ISSN 2085-4552

# Hospital Virtual Tour Website Design Using Multimedia Development Life Cycle

Dede Kurniadi[1], Murni Lestari Rahmi[2], Nabila Putri Nurhaliza[3]
[1,2,3] Department of Computer Science, Institut Teknologi Garut, Garut, Indonesia
[1] dede.kurniadi@itg.ac.id, [2] 2106035@itg.ac.id, [3] 2106074@itg.ac.id

Accepted 22 December 2025
Approved 06 January 2026

***Abstract*— In 2023, Indonesia recorded 3,155 hospitals spread across the country, comprising 2,636 general and 519 specialized hospitals. Although the number is significant, not all community members have easy, direct access to hospitals. To overcome this challenge, virtual tour technology has emerged as a relevant solution to facilitate access to information and increase the transparency of hospital services. This project aims to develop a virtual tour website for Medina Hospital in Garut Regency. The project uses a systematic development method known as the Multimedia Development Life Cycle (MDLC), which includes stages from concept to distribution. The resulting website allows users to explore various hospital areas, such as the Main Building, Emergency Room, Tulip Building, and Chemotherapy Poly, through a virtual 360-degree panoramic view. Additionally, building and floor selection features are designed to make it easy for users to navigate. This website is also equipped with a chatbot feature that helps users find the location of a specific room and video tutorial guides that provide instructions for using the website. The results of the black box test show that the website functions well without any significant technical problems, so it is ready for public use. This website is expected to increase accessibility and convenience for users in obtaining information about the facilities and rooms available at Medina Hospital.**

***Index Terms*— 360-degree Panorama; Hospital Virtual Tour; Interactive Website; Multimedia Development Life Cycle (MDLC).**

## I. INTRODUCTION

Based on the latest data, the number of hospitals in Indonesia has increased by 9.7% from 2,877 hospitals in 2019 to 3,155 in 2023. This number consists of 2,636 general hospitals and 519 special hospitals [1]. In Garut Regency, several hospitals serve public health needs, one of which is Medina Hospital. It was established in 2021 and is located in Wanaraja. With the increasing number of hospitals, there is a challenge to provide information that is easily accessible to the public regarding the facilities and services available in each hospital. In this case, information technology plays an important role in introducing and promoting the profile of hospital institutions as a transparent and informative public service [2]. Based on interviews with the management of Medina Hospital and observations of the hospital's official website, it was found that information regarding facilities and supporting services is still presented in text form, and there is no information about room locations. This makes it difficult for visitors to understand the building layout and locate specific facilities within the hospital. Virtual tour technology, as one of the latest innovations, offers a solution that can make it easier for patients and visitors to explore the facilities [3] of the hospital virtually, especially considering the complexity of the often-confusing layout of hospital buildings. Conventional websites containing text and static images are unable to provide a complete spatial representation. Users can only view certain angles rather than the full context of the space. However, a 360° virtual tour allows interactive visualization, enabling visitors to see facility areas, directions, and building layouts more clearly, as if they were physically present on-site.

A virtual tour is a simulation that displays a specific location through a series of photos that are put together into a panorama with a 360° perspective [4]. In the virtual tour, several images are combined through a stitching process to create a comprehensive panoramic photo effect. By integrating multiple photos, a wider and more detailed view is produced in the form of a 360° panorama [5]. Virtual tours can be used in various sectors such as education [6], tourism [7], real estate [8], hospitality [9] and the health sector as well as hospitals. The use of virtual tours in hospitals not only makes it easier for patients and visitors to explore the facilities, but can also provide better information regarding the services available, such as inpatient rooms, emergency rooms, operating rooms, polyclinics, and others.

This research is prepared by referring to several previous studies on the topic discussed, namely virtual tours. One of the studies focuses on the development of a Virtual tour application for Family Recreational Objects on 3D Stable which is designed to provide an interactive experience to visitors through the Multimedia Development Life Cycle (MDLC) method, allowing users to explore the 3D Stable area in 360 degrees [10]. With the same method, another study developed a virtual tour application for SMP Negeri 3

Kota Pagar Alam, which aims to help promote the school and facilitate access to information for students, teachers, and the community virtually [6]. In addition, there is also the development of a virtual tour application for SMK Negeri 1 Wajo, which helps prospective new students obtain information about majors and school facilities with interactive features that can be accessed through mobile and desktop devices [3]. Furthermore, the research on the virtual tour of Tourism in Lahendong Village using the prototyping method aims to introduce regional tourism by facilitating virtual access to information [7]. Finally, innovations in virtual tours that modify the Borg and Gall method focus on the development of educational tourism, which provides an interesting exploration experience for visitors and increases public awareness of the importance of the University of Malang Learning Museum [11].

