

Enhancing Tourist Experiences in Glodok Pancoran Through Virtual Tours

¹ Angelica Christina, ^{2,*} Tony , ³ Teny Handhayani

^{1,2,3} Department of Information Systems, Faculty of Information Technology, Universitas Tarumanagara, Jakarta, Indonesia

* Corresponding Author: tony@fti.untar.ac.id

Abstract: This research aims to develop a web-based tourist destination application for Glodok Pancoran, Jakarta, to improve tourist experience and promote local culture and culinary. The methods used in developing this application include database design, development using Visual Studio Code, React for the frontend, and Go (Golang) for the backend, as well as database management with MySQL. The app was tested using black box method and System Usability Scale (SUS) assessment to ensure functionality and user satisfaction. With an Agile approach, the app integrates Google Maps and Street View to provide virtual tours, which is a new innovation in promoting local tourism. The results showed a high level of user satisfaction with an average SUS score of 90.33, which was categorized as excellent. This study highlights the importance of virtual tours in tourism, especially for first-time visitors, and recommends further development based on user feedback to improve tourism and the local economy.

Keywords: agile, system usability scale, tourism, virtual tour, database management.



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1. Introduction

In today's digital era, technology has become an important part of various aspects of life, including in the tourism industry. One innovation that is increasingly being used is virtual tours, which allow visitors to explore tourist attractions without having to visit them directly. This phenomenon is increasingly relevant because virtual tours provide an opportunity for tourist destinations to introduce themselves to potential visitors from various parts of the world. In addition, this technology makes it easier for tourists to explore various locations more flexibly and comfortably, without having to leave home.

This Glodok area was once an active trading center but is now a shopping center for Chinese snacks, traditional medicine, and cheap electronics. In addition, Glodok Pancoran is also famous as an attractive entertainment center with various tourist destinations such as Petak Enam, Pancoran Point, and places of worship. In addition to tourist attractions, culinary in Glodok Pancoran is also a special attraction with various choices such as Djauw Coffee and Es Tak Kie. However, there are still many local culinary delights that are not widely known by the public. Based on observations, many visitors feel confused in determining the desired tourist destination, especially for those who visit the area for the first time. With the virtual tour feature, people can explore Glodok Pancoran online and observe the destinations there more clearly. This can also reduce visitors' confusion, provide a more comprehensive picture of the location to be visited, and help them plan their trip better and more efficiently.

In addition, several related studies resemble the application of tourist destinations in Glodok Pancoran. Luca et al. [1], researched to develop a Virtual Reality-based virtual tour application (VR360) to promote the cultural heritage of the city of Bari, Italy, by allowing users to explore the city's history through an immersive experience. The app uses 360° images taken with a specialized camera to provide insight into the urban development and architectural style of the city over time, influenced by various cultural dominations. Meanwhile, the web-based Glodok Pancoran tourist destination application

uses a virtual tour with Google Street View, providing an interactive experience that allows people to get to know Glodok Pancoran more deeply.

Stappung et al. [2], developed a 360° virtual tour to promote natural parks in the Maule region of Chile by integrating images, videos, and other interactive elements to provide an immersive tourism experience. This virtual tour app allows travelers to explore natural destinations without having to be in a physical location. Meanwhile, the tourist destination application in Glodok Pancoran uses a virtual tour based on Google Street View, which helps people get to know the place online.

Wiryanawan et al. [3], developed an interactive virtual tour based on 360-degree panoramic technology for Bandung City Museum, to provide an engaging educational experience for visitors online. This virtual tour application allows users to navigate around the museum building, listen to narration, and read brief information about each object displayed. Meanwhile, the Glodok Pancoran tourist destination app also provides an online virtual tour that allows users to explore Glodok Pancoran in greater depth.

Suryanto et al. [4], conducted a study by evaluating the user experience of the UPN (Universitas Pembangunan Nasional) Surabaya 360° virtual tour, which was designed to provide an interactive experience for prospective students and campus visitors. This virtual tour application allows users to explore campus facilities online with 360° images, providing insight into various areas of the university. Meanwhile, the tourist destination app at Glodok Pancoran provides an experience for visitors to explore the area using a 360° Google Street View-based virtual tour.

