

Development of Cultural Heritage Tourism Based on Virtual Reality (VR) Asahan Regency, North Sumatera Province

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Abstract. In the Asahan Regency Objects of Alleged Cultural Heritage (ODCB) registration activity carried out by the Asahan Regency Education Office in 2023, 60 ODCBs were identified in the form of objects, buildings, structures or sites. Of the 60 ODCBs, there are at least 20 ODCB whose priority is to become Cultural Heritage. However, most of these priority cultural heritage objects are unknown and unknown to the public. In fact, there are very few sources regarding the history and significance of this object when searched via internet searches. In fact, through the current digital era, it is very important to publish the existence of cultural heritage objects as one of the tourism potentials in Asahan Regency through digital technology networks. One form of digital or virtual cultural heritage tourism development in Asahan Regency that can be done is based on Virtual Reality (VR). This virtual cultural heritage tourism will produce website and mobile-based 3D animated videos that are needed in the era of revolution 4.0, both by local communities and the general public.

Keywords: Cultural Heritage, Archaeology, Asahan, Virtual Reality.

1 Introduction

Minister of Tourism and Creative Economy, Sandiaga Uno stated that history-based tourism is one of the most popular tourism themes for tourists after the COVID-19 pandemic (metro.suara.com). This is because global tourists today do not just want to have fun or rest and relax, but they also want something new that provides an experience as world citizens [1]. As a nation rich in historical values and objects, the development of this historical tourism must of course be pursued as much as possible, in order to realize the strengthening of national tourism.

The importance of historical potential in tourism development is based on several factors, namely: 1) historical tourism is the strongest driving factor, because tourists are directly involved with the historical heritage of the destinations visited; 2) historical objects are important assets of modern cities that can generate significant profits in economic development;

3) in the social field, historical tourism can even out seasonal fluctuations and tourist flows in the region; 4) historical potential becomes a very profitable "branding" and brings uniqueness to the region. Asahan Regency is one of the regencies in North Sumatra Province that is rich in historical and archaeological heritage that can be a source of historical tourism resources.

Asahan Regency is one of the regencies in North Sumatra Province that has a long and important history. Before the Unitary State of the Republic of Indonesia was established, Asahan had emerged as one of the sultanates that had its own government system. Around the 17th century, the Asahan Sultanate and other sultanates in East Sumatra became areas fought over by the Siak Sultanate and the Aceh Sultanate. Archaeological remains that can be found in Asahan Regency to this day include objects, buildings, structures, sites and areas. In the Cultural Heritage Law Number 11 of 2010 concerning Cultural Heritage, it has also been explained that cultural heritage objects consist of cultural heritage objects, cultural heritage buildings, cultural heritage structures, cultural heritage sites, and cultural heritage areas that need to be preserved because they have important value for history, science, education, religion, and/or culture through the determination process.

Unfortunately, all cultural heritage objects in Asahan Regency have not been published properly. In addition to its history not being recognized by the public, its location is also unknown. In fact, these cultural heritage objects are historical and archaeological remains of Asahan Regency which have high important value. Especially in strengthening national identity and national awareness. One effort to develop cultural heritage tourism can be done virtually based on Virtual Reality (VR). This virtual tourism development method is also one of the answers to the demands of the current 4.0 revolution era. So that the younger generation or other general public who in their daily lives are very close to digital activities have a greater opportunity to access cultural heritage tourism externally, either through websites or mobile.

Virtual cultural heritage tourism is a virtual space that has all sources of knowledge information packaged through multimedia by trying to create user interaction with the result of getting an experience like exploring a museum [2]. Virtual cultural heritage tourism is broadly a collection of images, sound files, document texts, and videos from history, science or cultural interests that are recorded digitally and can be accessed through electronic media. Virtual cultural heritage tourism content will produce a website filled with various multimedia elements such as 3D animation videos, menus containing the history of objects, the meaning of detailed aspects of objects, and the important value of cultural heritage objects [3]. Therefore, cultural heritage tourism using virtual reality (VR) will be more interactive and interesting.

2 Method

This study uses a research and development approach. The ADDIE model research and development has a procedure that is arranged with a sequence of activities at each stage of systematic development. In this study, there are five stages, namely (1) Analysis, (2) Design, (3) Development, (4) Implementation and ends with stage (5) Evaluation [4]. Analysis is the initial stage of the ADDIE model to identify possible causes of gaps regarding expectations and reality or facts in the actual field. The general procedure related to design is to conduct a data inventory in the field, namely the need to take 360° photos of cultural heritage objects in Asahan Regency.