Based on the background and previous research, this research was conducted to develop a virtual tour application at Medina Hospital using the MDLC method. The MDLC method was chosen because it offers a structured approach specifically for developing interactive multimedia content that integrates visual elements, text, and digital objects [12]. This method is also suitable because it supports the development of multimedia applications that combine images, animations, and interactive components in a systematic and efficient workflow [13]. This application is designed to make it easier for patients and visitors to explore various hospital facilities virtually. By utilizing virtual tour technology, it is hoped that the user experience can be improved through interactive features accessed through mobile and desktop devices

## II. METHOD

In order to maintain the timeliness and quality of the research project, the researcher implements the MDLC (Multimedia Development Life Cycle) approach in creating this project because of the appropriate development cycle for multimedia applications from start to finish which includes six stages [14] [15]. The six stages of MDLC include Concept, Design, Material Collection, Assembly, Testing, and Distribution presented in Figure 1.

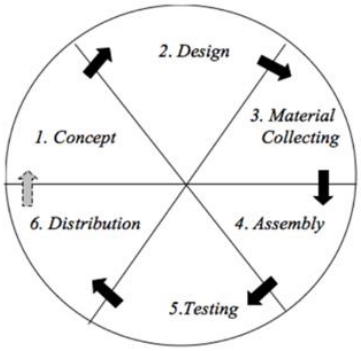


Fig. 1. Stages of the Multimedia Development Cycle

The first stage carried out is the Concept which is the initial formulation stage of the strategy to implement the project. Among them are determining the purpose of creating the project, identifying users, and determining strategies to achieve the project goals. In this project, the process carried out includes setting the goal of making the project, which is to facilitate access to information about Medina Hospital and provide an interesting visual experience to visitors. In addition, this stage also includes identifying the target users, such as patients, patients' families, or medical professionals, as well as formulating strategies to achieve the project objectives.

Furthermore, in the second stage, the design of multimedia project specifications was carried out. In this project, the process carried out includes designing the virtual tour navigation flow, program structure, virtual tour display design, and website user interface (UI). This design aims to allow users to explore the hospital virtually in a structured and easy-to-understand way.

The third stage is Material Collection, where at this stage the necessary assets are collected for the project. In the Medina Hospital virtual tour project, the main asset required is a 360-degree panoramic image of every corner of the hospital location taken in high quality to provide an accurate and compelling representation of the hospital. In addition, text assets are required to label the name of each location.

Then, all assets that have been collected at the Material Collection stage are then assembled in this fourth stage until it becomes a multimedia project. In this project, panorama assets are assembled according to the design created in the Design stage, including the addition of interactive elements and additional information with the help of the Panorama Studio 3 Pro application to create a virtual tour. This process also includes creating a website allowing users to access virtual tours. This process also includes creating a website using Visual Studio Code (VS Code) tools, an open-source source code editor that supports cloud and web development [16]. The website will be a platform for users to access virtual tours.

After the assembly stage is completed, testing is carried out using the black box method, which is a test that focuses on evaluating the functionality of the software based on predetermined criteria [17]. Blackbox testing aims to detect and identify various problems or malfunctions that may arise in the application [18], to ensure that all aspects of the virtual tour are working properly before they are distributed.

In the last stage, namely Distribution, the virtual tour website is hosted using the Koyeb cloud platform [19] to be accessed online through a URL. To facilitate access, QR codes were created and shared through various means, including social media and posters placed at several points of Medina Hospital locations.

This ensures that virtual tours can be accessed by the public easily and efficiently.

## III. Result And Discussion

### A. Concept

The Concept Stage in this study includes four activities carried out. The first activity is the identification of needs, carried out through interviews with the IT team of Medina Hospital which succeeded in revealing the needs of functionality that must be in the virtual tour website, including information about the rooms and facilities at Medina Hospital. In this activity, system requirements are generated which are presented in Table 1.

TABLE I. System Requirement

| No | System Requirements |
|---|---|
| **The system must be able to:** | |
| 1 | Displays 360° panoramic photos that clearly show the hospital area |
| 2 | Display the name of the room at each point of the room |
| 3 | Intuitive navigation features between rooms and floor |
| 4 | Drag to explore panoramic images of the virtual tour |
| 5 | Zoom in/out on panoramic images to see clearer details |
| 6 | There is a video tutorial on conducting a virtual tour |
| 7 | Displays brief profile information of Medina Hospital |
| 8 | Provides information on the location of a room |
| 9 | There is information on the location of Medina Hospital and can direct users via Google Maps |
| 10 | Dynamic website display |
| 11 | Responsive accessibility for a wide range of devices |
| **Nonfunctional Requirements:** | |
| 1 | Colors adjust the philosophy of Medina Hospital/similar to the main website of Medina Hospital |
| 2 | The website must be user-friendly |

Furthermore, the second activity at this stage is designing a concept. Based on the results of the interview, an initial concept was designed that described how this website works. The detailed description of the initial concept of the Medina Hospital virtual tour website is as follows.

