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Augmented Reality Introduction To Cirebon Mask At Setia Darma Mask House Gianyar

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ABSTRACT

This research aims to explore the application of Augmented Reality (AR) technology in the context of introducing Cirebon Masks at the Setia Darma Mask House, Gianyar using Marker Based. Cirebon masks have high cultural and artistic value in traditional Indonesian art, and the Setia Darma Mask House is an important place in introducing and preserving this art to the wider community. Using AR as a tool, this research investigates ways in which this technology can be used to provide visitors with an interactive and immersive learning experience about Cirebon Masks. The research methodology involved developing a custom AR application that allows users to see, hear, and interact with a virtual representation of the Cirebon Mask. Data was collected through observation, interviews and literature study to evaluate the effectiveness of the application. From the test results of 8 tests on the menu in the system using the black box testing method, the system is in accordance with the expected results, namely there are no errors when the system is used. the results of usability testing with the values obtained, namely Application Learnability is 89.4% which means Very Good, Efficiency gets 89.8% which means Very Good, Memorability gets 91.7% which means Very Good, Error gets 63.7% which means Fairly Good and Satisfaction gets 90, 1% which means Very Good.

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INTRODUCTION

Cultural recognition and exploration is an important aspect in enriching our understanding of diverse cultural heritage around the world. Culture is a way of life that continues to grow within a group of people and is passed down from generation to generation so that components such as religious systems, customs, language, clothing, works of art and buildings are formed (Abdurrahman & Azrino Gustalika, 2023). Among the various cultural riches that exist, traditional masks have a special place in Indonesian society, especially in performing arts and rituals. One type of mask that has high historical and artistic value is the Cirebon Mask. In addition to developing hardware technology, mobile phone application software technology is also developing rapidly. Like the development of mobile phone operating systems starting from Ms. Windows Mobile, RIM, Symbian, and most recently

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Android (Setiawan et al., 2019). The current problem is that based on the results of a questionnaire distributed to 30 random visitors, 70% stated that to be able to interact with the Cirebon masks on display, the interaction provided is very limited because visitors are prohibited from touching the masks carelessly because it can cause damage to the Cirebon masks.

Cirebon masks are one of the intangible cultural heritages in Indonesia. This is one of Cirebon's superior cultural assets and has become a cultural identity Cirebon. However, the condition of society tends to forget cultural assets and lack thereof assistance from the government makes Cirebon masks a third-class asset (Kurniadi, 2021). Most of the Cirebon masks are placed in glass cabinets, which makes it difficult for visitors to see the details of the mask as a whole. Apart from that, the main material of Cirebon masks is wood so they are prone to rotting if stored for a long time. If this is ignored, there will be extinction in the preservation of Cirebon's mask cultural heritageIn this context, research on the introduction of Cirebon Masks using Augmented Reality (AR) technology is an interesting and relevant subject. Augmented Reality (AR) is a technology that integrates virtual elements into the real world in real-time. It combines physical and virtual objects in the real environment, operates interactively in real-time, and involves the integration of objects in three dimensions, where virtual objects are seamlessly integrated with the real world. Augmented Reality introduces a new form of interaction between humans and computers (Dellia et al., 2022). AR has one advantage, namely that it can be implemented widely in various media. As this technology develops, the use of AR technology in the process of using images into attractive 3D animations to help simplify and expand the dissemination of information (Alifah et al., 2021).

This research aims to explore the potential of AR in the context of education and cultural introduction, especially in introducing the Cirebon Mask. The focus of this research is on the Setia Darma Mask House in Gianyar, which is a place dedicated to preserving and introducing traditional Indonesian mask art to the wider community. The problem currently occurring is the lack of interest of the local community in studying masks, especially Cirebon masks, because the loyal darma mask house still uses conventional methods in explaining the history and shape of Cirebon masks. Using AR as a tool, this research will explore ways in which this technology can be used to provide an interactive and in-depth learning experience about Cirebon Masks to visitors to Rumah Topeng Setia Darma. It is hoped that the results of this research will contribute to broadening insight into the use of modern technology in preserving and introducing cultural heritage, as well as increasing interest and appreciation for traditional Indonesian art, especially Cirebon Masks.

METHODS

Augmented Reality

Understanding Augmented reality (AR) is a technology that combines real world objects with digital elements, such as images, videos or other information, to create enriching interactive experiences the reality around us. Augmented Reality is an application that combines the real world with the virtual world in two-dimensional or three-dimensional form which is projected

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in a real environment at the same time. Augmented Reality is often also called tethered reality. This application is often implemented in a game (Afifah et al., 2019).

