



Utilization of Information Technology for Tourism Development of Lake Kelimutu, Ende Regency, East Nusa Tenggara With a Virtual Tour Based on Mobile Web

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ABSTRACT

The development of technology that is increasingly rapid day by day, gives rise to many new innovations from technology. One of the technological development innovations is virtual tours which are starting to be widely used, for example in some applications to introduce a location. However, the use of virtual tour applications as a medium for promoting tourism in Indonesia is still very small. Virtual tour Kelimutu lake tourism in Ende regency, East Nusa Tenggara, was created to be able to visually display information from the natural attractions of lake kelimutu. The development methodology used in this study is the Multimedia Development Life Cycle (MDLC) methodology which is a multimedia software design method that emphasizes the 6 stages of multimedia development with this virtual tour users can see the state of 360° natural lake attractions kelimutu made with immersive photography techniques. By presenting information in the form of a 360° panoramic image, it makes it easier for users to visually display information from the tourist attraction.

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1. INTRODUCTION

Tourism is a very sector important for the development of an area, tourism is one of the means of promotion to introduce the beauty of nature as well as the uniqueness of the culture in the area, the development of the tourism sector in a country will attract other sectors to develop as well because its products are necessary for supporting the tourism industry, such as the sector agriculture, animal husbandry, plantations, handicrafts people, increased employment opportunities, and others etc. (Udayana, Wirawan, & Sunarya, 2015). To meet information needs finally pushing human thought to develop technology so that it delivers ease in human life (Sulihati & Andriyani, 2016). Similarly, Technology information helps work with providing information and performing a variety of

tasks related to processing information. The utilization of information technology has covers a wide range of fields, ranging from the field economics, business to education (Ermatita, 2016). The development of tourism is one of the important things for a country. With this tourism, a country or more specifically the local government where the tourist attraction is located, will get income from the income of tourist visits for each tourist attraction. According to the Law of the Republic of Indonesia Number 10 of 2009 concerning Tourism, what is meant by a tourism business is a business who provide goods and or services to meet the needs of tourists and the organization of tourism. Tourist attraction is everything that has uniqueness, beauty, and value in the form of diversity of wealth nature, culture, and man-made products targeted or intended tourist visits. Tourism in the industrial era 4.0 is very important in an area or a large area. Tourism itself can also be used as a as an icon of the region that can be known to many foreign and domestic people, that can bring in tourists

The development of many times has resulted in the rapid development of technology. The use of technology in communicating as a means to facilitate human performance is very widely used among the public. According to the Great Dictionary of Indonesian (KBBI), the word technology contains the meaning of the scientific method to achieve practical goals, applied science or the whole means to provide the necessary goods for the survival and comfort of human life . The running process can use or produce certain products, where the products produced are not separate from other existing products. Tourism is one of the sectors that has been greatly affected by the COVID-19 pandemic. Based on data from the Ende Regency Tourism Office, the level of tourist visits to ende district has decreased. tourists visiting Kelimutu National Park in 2018 in the last 5 years are increasing but began to decline in 2019. in 2018 the number of tourist destinations reached 91,219, but decreased in 2019 to 87,498 tourists both domestically and abroad. Meanwhile, in 2020 during the COVID-19 pandemic, the number of tourists only reached 39,320 people.

The local government of Ende Regency created a new strategy that refers to the standard operating procedures (SOP) of health protocols. For this reason, the tour providers as well as other elements of the community who understand the health protocols of the tourism world carry out some socialization to the community what should be done and brought during visits to tourist attractions and also to what tour providers must be prepared and provided during tourists visiting. In addition, the Tourism Office also supports by adding infrastructure and supporting facilities in tourist attractions in accordance with health protocol standards, with the readiness and strategies that will be carried out, the tourist destinations of Ende Regency are ready to welcome tourism during the Covid-19 pandemic. Ende Regency, especially the tourism sector, is one of the strategic and potential sectors to be managed, developed and marketed. Kelimutu National Park is a favorite tourist attraction that is also an icon of Ende Regency which has high attractiveness and has beautiful scenery. Kelimutu National Park consists of hills and mountain mountains. One of them is Mount Kelimutu, which also has a three-color lake which is the place of Kelimutu National Park. Mount Kelimutu is the location / subject for tourists who are interesting to visit. This tourist attraction has the potential to increase the Original Income of the Ende Regency. In 2020 the number of tourists visiting income amounted to 39,320 and in 2021, visits continued to decline to 33,702. The decrease in visits has an impact on the Non-Tax State Revenue (PNBP) received by BTNK Ende. In 2019, receipts from entry tickets amounted to Rp 3,089,739,500. Meanwhile, in 2020, receipts decreased considerably to IDR 555,500,000. In 2021, receipts dropped again to IDR 308,900,500.