Suroso et al. [5], conducted a study that implemented a 360° virtual tour based on Virtual Reality (VR) in the Taman Safari Indonesia tourism industry to increase the number of visitors during the Covid-19 pandemic and reach visitors who are far from the park location. The research also aims to provide an immersive experience for visitors who cannot visit the park in person, as well as improve accessibility for domestic and international visitors. Meanwhile, the tourist destination application in Glodok Pancoran provides a virtual tour service that allows visitors to explore the Glodok Pancoran area online before physically visiting the place.

Through the application of virtual tour, this application is expected to introduce Glodok Pancoran as a tourist destination that is rich in culture and culinary potential, while increasing tourists' interest in visiting it. By providing wider access to tourists, both domestic and international, this application has the potential to improve the local economy. Travelers inspired by the virtual tour experience may choose to physically visit the location, bringing positive impacts to the tourism sector and small and medium enterprises in the area. As such, the app not only provides informational benefits but also contributes to the overall development and promotion of the Glodok Pancoran area.

2. Literature Review

2.1 Glodok Pancoran

Glodok Pancoran is one of the areas located in Taman Sari District, West Jakarta, Special Capital Region of Jakarta, Indonesia. This area is one of the majority of the population which contains Chinese ethnic and also architectural environment [6]. The Dutch established the Chinese camp at Glodok to control the Chinese population in Batavia. A side effect was the establishment of a business center there.

According to history, the name Glodok came from a small dome-shaped fountain in the front yard of the city hall, near the current Glodok Pancoran. Natives spelled the sound of the water "grojok-grojok" as Glodok. Another hypothesis proposed that the name Glodok was derived from the sound of water-carrying carts, "glodok-glodok". The name Pancoran is derived from the fountain (pancuran), which was an essential facility for the residents at the time [7]. Fig. 1 shows the coordinates of the Glodok Pancoran Entrance Gate.

Glodok Pancoran offers a variety of interesting destinations, ranging from cultural heritage, and culinary, to religious. Heritage destinations include the Chandra Building, Pancoran Chinatown Point, Pantjoran Tea House, and Petak Enam. Culinary in this area includes halal and non-halal food options, such as Djauw Coffee, Kuotie Shantung 86, Ellie Donut, and Sedap Wangi. For religious tourism, there are the Jami Arohiem Mosque, Sila Amerta Temple, Dharma Jaya Temple, and Santa Maria de Fatima Toasebio Church.

Glodok Pancoran combines history, culture, and modernity, making it a dynamic neighborhood in Jakarta.

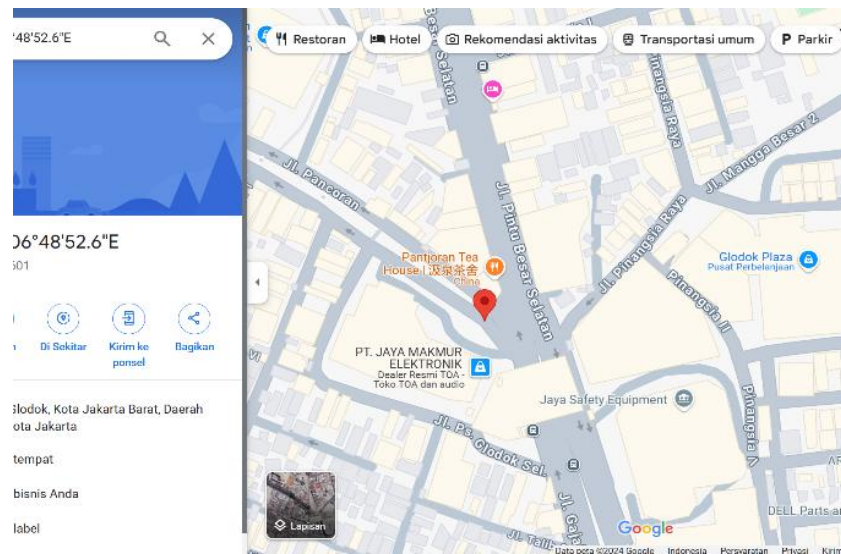


Figure 1. Coordinates of Glodok Pancoran Entrance Gate

2.2 Tourism

According to the Law of the Republic of Indonesia No. 10 of 2009 on Tourism Chapter I Article 1, tourism is a travel activity carried out by a person or group of people by visiting certain places for recreation, personal development, or studying the uniqueness of tourist attractions visited in a temporary period [8]. Tourist facilities are an important key in the formation of tourism products that play an important role in supporting the ease and comfort of tourist travel. According to Rathi [9], tourism provides 8% of global employment. Destination types are divided into several categories that have been written by Bayram *et al.* [10], namely adventure, medical, rural, cultural, culinary, religious, ecotourism, wildlife, and heritage tourism.

