to develop a mobile-based information system that will serve as the primary medium for disseminating information and promoting *Sidajaya* Tourism Village [10].

This is especially relevant as most people now utilize mobile applications in their daily activities. Through this information system, it is expected that people will find it easier to access information about tourism potential, cultural activities, accommodations, and available facilities in *Sidajaya* Tourism Village [11]. Thus, this system is anticipated to become an effective tool in increasing awareness and interest in visiting *Sidajaya* Tourism Village. If the level of interest and tourist visits to *Sidajaya* Tourism Village increases, the village's revenue will also grow, benefiting all community elements in *Sidajaya* Village. This study will detail the development plan for the *Sidajaya* Tourism Village mobile-based information system, including its objectives, methodology, and expected benefits from its implementation [12].

2. Conceptual Framework

2.1 Waterfall Model

In the design of this mobile app, research is conducted using the Software Development Life Cycle (SDLC) method. This methodology is carried out in a structured and sequential manner, with each step being executed according to the procedure [13]. The Waterfall method consists of four stages: requirement analysis (requirement definition), design (system and software design), code implementation (implementation), and testing (testing) [14]. Figure 1 explains the stages of the Waterfall model.

2.2 Requirement Definition

In the initial stage, an analysis will be conducted on the situation occurring in the partner's environment, which will serve as the research object. One of the methods used is observation, interviews, and literature studies to gather the necessary information for the research, so that the ongoing business processes, as well as those to be proposed, can be identified [16].

2.3 System and Software Design

Furthermore, in the software design and development stage, the author carries out several steps [17], including:

2.3.1 Unified Modelling Language (UML)

In this stage, modeling documents are created in the form of UML diagrams, such as Use Case Diagrams, Activity Diagrams, Sequence Diagrams, and Class Diagrams.

2.3.2 Database

After the modeling stage, the process continues to the analysis stage and the creation of the ERD (Entity Relationship Diagram) and data dictionary.
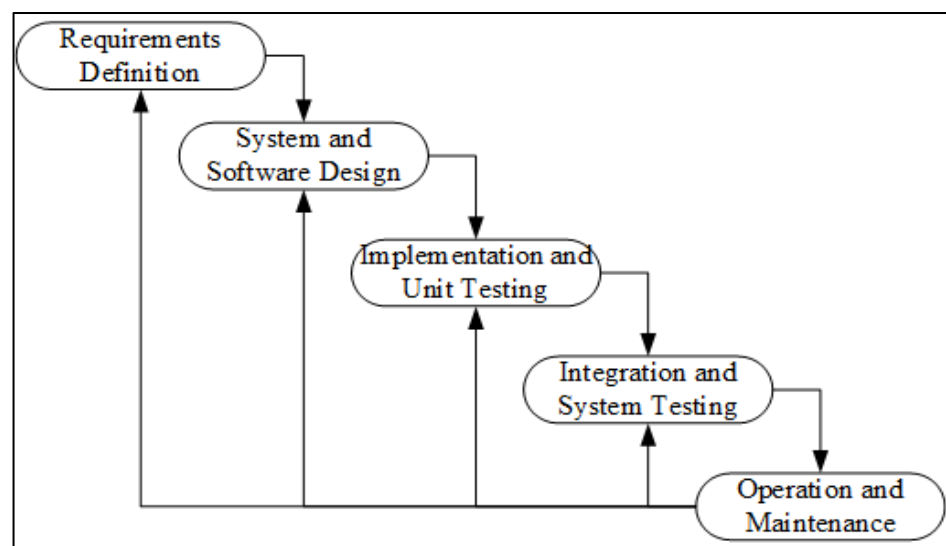

Figure 1. Stages of the Waterfall Model (*Source*: Sommerville, 2016 [15])

The database design is created with the aim that each data field has a relationship and can be connected to the database table.

2.3.3 User interface

The final stage is the design of the mockup interface or wireframe, which is the final visualization of the results from the modeling stage [18].

