Digitalization of Cultural Heritage Data in East Nusa Tenggara Towards a Metaverse Database
Initial Stage Towards the Virtual Museum of Austronesian Culture in East Nusa Tenggara

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1.1 Background

The potential threats to the traditional villages in East Nusa Tenggara (NTT) are relentless; fires could devastate the villages, which are largely made from organic materials, making them highly vulnerable to complete destruction. Indonesia's geographical location at the meeting point of major tectonic plates makes it prone to various natural disasters, such as earthquakes and volcanic eruptions. In addition to being located in the Pacific Ring of Fire, floods, cyclones, and droughts could also threaten the existence of cultural heritage, including the aftermath of such extreme weather conditions. This concern must be addressed with concrete steps to implement disaster mitigation. Efforts to record, archive, and create a reliable database of cultural heritage from an early stage are considered crucial, as no comprehensive effort has been made, and the existing initiatives are partial and do not cover the aspects necessary for future data needs.

Several incidents have directly affected the cultural heritage in East Nusa Tenggara, such as the destruction of traditional villages due to fires, the Cyclone Seroja disaster that devastated traditional village buildings, and other events that have led to the loss of the authenticity of cultural potential in East Nusa Tenggara and other parts of Indonesia. The lack of detailed and high-resolution archival data makes preservation and conservation efforts post-damage extremely challenging.

We are aware of the scarcity of knowledge and professional experts in the field of cultural heritage, particularly in preserving both tangible and intangible heritage on Sumba Island. We believe that it is vital to begin the identification and documentation of cultural potential in the highest specification format.

The above description provides a brief background of our concern as culture enthusiasts seeking solutions for the sustainability and resilience of culture and the communities that support it. The environmental conditions, extreme weather, natural disasters, human

negligence, and the risk of losing the authenticity of cultural data due to certain situations must be addressed to ensure its continuity. The development of information technology and data recording should be welcomed with creativity from its users. Artificial Intelligence (AI) has provided us with great opportunities to think critically, begin utilizing it, archiving, and using it for sustainable preservation efforts.

Objective

Based on the above introduction, we have outlined the following objectives:

a. Digital archiving of Sumba's traditional village cultural heritage in East Nusa Tenggara for future reliability.

b. Transformation of information through the transfer of Sumba's traditional village cultural heritage to a broader audience.

c. Realization of high-quality digital data for Sumba's traditional villages into a virtual museum of Austronesian culture in East Nusa Tenggara.

Concept of the Activity

The "Digitalization of Cultural Heritage Data in East Nusa Tenggara Towards a Metaverse Database" is the initial mission for strengthening and archiving, including publishing cultural content. The Metaverse is a virtual world that allows users to interact, communicate, work, play, and transact just like in the real world. The term "metaverse" has not been clearly defined yet. In simple terms, the metaverse is a concept of a virtual world that can be owned and filled with various objects and activities like the real world. This concept combines several technological elements, including virtual reality (VR) and augmented reality (AR). A database is a collection of information related to a specific subject for a particular purpose, organized and stored integrally using computerized methods to provide optimal information for users. The focus of this activity is on cultural heritage potential, which must be archived in a digital database due to its vulnerability.

Vulnerability of Cultural Heritage

As mentioned in the background, the urgency of this activity is focused on the vulnerability of traditional villages with all their valuable elements. A traditional village displays various artifacts, including architecture, sacred and profane ritual objects, and daily-use items by the community. Considering the vulnerability of these objects, we do not want to lose data (total

loss) due to the lack of preparedness in facing disasters. Through high-quality digital archives, we at least have data based on the authenticity of the objects. There should be no digital manipulation that can distort the meaning of cultural heritage, which is crucial for strengthening and building culture in the future.

In addition to natural factors, the loss of cultural heritage data can also be caused by human negligence, even by the community that supports the culture itself. Negligence can stem from a lack of awareness of the risks caused by certain behaviors. Considering that most of the materials used in traditional houses in NTT are organic and highly flammable, documenting this data for archiving and future processing is critical.

Strategic Value

The dynamic use of cultural objects for tourism has developed in various countries, becoming a primary sector, especially in tourism. The initial step towards that projection is updating cultural data. The Internet of Things (IoT) is a computing concept where everyday objects are connected to the internet and can identify themselves to other devices. IoT allows these objects to communicate and exchange data with other devices as long as they are connected to the internet. To broadcast, publish, and promote cultural heritage for various purposes, we should take advantage of the infrastructure that has developed today (the internet). Before publishing and connecting, reliable digital data is essential.

Output and Outcome

The output of this activity will be high-resolution digital photos and videos (≥4K), 360-degree high-resolution photos and videos, aerial view photos/videos from drones, 3D digital photogrammetry, linguistic data, ethnographic data on traditional villages, and megalithic heritage from Sumba Island, including traditional dances, musical instruments, and audio recordings. All collected data will be processed and stored on a dedicated server for future data processing. The data will be stored on a hosting server with high capacity, allowing public access. Specific links will be created for high-resolution data access.

