DESIGN CONCEPT OF AUGMENTED REALITY APPLICATION WITH GLASSES FOR INDONESIA WAYANG MUSEUM

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ABSTRACT

Wayang is one of Indonesia Culture. There is a museum exhibits a collection of Wayang, such as wayang kulit, wayang golek, traditional music instrument, and traditional mask from nation wide. The museum is known as Indonesia Wayang Museum. Currently the museum still use the ordinary and conventional system to serve the visitors, which is only show the Wayang inside the showcase, and the visitors have to be jostling to see the Wayang. This causes long queues. The Rapid growth of technology "drives" the museum to use information technology in both information processing and as a learning media. One of the technology which can be applied in Indonesia Wayang Museum is Augmented Reality (AR) technology. AR is a technology that can display virtual world to the real world. The application of Augmented Reality technology has some purposes to facilitate users, visitors of museum, to get information about objects, which are its collections. And also to provide interactive and interesting information. This article explains about the design concept of glasses utilization in Augmented Reality application for Indonesia Wayang Museum. Furthermore, it explain about design concept of Augmented Reality application for Indonesia Wayang Museum.

KEYWORDS: Augmented Reality, Glasses, Indonesia, Museum, Wayang.

I. INTRODUCTION

Indonesia has many cultures. One of them is Wayang. The word of wayang is come from Javanese language that means shadow. Philosophically, Wayang is a shadow, an illustration, or a portrait about life. Wayang not only described about human but also about human life in relation to the other human, nature, and God [1]. Wayang performed by *Dalang* (puppeteer or mastermind) who lead the performance and accompanied by traditional music. Indonesia has a museum which exhibits all types of Wayang from all areas in Indonesia. That museum has educational purpose for Indonesian people.

Development of technology in this world is so fast. It "forces" all of field including education, art and culture that supervise the museum to use technology either in terms of information processing or as a learning media. Until this time, almost all of museum in Indonesia included Wayang Museum still uses traditional ways to deliver or to exhibit their collection. Such as using guide book or brochure contains information of museum and their collection. The other way is using tour guide.

The application of Augmented Reality technology in museum especially Indonesia Wayang Museum is appropriate. The museum should have not prepared tour guide to help the visitors of museum on deliver information about the collection. Although it still needed, tour guide is just accompany the visitors to touring the museum. The Augmented Reality technology realized the virtual world to be used as an interactive learning media. Therefore, the museum visitors can be easy to understand about what is information of the object in the museum.

This paper consist of six (VI) sections, first sections contains an introductory, the second section elaborate the general description about Indonesia Wayang Museum, section 3 explain about the concept of augmented reality and the related works, fourth section contains an explanation about the

use of glasses in AR technology, the section 5 explain the design concept of AR application for Indonesia Wayang Museum and the last section is conclusion.

II. INDONESIA WAYANG MUSEUM [2]

The Wayang Museum is a museum dedicated to Javanese Wayang puppetry. The museum is located in west side of Fatahillah Square, Jakarta, Indonesia, near Jakarta History Museum and Fine Art and Ceramic Museum. The Wayang Museum is located at Jl. Pintu Besar Utara No. 27, Jakarta, Indonesia. At the first, building of Museum of Wayang is the old church established by VOC in 1640 by name "*de oude Hollandsche Kerk*". The church was used as a place of worship for Holland civilians and Holland Army lived in Batavia.

Since population of Japan and revolution of Republic of Indonesia Independency, the building was not maintained. In 1957, the building was yielded to Institute of Indonesia Culture or LKI (*Lembaga Kebudayaan Indonesia*) and renamed "*Museum Jakarta Lama*". In September 17th 1962, LKI delivered the building to Republic of Indonesia Government, which is Department of Education and Culture. And in Juny 23th 1968, the building was given to DKI Jakarta Government by Departement of Education and Culture. It was used as Institution of Museum and History Offices of DKI Jakarta.

Since The Jakarta Museum (Fatahillah Museum) was relocated to Jl. Taman Fatahillah No. 1, Jakarta Barat 11110, Indonesia, the building is used as Museum of Wayang by Institution of Museum and History of DKI Jakarta. The Idea to established the Museum of Wayang is when the governor of DKI Jakarta at that time, H. Ali Sadikin attended Pekan Wayang II in 1974. Indonesia Wayang Museum has many collections. There are wayang kulit, wayang golek, traditional music instrument, and traditional mask. Here are some collections of Indonesia Wayang Museum.

