

Research Article

Nusantara Digital Museum Based on Virtual Tour and Virtual Guide: A Case Study of Woven Fabric, Shawls, Songket and Ulos

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ABSTRACT

This study aims to digitize ulos, woven, songket and shawl fabrics spread across several districts and cities into a digital museum based on virtual tours and virtual guides. Digitization contains images of fabrics, then the patterns, symbols and motifs contained in each fabric will be explained as a learning of noble values, philosophy and history in each fabric as a cultural heritage based on local wisdom. The noble values, philosophy and historical meaning of the fabric are explained through the Indonesian digital museum platform as a form of love for museums with a cultural approach that contains meaning and significance. The Indonesian digital museum contains woven fabrics, songket, shawls and ulos used by the community, but few of them know the meaning, patterns and motifs contained in them. The focus of this research is a form of love for museums that are now starting to be abandoned. Departing from technological developments, a website-based Indonesian digital museum platform was designed and built that can be visited by the public online with a virtual tour experience and at the same time a guide (virtual guide). The method used in designing and building this Indonesian digital museum is the SDLC (Software Development Life Cycle) method. The research stages begin with system requirements analysis, then interactive museum design and supported by program code implementation so that during testing and verification it is ready for use.

Keywords: Museum; Virtual Tour; Virtual Guide; Kain Tenun; Selendang; Songket

1. INTRODUCTION

The Nusantara Digital Museum project based on Virtual Tour and Virtual Guide aims to present a new experience for museum visitors, allowing them to explore Nusantara cultural heritage digitally (Lubis & Sandi, 2020). This process involves user needs analysis, system design, application development, testing, and implementation (Prayitno, 2022). The needs analysis produces a needs specification document that serves as a guideline for development. The focus of the museum's objects includes woven fabrics, songket, scarves and ulos which are digitally recorded in various districts and cities spread across Indonesia. Furthermore, the system design is carried out by designing the architecture and user interface on the museum's interactive website platform (Agam et al., 2024). The development stage produces the Nusantara Digital Museum application which functions online as a virtual tour for the wider community (Sadzali et al., 2023). After that, testing is carried out to ensure the application is in accordance with the specifications and works well. The result is a test report that includes errors and functionality test results (Faturrazi et al., 2023). Finally, the application is implemented and ready for use by users, equipped with a user guide. This project follows the SDLC methodology to ensure efficiency and effectiveness in achieving project objectives. This research also involves a strategy for collecting data on woven fabrics, ulos, songket, and scarves from various sources, digitizing objects in the field, and designing and building a virtual museum with virtual tour and virtual guide features. Through this approach, the project aims to broaden public understanding of the cultural values of the Archipelago contained in these fabrics (Wati et al., 2022). Researchers are responsible for designing the system, compiling reports, and field observations to digitize the fabrics. Researchers will observe and make direct observations of traditional figures, weaving, songket or ulos actors and the local community to gain knowledge and information about the motifs, patterns, and symbols contained in the fabrics. The representation of the noble, philosophical, and historical values contained in the fabrics is presented to the public through a virtual museum, so that the urgency of this research lies in the learning point about the patterns, motifs, and symbols contained in the fabrics.

1.1 Research Question

1. It is necessary to design and build a Nusantara Digital Museum Based on Virtual Tour and Virtual Guide (Case Study of Woven Fabrics, Shawls, Songkets and Ulos) in several regencies/cities in Indonesia.
2. This Nusantara museum contains the digitalization of Woven Fabrics, Shawls, Songkets and Ulos Cases.
3. The meaning, pattern, symbols and motifs contained in Woven Fabrics, Shawls, Songkets and Ulos will be explained in terms of their noble, philosophical and historical values in the digital museum.
4. The meaning, pattern, symbols and motifs contained in the object will be explained in terms of their noble, philosophical and historical values to the public as a form of learning based on local wisdom of Nusantara culture.
5. Digitized Woven Fabrics, Shawls, Songkets and Ulos will be loaded into the Nusantara digital museum as a form of preserving cultural heritage and love for museums based on virtual tours and virtual guides.

1.2 Justification for the research

1. Collecting data on Tenun, Selendang, Songket and Ulos woven fabrics from various sources and field reviews
2. Digitizing objects in the field in several districts and cities in Indonesia
3. Designing and building a virtual museum with a website supported by virtual tour and virtual guide features.