2.4 Implementation

After the design stage is completed, the next stage is the code implementation stage. This stage implements the results from the analysis and modeling stages. The development of this information system uses the PHP programming language with the Laravel framework and MySQL database with PHPMyAdmin. The initial step in this implementation is the coding of the database, where the contents of the database are the results from the ERD design, transformed into tables. Once successful, the program coding is carried out so that the mockup blueprint design can be realized as an operational application ready for use. [19]

2.5 Testing

Testing is the final stage of this research. Once the implementation stage is completed and all the program features are deemed capable of addressing the existing issues, the testing stage is then carried out. The testing performed by the author uses the black box testing method to assess the system's feasibility. The testing is presented in a table, which contains tests on the functionality of the available buttons and menus. In addition to this, User Acceptance Testing (UAT) is conducted to evaluate the software's feasibility from the perspective of the end user [20].

3. Method

In collecting data, the author conducted interviews and observations at *Sidajaya* Tourism Village, which resulted in the following information:

## 3.1 Research Object Profile

Sidajaya Village is one of 10 villages in Cipunagara District, Subang Regency, West Java Province. This village is located in a lowland area, with an altitude of 70 meters above sea level. *Sidajaya* Village consists of 5 hamlets, namely Jambu, Pasirtanjung, Banjar, *Sidajaya*, and Sumur Jaya. It is a village with exceptional tourism potential, but it has yet to gain significant attention.

3.2 Problem Analysis

The tourism potential of *Sidajaya* Village, such as its natural wealth, culture, and local traditions, is not widely known by the general public. The available information about *Sidajaya* Village is very limited and restricted, which hinders the village's development in promoting and introducing *Sidajaya* to a broader audience. The difficulty in obtaining comprehensive and easily accessible information about this tourist destination causes people to be reluctant to learn more, thus limiting knowledge about the tourism potential of *Sidajaya* Village. Therefore, a platform tool is needed to help promote and disseminate information about *Sidajaya* Tourism Village, as well as to improve the accessibility of tourism information through a mobile platform app.

3.3 Design and Modelling

In the system modeling design stage, a use case diagram is created to identify all types of actors and the functionalities involved for each actor.
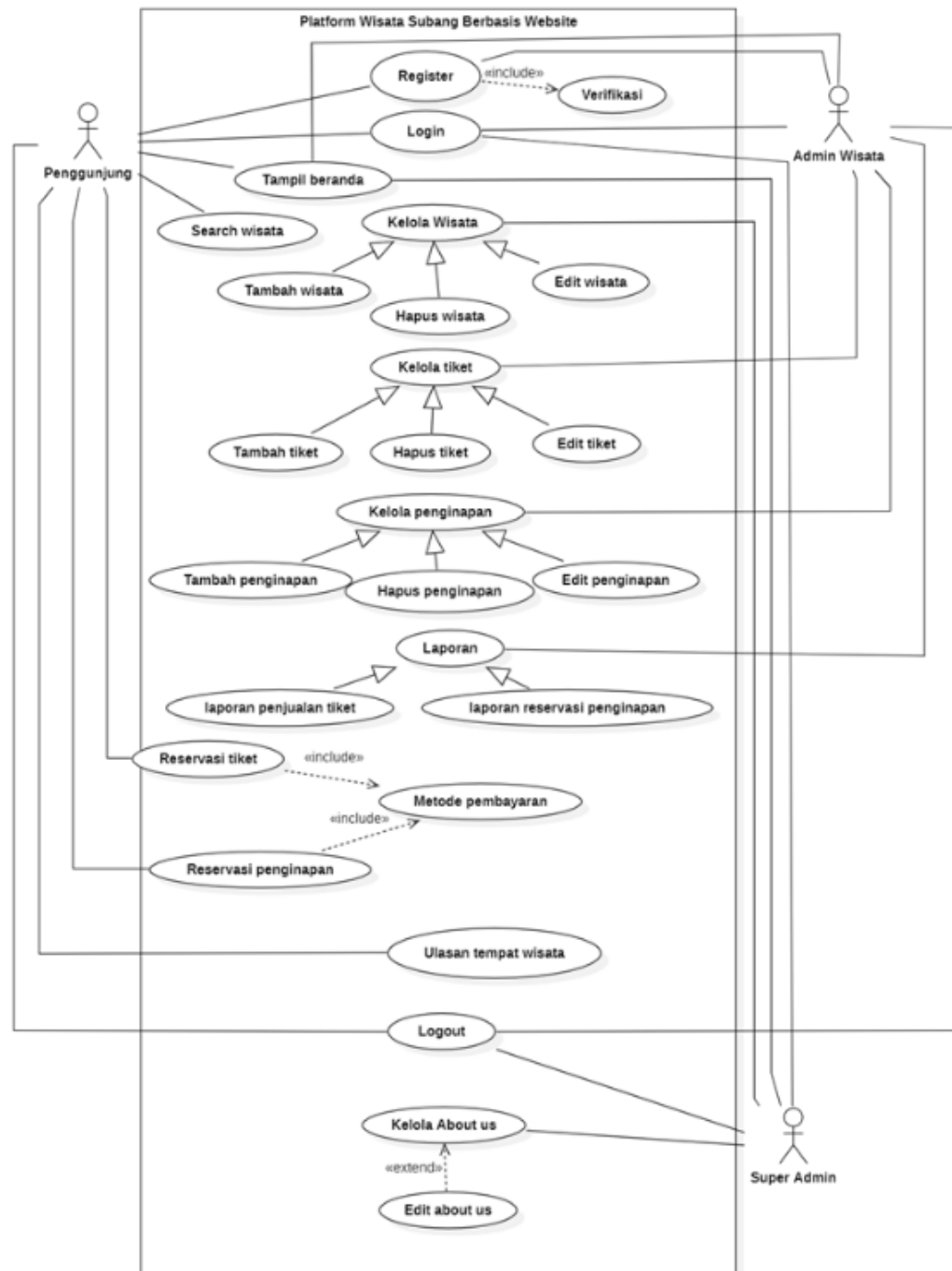
Figure 2. Use Case Diagram