- On the website, there are four pages (Home, Profile, Tutorial, and Virtual Tour).
- The home page displays a brief description of the website, and a button to start a virtual tour.
- To start the virtual tour, there are also four buttons based on the building (Main Building, Chemo Poly Building, Emergency Room Building, and Tulip Building) on the main page.
- The Profile page displays a brief history of Medina Hospital.
- The Tutorial page shows you how to use the website in the form of a video.
- The Virtual Tour page displays a 360-degree image display for virtual tours, there is also a menu button to move to a building/floor and a home button.
- There is a hotspot button on the virtual tour that allows users to switch locations.
- There is a chatbot to provide information on the location of a room.
- There is a button that points to Google Maps.

Then the third activity is the identification of the tools needed in this research. In this activity, a list of tools, both hardware and software, is produced which is presented in detail in Table 2.

TABLE II. Tools Used

| No | Tools | Description |
|---|---|---|
| 1 | Smartphone | Used for capturing 360-degree panoramic image assets in various areas of the hospital |
| 2 | Laptop | The main tools for project development and management, from design, and coding to deployment |
| 3 | DrawIO | Tools to create visual diagrams and design virtual tour interfaces and websites |
| 4 | Panorama 360 & Virtual Tours | Used to produce 360-degree panoramic images |
| 5 | Canva | Used for the creation of text assets, icons, and other graphic elements |
| 6 | PanoramaStudio 3 Pro | Used to edit and combine panoramic images into an interactive virtual tour |
| 7 | Visual Studio Code | Text editor and IDE for writing programming code in website development |
| 8 | Koyeb | Free hosting service platform used to deploy websites |

The last activity at this stage is the study of the literature of relevant journals and articles to be used as a reference in building virtual tours, the features that may exist in virtual tours, the latest technology that supports the creation of virtual tours, and the methods used to work on virtual tour projects. In this activity, the researcher obtained 5 journals that were used as a reference for making projects.

### B. Design

The Design stage in this study includes two stages of activities, the result of the design is in the form of a wireframe made using draw.io to provide an initial overview of the layout and navigation flow of the Medina Hospital virtual tour website.

The first activity is to design the virtual tour display. In this activity, the researcher determined the basic structure that would be used to navigate the user through various rooms and hospital floors, which in

this case was the hotspot icon. The hotspot icon used is listed in Table 3.

TABLE III. HOTSPOT IKONS IN USE

| No | Tools | Description |
|---|---|---|
| 1 |  | Used to direct users if they want to go to a specific area, this arrow will make it easier for users to understand the direction to take in a virtual tour. |
| 2 |  | Indicates the name of the specific location of the room in the hospital. Provide users with visual information about important points, such as a building, room, or specific facility. |
| 3 |  | Located on various doors that indicate the interaction area. When the user clicks on this icon, they can enter and exit the room. |

Then the second activity at this stage is to design a website appearance that focuses on the layout and structure of the website pages that will be used to access the virtual tour. Figure 2 presents the navigation flow diagram, which illustrates the relationships between pages and the main interaction paths within the Medina Hospital virtual tour website.

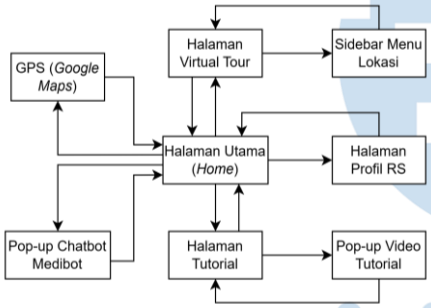


Fig. 2. Website Navigation Flow Design

Based on the navigation flow diagram in Figure 2, users begin their exploration from the Main Page (Home), which serves as the central navigation hub of the website. From this page, users can access several other pages, including the Hospital Profile Page, Tutorial Page, Virtual Tour Page, as well as interactive features such as the Medibot Chatbot Pop-up and the Tutorial Video Pop-up.

This activity also produces several UI layouts that will be used in the website, as presented in Figure 3 - Figure 9.