Unity 3D

Unity 3D is a popular game engine used to develop games, simulations, and interactive applications. With comprehensive features and multi-platform capabilities, Unity enables the creation of realistic 3D graphics and easy user interaction across a variety of devices. Unity is a game developer tool with rendering capabilities integrated into it. Unity is a new form of technology that makes it easier and easier for game developers to create games (Ramadhanti et al., 2021)

Cirebon Mask

The visualization of masks is not only a symbol or symbol of human character with all its different characteristics, but also reflects the order of values that can direct life towards goodness, both to obtain salvation in this world and in the afterlife. Each mask contains philosophical values that reflect various aspects, such as wisdom, leadership, love, and even anger, while depicting the journey of human life (Firdaus et al., 2016). The most basic Cirebon masks are five which are also called Panca Wanda Masks (Rachman & Almanfaluthi, 2018) namely

1. Panji, his pure white face symbolizes the purity of a newborn baby
2. Samba (Pamindo), a children's mask with a cheerful, funny and lively face
3. Rumyang, his face depicts a teenager
4. Patih (Tumenggung), this mask depicts an adult who has a firm face, personality and responsibility
5. Kelana (Ravana), a mask depicting someone who is angry.

Use case diagram

Use case diagrams are visual representations that describe interactions between users (actors) and the system. This diagram is useful for providing a clear picture of the context of a system and showing the limitations that exist in the system. By using use case diagrams, it can be easier to explain and understand how interactions between users and systems occur (Kurniawan, 2018).

Marker based tracking

The Marker based tracking method is a form of Augmented Reality (AR) that uses markers in the form of two-dimensional objects that have special patterns. The computer reads this marker via a webcam or camera connected to the computer. Usually, these markers are black and white illustrations with thick black lines and a white background (Apriyani et al., 2016).

Android

Android is a mobile operating system developed by Google for devices such as smartphones and tablets. It provides various features and access to applications through Google Play Store.

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Android is popular, flexible, and has a large ecosystem. This operating system is based on the Linux kernel which has been modified and developed especially for devices with touch screen interfaces (Prasetio & Wellem, 2022).

Data Collection

The data collection technique used is primary data by means of interviews, observations and questionnaires. And for secondary data using the documentation method and also the library method. From the results of the interviews, problems were found, namely the local community's lack of interest in studying masks and also that the Mask House has not implemented technological media in the process of conveying information from Cirebon Masks. This problem requires a media that aims to produce mask information through Augmented Reality.

Black Box and Usability Testing

Black box testing is software quality testing that focuses on software functionality. Black box testing aims to find incorrect functions, interface errors, data structure errors, performance errors, initialization and termination errors. Black Box testing relies on ensuring that each process functions according to the expected requirements. The tester can interpret a set of input conditions and perform tests on specific functionalities of the system. So testing is a way of implementing a program which aims to find mistakes or errors and then correct them so that the system can be said to be suitable for use (Wijaya & Astuti, 2021).

As per ISO 9241-110: 2006, effectiveness indicates the ability of users to accurately and fully accomplish their objectives using the product, while efficiency denotes achieving these objectives with reasonable exertion. Satisfaction, on the other hand, refers to the comfort and enjoyment experienced when using the product. To elucidate these ideas, the standard additionally outlines seven dialogue principles, which delineate the traits of user-system interaction facilitating task fulfillment, including error tolerance and adaptability for learning. Usability, according to this definition, emphasizes the importance of solving tasks or reaching goals with the help of a product or system. Usability is crucial for a system to continue being used by its users. Users will have the best experience when using a system with high usability (Kushendriawan et al., 2021).

Waterfall Method

The research method uses the waterfall method. The waterfall model is the most commonly used software development model for developing systems. According to Sommerville, this development model is linear from the initial phase of system development, the planning phase, to the final phase of system development, the maintenance phase. The next stage is not carried out until the previous stage is completed, and the previous stage cannot be returned or repeated (Wahid, 2020). The stages of the waterfall model are as seen in Figure 1.

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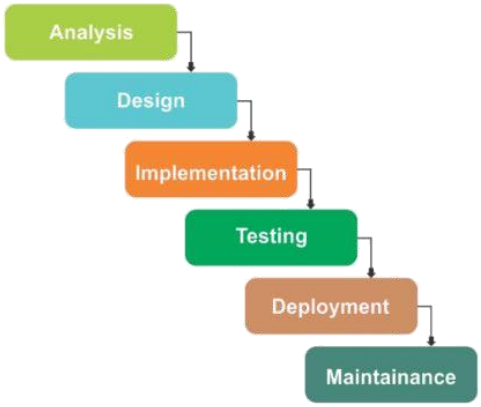

Figure 1. Waterfall Model Stages

RESULTS AND DISCUSSION

Systems Analysis

System analysis is carried out with the aim of knowing the processes running in the system. The purpose of knowing these processes is to understand the running of the system as a whole and the obstacles that may exist during system development. In the following flow, when users utilize the application, they will be directed to the main menu containing several buttons such as the information button, scanner button, filter button, complaint button, and credit button. If any of these buttons are clicked, users will be directed to the respective page detailing that button's function. Conversely, if none of the buttons are selected, users will be directed to exit the application. The system analysis in this research is in the form of a flowchart as seen in Figure 2.