2.3 Virtual Tour

A virtual tour is the most common semi-immersive virtual reality experience that most organizations are using nowadays. They can be devices or web-based. Overall, they deliver an interactive virtual experience [11]. Virtual tours are presented on a screen interface, allowing a user to swipe left and right on an interface and virtually travel around an interior or outdoor space, such as Google Street View, providing the experience of "being there" without actually being there [12].

3. Methodology

Agile is a scalable methodology that has gained widespread attention in the software development world due to its high success rate and impressive results [13]. Agile uses an iterative and incremental development approach rather than a linear approach like the waterfall model. The agile model allows for flexibility in moving between different phases, but development and research in both systems aim to produce something new [14]. According to Madni *et al.* [15], the Agile method consists of 6 phases, namely requirements, design, development, testing, deployment, and review. Fig. 2 shows the phases of the agile model.

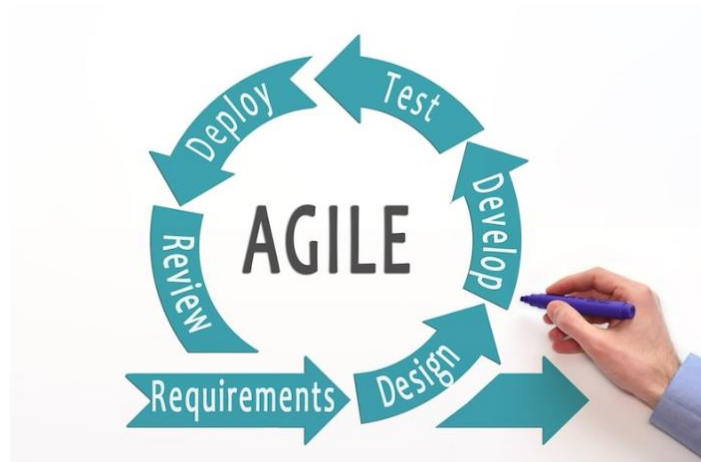


Figure 2. Agile Methodology [16]

3.1 Requirements

Requirements are a crucial stage in system development, where the development team works closely with the users to identify and document the needs that must be met by the system to be built. At this stage, the team and users discuss in depth the various desired aspects, as well as existing problems, to ensure that the solution developed matches the expectations and real needs of users.

This phase begins with data collection using the Google Form platform. The questionnaire in the Google Form includes questions about the features that the public desires for the main website. The general public can fill out the questionnaire through the link <https://bit.ly/kuesionerglodok>. To reach respondents, the Google Form is also distributed via an online poster through the Instagram account @angelicachriss and WhatsApp. The distributed poster can be seen in Fig 3.



Figure 3. Questionnaire Distribution Poster



Figure 4. Photo with Glodok Subdistrict Representatives

The distribution of the questionnaire took place over one week, from July 24, 2024, to July 31, 2024. During this period, 83 respondents completed the questionnaire regarding Glodok Pancoran. According to the survey of 83 respondents, the majority were aware of and interested in the Chinese culture and cuisine in Glodok Pancoran, Although some expressed difficulty in finding information about transportation and access to local cuisine in the area. The creation of a tourism application focusing on the Chinese cultural heritage and cuisine in Glodok Pancoran was considered very helpful by most respondents, with the information needs including cuisine, history, transportation, and additional features such as virtual tours and reviews.

In addition to using Google Forms, data collection was also carried out through interviews with several representatives from the Glodok subdistrict. The interview questions with these representatives focused on the features and processes needed for the admin website. The interview took place on Thursday, August 1, 2024, from 07:50 to 08:35 WIB at the Glodok Subdistrict office, located at Jalan Keadilan I No. 12, RT.2/RW.4, Glodok, Taman Sari District, West Jakarta. The interview was conducted with four representatives from the Glodok subdistrict: Mr. Harry (Subdistrict Head), Mr. Romani (Civil Registration and Population Office), Mr. Egi (Integrated One-Stop Service), and Mr. Rama (Subdistrict Staff), as shown in Fig. 4.

