

VISITOR GUIDE APPLICATION AT MUSEUM WITH AUGMENTED REALITY ANDROID-BASED

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ABSTRACT

Study this aim as a spatial introduction media on each the floor of the museum and the collections of the Regional Museum of Deli Serdang Pada Visitors Android based . Study this conducted at the Regional Museum of Deli Serdang, which is located at Jalan Negara, Petapahan Sports , Arts and Culture Area , Lubuk Pakam , Deli Serdang, North Sumatra 20517. In research this writer use Research and Development (R&D) methods . Study it also uses Rapid Application Development (RAD) as methodology development application . In conclusion this that the Visitor Guide Application (VGA) with technology Augmented Reality at the Regional Museum of Deli Serdang based on Android has built use Unity 3d apps , Blender and Vuforia with attractive appearance and user friendly. Augmented reality technology can used as tool guide because capable displays 3d object on each collection . The Visitor Guide Application (VGA) is also used as an introduction to spatial planning in each area the floor of the museum and collections in the Deli Serdang Regional Museum visitors Android based . Application this aim for make it easy visitors and the museum in the introduction process collections at the Regional Museum of Deli Serdang.

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INTRODUCTION

Technology has become a necessity in various areas of life today. Technology has been used in various fields, be it education, economy and government. One example of the application of technology in the field of government is to create an attendance information system. Absence is a collection of employee attendance data that is needed by every organization or office. The purpose of collecting data on employee absences in an organization can do many things with this data, one of which is as a suggestion for giving salaries in an organization [1].

In this study, the authors took the research object at one of the museums in Indonesia, the Regional Museum of Deli Serdang, which is located in the Regional Government Office Complex of Deli Serdang Regency, Lubuk Pakam District, North Sumatra Province. The Deli Serdang Regional Museum was established in 2001 using the Regional Revenue Budget Fund or APBD with the status of a technical implementation unit or UPT arts and culture. Deli

Serdang Regional Museum has three floors. On the first floor is a historical room where dioramas, story lines, and historical paintings are displayed about the journey of the two sultanates in Malay lands. On the second floor is a cultural space which is a reference to various cultures, especially ethnicities living in Malay land. Then on the last floor is a collection on post-independence.

Many visitors who come and are interested to see the information a collection of historical objects in the Regional Museum of Deli Serdang. With so many visitors or visitors who come to the Deli Regional Museum Serdang, a travel companion (guide) is needed inform the collection of historical objects in the Museum Deli Serdang area. However, the travel companion (Guide) who is in The Deli Serdang Regional Museum is still very minimal so if there is a spike visitor will find it difficult to provide explanations of information about the collection of historical objects in the Deli Regional Museum Serdang, and if there is a spike in visitors, a travel companion (Guide) must use waves / queues to visitors to explain information about collections in the Regional Museum of Deli

Serdang. For that needed a capable technology _ help in matter companion One of them is the trip (Guide) at the Regional Museum of Deli Serdang using Augmented Reality [2].

An important aspect of AR is the personalization features it offers. Mobile devices can capture user profiles through graphical forms with simple multiple-choice questions. This information is then automatically linked to metadata that describes the multimedia content and a personalized tour is created [3].

Along with the rapid development of technology, making the need to get information becomes more instant. By utilizing the use of Android - based Augmented Reality Augmented Reality is a technology that combines two-dimensional and or three-dimensional virtual objects into a real environment and then projects these virtual objects in reality in real time. Augmented reality applies to all senses, including hearing, touch, and smell. Apart from being used in fields such as health, the military, the manufacturing industry and the world of education [4]. This AR application can insert certain information into the virtual world and display it in the real world with the help of equipment such as webcams, computers, Android cellphones, or special glasses. This technology is very helpful for users to share various information. This application is designed using the Marker less method or what is known as one marker in Augmented Reality. The Marker less method is an AR method in which the recognized marker takes the form of a device's position, direction, or location [5]. Detection of target object characteristics and tracking of target objects based on camera poses are used as criteria in the process of tracking without a marker in AR technology, using this method user do not need to use a marker to display and users do not need to print markers to display digital elements [6].

