

Development of Information Services for Cultural Heritage Site Gedong Songo Temple through based Virtualization 3D Bilingual Technology and Location based Service

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Abstract: Central Java Province has several tourist attractions and beautiful historical heritage sites. One of them is Gedong Songo Temple which is located on the slopes of Mount Ungaran, precisely in Candi village, Bandungan Sub-district, Semarang Regency. In the development of tourist objects are published with images mounted on billboards or billboards installed on the roadside. Besides that, tourism objects are more able to be enjoyed by visitors if there is a map / plan or better known model that describes the actual manifestation of tourist sites. The purpose of this study are as follows: 1) Create an application in the form of 3D visualization of Gedong Songo Temple by using the Unity game engine which can later interact to see the condition of the temple visually and the historical stories of each temple so as to facilitate the Central Java Province tourism developers in particular Semarang Regency government for Gedong Songo Temple Tourism, 2) Get immediate benefits if this application is utilized by the general public.

1 INTRODUCTION

The tourism sector as a strategic sector of development has been able to demonstrate performance as an increasingly prospective and reliable sector in sustaining development, the national economy (Soebagyo, 2012). According to tourism experts from Egypt (Salah Wahab PhD), tourism activities should be an activity with an economic orientation. That view should be used as a basis for advancing tourism in Indonesia because it is either directly or indirectly very closely related to the economic level of the tourist city. Both artificial tourism objects and natural attractions have the same great potential to sell their beauty to local tourists and even foreign tourists (Farmukhit, et al. 2013) . One of the factors of achieving the target of the visit is that the tourism sector has a good influence on the national economy (GDP). In 2019 the tourism sector in Indonesia is predicted to be the biggest foreign exchange earner through the oil and gas sector, coal and palm oil (Triani, et al. 2018).

Central Java Province also has several attractions and beautiful historical heritage sites. One of them is Gedong Songo Temple which is located on the slopes of Ungaran Mountain, precisely in Candi village,

Bandungan Subdistrict, Semarang Regency. This Hindu heritage site is thought to have been built in the 9th century in the Syailendra dynasty in power in the land of Java. The beauty of nature and the historical value of the 9 temples should be able to attract both local and foreign tourists who want to know the history of Indonesian culture, especially Central Java.

In the development of tourism objects are published with images mounted on billboards or billboards installed on the side of the road. Besides that, tourism objects are more able to be enjoyed by visitors if there is a map / plan or better known model that describes the actual manifestation of tourist sites (Bahar, 2014).

Maket is one form to show the likeness of the building from the outside, but the model cannot see the entire contents of the building and is less interactive (Shite, et al. 2013). With the development of technology, models can be replaced with software, therefore the researcher developed the Gedong Songo Travel Tutorial as a media based on Unity technology that will describe 3-dimensional forms and interact through tourist sites. So as to help the Central Java Provincial government program "Visit Central Java 2018" in promoting cultural heritage that has the potential to be very promising to be visited by both

local and foreign tourists because this visualization plan contains bilingual history of this site.

Researchers took the object of the Gedong Songo Temple because at this time there was no form of visualization from the tourism reserve in Semarang Regency. In addition, the researcher believes that this temple has the potential to be visited by both local and foreign tourists. This temple is located in Bandungan Subdistrict, Semarang Regency, Central Java.

Since 1978, the government has continued to strive to develop tourism. This was stated in the TAP MPR no.IV/MPR/1978, namely that tourism needs to be improved and expanded to increase foreign exchange revenue, expand employment and introduce culture. Tourism development that has been carried out by both the government and the private sector has increased the number of tourist arrivals from domestic and abroad (Soebagyo, 2012). The Purpose of making this virtual tour concept is used in several fields including architecture. 3D modeling with the concept of Virtual Tour in the field of tourism is realized by making the exterior and interior models of the tourist attraction. This virtual tour has been widely used as an effective promotional tool especially in the field of tourism through interactive media (Fitri, 2016).

The efforts to promote tourism objects object must be more creative and keep abreast of current technological developments. One technology that can be developed is virtual tour. Virtual Tour consists of a collection of photos, images, video or virtual 3D models from the actual place, which is run using a desktop computer, information or other electronic media (Daud, et al. 2016). Virtual Tour can be used as a media that can bring and bring imagination to life the users. So as if the user experienced and felt the real situation (Suhendra and Fernando, 2016). Virtual Tour is a technology combining photography with information that aims to provide overall space information with a three-dimensional (3D) and interactive display. Space information in question can include indoor or outdoor which refers to the concept where objects can be explored like the real world, can browse in all directions, see all directions, rotate and explore the surroundings (Daud, et al. 2016).