Based on the results of the interview, the preservation of Chinese cultural heritage in Glodok Pancoran is considered essential for enhancing tourism and preserving the uniqueness of the Chinatown area in Jakarta. Furthermore, the development of an informative and engaging tourism destination app is expected to provide a comprehensive introduction to Glodok Pancoran, educate the public, and make it easier for tourists by showcasing transportation access, interesting spots, and relevant culinary information. With the addition of a virtual tour feature, it will undoubtedly help people explore and get to know Glodok Pancoran more deeply.

3.2 Design

At this stage, system development begins with process design using the Unified Modeling Language (UML), which includes several diagrams such as use cases, use case scenarios, class diagrams, activity diagrams, and sequences. UML is a visual language used to define, illustrate, build, and document the components of software systems [17]. One of the diagrams commonly used in the system design phase is the use case diagram, which illustrates the interaction between users (actors) and the system, as well as how the system will fulfill the users' needs. Fig 5 shows the use case diagram of the tourist destination application in Glodok Pancoran.



Figure 5. Use Case Diagram

After the design process is complete, proceed with database design which includes table specification, logical database design for efficient data structure, and conceptual database design to design conceptual data models that reflect entities and relationships. Database design is an essential process in developing organized and effective database systems [18]. Fig 6 shows the logical database design of the tourist destination application in Glodok Pancoran.

The next stage is user interface (UI) design, where the visual design of the system is created using the Figma application, to ensure an intuitive and responsive user experience across various devices. All these stages aim to produce a well-structured, functional, and easy-to-use system following user needs.

