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Enhancing Losari Beach Exploration: Augmented Reality for Immersive Visualization

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ABSTRACT: South Sulawesi, commonly known as Makassar, boasts rich cultural heritage and customs, making it a prominent destination for tourism. Among its attractions, Losari beach stands out as a focal point for visitors seeking to explore the city's natural beauty and cultural offerings. In this context, leveraging modern technology such as augmented reality presents an innovative approach to showcasing Losari beach to potential tourists. This research endeavors to introduce tourism assets in a more visually captivating manner through the use of augmented reality. Utilizing software tools like Unity and Adobe Illustrator, the study focuses on creating an immersive experience where tourists can interact with virtual representations of Losari beach. By simply pointing their mobile phone cameras at designated markers or using barcode scanners, tourists can access augmented reality features embedded within the application. The findings of this research aim to provide valuable information, particularly for foreign tourists, about Losari beach, positioning it as a compelling destination within South Sulawesi's diverse array of tourist attractions. Through this technological innovation, the study seeks to enhance the visibility and appeal of Makassar city's tourism offerings on a global scale.

KEYWORDS: *Visualizing, Losari Beach, Augmented Reality*

I. INTRODUCTION

South Sulawesi is the provincial capital which is province located in the southern part of the island of Sulawesi, it is one of the provinces of Indonesia with its various tourists. South Sulawesi has its own attraction for tourists, both local and foreign. A tourist attraction is anything that can attract people to visit with the aim of having fun for a long time to get satisfaction. The city of Makassar has a lot of potential to develop tourism-related industries, which is supported by the many tourist attractions spread throughout the city and divided into several categories including marine tourism, religious tourism, shopping tourism and nature tourism (Surur et al., 2023; Amiruddin, 2022; Rendra et al., 2019). One of places can be as icon in south Sulawesi namely Losari beach and take a trip to Losari beach, which is one of the tourist attractions visited by many people. The development of communication technology, there are a lot of mobile phones that can help human activities for solving the problems in using a telephone can be as a tool to guide for tourist trips in South Sulawesi Province.

Schmalstieg et al. (2011) said augmented reality can enrich the real world environment with synthetic information, to cope with the limitations of the real world for a specific application. Augmented reality is aiming technology to take the real world as basis by combining some virtual technologies and add contextual data. This contextual can be in the form of audio commentary, location data, historical context or in other forms. With augmented reality technology, our surrounding environment can be transformed into a digital interactive space. Information about objects and places around us can be entered into an augmented reality system and displayed directly on real-world screens (Chao et al., 2022; Nicholas, 2022; Rahman, 2021). This creates an experience where information seems like a natural part of our surroundings, forming an additional reality that complements the existing physical reality.

The main function of augmented reality technology is to improve an individual's perception of the surrounding world. By making elements from the virtual world and the real world into one unit, augmented reality is able to provide a new interface that is very helpful in various fields (Pradana, 2019). For example, in the field of education, augmented reality can be used to provide a more immersive and interactive learning experience. In the field of training, this technology can help in realistically simulating certain situations, enabling more effective and safer training.

Apart from that, augmented reality also has wide applications in various industries such as repair and maintenance, manufacturing, military, and entertainment and gaming. By utilizing relevant information displayed in real-time on the screen, professionals can work more efficiently and accurately (Khullar et al., 2022; Nishi et al., 2022; Thees et al., 2022; Yaumi et al., 2024). On the other hand, in the context of entertainment, this technology opens the door to exciting new experiences, such as games that seamlessly blend the real and virtual worlds. In this way, augmented reality is not only an innovative tool, but also opens up new potential in the way we interact with the world around us.

The research focuses on visualizing Losari beach through augmented reality, with a particular emphasis on student involvement in innovating this technology. By leveraging augmented reality, the aim is to provide an immersive and interactive experience of Losari beach. The study involves students who are tasked with developing and implementing innovative augmented reality solutions. Through this research, the goal is to explore the potential of augmented reality in enhancing experiences of natural environments like Losari beach, while also fostering student creativity and technological innovation.

II. LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

2.1. Visualizing

The design media for Losari beach on promotional media will be using 3D Virtual Reality or 3-dimensional as virtual reality may use to see the things in the virtual world. Kounavis et. al., (2012) Visualizing pictures making in reality that can be seen in a visualization technique can be design with combining the drawings of plans that have been made into computer generated data such as text, video, graphics, GPS data and other multimedia. The real world view, as captured from the camera of a computer or other devices. It can be synthesizes some varieties on multimedia major. Both on two and three dimensions into real world as those seen the visualizing pictures (Brar & Jindal, 2023; Yu et al., 2023). The users may interact into virtual environments can be used as standard namely keyboard and mouse. Virtual experiences may display on computer with screen and stereoscopic VR. Those visualizations contain information including sound through the speaker. Visualization of Losari beach can be developed. By application can be seen as a visual. It is creative, innovative and an interactive promotional into media distributing to an event exhibition of multimedia and showing to generation Z.

2.2. Losari Beach

According to Tjendra and Sunaryo (2023), Losari Beach is a stunning destination with a wide, soothing sea panorama, and is located to the west of Makassar City, South Sulawesi Province, Indonesia. Famous as a popular tourist destination, this beach offers a unique experience for its visitors, from enjoying the sunrise to sunset while feeling the breeze, while enjoying typical Makassar dishes. The uniqueness of Losari Beach lies in its unusual sand, which replaces the concrete on the beach, giving a different and interesting feel to visitors.

Losari Beach is also an icon of Daeng City and is one of the best places to enjoy various recreational activities. From riding a banana boat, sailing on a traditional boat, to jogging along the beach, visitors can find a variety of fun here (Firnanelty et al., 2022; Irafany et al., 2022). However, the main attraction is the beautiful moment at sunset, which can be enjoyed while tasting various culinary dishes typical of the region. Losari Beach is not just an ordinary holiday destination, but also a place that offers an unforgettable experience for anyone who visits it.

With its enchanting natural beauty and the various activities it offers, Losari Beach has become one of the most popular tourist destinations in South Sulawesi. Combining natural beauty with unique cultural and culinary experiences, this beach offers something special to every visitor, making it a place not to be missed for anyone visiting Makassar City (Martosenjoyo & Mulyadi, 2021; Nurjannah et al., 2023).

III. RESEARCH METHODOLOGY

The research explores the utilization of the waterfall method as one of the application development methodologies. This systematic approach involves stages that include overviews of the design process, which are integral to the waterfall method. To execute this, various software applications will be employed, such as cinema 4D R14, unity 2019 1.7f1, and adobe illustrator CC 2017. These software tools will facilitate the implementation of design concepts and flowcharts, which are essential components in the development of applications using unity and vuforia software.

By leveraging these software applications and adhering to the structured approach of the waterfall method, the research aims to seamlessly integrate design concepts and flowcharts into the development process of applications. This methodology ensures a systematic progression through stages, enabling a comprehensive overview of the design process and efficient utilization of software tools for application development. Through this approach, the research endeavors to optimize the utilization of technology to achieve the envisioned objectives effectively.

IV. RESULT AND DISCUSSION

The utilization of the waterfall method stands as a cornerstone in the systematic development of applications. This method unfolds in a series of structured stages, commencing with an overview of the design process. Embracing the waterfall approach ensures a methodical progression, wherein each stage builds upon the preceding one. Through this systematic framework, developers navigate through the design process with clarity and precision, laying a solid foundation for the subsequent stages of application development.

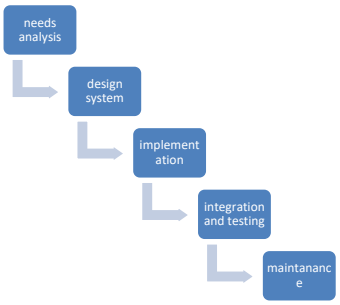

Figure 1: Design process using on waterfall method

The project began with an in-depth requirements analysis, which included system design, implementation, integration, and application testing. These stages are important for establishing the direction of project development. In the initial stage, efforts begin by exploring the information, models and system specifications required for application creation. The features that will be embedded in this application are designed to meet functional requirements, allowing users to obtain detailed information about the tourist attraction 'Losari Beach' in South Sulawesi through digital representations that can be accessed via camera scans. Apart from that, the use of software and hardware as non-functional aspects is also a consideration in development.

The Losari Beach application interface design is visible when the application is opened, presenting important buttons such as 'start' and 'exit', as well as the main AR camera for scanning. These concepts were then implemented in application design using Unity and Vuforia software. The next step involves creating bookmarks for Augmented Reality on web pages equipped with AR bookmarking features. The next stage, referred to as the cinema stage, involves creating a 3D model for Augmented Reality purposes using the Cinema 4D R16 application. This 3D modeling process is directed at creating a clear and realistic digital representation of the elements related to the augmented reality experience of Losari Beach.