Augmented reality (AR) technology has the potential to enrich our daily lives in many aspects. One of them is the experience of visiting a museum. Today, state-of-the-art mobile museum visitor guides provide us with rich information that is personalized and context-aware. However, this system has one major drawback: they force the visitor to hold the guide and look at the screen. Leveraging this technology makes it possible to provide wearable AR views without needing to hold a guide and look at them and without distracting the user from the actual object [7].

AR guide state and applicable AR guide state. Guides are evaluated in terms of the overall museum experience they provide, visitor engagement and involvement in the artwork, and their satisfaction with the guide [8]. Our

assumption is that handheld AR guides will be perceived as more intuitive and easier to use. On the other hand, because the magnified graphics on the smart glasses are directly in the viewer's field of view and appear as if they are in the physical scene, we assumed that wearable AR guides would provide a more engaging experience and engage visitors more with the artwork. [9].

With this technology, it can help the Deli Serdang Regional Museum, especially travel companions (Guide) in conveying information in real terms by realizing the virtual world into the real world regarding buildings and collections of historical objects in a more interesting and interactive way. [10]. This will also add interest or interest to the public or visitors to the Deli Serdang Regional Museum to add knowledge about historical objects in the Deli Serdang Regional Museum. Based on the above, the problem formulation chosen by the author is how to build a Visitor Guide Application (VGA) with augmented reality at the Deli Serdang Regional Museum based on Android.

Methods

The application development method used in this study uses the RAD (Rapid Application Development) method. Rapid Application Development (RAD) is an information system development method for a short time, so it is considered appropriate for e-commerce development. RAD uses method iterative (repetitive) in developing a system where the working model of the system is constructed at the outset Step of development with destination set user requirements and removed [11]. In the development system, everyday information requires a minimum time of 180 days; however, using the RAD method could resolve in 30-90 days [12]. Because Therefore, this application development method with RAD is used because the processing time is short, and the processing stages do not depend on previous process problems because they are interrelated. The locations of system development are as follows.

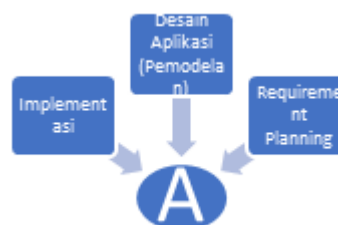


Figure 1. Methodology Study [13]

a. Data collection

At this data collection stage, the author carried out several techniques, namely observation, interviews and literature study on the research object, namely the Regional Museum of Deli Serdang. At this stage, the writer collects all the information or data supporting this research.

b. Identification of problems

After the writer has collected data, as explained in the previous data collection stage, the next step is identifying the problem from the previously owned data. From the Identification of the problem, the number of guides at the Deli Serdang Regional Museum still needs to be increased, so if there is a surge in visitors, it will be challenging to provide explanations of information about the collection of historical objects in the Deli Serdang Regional Museum.

c. Study of Literature

After collecting data, it is then known what problems will be solved by identifying the problem, and then the next step is for the writer to study theories that can support this research. The sources theory that the authors studied in this study was sourced from previous research from supporting articles and books.

d. Prototyping Method

In this study, the authors used the RAD method. The RAD method can help you develop applications relatively quickly [13]. This is because users can participate in the entire system development process when implementing Rapid Application Development (RAD). RAD can soon create a system because the developed method can meet user requests to reduce the time required for redevelopment after the implementation phase. Following the RAD methodology, the development phases are shown in the figure below.



Figure 2. Stages of the RAD method

RESULTS AND DISCUSSION

1. Results Display

Following this is results from the Visitor Guide Application (VGA) application design On Museum Area Deli Serdang [14].

a. Display Main Page



Figure 3. Initial Appearance of the Application

The start page is the opening page of the Visitor Guide Application (VGA) application. This page appears. The initial loading is displayed after the application is started.

b. Main Menu



Figure 4. Menu Main

The main menu is a page that will display several options buttons the user can select.

c. AR Museum menus



Figure 5. Page Scans On Menu AR Museum

The AR Museum menu is a page for marker detection, namely, the marker detection display will open when the user presses the button on the AR Museum menu. When the marker detection displays opens, the camera will automatically activate. This marker detection scene is used to detect a marker indicated by the user. The following is a marker detection display when the camera is active.