In the development phase, what is done is to validate the 360° virtual reality (VR) product of cultural heritage tourism in Asahan Regency through the Theasys.io website. General procedures related to the development phase consist of producing a prototype, selecting supporting software, and conducting formative revisions. The next stage is implementation, at this stage preparing researchers to present the results of the 360° virtual reality (VR) of cultural heritage tourism in Asahan Regency to various stakeholders in Asahan. The final stage is evaluation, which can be interpreted as a process carried out to provide value to the 360° virtual reality (VR) prototype of cultural heritage tourism in Asahan Regency.

3 Results and Discussion

Asahan Regency has 25 sub-districts, each of which is suspected of having objects suspected of being cultural heritage (ODCB). In the registration activity carried out in November - December 2023, of the 25 sub-districts, only 15 sub-districts have successfully identified the potential for ODCB, namely 60 ODCB [5]. The ODCB that were successfully identified include objects, buildings, structures and sites with religious characteristics such as tombstones or graves, mosques, Islamic boarding schools and others. There are also objects with cultural characteristics related to the history of ethnic groups in Asahan. In addition, there are also objects with characteristics of Dutch East Indies colonialism, plantations, Japanese occupation, and revolutionary struggles.

Table 1. List of ODCB Distribution in Asahan Regency.

Sub-District Name	Number of Sites
Bandar Pasir Mandoge	2
Bandar Pulau	4
Aek Songsongan	1
Rehuning	-
Pulau Rakyat	12
Aek Kuasan	-
Aek Ledong	-
Sei Kepayang	-
Sei Kepayang Barat	-
Sei Kepayang Timur	2
Simpang Empat	5
Teluk Dalam	3
Air Batu	-
Sei Dadap	2
Buntu Pane	1
Tinggi Raja	-
Setia Janji	-
Meranti	-
Pulo Bandring	-
Rawang Panca Arga	2

Air Joman	2
Silau Laut	5
Kota Kisaran Barat	10
Kota Kisaran Timur	4
Bunut	2
Total	60

The classification of the ODCB forms is in the form of 2 objects, 20 objects in the form of buildings, 33 objects in the form of structures, and 4 objects in the form of sites. Of the 60 ODCBs, 10 objects were then designated as cultural heritage [5].

Table 2. List of cultural heritage in Asahan District.

List of Cultural Heritage	Status
Mangkuk Getah Karet HAPM	Cultural Heritage Objects
Bedil or Senapan Lontak	Cultural Heritage Objects
Gedung Juang 45 Asahan	Cultural Heritage Building
Masjid Raya Kisaran	Cultural Heritage Building
Rumah Makan Pondok Kelapa	Cultural Heritage Building
Rumah Syech Abdul Majid	Cultural Heritage Building
Makam Nisan Aceh	Cultural Heritage Sturcture
Makam Sultan Abdul Jalil	Cultural Heritage Sturcture
Menara Air PDAM	Cultural Heritage Sturcture
Makam Belanda	Cultural Heritage Sturcture

Based on the results of the research team's observations in the field, it was concluded that objects that have the potential to be developed as virtual tourism based on augmented reality using www.theasys.io 360 are:

- Gedung Juang 45 Asahan
- Masjid Raya Kisaran
- Rumah Makan Pondok Kelapa
- Makam Belanda

After completing the analysis stage of 4 cultural heritage objects that have been designated as district-level cultural heritage by the Regent of Asahan Regency, the next stage is the design stage. The researcher carried out several activities including developing initial ideas, conducting data inventory in the field, namely the need to take 360° photos of 4 cultural heritage objects in Asahan Regency, namely: 1) Gedung Juang 45 Asahan; 2) Kisaran Grand Mosque; 3) Pondok Kelapa Restaurant; 4) Dutch Cemetery. The design stages in this study are as follows: creating a flowchart, creating a storyboard, development, dan implementation.

2.1 Creating a Flowchart

The researcher developed a concept regarding the existence of in-situ objects in the field into virtual tourism content based on augmented reality. The flowchart was made starting from the opening, content, and closing.

