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Augmented Reality for Mobile-Based Computer Network Learning Interactions

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Abstract: The development of technology has an effect on aspects of education that have an impact on learning activities. The utilization of learning media on computer networks is still incomplete so that it has an impact on understanding how computer networks are installed theoretically. Mobile phones today have many features that can be utilized for playing games, watching videos, listening to music, personal assistants, searching for information, GPS, and much more. One of the interesting technologies that can be developed on mobile phones is Augmented Reality. Augmented Reality (AR) is a technology that combines two-dimensional or three-dimensional virtual objects into a three-dimensional real environment and then projects them in real-time. This study discussed the design of Android applications using augmented reality technology used in computer networking subjects. (Augmented Reality Network) describes the description of computer network equipment displayed in 3D. The method used is Research and Development (R&D). The results of the learning media trial conducted on respondents obtained a score with an average percentage rate of 84.5% with the description of this AR product worthy of use.

Keywords: Augmented Reality, Learning Media, Computer Networking, 3D, Marker, Mobile Phone

1. INTRODUCTION

Technology is made to make it easier for humans to complete or work on their activities. One of the technologies that are currently widely used is mobile phones. Mobile phone technology itself has developed quite rapidly, in addition to its main function to communicate either phone or send messages. Mobile phones today have many features that can be utilized for playing games, watching videos, listening to music, personal assistants, searching for information, GPS, and much more. One of the interesting technologies that can be developed on mobile phones is Augmented Reality. Augmented Reality (AR) is a technology that combines two-dimensional or three-dimensional virtual objects into a three-dimensional real environment and then projects them in real-time. Augmented Reality (AR) is a new medium of information delivery that is developing today. AR is a technology that combines both two-dimensional (2D) and three-dimensional (3D) virtual objects into the real environment around us. AR is different from Virtual Reality (VR), because here AR only adds virtual objects into our surrounding environment, while VR replaces our entire environment with visual objects. With AR a user can feel the delivery of information more interesting and more real. To be able to present the right information in the real world, AR needs a marker. A marker is a real object that is used as a reference for the appearance of a 3D object. Looking at the capabilities possessed by AR, Augmented Reality can be used as an interesting learning medium. This is because AR can present interactive and more efficient learning because the teaching and learning process is not only theoretical but also can see objects taught in 3D objects. One of the lessons that can be used using AR is to learn the pattern of computer networking. Based on the background above, the problem formulation of this study is how to make augmented reality-based computer network learning with markers can make learning more interactive. The formulation of the concept of research is to bring up 2D or 3D objects from computer networks by using markers for AR. The purpose of AR and Virtual Reality (VR) in general is the same, but in theory, VR presents the user in a virtual world, which makes the user seem to be somewhere else. Ar in theory presents a virtual effect in the real world. Through the comparison of whether the marker is appropriate or not, if not, then the information on the marker will not be used, and if the marker is recognized, then the information on the marker will be used to render and duplicate the object of digital elements in the form of 3D Computer Network Hardware.

2. SIMULATION MODEL

Tracking methods are used, but this explanation is how common basic concepts are used such as Based Marker Tracking. At this stage, (1) Augmented Reality works by using image recognition, the image used is a Marker (Marker) in the form of an image, while the image used is an image of computer network devices such as Routers, Switches, etc. (2) The principle of working through the camera will carry out the process to detect markers that have been determined, can be imaged with certain patterns or others. (3) After recognizing and marking a predetermined marker pattern, the camera on the device will process the image on the Engine on the Computer or Smartphone and match it with a predefined Image Database. Through the comparison of whether the marker is appropriate or not, if not, then the information on the marker will not be used, and if the marker is recognized, then the information on the marker will be used to render and duplicate the object of digital elements in the form of 3D Computer Network Hardware.