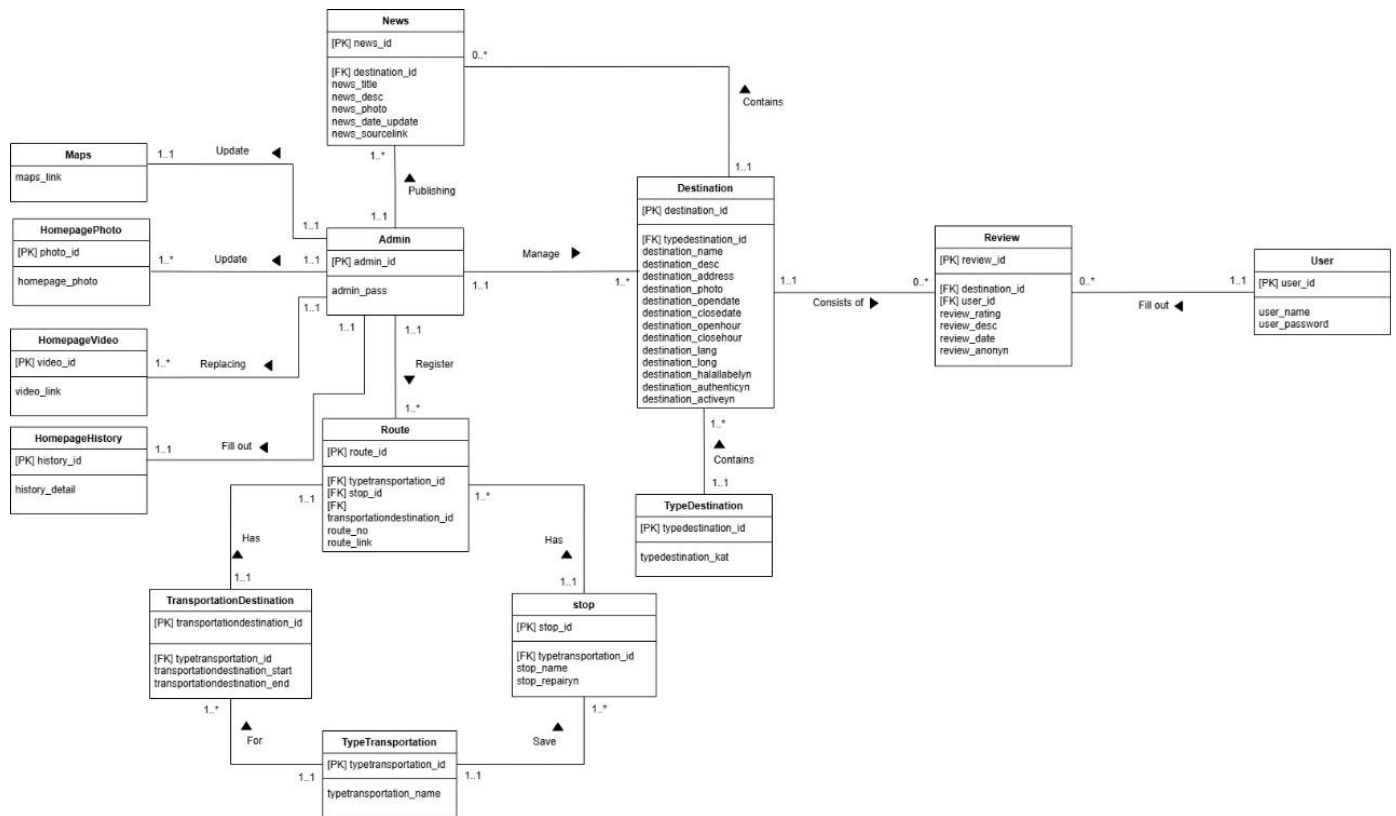


Figure 6. Logical Database Design

3.3 Development

The development phase is critical in the creation of the system, where the entire pre-designed design is translated into executable code. Before starting to write code, developers need to install and prepare various software, such as Visual Studio Code as the main code editor, as well as supporting packages such as React for frontend development, Yarn as a package manager, and Material UI (MUI) for responsive and modern user interface design. In addition, this stage also includes the development of the backend, which serves to connect the data in the database with the frontend interface through API (Application Programming Interface) and HTTP endpoints. The backend development is done using the Go (Golang) programming language, which is known for its high performance, and MySQL as a database management system for data storage and management. During the development phase, code testing is also carried out to ensure each part of the system works properly, minimize errors, and ensure integration between the frontend, backend, and database runs smoothly according to the agreed needs and system design.

3.4 Testing

In the testing phase, the system that has been developed will be tested according to the requirements using the black box testing method. Black box testing, also known as specification-based or functional testing, focuses solely on the program's specifications and does not involve any understanding of the program's internal code structure [19]. The goal of black box testing is to ensure that the program fulfills the defined requirements, without any insight into its implementation. In addition to black box testing, the application was also tested using the System Usability Scale (SUS). The System Usability Scale (SUS) is a standardized set of 10 Likert-scale questions developed by John Brooke in 1986. These questions can be directed at customers to assess a particular content experience or item you wish to evaluate. SUS helps determine how effective and understandable the content is for your users, and it can be valuable for benchmarking and

periodic re-evaluation to track whether your content is consistently improving from the perspective of your customers [20].

3.5 Deployment

After testing is complete, the Glodok Pancoran tourist destination website is ready to be introduced to the community and admin. Through planned deployment, this website will provide optimal benefits and evolve according to user needs. The deployment process is done carefully to ensure that the website can be accessed smoothly by all users, taking into account the performance, security, and scalability factors of the system. During this phase, clear documentation is also prepared to ease the process of maintaining and managing the website in the future.

3.6 Review

At this stage, after the website is used by the community, the admin receives feedback that is used for system maintenance and improvement. The in-depth review process will ensure that the Glodok Pancoran tourist destination website provides maximum benefits and evolves according to user needs. Feedback received through surveys, user comments, and usage data analysis will help identify areas that need to be fixed or improved. Based on the review, developers can make feature updates, fix technical issues, and adapt the website to changing user needs or preferences, so that the site remains relevant and effective as a tourist promotion tool in Glodok Village.