Virtual tour that was applied to the gedong songo temple attraction wanted to be made using unity.unity 3D software is a game engine, which is image processing, graphics, sound, input software, etc. which is intended to make games. Unity 3D is a multiplatform game engine, which is capable of being published on a standalone (.exe), web-based, android, iOS, XBOX, or PS3 basis, with a note of getting a license (Jubaedi, 2017).

2 METHOD

This research use research and development (R&D) method. Research and Development method is commonly used in the engineering field where almost all technology such us products such as electronic devices, hardware, vehicles, aircraft, weapons and modern household tools. This method is also used in natural science, administration, and social science (Soebagyo, 2012). The purpose of this method is to produce a particular product and test the effectiveness of the product. The R&D method uses research that is needs analysis and requires effectiveness testing to test whether the product works well. Research begins with a requirement analysis phase consisting of the formulation of potential and problems, data collection, software analysis, and hardware. The next step is product design. 3D design on this application using 3DsMax and Sketchup software while Virtual Tour design is done in Unity 3D game engine. Products that have been made will be tested by several testing stages. The research steps undertaken are explained as Figure 1.

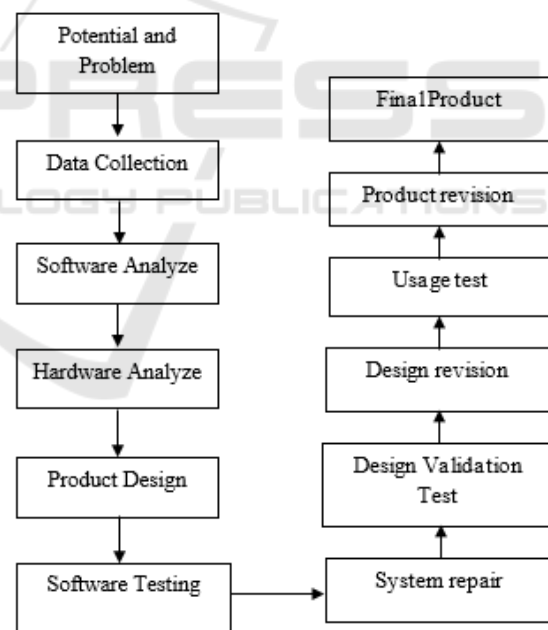


Figure 1: Development Procedures.

This application is expected to fill processes as follows: (1) This application can visualize Gedong Songo Temple into 3D objects, (2) This application capable of displaying information about building and history of Gedong Songo Temple with narration in Indonesia and English, (3) This application can displaying virtual tour technology that allows the user

to exploring the building like in the real life visiting Gedong Songo Temple. The application should be run on mobile device equipped with a gyroscope sensor and using VR cardboards device. The operating system that can play this application was android at least 5.0 version or android lollipop. It is controlled with gyroscope sensor. The development of this application used of diagrams namely use-case diagrams. Figure 2 shows the use case diagrams illustrates about system functionality.

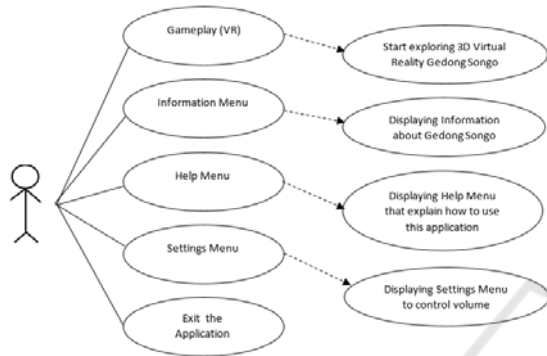


Figure 2: Use Case Diagram.

The interface was design to be user friendly and easy to understans. The UI design were presented in Figure 3 is the main menu, Figure 4 is the information menu, Figure 5 is the setting menu, Figure 6 is help menu and Figure 7 is gameplay.

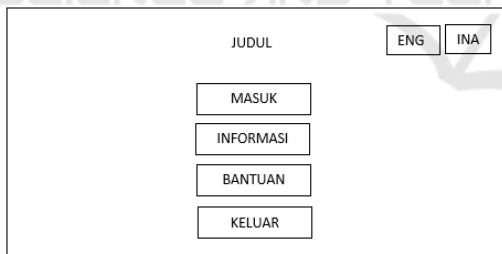


Figure 3: Main Menu.