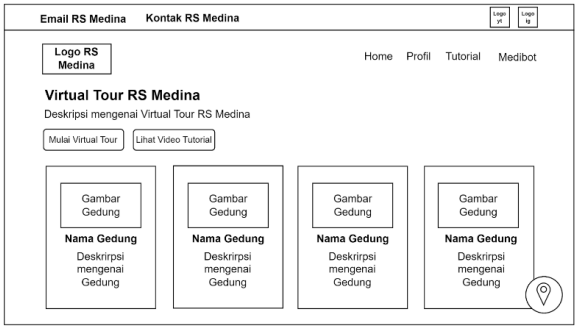


Fig. 3. Main Page Design

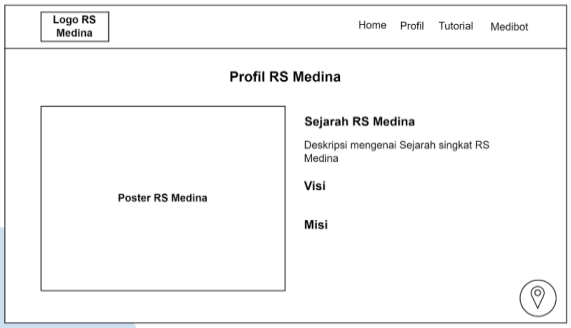


Fig. 4. Profile Page Design

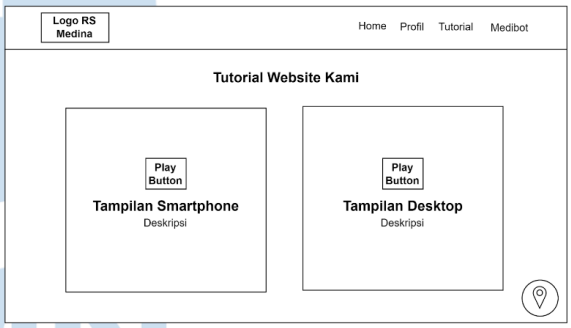


Fig. 5. Tutorial Page Design

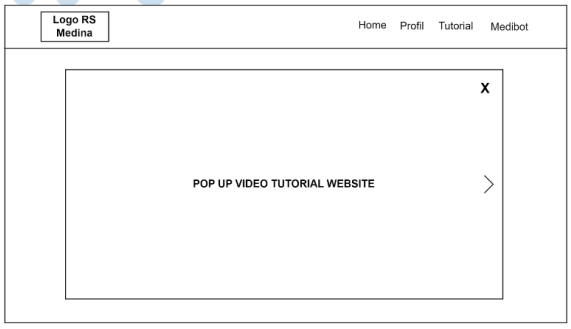


Fig. 6. Tutorial Video Pop-up Design

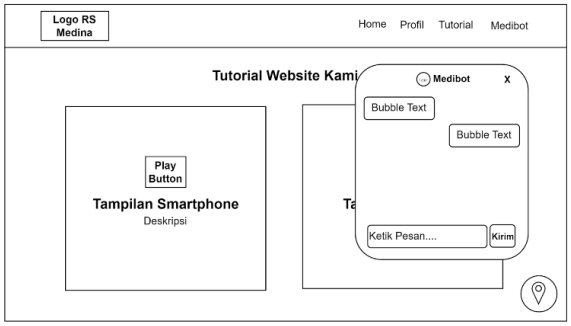


Fig. 7. Chatbot Pop-Up Design

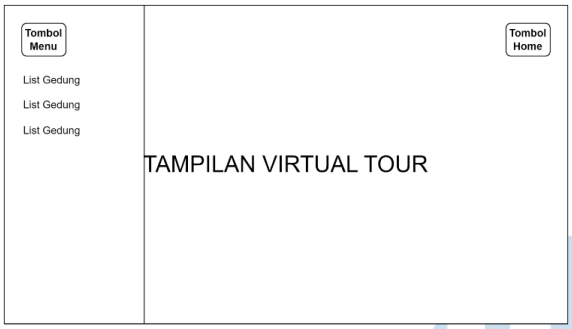


Fig. 8. 360 Degree Panorama Image Sample

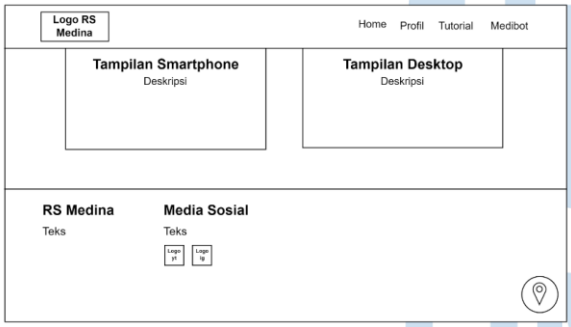


Fig. 9. Web Footer Design

These designs will then be implemented into the website at the Assembly stage.