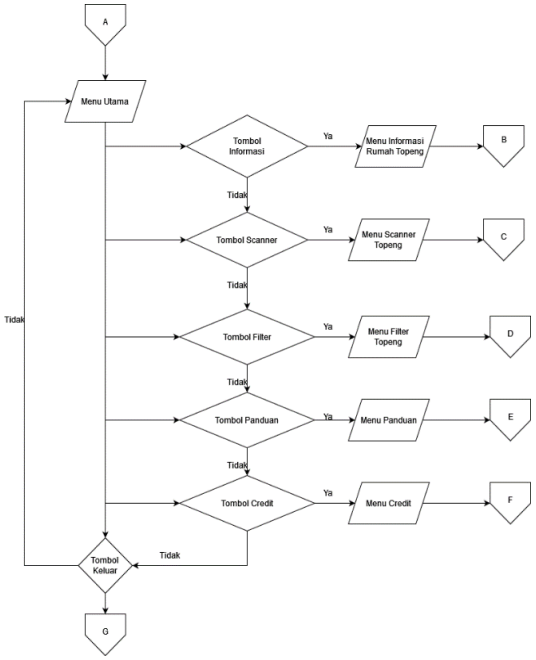

Figure 2. System flowchart

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System Design

The design of this research system uses a Use Case Diagram which describes the gradual activities contained in the Cirebon Mask Augmented Reality application between the user and the application that has been created as seen in Figure 3. The information on the mask house in the image begins with the user launching the application, then the application displays a splash screen, followed by showing the main page. Next, the user selects the Mask House Information menu, and the application processes to the Mask House Information page. Scanning the mask in the image starts with the user launching the application, then the application displays a splash screen, followed by showing the main page. Next, the user selects the Scan Mask menu, then the application processes it by displaying the page from the Cirebon mask augmented reality scan menu. Next, the user scans the Cirebon mask marker, then the application displays the 3D results of the Cirebon Mask object. Next, the user is given the option to access information about the Cirebon mask object or return to the Scan Mask menu. Filtering the mask in the image begins with the user launching the application, then the application displays a splash screen, followed by showing the main page. Next, the user selects the Mask Filter menu, then the application processes it by displaying the page from the mask filter menu. Next, the user selects the Cirebon mask filter, then the user will apply the filter which the application will then process. Next, the user will get the results of the mask filter. Guidance in the image starts with the user launching the application, then the application displays a splash screen, followed by showing the main page. Next, the user selects the Guide menu, and the application processes to the Guide page. Credit in the image starts with the user launching the application, then the application displays a splash screen, followed by showing the main page. Next, the user selects the Credit menu, and the application processes to the Credit page.

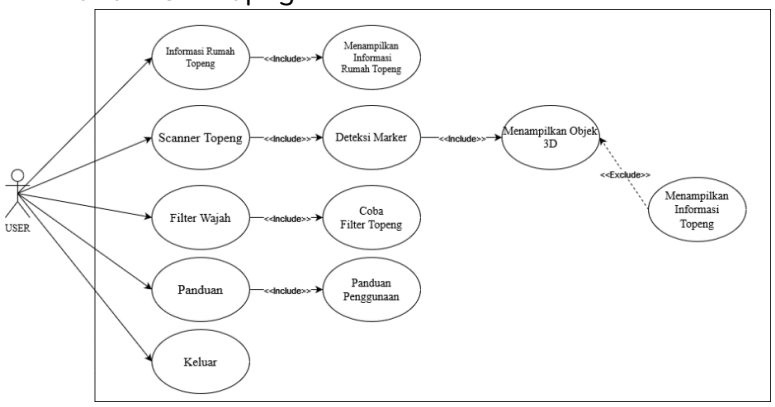

Figure 3. Use case diagram

Implementation

The system implementation in this research is as follows.

a. Main page

The Main Menu page on the Cirebon Mask AR application will display several menu options that can be accessed by users starting from About which is used to provide information regarding the loyal darma mask house then there is Mask Scan which is used to

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display 3D masks and information from the mask, Mask Filter where its use is to try on masks, a guide menu to guide users on how to use the application, as seen in Figure 4.

Figure 4. Main page

b. Mask filter page

The Filter Menu page displays the choice of what mask to use. If the user presses the existing mask button, it will direct the user to the menu using filters, where if they have entered the menu using filters, the user's face will be covered by the selected mask as shown in Figure 5.