In this use case, there are 3 main actors: super admin, tourism admin, and visitors. The super admin has the role of managing the accounts of other users, such as the accounts of the tourism management admins and the visitors' accounts. The tourism admin actor can manage tourist attractions, accommodations, tickets, and reservation reports. The visitor actor can search for tourist destinations, reserve tickets, and make accommodation reservations.
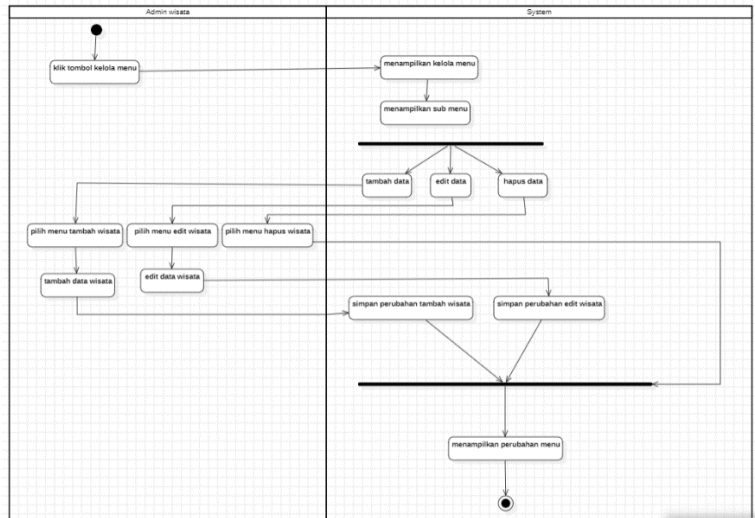
Figure 3. Activity Diagram for Managing Tourism

