AUGMENTED REALITY APPLICATION ‘SUPER SEMAR’

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Augmented Reality is a technology that combines real and virtual environments. The use of augmented reality can help users in any way, one of which is in terms of education. With the rapid development of technology, many Indonesians have forgotten and abandoned the values that constitute the identity of the Indonesian nation itself. Therefore, Augmented Reality technology can be used to help introduce Indonesia, especially the values of the archipelago and the insight of the archipelago in particular to the Indonesian people, especially the younger generation.

Keyword : Augmented Reality, technology, wawasan nusantara

I. Introduction

Mobile Augmented Reality is a new technology that is able to combine real and virtual environments. Mobile Augmented Reality is a new technology that is able to combine real and virtual environments. AR can be displayed on various devices such as mobile phones, special glasses, cameras, screens, webcams, and so on. These devices will function as output devices. Why output devices? Because it will display information in the form of videos, images, animations, and 3D models that need to be used.

Thus, users can see the results in both artificial and natural light. Augmented Reality or AR uses SLAM (Simultaneous Localization and Mapping) technology, sensors, and depth meters. For example, collecting sensor data to determine a location, calculating the distance from the previous location to the destination location, etc.

The use of this technology has grown rapidly throughout the world. As for its use is used for daily needs by humans around the world. Then behind the rapid growth of Augmented Reality, the Indonesian people have left many values that are the identity of the Indonesian nation itself. Thus, the existence of rapid technological developments is rarely used by people to help continue to introduce existing Indonesian values and insights into the archipelago in particular. Thus, the authors want to show the readers that the use of Augmented Reality can be used to help the public know more about the values that make up the nation's identity. This use is expected not only to help but also to foster enthusiasm for values through technology. That way, not only technology that develops but also insight in society can develop as well.

II. Method

The method used for making this Augmented Reality application is the Waterfall method. The waterfall method is one type of application development model and is included in the classic life cycle, which emphasizes sequential and systematic phases. For the development model, it can be analogous to a waterfall, where each stage is carried out sequentially from top to bottom. The stages in this method are rigid and usually patterned as follows: determining the scope

and requirements of the project, analyzing these requirements, making designs, implementing them, conducting trials, using them on the project and finally maintaining them.

According to Ian Sommerville (2011) explains that there are five stages in the Waterfall Method, namely Requirements Analysis and Definition, System and Software Design, Implementation and Unit Testing, Integration and System Testing, and Operation and Maintenance. Picture the steps of the waterfall method in figure 1.

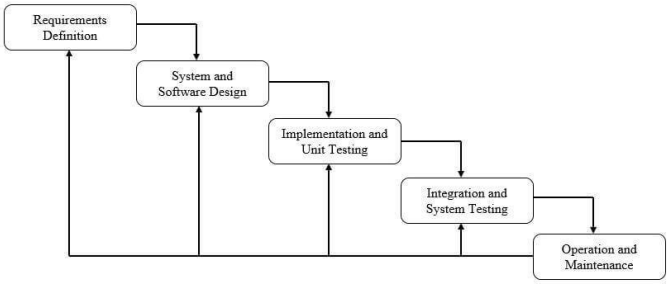

Figure 1. the steps in the waterfall method

Waterfall Method Steps

1. **Requirements Analysis**

   Before doing software development, a developer must know and understand how the information needs of users for a software. This information collection method can be obtained in various ways including, discussion, observation, survey, interview, and so on. The information obtained is then processed and analyzed so that complete data or information is obtained regarding the specifications of user needs for the software to be developed.

2. **System and Software Design**

   Information regarding the requirements specification from the Requirements Analysis stage is then analyzed at this stage and then implemented in the development design. Design drafting is done with the aim of helping to provide a complete picture of what must be done. This stage will also help developers to prepare hardware requirements in making the software system architecture that will be made as a whole.

3. **Implementation and Unit Testing**

   The implementation and unit testing stages are the programming stage. Software development is divided into small modules which will be combined in the next stage. Besides that, in this phase, testing and checking of the functionality of the modules that have been made is also carried out, whether they meet the desired criteria or not.

4. **Integration and System Testing**

   After all units or modules that have been developed and tested in the implementation stage are then integrated into the overall system. After the integration process is complete, further inspection and testing of the system as a whole is carried out to identify possible system failures and errors.