4. Results and Implementation

4.1 Implementation of Virtual Tour

The application of virtual tour in a web-based tourist destination application in Glodok Pancoran utilizes Google Maps and Street View 360-degree features, which allow tourists to explore various tourist attractions online. This feature makes it easy for tourists to see firsthand the environmental conditions and attractions in the area as if they were on location. By using this technology, users can explore every corner of the tourist attractions without having to leave home. Virtual tours provide an immersive and interactive experience, which increases user interest in tourist destinations in Glodok Pancoran. The following is the pseudocode for the implementation of a web-based virtual tour at Glodok Pancoran.

```

Function getMaps()
Function to retrieve links from the database using the API. The result is stored
in the variable tempData.
{
1. [Calling API]
const response = await api.getMaps();

2. [Returns the result]
Return (tempData)
}
Virtual_Tour Algorithm
An algorithm to display the virtual tour. The link is retrieved using the
getMaps function and stored in the tempData variable to be used in the valueMaps
variable, which has a string data type.
[Function Declaration]
FUNCTION getMaps()

1. [Initialize variable]
valueMaps = tempData
2. [Reading the Google Maps link (Street View)]
Read(valueMaps)
3. [Executing the virtual tour display]
<Box
    component="iframe"

```



```
src={valueMaps}
sx={{
  width: "100%",
  height: "100%",
  border: "none",
}}
allowFullScreen
loading="lazy"
referrerPolicy="no-referrer-when-downgrade"
/>
4. [Finish]
Halt
```

Fig. 7 until Fig.9 a and b show the application of virtual tours for some famous places in Glodok Pancoran.



Figure 7. Entrance Gate of Glodok Pancoran

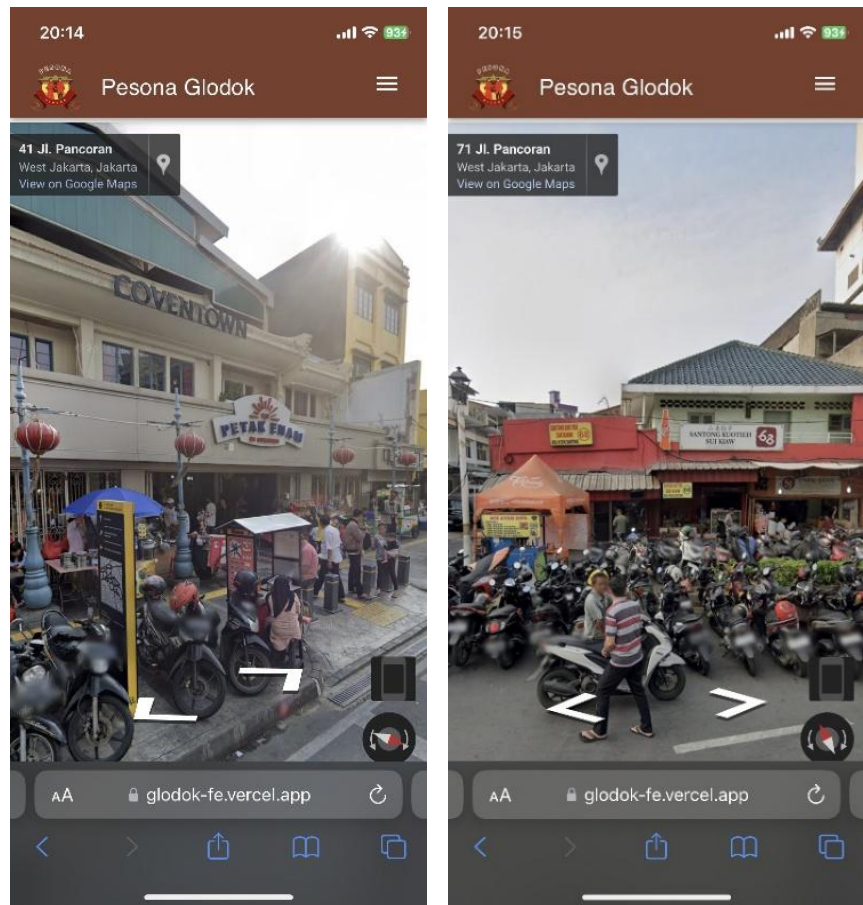
The main advantage of implementing a virtual tour is its ability to provide more detailed visual information to visitors before they physically travel. Tourists can find out the facilities, accessibility, and surroundings of the tourist attractions they are interested in. This will certainly make it easier for them to plan their visit more efficiently, thereby reducing the sense of confusion or uncertainty when on location.