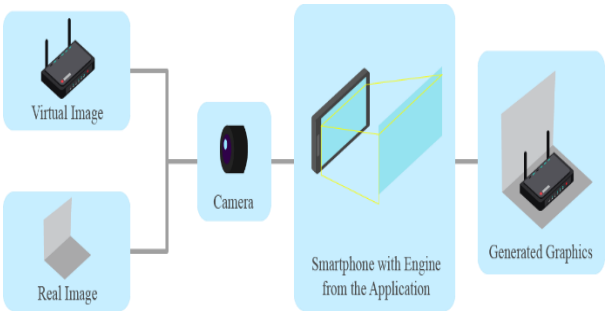

Figure 1. Augmented Reality Working Concept Scheme

3. RESULT

Augmented Reality technology. In this method, Augmented Reality requires a marker that can be an image that is then analyzed as a trigger to call digital elements. Markers in the form of images used as markers are triggers to call virtual objects into the real world through a device. The images used in this AR application consist of images of the device used, such as routers, Access Points that correspond to the 3D object to be used.

Figure 2. Image of Device Used as Marker

Vuforia is one of the Augmented Reality Software Development Kits (SDKs) for mobile devices provided by Qualcomm to help developers create Augmented Reality (AR) applications on smartphones (iOS, Android). Vuforia uses Computer Vision technology to recognize and track images (Target Images), and simple 3D objects in real-time. When the smartphone camera is turned on and directed against the marker object, an object will appear from the computer network device as well as a description of the object.

Figure 3. Computer Networking Tools 3D Object View

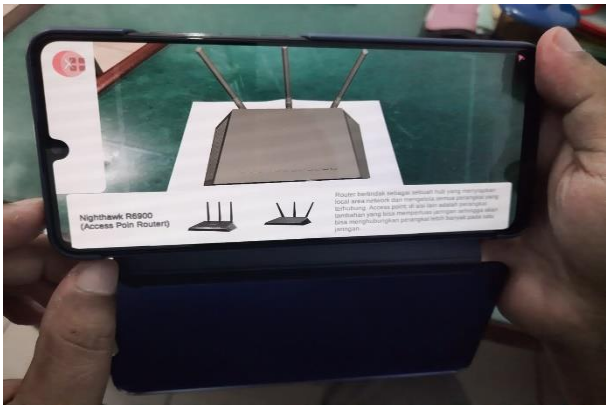

Figure 4. Augmented Reality Display Using Mobile Phone

Based on the results obtained from responses from respondents that Augmented Reality computer network learning products attracted learners, with an average percentage rate of 84.5%.

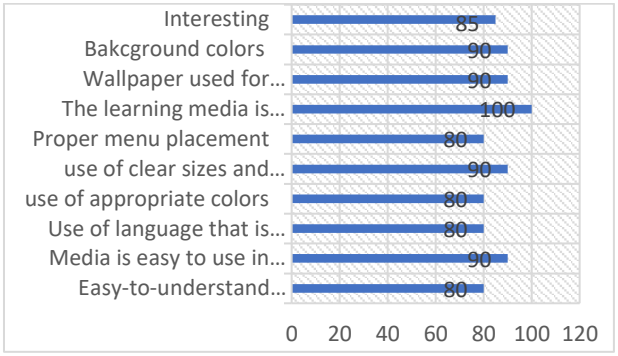

Figure 6. Response to Augmented Reality Media

Mobile-based computer network learning media by utilizing Augmented Reality Technology, developed using vuforia in the form of SDK (software development kit) intended for mobile so that it is easy to use and can run on smartphones. The design step is based on Luther model, starting with concept, design, material collecting, assembly, testing, and distribution.

4. CONCLUSION

This research has presented the development of interactive learning media based on augmented reality (AR), which is implemented for learning. The app was developed based on input and advice from several researchers. So it is expected that teachers can continue to provide content input provided to learners. It is hoped that creating interactive learning and providing a user experience can make it easier for teachers to provide understanding to users. Based on the results of tests conducted on respondents obtained with an average result of 84.5% with very agreeable information so that the use of AR media is suitable for use. As for the advice from researchers who want to convey so that the next study can be developed on operating systems other than Android, namely the iOS operating system and on applications can be added animations to the application and complete with written and oral descriptions.

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