Besides the use case diagram, there is also an activity diagram, which is a detailed breakdown of the use case scenario. The activity diagram clearly illustrates the activities between the user and the system.
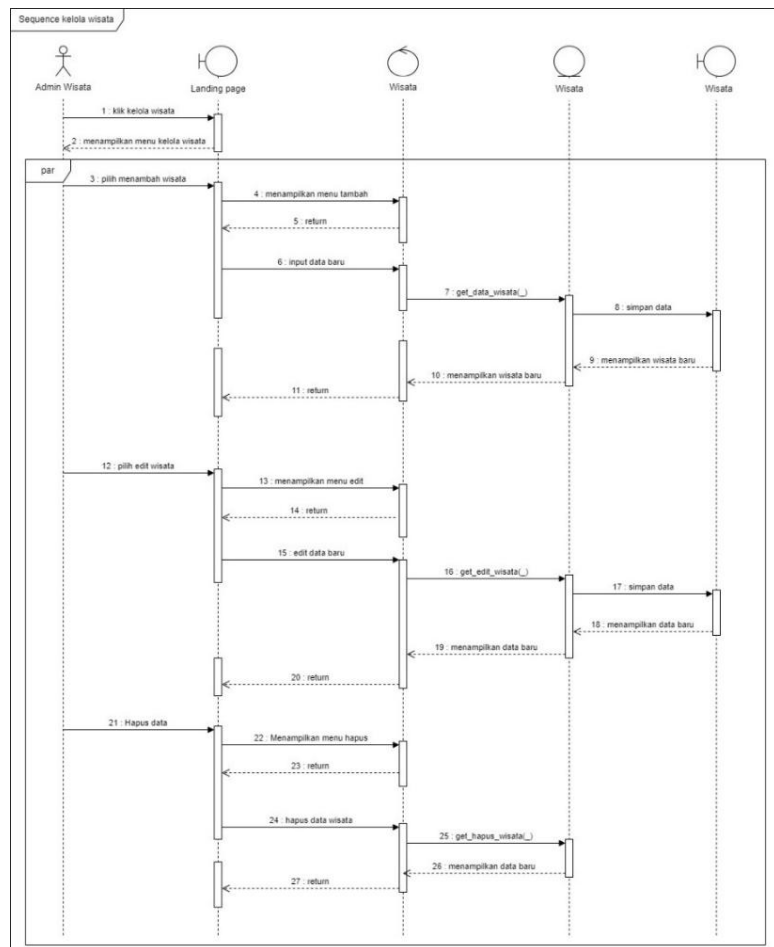

Figure 4. Sequence Diagram for Managing Tourism

After creating the activity diagram, a sequence diagram is needed to detail and illustrate each activity that can be handled using the model, view, and controller files that have been designed. This makes it easier for the programmer to inventory and document the MVC files required for the project development.

4. Result and Discussion

4.1 Code Implementation

This stage explains the results of the analysis and modeling design that have been carried out previously. In this stage, the program coding is done based on the analysis and modeling process, to realize the expected application system and conduct testing.
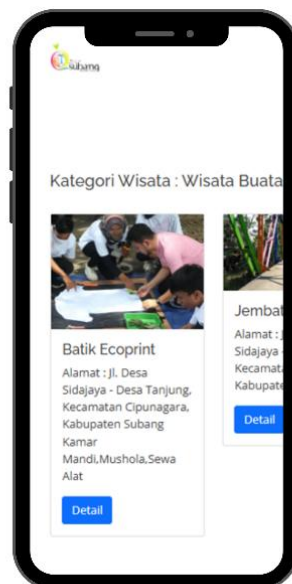

Figure 5. Homepage Display

Figure 6. Tourist Spot Search Page Display

Figure 7. Menu Inputting data for reservation

Figure 8. Tourist Accommodation Reservation and Ticket Booking Page Display

4.2 *Testing*

The testing conducted by the author uses the Black Box Testing method and User Acceptance Testing (UAT). Below are the testing methods used by the author.

4.2.1 Blackbox Testing

Black Box Testing focuses on examining the functionality of the features of the system being developed, intending to identify any errors or bugs in the system. This testing is conducted through a peer review process, involving colleagues. Before the testing is carried out, the author provides the black box testing format to the testers. After the testing, each tester evaluates the functionality of the feature they tested. By using this method, it is hoped that when the system is published, there will be no further functionality issues with the system that has been developed. The details of Blackbox Testing are shown in Table 1.

Table 1. Blackbox Testing

No	Test Description	Expected Results	Valid/ Invalid	Score
1	Login with user/tourist access	The system displays the tourist visitor dashboard page	Valid	100
2	Tourist ticket booking process by user	The system displays the ticket booking form and processes the booking data	Valid	100
3	Checkout process for tourist ticket payment	The system displays the payment invoice data after the ticket booking is processed and prints a receipt.	Valid	100
4	Login with administrator access	The system displays the tourist visitor dashboard page	Valid	100
4	Managing user accounts	The system can add, edit, and delete user account data, and changes are reflected in the user data.	Valid	100
5	Managing tourist data	The system can add, edit, and delete tourist data, and changes are reflected in the tourist data.	Valid	100
6	Managing tourist category data	The system can add, edit, and delete tourist category data, and changes are reflected in the category data.	Valid	100
7	Managing facility data	The system can add, edit, and delete facility data, and changes are reflected in the facility data.	Valid	100
8	Managing event data	The system can add, edit, and delete event data, and changes are reflected in the event data.	Valid	100