Wayang Kyai Intan This wayang is the craft of an Tionghoa, named Babah Palim. He is from Muntilan, Jawa Tengah. The wayang made on 1870. The Wayang kulit Kyai Intan has a certain spesification, the *wanda* as same as the standard shape of wayang kulit from Yogyakarta or other wayang kulit. The basic material to made this wayang kulit is the best buffalo leather, strong and smooth. Paint that used to wayang Kyai Intan is not same with others paint. The paint used is sakura paint.

Gamelan Kyai Intan The Gamelan Kyai Intan is one set with Wayang Kyai Intan initiated by Babah Poli and made by Ki Guno Kerti on 1870 in Muntilan, Jawa Tengah, with *Laras Pelog* and *Slendro*. This *gamelan* became a collection in Indonesia Wayang Museum since 1975.

Wayang Golek Menak Kebumen When Islam came to Java, stories of Islam also appeared. *Menak* means Lord. For the first time, Wayang Golek was made by Sunan Kudus. The famous *Menak* story is a story of Amir Hamzah, uncle of the Prophet Muhammad. This *Menak* story was delivered on Javanese. The moeslem names renamed into Java language. Amir Hamzah became Wong Agung Menak Jayengrana.

Wayang Revolusi In 1950, R. M. Sayid made Wayang Perdjoengan, known as Wayang Revolution. This special wayang bought by Wereld museum (known as Voor Vol Kenkude Museum in the past) in Rotterdam. Wayang Revolution does not have written filmscript, because its show does not have special rule. In general, this wayang showed perform the adaptation story from various sources of Indonesian national history and adapted with the wayang figures.

Blencong A traditional lamp was used before electricity available. The "geber" or screen from coconut root material was used to show the Wayang kulit. The wick was made by "lowe" or cotton. This is known as Blencong. Indonesia Wayang Museum exhibits this collection as a learning form. Blencong in this museum was donated from Kol. (Purn) Casel A. Heshisius, royal commissioned officer from Den Haag, Netherland.

Wayang Wahyu Apperance of Wayang Wahyu is an idea of Brooder Timo Heus Wignyosubroto, a clergyman from Surakarta. In 1959, a meeting held with MM. Atmowijoyo, R., Roesardi Wijoyosawarno, and J. Soetarmo. The meeting produced a deal to realization of Wayang Wahyu. That wayang made by R. Roesardi in 1960. *Lakon* or performer from Wayang Wahyu is from old and new scripture covenant, in which containing the word of God. Story of Wayang kulit Wahyu begins with *Nabi Adam* dan *Siti Hawa* when they were at heaven and be disturbed by Satan so that they were relegated to the world. This wayang was made to concern of christian visualization and performed every Christian Great Day.

III. AUGMENTED REALITY

Augmented Reality (AR) is a famous scientific fields for several decades. In 1993, one of ACM comunication issues is dedicated for new field, which is Augmented Reality and current computation in everywhere. One of significant contributor is Mark Weiser from Xerox Palo Alto Laboratorium [3]. Augmented Reality can be translated as added reality. AR is a part of computer vision because AR used the technique to determine the suitability between image and real world and also compute pose, projection matrix and homography from both of the suitability. Augmented Reality used has a purpose to combine image sintetic into virtual world [4].

Many researcher define the AR as a technology which need Head Mounted Displays (HDMs) in used. For more specification of Augmented Reality technology, a survey investigated that there are three characteristics in Augmented Reality [5]:

1. combine real and virtual
2. interact in real-time
3. registered in 3D

This technology has been used to help strengthen the vision of the pilot with additional flight information and called VCASS technology. AR is also used as a tool in human perception and applied as a virtual user guide to help get the job as a printer or laser treatments. Augmented Reality developed at UNC helps a doctor see ultrasonic proficiency level vision that enables physicians to stare directly from the patient's body [6]. With age progress, Augmented Reality was used by both government and private institutions such as museums for the application of learning or interaction tool for visitors on the museum to be more interesting and easier for visitors to capture objects contained in museum.