## C. *Material Collecting*

At the Material Collecting stage, two activities were carried out. The first activity was to take panoramic pictures at 67 location points. Among them are 51 location points in the Main Building, 5 location points in the Chemotherapy Building, 5 location points in the Emergency Room Building, and 6 location points in the Tulip Building. This activity resulted in a 360-degree panoramic image with a total of 67 images. The resulting 360-degree panoramic image sample can be seen in Figure 10.

Fig. 10. 360 Degree Panorama Image Sample

Next, the second activity at this stage is to create text assets and icons using Canva tools. In this activity, a total of 131 text assets and a total of 12 icon assets were produced, both of which were in .png format. The resulting asset sample is shown in Figure 11.


Fig. 11. Text & Icon Assets Sample

The assets that have been collected, namely 67 360-degree panoramic images and 143 images of text assets and icons, will then be implemented at a later stage.

## D. *Assembly*

There are two activities in this Assembly stage. The first activity is to create a virtual tour by integrating 360-degree panoramic images from 67 locations at Medina Hospital into the PanoramaStudio 3 Pro application, including placing interactive elements such as hotspot icons and text. This activity resulted in a virtual tour, which can be seen in Figure 12.

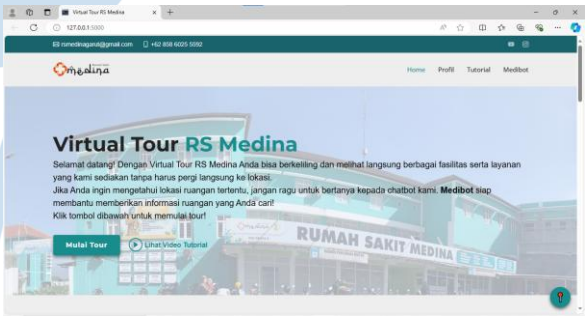


Fig. 12. Virtual Tour Page Display

The second activity is to create a virtual tour website. This website is developed according to the concept that has been designed and uses all the materials that have been collected at the celebrity stage by using Visual Studio Code (VS Code) tools. After that, the virtual tour is integrated into the website. The following are the results of the construction of the Medina Hospital virtual tour website presented in Figure 13 - Figure 20.

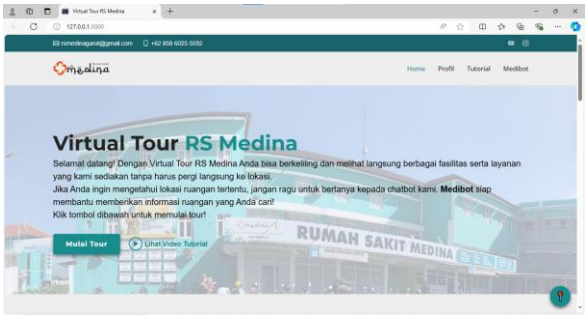


Fig. 13. Main Page Display (Home)

Figure 13 shows the main page (Home) which is the initial display of the website. On this page, users can start the virtual tour by clicking the "Start Tour" button or go to the tutorial page by clicking the "View Video Tutorial" button.

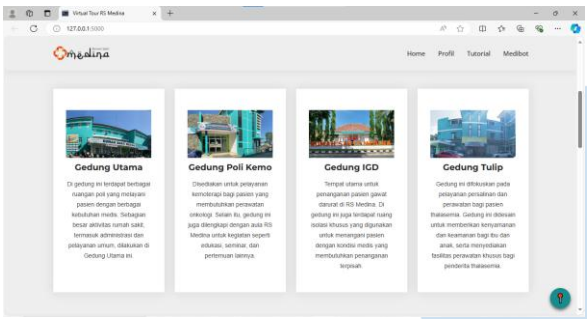


Fig. 14. Main Page Display (Building Options)

Figure 14 shows the main page (Building Selection) that allows users to start the virtual tour heading directly to a specific building.

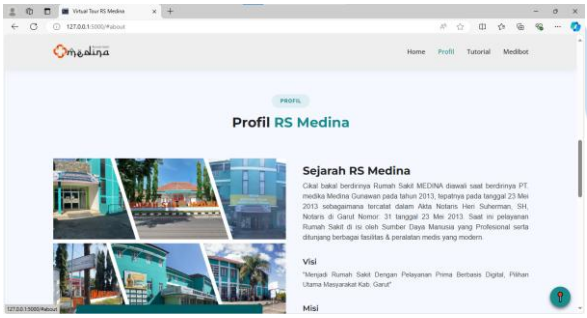


Fig. 15. Profile Page Display

Figure 15 shows the profile page that presents a brief history of Medina Hospital.