2. RESEARCH METHOD

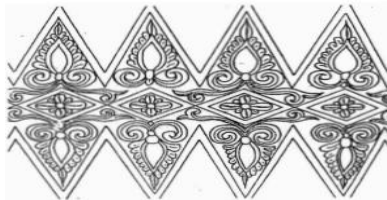
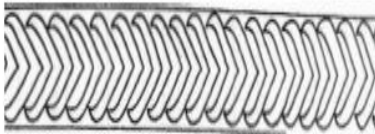
The SDLC (System Development Life Cycle) method is a visual representation of the steps to be taken in developing the project. This method helps in visualizing the process systematically from the planning stage to implementation (Rikky et al., 2023). First, the planning stage involves identifying user needs, determining project objectives, and analyzing software requirements (Lestari & Rahardi, 2023). This step will be followed by the analysis stage, where user needs will be studied further, technical requirements will be determined, and an initial design will be drawn up (Monika et al., 2023). Then, the design stage will include the overall system design, including user interface design and software architecture. Once the design is approved, the development stage begins where the actual program code is created based on the specified specifications (Junaid et al., 2022). This stage is a continuation of previous research, namely the Android-based digital ulos museum (Wulandari et al., 2021). This research is a development of the previous one, the main focus of this development is the design of a Digital museum based on virtual tours and virtual guides whose case studies are representations of learning noble values, philosophy and history regarding the meaning, patterns, symbols and motifs found in ulos cloth, scarves, songket and Indonesian weaving in several districts and cities in Indonesia (Robbani & Rosmansyah, 2021).

3. RESULTS AND DISCUSSION

3.1 Woven Fabric

One form of cultural craft inherited from our ancestors is traditional woven cloth in various regions known as songket woven cloth (Wati et al., 2022). It is not certain who and when the songket woven cloth first appeared in the West Sumatra and Riau communities (Faturrazi et al., 2023). Experts are trying to find out where weaving first originated. One of them is an anthropologist named Affendi who estimates that the weaving culture was around 500 BC, namely during the era of Mesopotamia and ancient Egypt (Wijayanti et al., 2019).

Table 1. Pictures of Woven Fabrics and Descriptions of Philosophical and Historical Values

Name	Picture	Information
Pucuak Rabuang		When young, a person contributes, and when old, remains useful as a role model for his people. Bamboo shoots symbolize future leaders who, although not yet leading, are an important part of the leadership regeneration process (Pradana Adiputra & Nala Hari Wardana, 2020).
Bada Mudiak (Ikan Teri Hidup Dihulu Sungai)		“Bada Mudiak” refers to anchovies that live in groups and are united, as in the proverbs “Bada mudiak ka hulu sarombongan” and “Buruang Punai tabang sakawan” (Hendra & Sari, 2021). This metaphor symbolizes a harmonious, peaceful, and compact life (Budiwirman, 2012).

Buah Palo
Bapatah






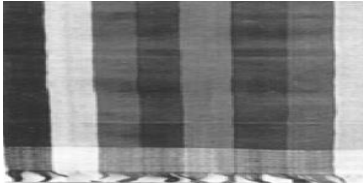

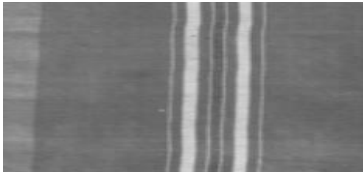
The halved nutmeg symbolizes the spirit of sharing beauty and happiness without limits, not only for small groups, but to be enjoyed together (Seprisyam et al., 2021).

3.2 Shawl

The shawl is an heirloom and complements all customary and traditional activities in society from birth to death (Zamilia, 2023).

Table 2. Images of Shawls and Descriptions of Philosophical and Historical Values


Name	Picture	Information
Selendang Rona Merah		The shawl symbolizes the spirit of optimism and the opportunity for success for everyone (Baba et al., n.d.).
Selendang Ceplok Peni		The word ceplok peni comes from Javanese, where ceplok means flower seen from above, and peni means beautiful and charming.
Selendang Tuntum Kuaci		The sunflower seed shawl symbolizes love that grows again, is sincere, eternal, and continues to grow like sunflower seeds that grow into beautiful flowers.
Selendang Galaran Kembang		The galaran kembang shawl means an invitation to return to the truth shown by God.
Selendang Bronta		The Bronta shawl symbolizes the desire to possess someone with full affection.
Selendang Miring Cawang		This shawl means that hope always exists, and strong belief will bring solutions.
Selendang Motif Bunga Krisan		Chrysanthemum flower motif shawl, used on the wedding day, symbolizes happy wishes for the bride and groom.
Selendang Ikhlasing Manah, Seri Sekar Anggrek		Ikhlasing manah means sincerity of heart. The philosophy is to live with deep sincerity to work wholeheartedly, creating artistic works that reflect noble culture (Hendra & Sari, 2021).
Selendang Ikhlasing Manah, Seri Sekar Anggrek Latar Nitik Mbang		Ikhlasing manah means sincerity of heart to work and create with all one's soul, producing works of artistic value that reflect noble culture.