One of them is an application displayed information about objects in a museum. This application uses a mobile or hand-held as a personal user guide. Visitors can see the visualization and animation of museum objects from the tool. Not only displays multimedia content but also role as an assistant or as a replacement for intelligence guide book. AR applications, named AR tour is presented in the form of a team – oriented game. There are two teams of visitors with a target age of 10-14 years to investigate and solve a criminal case. The game becomes one of the leading Augmented Reality application on museum, AR Tour [7]. There is another augmented reality application, The Archeoguide, that provide information *in situ* in the archaeological heritage and the objects complete with a superimposed virtual images of their state on the archeology [8].

Figure 1. Archeoguide Application [8]

Meta-Museum is also concept of augmented reality for knowledge sharing. The Meta-Museum has purpose to support knowledge discovery in entertaining by providing user experience in knowledge, history, art, etc. The Meta-Museum not only about the integration between the virtual world and the real world but also about the hyper communication facilitation the visitors and people behind exhibit (exhibitors)[9].
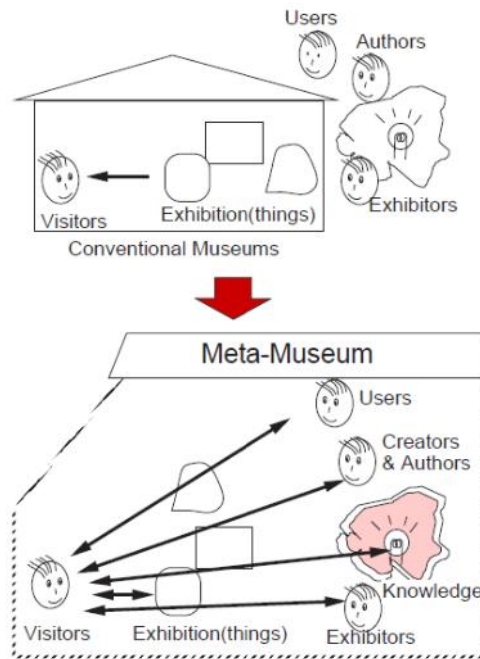
Figure 2. The Concept of Meta-Museum[9]

In Augmented Reality, there are two important terms used, tracker and marker. Tracker is a tool used on capture the images of the object acts as a marker. Marker itself is the object image as a place to display animation when the object was arrested by the tracker.

IV. THE USE OF GLASSES AS PROPS OF AUGMENTED REALITY

Glasses are a tool used to clarify the human eyesight problems in the course so that people can see as clearly as the other who has good eyesight. Glasses consists of two parts, the frame and the lens. Frame is used to prop up the lens and to facilitate the use in humans. While the lens is used to clarify the eyesight. Now, the glasses were used not only to clarify the eyesight only but can be used as props, including props of Augmented Reality.
There are three categories of augmented reality displays based on the position between the user and the real world or environment. There are head worn, hand-held, and spatial[10]. So far, the tools used to be a tracker or catcher of a marker is a smartphone, gadgets that included to hand-held category, until Head Mounted Devices (HMDs) glasses alike and HMDs included to head-worn. By default, closed - view HMDS does not allow direct view of the real world, but the see-through HMD, which is to see the real world with virtual objects by carrying optical and video technology [5].

Figure 3. HDMs Technology [5]

The concept of Augmented Reality glasses that will be used in Augmented Reality applications for Indonesia Wayang Museum is similar to the HMDS. The glasses need to add a camera device that

serves as a tracker. Technology in Augmented Reality glasses is like a technology in Google Glass. Lens of Augmented Reality glasses is certainly different as regular glasses because the lens used to project the animation appeared when the tracker captures an image or capture markers. Users only need to focus glasses especially camera serves as a tracker to the wayang served as a marker.

Glasses form is simple and easy to use, so it is appropriate used for the application of Augmented Reality in the Indonesia Wayang Museum. It is expected to facilitate the user in knowing the information of the objects contained in the museum, and to increase the number of Indonesia Wayang Museum visitors.