4.2.2   *User Acceptance Testing (UAT)*

UAT is conducted to determine whether the developed system meets the needs of the users. In UAT, the level of user acceptance of the system is assessed based on the total score of all the question weights. Based on the results of the UAT testing conducted on the *Sidajaya* tourism ticket reservation information system, the conclusion is that the system received a score of 95% for the system aspect, 88% for the user aspect, and 88% for the interaction aspect. Therefore, the average score from the UAT testing of the *Sidajaya* tourism ticket reservation information system is 89%. In addition, the UAT results for Village Administrators (2 people) are shown in detail in the results of the weighting percentage calculation in Table 2. and Table 3 shows the UAT Results for Users / Tourists (10 people).

Table 2. UAT Results for Village Administrator (2 people)

No	Question	A	B	C	D	Percentage
1	The *Sidajaya* tourism information system is user-friendly and easy to use.	2	0	0	0	100%
2	The *Sidajaya* tourism information system helps and simplifies the admin's task in managing data and tourism categories.	2	0	0	0	100%
3	The *Sidajaya* tourism information system helps and simplifies the admin's task in managing event data and tourism facilities.	2	0	0	0	100%
4	The *Sidajaya* tourism information system helps and simplifies the management of tourism admin accounts.	2	0	0	0	100%
5	The *Sidajaya* tourism information system has fast and optimal data processing time.	2	0	0	0	100%

Table 3. UAT Results for Users / Tourists (10 people)

No	Question	A	B	C	D	A (%)	B (%)	C (%)	D (%)
1	The user interface of the *Sidajaya* tourism information system is comfortable and appealing to look at.	8	2	0	0	80%	20%	0%	0%
2	The *Sidajaya* tourism information system is easy to use and provides easy access.	6	3	1	0	60%	30%	10%	0%
3	The *Sidajaya* tourism information system facilitates the online ticket booking and payment process.	10	0	0	0	100%	0%	0%	0%
4	The *Sidajaya* tourism information system provides complete and detailed information about the tourist attractions in Sidajaya village.	7	2	1	0	70%	20%	10%	0%
5	The *Sidajaya* tourism information system makes it easier for tourists to leave reviews and ratings, which are useful for both the administrators and other tourists.	8	1	1	0	80%	10%	10%	0%

Moreover, after obtaining the percentage values, the calculation continues by multiplying each percentage by the corresponding weights for points A through D. Once the weighted value is calculated which is shown in detail in Table 4, this weighted value needs to be divided by 10 people to obtain the rating weight. For example, if the total weight is 45, dividing by 10 gives 4.5, which is then divided by 5 (the maximum weight value). This will result in the percentage weight for the questionnaire component being assessed.

Table 4. Percentages with corresponding weights for points A to D

No	Question	A x 5	B x 4	C x 3	D x 2	Total Weight	Average Rating	Weight Percentage
1	The user interface of the *Sidajaya* tourism information system is comfortable and appealing to look at.	8	2	0	0	48	4.8	96.00%
2	The *Sidajaya* tourism information system is easy to use and provides easy access.	6	3	1	0	45	4.5	90.00%
3	The *Sidajaya* tourism information system facilitates the online ticket booking and payment process.	10	0	0	0	50	5.0	100.00%
4	The *Sidajaya* tourism information system provides complete and detailed information about the tourist attractions in Sidajaya village.	7	2	1	0	46	4.6	92.00%
5	The *Sidajaya* tourism information system makes it easier for tourists to leave reviews and ratings, which are useful for both the administrators and other tourists.	8	1	1	0	47	4.7	94.00%

4.2.3   *Quality of Service (QoS) Report for mobile apps sidajaya*
This mobile app uses using web view layer to appear as an interface of *Sidajaya's* website. This report aims to evaluate the Quality of Service (QoS) of the Desa *Sidajaya* website. The QoS analysis includes availability, performance, security, user experience, and other factors that provide a comprehensive overview of the website's quality and performance.