Selendang Suji		The color and motif of the Suji shawl are symbols of newly married women, with bright colors such as red symbolizing cheerfulness and youth.
Selendang Suji		The colors and motifs of the Suji shawl, such as green, yellow, and cream, symbolize women who have been married for a long time and have grown children.
Selendang Suji Terawang		The translucent suji shawl symbolizes the wearer being over 50 years old or already having grandchildren.
Selendang Kluwung/Klowong		Kluwung, meaning rainbow in Javanese, symbolizes the wonders of nature and the greatness of God. This motif is used in the mitoni ceremony to pray for the safety of a 7-month-old fetus.
Selendang Gedog Madu		The Gedog Madu shawl is used in the mitoni ceremony, just like the kluwung pattern, to wish health for the baby to be born.
Selendang Sulus Angin		Sulus Angin, which means roots and banyan tree in Javanese, symbolizes a long-lasting and harmonious life. This motif is usually used for a married couple.





3.3 Songket

Songket is classified as a brocade weave. Songket is woven by hand with gold and silver threads (Utami, 2022). Its sparkling appearance with gold threads, and its smooth fabric because it is made from silk, have made songket cloth a noble clothing since ancient times and worn at traditional ceremonies or official ceremonies, such as wedding ceremonies (Manru & Efrizal, 2022).

Table 3. Songket Images and Descriptions of Philosophical and Historical Values

Name	Picture	Information
Pucuk Rabuang		When young, a person can contribute, while in old age, he becomes a role model for his community. Although bamboo shoots as a symbol of leadership cannot yet become leaders, they still play a role in the process of passing on leadership (Dewi et al., 2024).

Bada Mudiak (Ikan Teri Hidup Dihulu Sungai)		"Bada Mudiak" is a type of anchovy that is commonly found in the sea and on the coast. The life of these anchovies attracts human attention because they live in compact groups. This is reflected in traditional expressions such as "Bada mudiak ka hulu sarombongan" (anchovies move together upstream) and "Buruang Punai tabang sakawan" (like punai birds flying in groups), which describe a harmonious and peaceful life.
Saluak Laka (Alas Periuk Terbuat dari Lidi)		Laka is a pot base made from woven round coconut sticks. This decoration symbolizes closeness and strength in social life, where close relationships and good cooperation are able to face great responsibilities while remaining humble.
Buah Palo Bapatah (Buah Pala yang Dipatahkan)		The halved nutmeg symbolizes the desire to share happiness and beauty together.
Sirangkak (Kepiting)		Sirangkak, which means crab, symbolizes a warning not to hurt weak people, because that action is very painful.
Barantai (saling mengikat)		This symbol represents the inseparable union between men and women as God's creatures.
Tirai Pucuk Jaguang (Serabut yang Terdapat pada Ujung Jagung)		The meaning of corn is as a symbolic value, a symbol of prosperity.
Balah Kacang (Belahan Kacang)		This symbolic value teaches us to show good intentions without arrogance about our abilities or wealth.
Saik Ajik dan Saik Kalamai (Sejenis Dodol)		Saik Kalamai contains meaning and symbolic value is a life that is economical and planned.
Itiak Pulang Patang		This symbol depicts the neat and orderly behavior of ducks when walking, symbolizing harmony, solidarity, and obedience to leaders to maintain harmony in society.

Sajamba Makan		This motif symbolizes social ethics that value harmony and togetherness in society.
Kaluak Paku		This motif, inspired by the curve of a young fern plant, symbolizes the role of Minangkabau men as fathers in the family and mamak in their clan, as well as their responsibilities towards their children and nephews in their personal and social lives.
Tampauk Manggih		The tampauk manggih motif, which is inspired by the balanced arrangement of mangosteen petals, symbolizes the importance of self-introspection over bad deeds.
Songket Palembang		Palembang Songket cloth is used at weddings and is likened to a King and Queen.