Virtual Tourism (Virtual Tourism) is one of the alternatives that emerged in the midst of the COVID-19 pandemic. Virtual Tourism is here as a form of transformation and adaptation against the pandemic by utilizing technology, while waiting for the recovery process of the tourism world which is not yet significant. The idea of Virtual Tourism has

now begun and continues to be developed by various parties, such as the Ministry of Tourism and Creative Economy, local government, and the community. The content in this Virtual Tour is also very diverse, ranging from natural panoramas, museums, art performances and performances, indigenous culture, to the atmosphere of metropolitan life in Indonesia which is available in the form of images and videos. The hope is that the existence of virtual tour tours can make potential tourists feel like they are in the destination where they want to be. This is tantamount to offering a "try before buying" experience that can encourage the urge to travel.

Mobile web is a technology that accommodates the need for internet access through mobile devices. Previously, the web or internet could only be accessed through a computer (PC/personal computer). Responding to this situation, the author tries to build a website-based information system with virtualtour technology to facilitate and promote more broadly in the field of tourism, especially lake kelimutu tourism in Ende regency, East Nusa Tenggara. This system is also a form of promotion through the internet and computer media. The more tourists who visit, the income of the area and the surrounding community will increase, in addition to that with the existence of a web-based information system, tourism objects in ende district will be better known by the wider community and motivate the local government to pay attention to the management of tourist attractions in the area.

2. RESEARCH METHOD

There are still many application development methodologies for multimedia, but not necessarily these methods can be applied to multimedia-based software development. One of the most well-known software development methods is the multimedia development method according to O.B.P. Mah et al. (2019) who argue that there are 3 (three) stages in the multimedia development methodology, namely Data collection, Data preprocessing, Data processing.

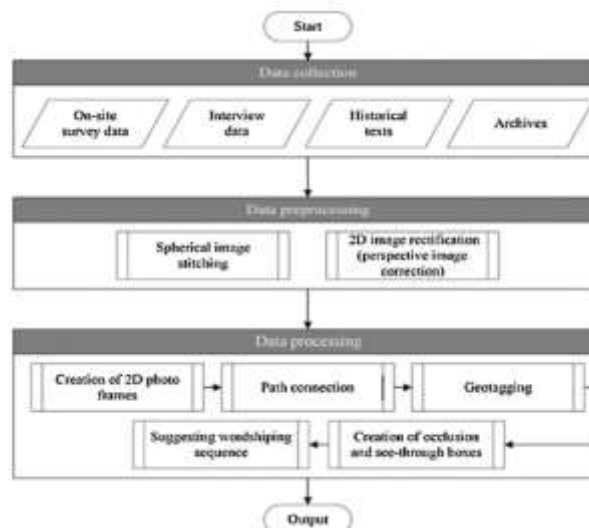


Figure 1. Multimedia Development Model O.B.P. Mah et al

- Here are 3 (three) stages of the multimedia development method of O.B.P.Mah et al:
1. Data Collection, Data Collection is the procedure of collecting, measuring, and analyzing accurate insights for existing problems using standard validated techniques. What we need to know is the purpose of the data collection The collection of accurate data collection is very important and aims to maintain the integrity of the research,

make the right business decisions and ensure quality assurance. From the data collection that we see in the chart above, there are several types of data collection, namely, collecting location survey data, interview data, historical texts, archive archives.

2. Data Preprocessing, Data preprocessing is a process that transforms raw data into a more understandable form. This process is important to do because raw data often does not have an orderly format. In the preprocessing data stages there are 2 types of processes, namely Spherical Image Stitching and 2D image rectification (perspective image correction)
3. Data Processing, Data Processing is a method of collecting raw data and translating it into usable information. It is usually carried out in a step-by-step process by a team of data scientists and data engineers in an organization. Raw data is collected, filtered, sorted, processed, analyzed, saved, and then presented in a readable format. In this data processing there are several stages that will be explained later

Real data was collected through on-site surveys using 360 cameras and DSLR cameras. The 360 camera is used to capture images of Lake Kelimutu. The raw spherical image is further processed into a panoramic image. It was also observed that the level of detail for objects is much reduced. In particular, figure 360 of the monument located near the ceiling where it stands around the lake area has a low image resolution. Therefore, DSLR cameras are used to capture high-resolution 2D images. This 2D image is superimposed onto a panoramic image to overcome low visibility. In particular, the image is taken from the position of data collection (point of view) denoted using the point a. To ensure a consistent display of levels and angles is applied to all round images, a stabilizer with built-in levels was used during the collection of the 360 image. The pictures covered the whole scene. It is difficult to determine the exact number of data collection points and the exact location of the points. We address these challenges by implementing trial and error methods to improve data collection. For enclosed spaces the angle of view is deliberately selected and arranged using triangulation to ensure maximum coverage of enclosed areas, such as gazebos on lake kelimutu. Although spherical images have a higher resolution, they do not have the same degree of overlap or ease of collection compared to spherical videos. Thus, a mixed data method was adopted, which involved recording a video covering the entire area of the lake to complement the image in the Virtual Tour.