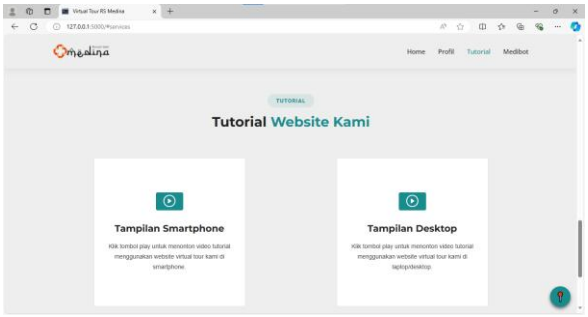


Fig. 16. Tutorial Page Display

Figure 16 shows the tutorial page using the website, both on smartphone and desktop displays.

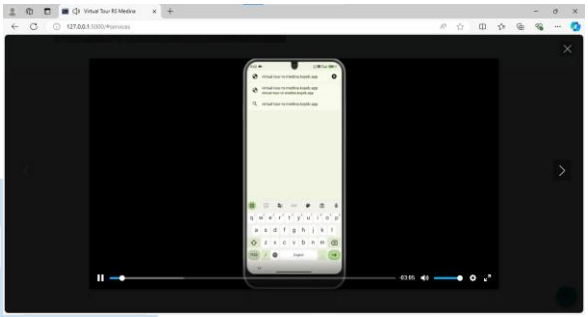

Fig. 17. Tutorial Video Pop-up Display

Figure 17 shows the pop-up video tutorial when clicking the play button.

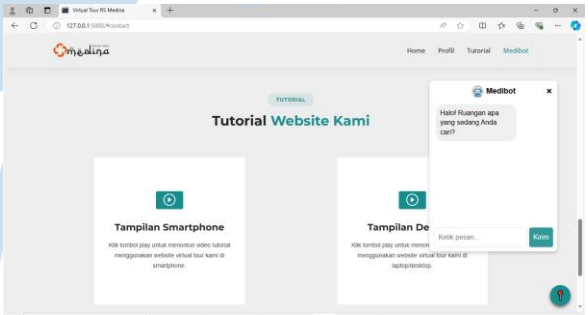


Fig. 18. Chatbot Pop-up Display

Figure 18 shows a pop-up chatbot named Medibot, where users can ask for information related to the location of rooms in Medina Hospital.

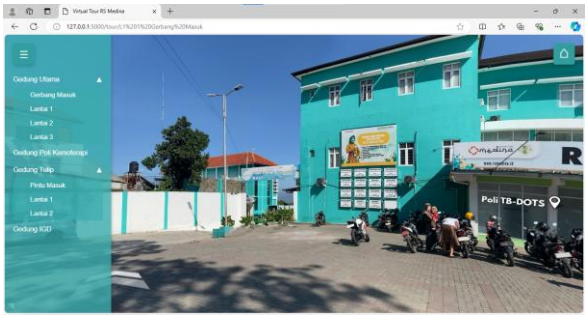


Fig. 19. Virtual Tour & Sidebar Menu Page Display

Figure 19 menunjukkan tampilan melakukan *virtual tour*, halaman ini dilengkapi dengan *sidebar* menu untuk mengakses secara langsung lokasi tertentu.

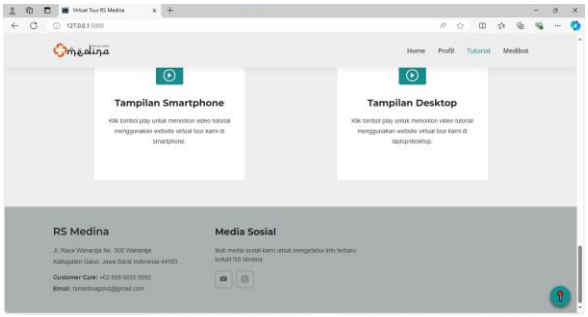


Fig. 20. Footer Display

Figure 20 shows a footer that displays clear contact information and links to Medina Hospital's official social media accounts, such as Instagram and YouTube to make it easier for users to access the latest information about Medina Hospital.

### *E. Testing*

The testing phase was carried out using the black box method. Researchers developed 26 test scenarios to ensure that all website features functioned according to the planned requirements. Some of the key scenarios included: starting the virtual tour from the main page, allowing users to access the virtual tour page after clicking the "Start Tour" button; selecting a specific building and floor, enabling users to navigate to the Main Building, Poli Kemo Building, Emergency Building, and Tulip Building, including floor-to-floor navigation within the Main and Tulip Buildings; using the Medibot chatbot, where users can inquire about the location of a specific room and the chatbot provides the appropriate response; accessing video tutorials, allowing users to watch step-by-step guides on both smartphone and desktop views and correctly close the tutorial pop-up; and Google Maps integration, enabling users to access the location of Medina Hospital directly through the Google Maps icon on the website.