With this feature, travelers can make more informed decisions about where to visit, based on accurate visual displays.

Therefore, the application of Google Maps-based virtual tours is expected to improve the overall tourism experience. This technology not only provides convenience in exploring tourist destinations but also increases user convenience in planning trips. In addition, the use of virtual tours also has the potential to attract more tourists to visit Glodok Pancoran, as they can more easily get to know interesting places that they may not have known before. Overall, this virtual tour can be an effective tool in introducing and promoting tourist destinations in Glodok Pancoran.



Figure 8. Pancoran Chinatown Point



(a)

(b)

Figure 9. (a) Petak Enam (b) Santong Kuotieh Sui Kiaw 68

4.2 Application Test Result

After the development of the web-based tourist destination application in Glodok Pancoran has been completed, the next stage is testing. The testing process of this Glodok Pancoran tourist destination application uses the black box testing method and the System Usability Scale (SUS). The purpose of this test is to assess the effectiveness of the information system and ensure that the results achieved match the expectations that have been set. In addition, this test also aims to identify potential problems and areas that require improvement, so that the application can provide an optimal experience for users.

Black box testing was held on Friday, October 25, 2024, from 09.55 until 10.50 WIB in Glodok Village located at Jalan Keadilan I No.1 2, RT.2/RW.4, Glodok, Kec. Taman Sari, West Jakarta City. This testing process was held with several Glodok representatives including Mr. Harry, Mr. Egi, Mr. Agung Fajar, and others. Black box testing on the web-based Glodok Pancoran tourist destination application was successful as expected. Fig. 10 is a documentation of black box testing on the application of tourist destinations in web-based Glodok Pancoran.



Figure 10. Blackbox Testing Process

The SUS data collection process was carried out by distributing Google Forms via the link <https://bit.ly/SUSGlodokPancoran>. Data collection began on Monday, October 21, 2024, and ended on Wednesday, October 23, 2024. During this period, respondents were asked to fill out an online form to give their assessment of the system under test. Each respondent will provide a score for 10 SUS questions designed to measure user satisfaction. Equation 1 shows the formula of the System Usability Scale (SUS).

$$\bar{x} = \frac{\sum x}{n} \quad (1)$$

A total of 30 respondents participated in filling out the SUS for the web-based Glodok Pancoran tourist destination application. Of these, 19 respondents (63.3%) were female, while 11 respondents (36.7%) were male. The age of respondents ranged from 20 to 44 years, with an average age of 24 years. The majority of respondents work as private employees, students, teachers, and others. The overall result of SUS points obtained from 30 respondents is 2710. Therefore, the average SUS obtained is 90.33. With this, it can be concluded that the acceptability range is acceptable, the grade scale is A, and adjective ratings are excellent. Fig 11 shows the scale of the SUS.

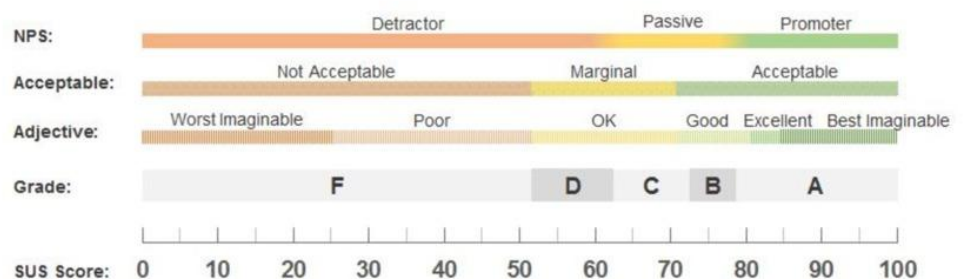


Figure 11. Scale of The SUS [21]

5. Conclusion

The development of a web-based tourist destination application for Glodok Pancoran has successfully enhanced the tourist experience by providing a virtual tour utilizing Google Maps and Street View. The app not only promotes local culture and cuisine but also reduces visitor confusion, especially for first-time visitors. With a high user satisfaction score of 90.33 on the System Usability Scale (SUS), the app demonstrates its effectiveness in supporting local tourism. To improve this app further, it is recommended to continue collecting and analyzing user feedback. This can help in identifying areas that require improvement or additional features that can enhance the user experience. In addition, improvements to the security and scalability aspects of the app can be considered to ensure the app remains reliable and accessible to more users. Future research could focus on developing additional interactive features, such as integration with social media to share travel experiences, or the use of augmented reality (AR) technology to provide a more immersive experience.