3. RESULTS AND DISCUSSIONS

Interface design is used to design web-based virtual tour applications. Some parts need to be considered including: Home Page, The front yard is used as the initial display of the kelimutu lake tourism virtual tour application, the design of the front yard that is made will produce a front view of the kelimutu lake as shown in figure 2 below.

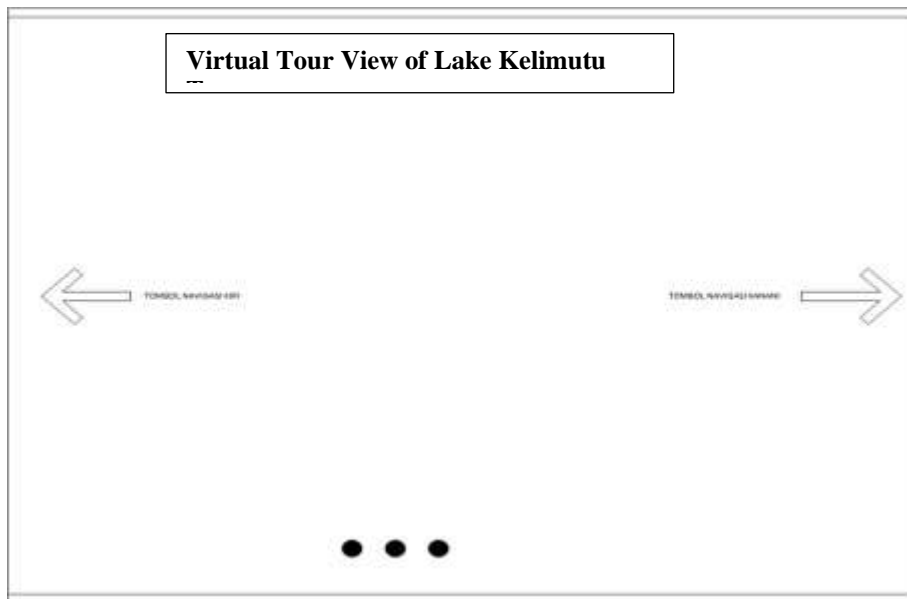


Figure 2. Virtual view design of kelimutu lake tour

The design of the main courtyard of Lake Kelimutu The main page display design is used as the main display of the kelimutu lake tourism virtual toor application, the main page design created will produce the main view of the 3 kelimutu lakes. As in figure 3 below.

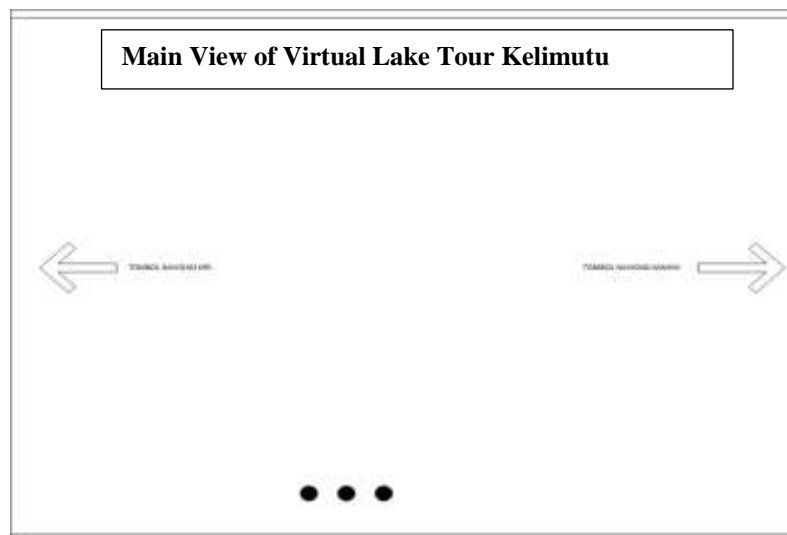


Figure 3. Design of the virtual main view of kelimutu lake tour

As a result of the implementation of the home page of the kelimutu lake tourism virtual toor application was run for the first time, this page displays the front view of the entrance to the kelimutu lake tourism.



Figure 4. Front page view virtual tour kelimutu lake tour

Home, The result of the implementation of the main page of the kelimutu lake tourism virtual tour application was run for the first time, this page displays the main view of the 3 lakes of lake kelimutu.



Figure 5. Kelimutu Lake Virtual Tour Display

from the results of the application, users can see virtually the kelimutu lake tour before visiting directly, where with this application it also helps tourists' interest in visiting lake Kelimutu so that it helps increase regional income from its tourism results.

4. CONCLUSION

Application of natural attractions in Lake Kelimutu was successfully carried out and can be developed again in the future. The photo size for panoramas in Eclipse by using the PanoramaGL library should not exceed the size of 1024 x 512.

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