3.4 Ulos

Ulos cloth is an important element in Batak traditional ceremonies. The type and presence of this cloth in a ritual can be a symbol of respect for individuals who follow traditional traditions (Shafa Della Afrilla, 2024). Ulos is a type of Batak woven cloth in the form of a shawl, which symbolically represents the emotional bond between parents and children, or between individuals and each other (Kristina Br Karosekali Emmya, 2024). Ulos is considered a binder or unification of affection between family or individuals with the community. The variety and motifs of ulos cloth reflect certain meanings that can be interpreted based on specific characters, functions, situations, and bonds (Sinulingga et al., 2024).

3.4.1 Ulos Paroppa Sadum

The variety of patterns and motifs contained in the ulos sadum are: pusuk ni robung, corn plant stylization, bona bulu, jagar-jagar, pilin or bondul na opat, aropik or burangir, coffee flower stylization, thick vertical lines or alaman na balik, raga-raga, and buffalo stylization (Ritonga et al., 2024). The diversity of patterns and motifs contained in the form of symbols or emblems. The decorative symbols of the ulos sadum have meaning in the lives of the Batak Mandailing people in particular (Sihotang et al., 2024).

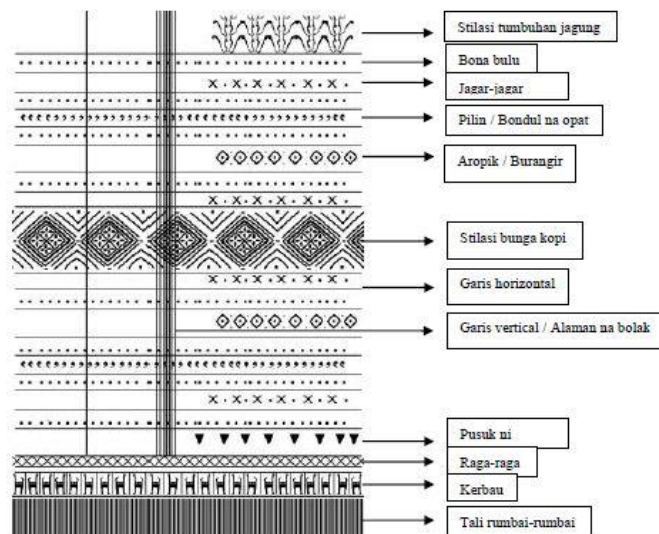


Figure 1. Ulos Paroppa Sadum

- a. Corn plant stylization symbolizes fertility, reflecting the fertile and rich corn-rich Mandailing agricultural products.
- b. Bona Bulu motif in the form of a rectangle or square symbolizes the Mandailing government system, where the king and namora natoras are the place to ask for help.
- c. Jagar-jagar motif in the form of small boxes symbolizes the obedience of the Mandailing people to customs, in accordance with the motto "a country of worship, obedient to worship."
- d. Pilin or bondul na opat has the meaning that every customary problem must be resolved in the house called sopo godang fairly.
- e. Burangir motif, a symbol of betel leaves, symbolizes the king and namora natoras, reflecting the importance of asking for their permission or consideration in customary matters.
- f. Coffee flowers are a symbol of life, this is one of the parts of the Mandailing people's agricultural products that are managed as a livelihood in farming (gardening).
- g. The Pusuk ni Robung motif, shaped like a bamboo shoot, symbolizes the social and cultural life of the Batak Mandailing which is based on the dalian na tolu tradition and kinship relations.
- h. The Raga-raga motif symbolizes order and harmony, reflecting close, peaceful, and prosperous relations between relatives, one clan, and members of the community.
- i. The buffalo motif, a typical Mandailing livestock, symbolizes the power of law and the obligation of the community to obey the regulations set by the king, religious scholars, and traditional figures.
- j. The alternating line or alaman motif symbolizes the power of the king, with the meaning that anyone who seeks protection in the Bagas Godang yard must not be disturbed, and if violated, all the villagers will become his opponents.

3.5 Use Case

Use case is a technique used in software or information system development to capture functional needs, use case explains the interactions that occur between actors and initiators of the interaction of the system itself with the existing system, a use case is represented by a sequence of simple steps (Robbani & Rosmansyah, 2021). In the use case display, users can see the Nusantara Digital Museum Based on Virtual Tour and Virtual Guide (Case Study of Woven Fabrics, Shawls, Songket and Ulos), [Figure 2](#).