After the creation of 3D models, the project moves to the integration stage, where the models are integrated into the application environment to ensure seamless interaction with the richest reality interface. This integration stage requires careful attention to detail to effectively synchronize digital elements with the real-world environment. As development continued, rigorous testing protocols were implemented to validate the functionality, performance and user experience of the Losari Beach application. Through iterative testing cycles, any discrepancies or deficiencies are identified and addressed, so that the application meets established standards of quality and usability. In conclusion, this project includes a comprehensive journey, from analysis, design, implementation, integration, to testing, resulting in an application that amazes and pampers users with a captivating exploration of the beauty of Losari Beach through the richest reality.

After the testing phase, the final step is the official launch of the Losari Beach application. This launch involves deploying the application to users through various platforms and appropriate distribution channels. Additionally, active marketing is carried out to introduce the app to the wider community, ensuring that potential users can find and download the app easily.

After launch, the role of application maintenance and updates becomes important. The development team will continuously monitor application performance, respond to user feedback, and make fixes or improvements as needed. In this way, the Losari Beach application will continue to develop and improve its quality over time, providing a better experience to users and remaining relevant in the face of changing technology and user needs.

Figure 2: 3D Model of Losari Beach is made by Pradana, O.

Once the markers and 3D model have been successfully created, the next step is to insert the user interface assets into the application using Adobe Illustrator. The goal is to increase the visual appeal of the application to make it more attractive to users. After all components are ready, the process of combining the materials is carried out using the Unity application. This process integrates all the elements that have been created into one unit that can function as a complete application.

Along with the integration phase, the application enters the testing phase. Testing was carried out using a 9th generation iPad device to ensure the application ran smoothly and as expected. This stage determines the success of the application before it is officially released to users. One example of its application is a waterfall model that has been created, which is then tested through the application to ensure its visual quality and consistency. Thus, this stage is a crucial step in ensuring that the application is ready for use by users.

After going through all these stages, the Losari Beach application is ready to be launched to the public. With the integration of markers, 3D models, an attractive user interface, and satisfactory test results, this application is expected to provide an engaging experience for users who want to explore the beauty of Losari Beach through augmented reality technology. With the official launch of the application, it is hoped that it can also increase the popularity and tourist visits to this destination and make a positive contribution to tourism promotion in South Sulawesi.

Figure 3. Marked Scanner of Losari Beach is made by Pradana, O.

Losari Beach Scanner, which is located at the end of Makassar city, has high strategic value and potential as a tourist attraction for visitors. With scanners that have been marked along Losari Beach, visitors can easily access information through the application that has been created. This allows for a more interactive and informative tourism experience for visitors who want to know more about tourist destinations in South Sulawesi, including the beautiful waterfalls available in the area (Ahdi et al., 2021).

Developing applications systematically, as implemented in this project, allows local communities to play a role in promoting and developing the tourism potential of their region. By utilizing scanning technology and augmented reality, information about South Sulawesi tourist destinations can be disseminated more widely

and effectively to visitors. Through the stages that have been explained, the application design process using the waterfall method becomes a strong foundation for creating an unforgettable tourist experience for visitors. Thus, this application is not only a means of information, but also a tool to increase awareness and appreciation of the richness of regional tourism.

With this application, it is hoped that it can also make a positive contribution to the local economy around Losari Beach. By providing information that is more accessible and interesting for tourists, this application can increase the number of tourist visits, which in turn will increase income from the tourism sector for local business actors, such as street vendors, lodging managers and other tourism service providers. This creates a sustainable positive effect on the regional economy, helping local communities improve their standard of living and improving their well-being.

V. CONCLUSION

In conclusion, South Sulawesi, particularly its capital city Makassar, holds significant potential for tourism development, boasting diverse attractions ranging from marine and nature tourism to religious and shopping experiences. Losari Beach stands out as an iconic destination within the region, drawing in numerous visitors. Leveraging advancements in communication technology, particularly augmented reality, presents a promising avenue for enhancing tourist experiences. Augmented reality enriches the real-world environment with synthetic information, creating immersive and interactive interfaces that seamlessly blend virtual and physical realities. This technology not only enhances tourism experiences but also finds wide applications across various industries, from education and training to entertainment and gaming. Focusing on visualizing Losari Beach through augmented reality, with an emphasis on student involvement, offers a unique opportunity to explore the intersection of technology and tourism, fostering innovation and creativity while providing visitors with memorable and enriching experiences. Through such initiatives, South Sulawesi can further establish itself as a premier tourist destination, captivating both local and international travelers.

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