Figure 5. Mask Filter

c. Mask scan page

The Scan Menu page will display 3D of the mask, where if you scan the Qr-Code available at the Setia Darma Mask and Puppet House, the 3D Mask will appear and on the Scan Page there is also an information menu that can be selected in Indonesian and English which will be displays information on the scanned Qr-code of the mask, as seen in Figure 6.

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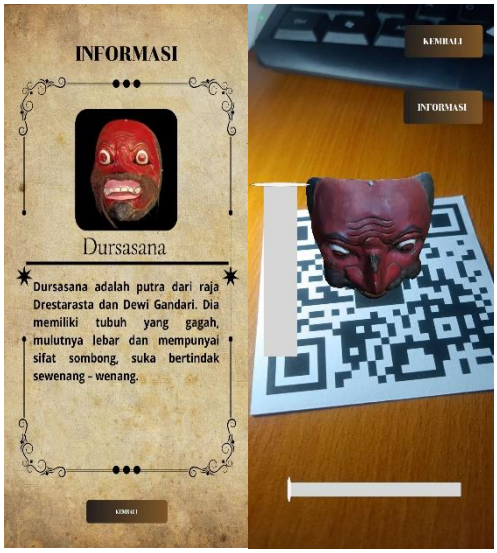

Figure 6. Mask scan page

d. Guide page

The Guide Menu page contains Indonesian and English language options before entering the contents of the guide, where the guide contains an explanation of the functions of the buttons in the Cirebon Mask AR application as seen in Figure 7.

Figure 7. Guide page

Testing

Testing is carried out to observe the results of execution through testing and check the function of the application test results. The method used is the Black Box Testing method as in Table 1.

Table 1. Application Testing

No	Splash Screen Display Testing		
	Testing process	Results	Information
1	When the application is run	Displays Splash Screen	

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No	Splash Screen Display Testing		
	Testing process	Results	Information
			According to expectations
2	When the Splash Screen disappears	Displays the Main Page	According to expectations
3	When selecting the menu available on the main page	Goes to the selected page	According to expectations
4	When pressing the Quit button	Exit the application	According to expectations
5	When selecting the Scan Mask menu When scanning the Cirebon Mask marker according to the barcode.	Capture the existing markers on the Cirebon Mask	According to expectations
6	When selecting the Filter menu.	Displays the Mask filter page	According to expectations
7	When the camera is pointed at the user's face	Displaying the Cirebon Mask 3D Filter.	According to expectations
8	When selecting the guide menu	Displays the wizard page	According to expectations

Based on the results of blackbox testing, where 8 menus were tested, the obtained result is that there are no errors encountered during the use of the application. Each button functions properly and operates according to its intended function. Usability Testing testing process which received 25 respondents from the public, the results of the questionnaire were that the Application Learnability percentage was 89.4%, which means Very Good, this shows the level of ease of the application is very easy to use. . In Efficiency, it gets 89.8%, which means Very Good, it shows the level of user adjustment speed in the application is very efficient, in Memorability, it gets 91.7%, which means Very Good, it shows the level of ease of the application that users have used several times, which users don't even look at. another guide in using the application which means this application is very easy for users to use, in Error it gets 63.7% which means Fairly Good. This shows the error level of the application after the user has tried the application several times and also the level of user resolution of the error, and finally Satisfaction got 90.1%, which means Very Good, this shows the level of user satisfaction with this application, which can be concluded from the results found that users are very satisfied with the application. Usability testing results can be seen in table 2

Table 2. Usability Testing

No	Variable	Qualification	Category
1	Learnability	89,4 %	Very good
2	Eficiency	89,8 %	Very good
3	Memorability	91,7 %	Very good
4	Error	63,7 %	Enough
5	Satisfaction	90,1 %	Very good

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CONCLUSION

This research has been successfully carried out through several stages. There are several stages in the process of designing the Cirebon Mask Augmented Reality application, namely the first stage is the process of collecting the necessary data such as information from each mask that will be used, as well as analyzing the results of the information collection with the aim of creating the Cirebon Mask Augmented Reality application. The second stage is the application creation process, where in this process there are several stages, namely the production stage which includes taking assets, making markers and user interface. In the pre-production process which includes the process of combining all assets starting from markers, 3D assets and other assets. The results of blackbox testing, where 8 menus were tested, the obtained result is that there are no errors encountered during the use of the application. Each button functions properly and operates according to its intended function and the results of this research can help the Cirebon mask house to provide information media in the form of AR to increase public knowledge about Cirebon masks based on the results of usability testing with the values obtained, namely Application Learnability is 89.4% which means Very Good, Efficiency gets 89.8% which means Very Good, Memorability gets 91.7% which means Very Good, Error gets 63.7% which means Fairly Good and Satisfaction gets 90, 1% which means Very Good.

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