Table 5. Quality of Service (QoS) Report for mobile apps *sidajaya*

QoS Aspect	Indicator	Evaluation Result
3.1 Availability	Uptime	99.8% uptime, with no significant downtime observed.
	Server Response Time	Average response time: 1.2 seconds.
3.2 Performance	Page Load Time (Google PageSpeed)	Desktop: 75/100, Mobile: 60/100 (needs improvement for mobile).
	Page Load Time (GTmetrix)	3.5 seconds (slightly slower than the ideal standard of under 3 seconds).
	First Contentful Paint (FCP)	1.6 seconds (content appears fairly quickly).
	Time to Interactive (TTI)	3.2 seconds (acceptable but can be improved).
3.3 Security	SSL Certificate	Uses HTTPS with a valid SSL certificate, rating: B (stronger encryption needed).
	Vulnerability to Attacks	Not vulnerable to common attacks (SQL injection, XSS), but improvements are needed in other security aspects.
3.4 User Experience	Responsive Design	Responsive, but design elements like image sizes and layout need further optimization for mobile devices.
	Navigation	Easy to navigate, but some links are unclear for new users.
	Interaction Speed	Responds quickly to clicks and navigation, with slight delays in loading dynamic content.
	User Feedback	60% of visitors access the site using mobile devices, and prioritizing mobile optimization is recommended.
3.5 Scalability	Load Testing	Handles up to 100 concurrent users without significant performance degradation. When tested with more than 500 users, page load times increased slightly, and some elements took longer to load.

4.3 *Availability*
- Uptime: The website was tested over 24 hours to ensure its availability. Results show that the website had 99.8% uptime, with no significant downtime observed.
- Server Response Time: The website was accessible with an average response time of approximately 1.2 seconds, indicating good availability.

4.4 *Performance*
- Page Load Time:
- Google PageSpeed Insights reports a score of 75/100 for desktop and 60/100 for mobile. This suggests that the performance is decent but there is room for improvement, particularly on mobile devices.
- GTmetrix shows a page load time of 3.5 seconds, which is slightly higher than the ideal standard of under 3 seconds.

- First Contentful Paint (FCP): 1.6 seconds, indicating that the first content appears fairly quickly.
- Time to Interactive (TTI): 3.2 seconds, which is acceptable but could be improved for a faster interactive experience.

4.5 Security
- SSL Certificate: The website uses HTTPS with a valid SSL certificate, but testing with Qualys SSL Labs reveals a rating of B. This means while the site is secure, some areas could be improved (e.g., using stronger encryption algorithms).
- Vulnerability to Attacks: Testing with OWASP ZAP and Burp Suite indicates that the site is not vulnerable to common attacks such as SQL injection or Cross-site Scripting (XSS), but improvements could be made in other areas of security.

4.6 User Experience (UX)
- Responsive Design: The site appears responsive, but some design elements are not fully optimized for mobile devices, such as image sizes and layouts on smaller screens.
- Navigation: Users can easily navigate the site, but some links are not as clear for new users.
- Interaction Speed: The site responds well to clicks and navigation, although there is a slight delay when loading dynamic content.
- User Feedback: Based on feedback gathered through Google Analytics, more than 60% of visitors access the site using mobile devices, suggesting that mobile optimization should be prioritized.

4.7 Scalability
Load Testing: Using Loader.io, the site handled up to 100 concurrent users without significant performance degradation. However, when tested with more than 500 users, page load times increased slightly, and some elements took longer to load.

5. Conclusion

With the existence of the *Sidajaya* Tourism Village Information System based on mobile platforms, it can serve as a medium for information and promotion for the village to enhance the tourism potential that is still widely unknown to the general public. With this platform, it is hoped that it can address obstacles, especially in introducing the potential of *Sidajaya* Tourism Village, so that the public's knowledge of *Sidajaya* Village becomes broader. Additionally, this mobile platform can help tourists make reservations for tourist spots and accommodations, along with the inclusion of a payment gateway system, which makes it easier for visitors to make online payment transactions. It is expected that with the increasing number of accommodation and tourism transactions in *Sidajaya* Village, the revenue and income for tourism business operators in *Sidajaya* will rise, thus improving the welfare of the village community.

Conflicts of Interest: The authors declare no conflict of interest.

Additional Information: No Additional Information from the authors.

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