V.   DESIGNING AUGMENTED REALITY APPLICATION ON INDONESIA WAYANG MUSEUM

In Indonesia Wayang Museum, Augmented Reality technology can be applied to facilitate the visitors to capture information about objects and also provide an attractive interaction for visitors. The use of glasses as props Augmented Reality should also be considered. Certainly it has differences between the use of its glasses with the use of Smartphone, gadgets, or desktop PC (with webcam). The difference can be seen from the platform of each individual - each tool. Figure 4 depicted the flowchart of steps uses Augmented Reality applications with glasses for Indonesia Wayang Museum.

To create an Augmented Reality application for the Wayang Museum, it required data on Wayang information or other objects in the museum, history or story behind the Wayang, the Wayang-making, and the philosophy of the Wayang. The information displayed can be adapted from the books or information which is usually placed with the museum's collection. The following are the steps in developing the application.
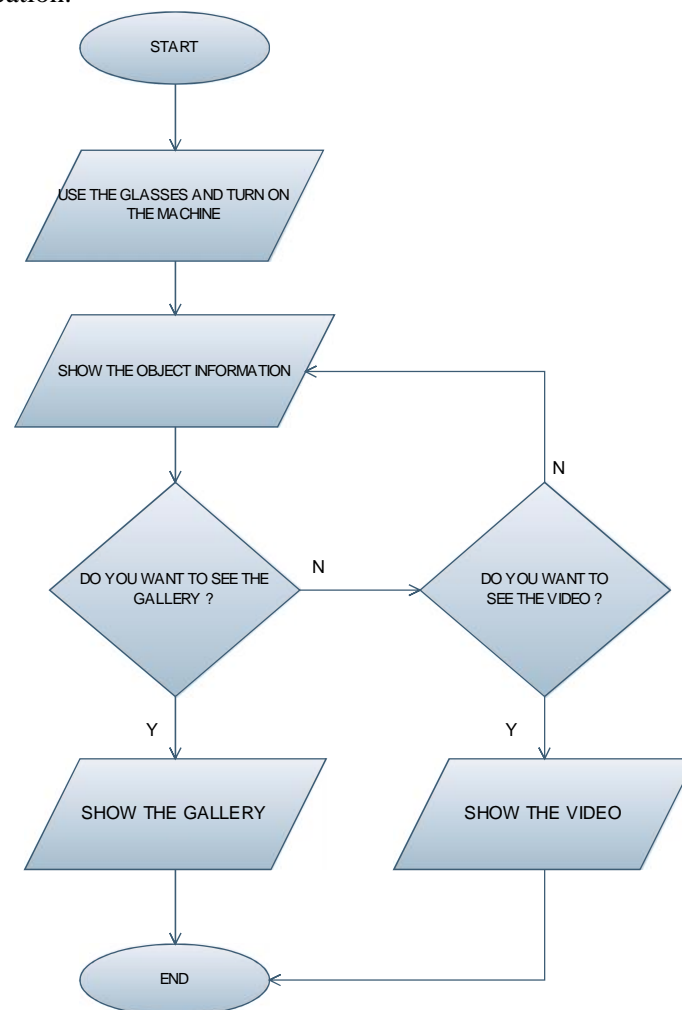

Figure 4. Flowchart of Step by Step

Design of 3D Animation: Since this application aims to simplify the user who are museum visitors in getting information about the object, the animation displayed should be short, dense, clear and user friendly so it does not take a lot of navigation within the application. Provision of a brief tutorial in the use of the application is needed so that the user feels no difficulty in using it. Figure 5 is a picture of design concepts in the application main view.

Design of Application Interaction: Interaction which can be applied in the application is such interaction on the touch screen. So users though - will be able to touch animation. Interaction is used to allow users to access information. As in the information display that displays more than one image or image gallery, users only need to shift the image to see the next picture and vice versa when they want to see the previous image. Those features are similar with the images gallery feature on the touch-screen smartphone.

Figure 5. Main Display Design for AR Application of Wayang Museum

VI.   CONCLUSION

This paper is not to elaborate fully develop an Augmented Reality applications but rather to explain the design concept of Augmented Reality using glasses for Indonesia Wayang Museum. In addition to explain the concept of glasses as props of Augmented Reality, also it explained the design concept of an Augmented Reality application for Indonesia Wayang Museum. This design concept is expected to be implemented in the future so it can help to assist Indonesia Wayang Museum collections to exhibit the collections in an interactive and attractive way. So it will increase the number of visitors.

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