d. Scan Display of the Deli Serdang Museum Building

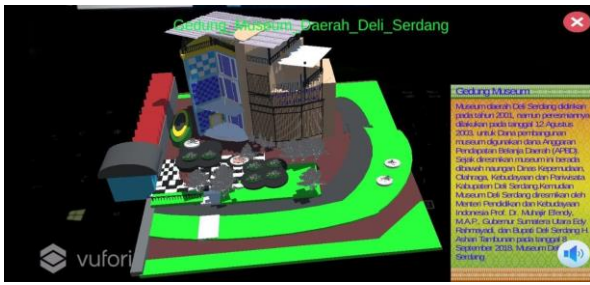
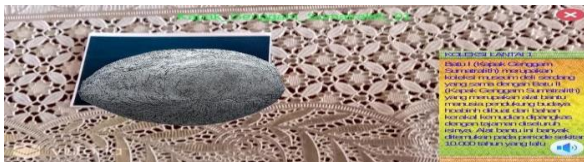


Figure 6. Display of the results of the Scan of the Deli Serdang Regional Museum Building

After we scan the image of the Deli Serdang Regional Museum building, the AR of the Deli Serdang Regional Museum building appears; on this page, there are two buttons, namely the voice button and the close button.

e. Some Scan Display Images in the Deli Serdang Museum



Picture 7. Appearance Results Scans Picture Stone I (Ax handheld Sumtralith)

Display in Figure 7 is one of the results of the AR scan on the 1st floor, namely Batu II (Sumatralith Handheld Ax).



Figure 8. Appearance Scan results in Picture Sampan

In figure 8, sampan. In the language of the palace, the word sampan literally means three boards, from the words sam (three) and pan (board). This word is used to refer to the design of this boat, which consists of a flat bottom (made from a piece of board). Two other boards are installed on both sides. Canoes are not only used by fishermen as a means of river and sea transportation. In the colonial period, canoes were used to transport plantation products.



Figure 9. Appearance Results Scans Picture Tool weaving

in figure 9, a loom is a tool or machine for weaving yarn into textiles. The loom consists of traditional looms and looms. The basic function of the loom is as a place to attach the warp threads to make cloth.



Figure 10. Appearance Results Scans Picture Train Wind

In figure 10, the wind carriage is a designation for bicycles that originated in France around the early 18th century.

f. Museum Info Menu



Figure 11. Appearance Menu Info Museum

On this page is museum info starting from room info and instructions for each room on Floors 1, 2 and 3 of the Deli Serdang Regional Museum.

g. Display Menu Floor I

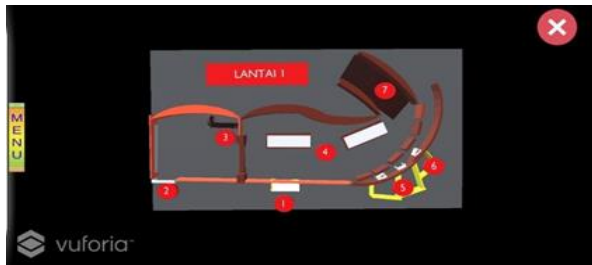
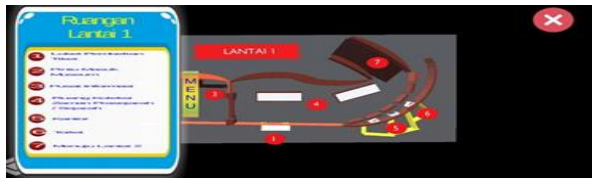


Figure 12. Appearance Menu Floor 1

When we select one of the museum floor menus, a museum floor plan will appear in the image below, and in this application there are numbers or numbers, meaning that each number is information on the name of the room at the Deli Serdang Regional Museum.