Overall, the 26 blackbox test scenarios covered various user interactions, ranging from main page navigation, building and floor selection, hotspot usage, chatbot interaction, to video tutorial testing and map access. All scenarios resulted in an “OK” status which means the result is in accordance with the expected result. The overall test results show that all features on the Medina Hospital virtual tour website have functioned as expected.

### *F. Distribution*

The distribution stage aims to ensure the accessibility of the Medina Hospital virtual tour website to the public through the Internet platform. The results of the activities in this stage include the implementation and publication of the website. The Medina Hospital virtual tour website was successfully deployed and can be accessed online via the URL https://virtual-tour-rs-medina.koyeb.app/. As for the initial display when the website is visited, it can be seen in Figure 21.

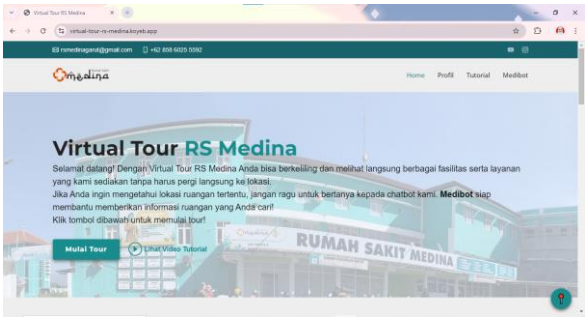


Fig. 21. Medina Hospital Virtual Tour Website Page Display

To promote the website, an online poster was created equipped with a QR Code as shown in Figure 22 which is linked to the virtual tour domain.


Fig. 22. Online Poster for Medina Hospital Virtual Tour Website

By scanning the QR Code, users can easily access the website without typing in the URL manually. This strategy not only facilitates access to information but also increases community engagement with the virtual tour services offered. Posters were distributed on Medina Hospital's official social media as well as placed in several areas of the hospital to introduce and promote the website to patients and visitors.

## IV. CONCLUSIONS

Based on the results and discussion, this study successfully built the Medina Hospital Virtual Tour Website, which is equipped with navigation features to facilitate users in exploring various areas of the hospital virtually displayed in a 360-degree panoramic format. In addition, there are additional features, such as building and floor options designed to make it easier for users to go directly to the desired location, chatbot features to help users find information about the location of the room they are looking for, also on each page is equipped with a Google Maps navigation icon that allows users to find the location of Medina Hospital. We also provide a tutorial page that is accompanied by a step-by-step video guide to using the

website on both smartphone and desktop displays, thus ensuring convenient accessibility for all users. The results of the functionality test using black box testing show that the Medina Hospital Virtual Tour Website functions optimally and meets the planned functional needs. This is evidenced by the test results which found no significant technical problems. The website was presented and directly tested by the management of Medina Hospital, who assessed that the platform is effective in presenting the hospital's facilities and services interactively. So it can be said that the website is ready to be accessed by the public and provides useful information for users. For future development, adding an indoor navigation map would help users determine their real-time location. Additionally, integrating AR (Augmented Reality) or location-based notifications could further enhance the user experience.

## ACKNOWLEDGMENT

The Authors wish to acknowledge Institut Teknologi Garut, which supports and funds this research publication

## REFERENCES

[1] Kementerian Kesehatan Indonesia, "Profil Kesehatan Indonesia Tahun 2023," Jakarta, 2023.

[2] A. E. Permanasari, D. A. Hidayat, S. Wibirama, I. S. Sakkinah, and D. R. A. Rambli, "Development of a hospital virtual tour with virtual reality-based panorama," *International Journal of Innovation and Learning*, vol. 30, no. 2, p. 119, 2021, doi: 10.1504/IJIL.2021.117218.

[3] Safwan Kasma, S. Supriadi, and S. Suhaemi, "Pengembangan Aplikasi Virtual Tour Pengenalan Lingkungan Sekolah SMK Negeri 1 Wajo Sebagai Media Informasi," *BANDWIDTH: Journal of Informatics and Computer Engineering*, vol. 2, no. 2, pp. 121–131, Jul. 2024, doi: 10.53769/bandwidth.v2i2.803.

[4] D. Dairoh, D. I. Af'idah, S. F. Handayani, R. W. Pratiwi, A. Rachman, and D. C. A. Saputra, "Pengenalan dan Pemanfaatan Aplikasi Virtual Tour sebagai Media Promosi Wisata," *JMM (Jurnal Masyarakat Mandiri)*, vol. 7, no. 1, p. 12, Jan. 2023, doi: 10.31764/jmm.v7i1.11734.