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References

1. V. D. Luca, G. Marcantonio, M. C. Barba, and L. T. D. Paolis, "A Virtual Tour for the Promotion of Tourism of the City of Bari," *Information*, vol. 13, no. 7, p. 339, 2022.
2. Y. Stappung, C. Aliaga, J. Cartes, L. Jago, J. . A. R. Suárez, N. A. Barriga and F. Besoain, "Developing 360 Virtual Tours for Promoting Tourism in Natural Parks in Chile," *Sustainability*, vol. 15, no. 22, p. 16043, 2023.
3. M. W. Ryzki and S. S. Nuraisyah, "Development of interactive virtual tour based on 360-degree panorama technology at the Bandung City Museum," *International Journal of Quantitative Research and Modeling*, vol. 4, no. 4, pp. 294-300, 2023.
4. T. L. M. Suryanto, N. C. Wibowo, and K. K. Pangestu, "An Evaluation of User Experience for 360° UPN Virtual Tour," *Nusantara Science and Technology Proceedings*, pp. 345-352, 2023.
5. J. S. Suroso, G. Wang, M. F. A. Suroso, F. P. Astaman, L. M. Budhaye and W. Bustoni, "Applying 360° Live Virtual Reality Tour in Taman Safari Indonesia Tourism Industry: Enterprise Architecture Approach," *2022 IEEE International Conference of Computer Science and Information Technology (ICOSNIKOM)*, pp. 1-7, 2022.
6. R. Setiawati, "Community Empowerment as a Tourist Attraction and Creative Economy Development in Kota Tua Jakarta," *Journal of Indonesian Tourism and Policy Studies*, vol. 5, no. 2, p. 4, 2020.
7. KPG Redaksi, *Kota Tua Jakarta*, Jakarta: Kepustakaan Populer Gramedia, 2013.
8. Republik Indonesia, "Undang-undang nomor 10 tahun 2009 tentang Kepariwisata," Jakarta: Republik Indonesia, 2009.
9. D. Rathi, *Tourism Economics*, Ashok Yakkaldevi, 2022.
10. G. E. Bayram, S. H. A. Shah and M. N. Tunio, *Women's Empowerment Within the Tourism Industry*, IGI Global, 2023.
11. T. Velumani, P. Devi, P. Aruljeyanthi and T. S. T, *A Modern Approach of Virtual Reality and Augmented Reality*, SK Research Group of Companies, 2023.
12. K. Kloeckl, *The Urban Improvise*, Yale University Press, 2020.
13. S. Hooda, V. M. Sood, Y. Singh, . S. Dalal and M. Sood, *Agile Software Development: Trends, Challenges and Applications*, John Wiley & Sons, 2023.
14. B. J. Oates, M. Griffiths, and R. McLean, *Researching Information Systems and Computing*, Sage, 2022.
15. D. Verma, A. Madni, S. Hoffenson and L. Xiao, "The Proceedings of the 2023 Conference on System Engineering Research:

- System Engineering Towards a Smart and Sustainable World," in Conference on Systems Engineering Research Series, 2024.
16. T. B. Hilburn and M. Towhidnejad, *Software Engineering Practice: A Case Study Approach*, Chapman and Hall/CRC, 2020.
 17. S. Sundaramoorthy, *UML Diagramming: A Case Study Approach*, CRC Press, 2022.
 18. R. Johnson, *Database Design with SQL: Building Fast and Reliable Systems*, 2024: HiTeX Press.
 19. R. Bierig, S. Brown, E. Galván, J. Timoney and J. Timoney, *Essentials of Software Testing*, Cambridge University Press, 2021.
 20. E. Jorgensen, *Strategic Content Design: Tools and Research Techniques for Better UX*, Rosenfeld Media, 2023.
 21. P. Wikanta, A. Uperiati, and A. Dwijotomo, "ICAE 2022: Proceedings of the 5th International Conference on Applied Engineering, ICAE 2022, 5 October 2022, Batam, Indonesia," in EAI Publishing, Batam, 2023.