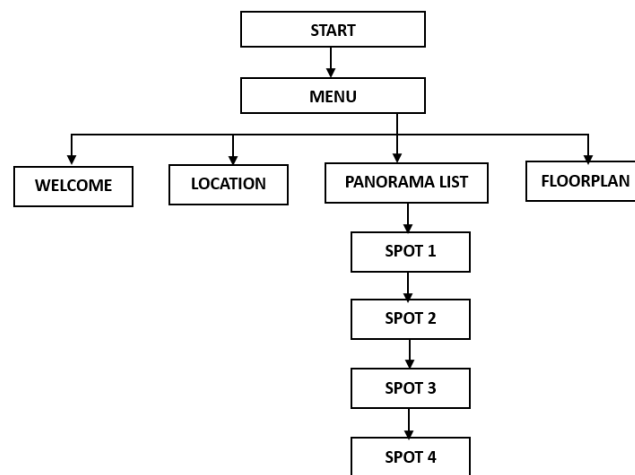


Fig. 1. Flowchart of Asahan Cultural Heritage Virtual Museum Design.

2.2 Creating a Storyboard

A storyboard is used to create a web display design for a photography gallery of cultural heritage objects that is being developed. The storyboard contains stages and sections that will be displayed on virtual tours based on augmented reality.

2.3 Development

The next stage is the development stage where at this stage the production of data acquisition begins using appropriate equipment in their 360° documentation. At this stage there are several steps taken including the process of taking pictures in the field, developing content related to information text, images, supporting audio and video, and others. The systematics in this development stage consist of:

- 360° Photo Capture
- Supporting Software Selection
- Unifying Materials

The models that have been developed are as follows:



Fig. 2. Panorama 1 of the Front of the Kisaran Grand Mosque

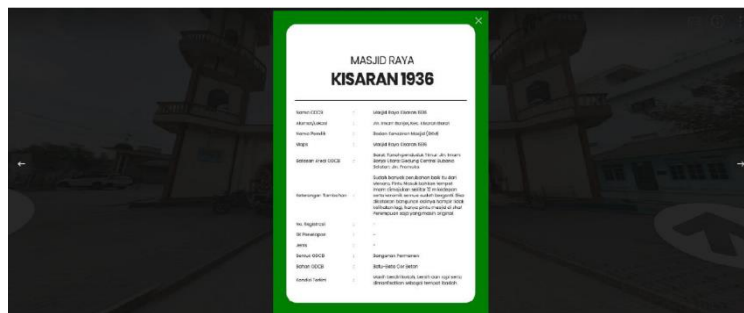


Fig. 3. Information on Panorama 1

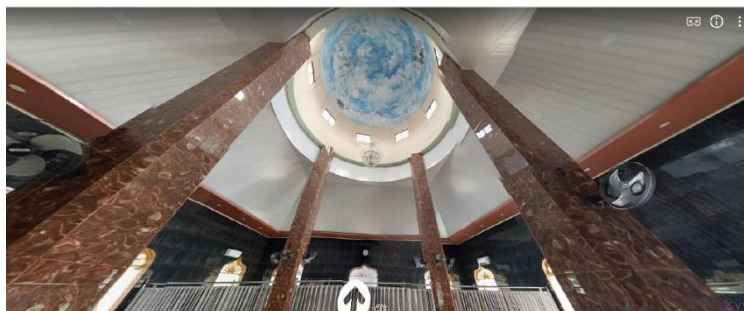


Fig. 4. Sample Image in Panorama 2

2.4 Implementation

After the analysis, design, and development stages are completed, the next stage is the implementation stage. At this stage, the implementation of the use of the Asahan Regency cultural heritage Virtual Tour web is carried out.

3 Conclusion

In this study, important data was found related to the potential of cultural heritage in Asahan Regency. At least based on the results of the inventory that had been carried out, it was found as 60 ODCB, although after further analysis it turned out that not all ODCB ultimately met the right criteria to be designated as Cultural Heritage. In 2024, the Asahan Regency Government has designated as many as 10 district-level cultural heritage objects. Based on the 10 objects that have been designated, it was further identified that the objects that have the potential to develop virtual tourism are 4 objects, namely 1) Gedung Juang 45 Asahan; 2) Kisaran Grand Mosque; 3) Pondok Kelapa Restaurant; and 4) Dutch Cemetery Area. Currently, 3600 data recordings of the 4 objects are being processed and developed.

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