[5] Y. Anggara, G. Maulana Zamroni, A. Dahlan, J. Selatan, and D. Istimewa Yogyakarta, "Virtual Reality Tour Menggunakan Metode Gambar Panorama 360° Sebagai Media Informasi dan Pengenalan Gedung Perkuliahan Kampus 4 Universitas Ahmad Dahlan," vol. 9, no. 1, pp. 1–12, 2021, doi: 10.12928/jstie.v8i3.xxx.

[6] P. Utami and J. Jemakmun, "Aplikasi Virtual Tour Sekolah Menengah Pertama (SMP) Negeri 3 Kota Pagar Alam Berbasis Android," *Journal of Software Engineering Ampera*, vol. 2, no. 3, pp. 144–153, Oct. 2021, doi: 10.51519/journalsea.v2i3.124.

[7] Vicky C. Mende, Quido C. Kainde, and Ferdinan I. Sangkop, "Virtual Tour Pariwisata Kelurahan Lahendong Berbasis Web Menggunakan Metode Prototyping," *Jurnal Penelitian Rumpun Ilmu Teknik*, vol. 2, no. 2, pp. 187–199, May 2023, doi: 10.55606/juprit.v2i2.1963.

[8] I. Miljkovic, O. Shlyakhetko, and S. Fedushko, "Real Estate App Development Based on AI/VR Technologies," *Electronics (Basel)*, vol. 12, no. 3, p. 707, Jan. 2023, doi: 10.3390/electronics12030707.

[9] H. Rahaman, E. Champion, and D. McMeekin, "Outside Inn: Exploring the Heritage of a Historic Hotel through 360-Panoramas," *Heritage*, vol. 6, no. 5, pp. 4380–4410, May 2023, doi: 10.3390/heritage6050232.

[10] I. Febrianto and M. S. Putra, "Aplikasi Virtual Tour Sebagai Pengenalan Objek Rekreasi Keluarga Pada 3D Stable," *Jurnal Ilmiah Komputasi*, vol. 23, no. 1, pp. 113–120, 2024.

[11] U. Nafi'ah, A. Sapto, J. Sayono, A. Herdiyani, and G. Smith, "The Innovation of Virtual Tour of Malang State University Learning Museum as an Alternative for Educational Tourism in the Disruptive Era," *KnE Social Sciences*, pp. 117–126, 2023.

[12] M. Gemilang Ramadhan *et al.*, "Pengembangan Aplikasi Monitoring Kondisi Tanaman Berbasis Markerless Augmented Reality dengan Metode MDLC," *Jurnal Ilmiah MEDIA SISFO*, vol. 19, no. 2, 2025, doi: 10.33998/mediasisfo.2019.19.2.2570.

[13] D. Kurniadi, L. Fitriani, E. Satria, and A. Rahman, "Multimedia system model for electrical circuits on android mobile devices," *IOP Conf Ser Mater Sci Eng*, vol. 1098, no. 3, p. 032092, Mar. 2021, doi: 10.1088/1757-899X/1098/3/032092.

[14] A. C. Luther, *Authoring Interactive Multimedia*. in IBM tools series. AP Professional, 1994. [Online]. Available: https://books.google.co.id/books?id=gpULAQAAMAAJ

[15] F. N. Kumala, A. Ghufron, P. P. Astuti, M. Crismonika, M. N. Hudha, and C. I. R. Nita, "MDLC model for developing multimedia e-learning on energy concept for primary school students," *J Phys Conf Ser*, vol. 1869, no. 1, p. 012068, Apr. 2021, doi: 10.1088/1742-6596/1869/1/012068.

[16] M. Plainer, "Practical Study of Visual Studio Code Practical Course—Contributing to an Open-Source Project," 2021. [Online]. Available: https://api.semanticscholar.org/CorpusID:227995553

[17] M. Sholeh, I. Gisfas, Cahiman, and M. A. Fauzi, "Black Box Testing on ukmbantul.com Page with Boundary Value Analysis and Equivalence Partitioning Methods," *J Phys Conf Ser*, vol. 1823, no. 1, p. 012029, Mar. 2021, doi: 10.1088/1742-6596/1823/1/012029.

[18] Umiringsih, M. Nur Ichsanudin, M. Yusuf, and S. Suraya, "Pengujian Fungsional Perangkat Lunak Sistem Informasi Perpustakaan dengan Metode Blackbox Testing bagi Pemula," *STORAGE: Jurnal Ilmiah Teknik dan Ilmu Komputer*, vol. 1, no. 2, pp. 1–8, May 2022, doi: 10.55123/storage.v1i2.270.

[19] Koyeb Cloud Platform (Version 5.6.0) [Serverless hosting platform and command-line interface], "Cloud Platform," 2025, 5.6.0. Accessed: Aug. 24, 2024. [Online]. Available: https://www.koyeb.com