Execution

The activity titled “Digitalization of Cultural Heritage Data in East Nusa Tenggara Towards a Metaverse Database” will be conducted in East Nusa Tenggara, specifically on Sumba Island. This activity focuses on observing and collecting data from the traditional villages of Sumba, including photos, videos, audio, aerial video, 360º video, and 3D images in digital

photogrammetry. Given the diversity of objects, including architecture, ethnographic items, megalithic tombs, musical instruments, languages, and folklore, various data recording tools and special expertise will be required.

Methodology

The methodology for this activity is divided into three main parts: field research (observation), field data recording, and editing-uploading. This research includes secondary data collection from books, articles, and related research on the objects. The initial research findings will be used for the identification of the forms, functions, meanings of traditional villages, and their important values, referring to Law No. 11 of 2010 on Cultural Heritage.

Instruments and Data Recording Devices

1. Ultra HD Digital Camera (4K Cinema Quality)
2. Ultra HD Video Camera (4K Cinema Quality)
3. 360º Camera (8K Support for 3D Photogrammetry)
4. Drone with Lidar and Photogrammetry capabilities
5. iPad Pro 2021 (Lidar Scanner)
6. Audio Recording Equipment (Zoom F6 MultiTrack Field Recorder)
7. High-performance Laptop/Computer for Editing
8. LED Studio Lighting for Indoor Use
9. 3D Vista Software Package
10. High-capacity Hosting Server Package
11. High-capacity Memory Cards and Hard Disks

The success of this project relies heavily on the availability of equipment with advanced technology. Some of these devices are essential before the data can be processed and published. Experts in archaeology, ethnomusicology, museology, multimedia curation, professional photographers, digital photogrammetry practitioners, and virtual reality experts will be key to the project's success.

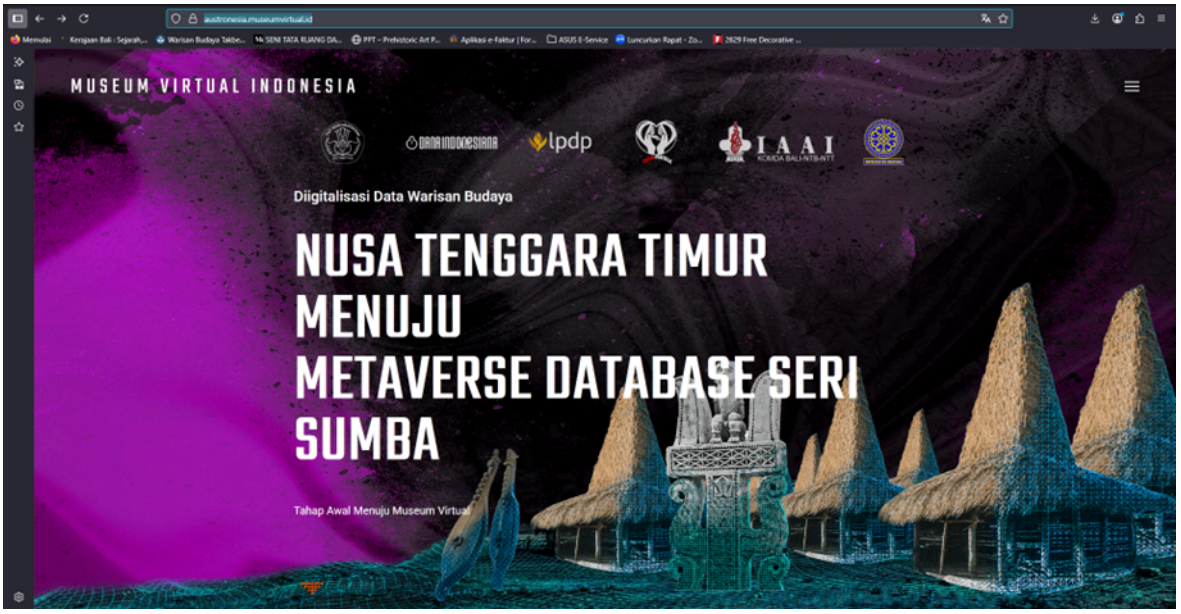
Target Objects

The initial research will involve experts in archaeology and cultural heritage, including both tangible and intangible cultural heritage, across 40 traditional villages in four regencies on Sumba Island:

- **West Sumba Regency** (10 villages)
- **Sumba Regency** (8 villages)
- **Central Sumba Regency** (14 villages)
- **East Sumba Regency** (12 villages)

Results

The digitized data of Sumba's traditional villages will be processed and published in a virtual museum integrated with other data services for public access. Users can access the following link, which is still under construction:



https://austronesia.museumvirtual.id/

Conclusion

The spirit of conserving cultural values today requires special attention from both the government and society as future generations. Technological advancements, alongside the

creativity of millennials in developing their own innovations, should support efforts to increase awareness of cultural heritage preservation. The belief that a country without culture is empty, and that culture without conservation is an irony, is truly relevant today. We hope that these small steps will inspire creativity among millennials to make more productive use of this data in the future. We also hope that the open-source data portal can be further developed and transformed into various content following the applications that are rapidly growing, especially in the cultural field. We are confident that technology will continue to evolve, and we must embrace this challenge in the future. AI multimedia is a contemporary product that requires special skills, advanced tools, and innovations to thrive in the digital era of the metaverse and Big Data.