5. **Operation and Maintenance**

   In the last stage in the Waterfall Method, the finished software is operated by the user and carried out maintenance. Maintenance allows developers to make improvements to errors that were not detected in the earlier stages. Maintenance includes repairing errors, improving the implementation of the system unit, and upgrading and adjusting the system as needed.

III. Augmented Reality Idea and SDK

A. AR Idea

The idea of Augmented Reality is taken from the lack of public insight about the basics or things in general from the insight of the archipelago. Many Indonesian people are still indifferent about the importance of insight into the archipelago. Not only that, but this happens because of the lack of forums and also the lack of knowledge of the archipelago in various places. With Augmented Reality, it is hoped that the public will be able to recognize the basics of

insight into the archipelago by utilizing existing technologies such as Augmented Reality.

B. SDK

SDK is a kit that can be used by developers to develop android-based applications. It contains several tools such as a debugger, software libraries, emulators, documentation, sample code, and tutorial. The SDKs used are as follows:

1. Vuforia

Vuforia is an Augmented Reality Software Development for mobile devices that enables AR creation. Using Vuforia online makes it easy for editors to use it. Especially the use of Vuforia with Unity. Creating a target image in Vuforia.

2. Unity

Unity is an application used to develop multi-platform games designed to be easy to use. Unity is full of mixes with professional apps. Editor in Unity is made with a simple user interface. The use of Unity here is combined with Vuforia and also Blender.

3. Blender

Blender is software used to create animated films, visual effects, 3D printed models, interactive 3D applications, and video games. Blender here is used by us to create 3D which will later become the object of the AR that we created.

4. Android Studio

Android Studio is the official developer for developing Android applications based on IntelliJ IDEA. Apart from being a powerful code editor and IntelliJ features, Android Studio offers many features that increase productivity in creating Android applications. Here the use of Android studio is as an AR development that has been made in Unity

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V. AUGMENTED REALITY WORKMANSHIP AND RESULTS

There are several things that start and end the work of Augmented Reality. The following are the steps that the compilers did to produce an augmented reality project:

1. Determine the concept to be made and make an agreement with the team in determining the features in the Augmented Reality application. as in the SDK described above.
2. Looking for images that will be used and converted into 3D to be used as AR objects.
3. Turn 2D objects into 3D using a blender. Then, export the file with fbx format.
4. After that, open vuforia to create AR which will be combined with Unity which will later become the target image of the AR created. On vuforia download vuforia engine to be imported into unity and also download the required database.
5. After that, open Unity 3D and import the package to display the vuforia engine needed to display the target image that will be used as the target of the AR created. After that, insert the 3D model that has been made in the blender into Unity 3D. After that try AR with the camera. Image 1 and Image 2.

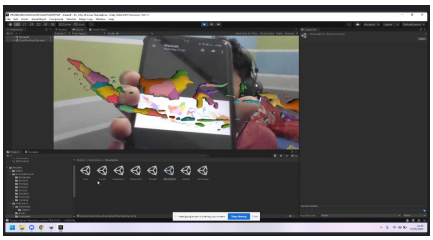

Image 1. AR of Peta Indonesia

Image 2. AR of Garuda Indonesia

6. After success, then create a “Main Menu”, a menu list that will be the main menu for Archipelago Insights with scripts from Unity using C# language in Visual Studio Code.
7. Neat the results of the Main Menu that has been created in the VSCode. Image 3.

Image 3. Main Menu

8. Combining the AR menu with existing material, don't forget to enter the narration into the hierarchy so that it appears when the application is made.
9. After the merge experiment is successful, the next step is to import into an application with the Android Studio SDK that is in Unity 3D. So that it can be installed on an Android smartphone.

The following are the results of Augmented Reality that have been installed on an Android smartphone. Image 4.

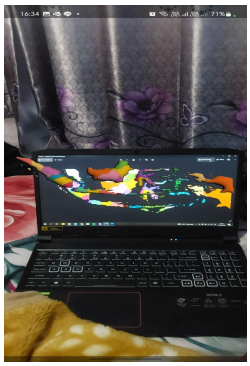

Image 4. AR Results from Smarthphone

VI. Reference

[1] *Sanni, Siltanen. Theory and Application of Marker based Augmented Reality.2012. VTT Science*

[2] S. Nazruddin, *Pemograman Aplikasi Mobile Smartphone dan Tablet PC berbasis Android*. Bandung: Informatika Bandung, 2011.

[3] Amin Dhiraj, AminSharvari, Govilkar Sharvari Govilkar, Comparative Study of Augmented Reality Sdk's. International Journal on