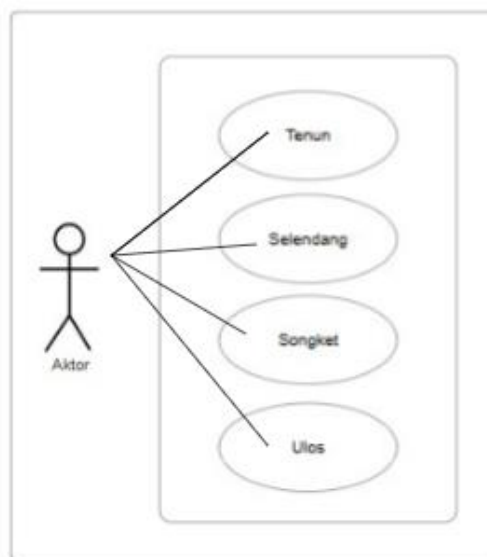


Figure 2. Display of the Nusantara Digital Museum Use Case

3.6 Flowchart

A flowchart is a picture or diagram that shows the sequence and relationship between processes and their instructions. The flowchart display of the Ulos museum begins with the user selecting a menu option, then the user will select the menu to view. The Nusantara Digital Museum Based on Virtual Tour and Virtual Guide contains 4 (four) fabrics, namely Woven Fabric, Shawls, Songket and Ulos (Wulandari et al., 2021). Furthermore, visitors can explore the museum virtually, approaching the image by enlarging the image and reducing the image. Then the cursor that the user directs to the fabric object in the museum will display a description or explanation of the meaning and significance of the fabric images in the museum (Junaid et al., 2022).

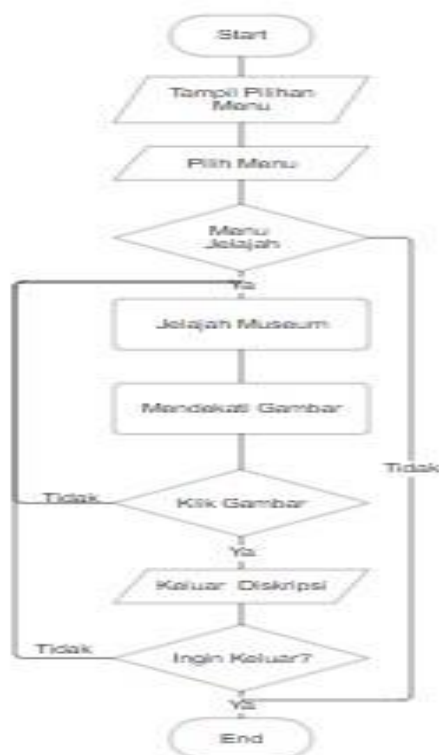


Figure 3. Flowchart of the Nusantara Digital Museum

The following is a picture of the main menu of the Nusantara Digital Museum based on Virtual Tour and Virtual Guide (Case Study of Woven Fabrics, Shawls, Songket and Ulos).

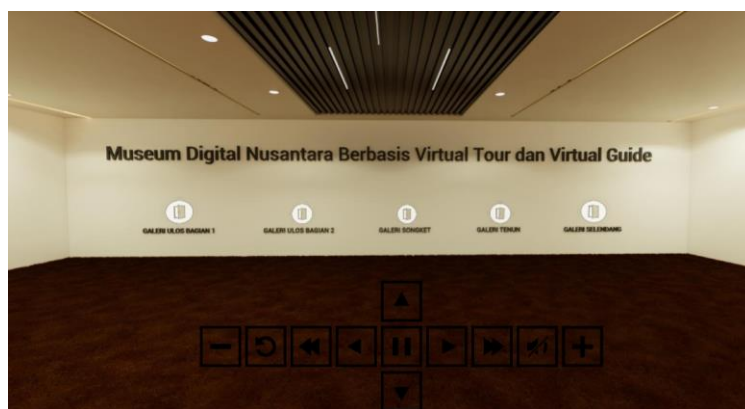


Figure 4. Main Menu Display

4. CONCLUSION

Designing a Digital Nusantara Museum based on Virtual Tour and Virtual Guide, with case studies on woven fabrics, scarves, songket, and ulos, is a strategic step to preserve the cultural heritage of fabrics and users explore the museum's collection virtually through a 360-degree tour. By utilizing digital technology, this museum can provide easy access for the public to learn about the richness of Nusantara culture without geographical limitations. Furthermore, by using virtual tour and virtual guide features to create an interesting and in-depth educational experience. Supporting cultural preservation by documenting and visualizing traditional fabrics, motifs, and their philosophies, so that they can be passed down to future generations. Then encouraging cultural tourism while connecting the promotion of local culture with economic potential through digital visits and interest in traditional fabric products.

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