Picture 13. Appearance List Room Floor 1

In this view, if we have pressed Menu in the middle of the floor plan, the Floor Room Menu will appear, where this menu contains lists of rooms on the floor of the Deli Serdang Regional Museum.

h. Display Mailbox Directions and Room Information



Figure 14. Appearance Box Message Instruction and Info Room

The directions and information message box page appears when the application user has selected a number or a room name in the application floor room menu.

i. Display Directions Menu



Figure 15. Appearance Box Message Room Info

When we select one of the room numbers or names in the room menu, directions will appear to go to that room. For example, in this image, the application user chooses the number 3 or the name of the information centre room. Then there are directions to the room information centre, which can be seen in the image below

j. Display Information Pages

The image below contains room information if the user selects the information menu in the information message box. In this view, the user selects number 3 or the information center, and information about that room will appear.



Figure 16. Appearance Page Information

k. Help Menu

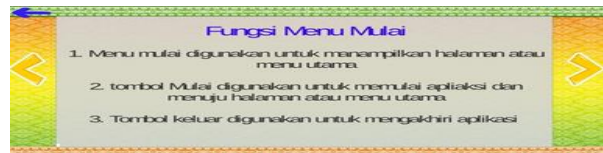


Figure 17. Start Menu Function Slideshow

There are three information slides in this menu, namely the start menu function, the primary menu function and how to use AR. In the image below, there is a display of how to use or function the start menu.



Figure 18. Appearance Slides Function Menu Main

from the picture above it is known that visitors can find out information from the main menu.

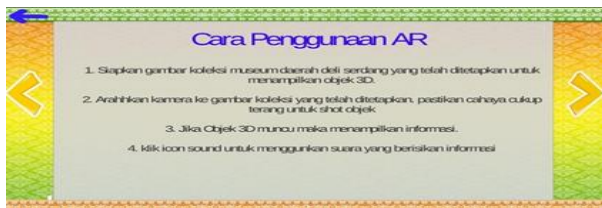


Figure 19. Appearance Slides Method Use AR

2. Trial Results

From the last test using the Android 10 Q smartphone Vivo Y30i device was carried out, the test results were obtained, which had satisfactory results. The test results can be seen in the table below this.

Table1. Black Box testing

Scenario which Walk	Result which Expected	Result Testing	Conclusion
Operate Application	Show page menu main	v	Succeed
Clicking menu start	Show page menu main	v	Succeed
Clicking AR Museum	Come on stage screen camera AR	v	Succeed
Scan picture building museum	Come on stage result 3D building museums along with information	v	Succeed
Scan picture stone I (Ax handheld sumatralith)	Stone 3D result show I (Hand Axe sumatralith along information)	v	Succeed
Scan picture stone II (Ax handheld sumatralith)	Stone 3D result show II (Hand Axe sumatralith along information)	v	Succeed
Scan picture coin china	Come on stage result 3D coin china along information	v	Succeed
Scan picture rubbish shell	Show 3D result rubbish shell along information	v	Succeed
Scan picture ceramic fragment celedon	Show 3D result ceramic fragment celedon along information	v	Succeed
Scan picture Dish FlagSerdang	Show 3D result flag plate serdang along with information	v	Succeed
Scan picture Pahar	Come on stage result 3D Pahar along information	v	Succeed
Scan picture cookies loud	Come on stage result 3D Dipper hard cookies along with information	v	Succeed
Scan picture cigar	Come on stage result 3D cigar along information	v	Succeed
Scan picture sampan	Show 3D result canoe along information	v	Succeed
Scan picture Eye money original	Come on stage result 3D collection Eye money original along information	v	Succeed

From the table, one can see many interested visitors _ with existing applications. This is the same as the study [15] findings that demonstrate potential AR applications. Some attendees who tried it loved that they didn't have to hold it or experience the exhibition via the secondary screen, as mentioned for smartphones. However, p a need for more technological advances to make it more convenient to use in museums. These advances include expanding the field of view, creating user interfaces that are less straining for the eyes, and making smart glasses more comfortable to wear.

CONCLUSION

At this conclusion that the Visitor Guide Application (VGA) with Augmented Reality technology at the Deli Serdang Regional Museum based on Android has been built using the Unity 3d, Blender and Vuforia applications with an attractive and user-friendly appearance. Augmented reality technology can be used as a guiding tool because it is capable of displaying 3d objects in each collection.

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