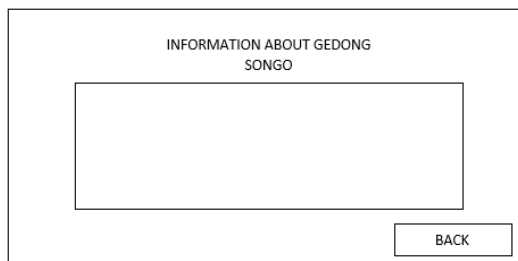


Figure 4: Information Menu.

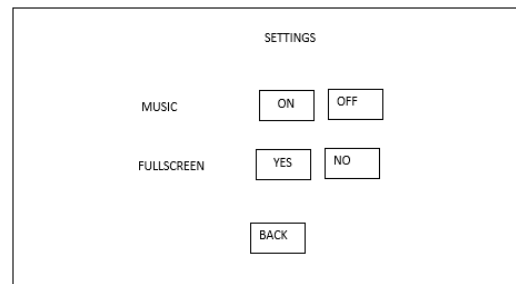


Figure 5: Settings Menu.

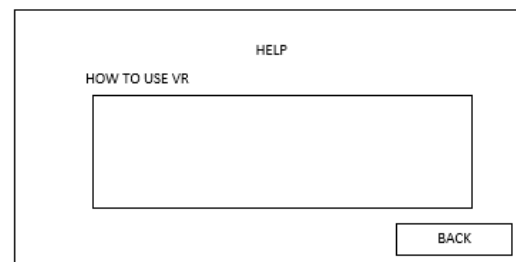


Figure 6: Help Menu.



Figure 7: Gameplay.

3 RESULT AND DISCUSSION

Application Virtual Tour Gedong Songo has minimum spesifications consisted of processor intel core 2 duo with RAM 2GB, and graphic card VGA. Interface implementation was done according user interface design that created earlier. Final UI design presented in Figure 8 is the main menu, Figure 9 is the information menu, Figure 10 is the setting menu, Figure 11 is help menu and Figure 12 is gameplay.



Figure 8: Main Menu UI.



Figure 12: Virtual Tour Gedong Songo.



Figure 9: Information Menu.



Figure 10: Settings Menu.



Figure 11: Settings Help.

Evaluation divided by three steps: (1) software testing; (2) design validation testing; (3) user response testing. The first step is software testing using black box method. This step was run by developer to discover system functional errors. Software testing results show the system is running well and there is no functional error. The result of black box testing is shown in Table 1.

Table 1: Black Box Test Results.

Step	Test Case	Expected Results	Actual Result	Status (Pass/Fail)
1	Press "Indonesia" button	Should Displays Indonesian Main Menu	Displays Indonesian Main Menu Successfully	Pass
2	Press "English" button	Should Displays English Main Menu	Displays English Main Menu	Pass
3	Press Information button	Should Displays Information Menu	Displays Information Menu	Pass
4	Press Help button	Should Displays Help Menu	Displays Help Menu	Pass
5	Press Settings button	Should Displays Settings Menu	Displays Settings Menu	Pass
6	Press Enter button	Should Displays Gameplay	Displays Gameplay	Pass
7	Press Exit button	Should Close the Application	No Display	Pass

The second step was design validation testing. Design validation testing is done by material experts who know the overall design of the tourist objects. The data analysis technique used in the design validation test and user usage test is using Likert scale. Sugiyono (Sugiyono, 2013) suggests Likert scale is used to measure attitudes, opinions, and

perceptions of a person to something. The results of the design validation testing shows the percentage of assessment of 90.56% which is categorized as good. The last step was user usage testing. This step conducted by giving an assessment paper to 20 people of sample users to use all the features in this application. Result of user response testing shows percentage of assessment of 80.56% which is categorized as good.

4 CONCLUSIONS

Based on research of “Development of Information Services for Cultural Heritage Site Gedong Songo Temple Through Based Virtualization 3D Bilingual Technology and Location Based Service”, it can be concluded the final application named Virtual Tour Gedong Songo is run on desktop with operating system Windows.

This application has been through several stages of testing that shows the percentage of design validation validation of 90.56% and the percentage of user test valuation of 80% which is included in category is very good to introduce and promote Gedong Songo Temple.

Users can get to know and learn about one of historic buildings in Indonesia presented in this application.

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