Prototype of Information System of Tangible Cultural Heritage Documents Management

Khafiizh Hastuti
Faculty of Computer Science
Dian Nuswantoro University
Semarang, Indonesia

Abu Salam
Faculty of Computer Science
Dian Nuswantoro University
Semarang, Indonesia

L. Budi Handoko
Faculty of Computer Science
Dian Nuswantoro University
Semarang, Indonesia

Erwin Yudi Hidayat
Faculty of Computer Science
Dian Nuswantoro University
Semarang, Indonesia

Abstract: The geographical position of Central Java which is in the middle of the island of Java, making it a melting pot of cultures as well as the cultural center of Java island. Cultural heritage is divided into tangible cultural heritage and intangible cultural heritage. Tangible cultural heritage is the work of the human body that can be moved or moving, or that cannot be moved or did not move. Department of Culture and Tourism of Central Java has documented manually cultural heritage but very vulnerable to damage. There are also many cultural heritages that have not been recorded. The process of data collection and recording are very difficult, since the data sources are scattered and not well organized. Documentation of cultural heritage in Central Java can be used as an information system database for a wide range of cultural interests in Central Java. The aim is to facilitate and ease The Department of Culture and Tourism of Central Java to documents and records cultural heritage collections for the category of tangible cultural heritage. In the long-term plan, this system can be used as a reference by another region, thus forming the national cultural heritage documentation system.

Keywords: Tangible cultural heritage, database, information system, documentation, multimedia data

I. INTRODUCTION

Central Java with an area of ± 32548 km² has a wide range of cultural potentials [1], such as cultural heritage which also known as the melting pot. Cultural heritage of Central Java is very various, can be grouped into two. First, the objects of cultural heritage that can be touched (tangible cultural heritage) such as Borobudur Historic Temple in Magelang and Lawang Sewu Building in Semarang City. Second, any object of cultural heritage that cannot be touched (intangible cultural heritage), for example Javanese traditional font, dance, and ceremonies. There are five world heritages of Central Java recorded and recognized by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Five of them are Borobudur Temple, Sangiran the Early Man Site in Sragen district, puppets or traditional performance, batik, and Keris Pusaka (ceremonial knife) [1]. Those objects are recognized as a world cultural heritage because of their outstanding universal value. This fact gives more value to the development of culture and tourism which can be used to build a better civilization in Central Java province, especially in terms of culture and tourism.

Cultural heritage management is managed by the Department of Culture and Tourism of Central Java Province under Archaeology and Cultural Value depertment, and Arts and Film department, as well as two Technical Implementation Unit (UPT) which are Rangga Warsita Museum of Central Java and Central Java Cultural Park. Managing and recording all sorts of data about the cultural heritage and art is one of the two departments's and UPT's tasks. However, the management is still done using the manual method. This method is certainly susceptible to damage. The process of data collection of tangible cultural heritage is also experiencing a very high difficulty. Because the data required for completing a collection is scattered and unorganized. In fact, there are many source of data are not yet clear untill today.

Preservation of culture is divided into two forms, namely culture experience (with cultural preservation work directly on the scene) and culture knowledge (cultural preservation by creating an information center about the culture functionalized in various forms) [2]. Among those two forms of the preservation, cultural knowledge is the most effective form to conduct. This is due to the large scope of its preservation instead of focused on one of the preservation of culture.

The development of communication technology by utilizing the computer is growing rapidly from year to year as impact on the dissemination of information in a region. Information spread quickly over the internet. Internet, which is a global network of computers around the world have made the flow of information more rapidly, easily, and accurately.

According to the survey results of Markplus Insight, the number of internet user in Indonesia has increased. If in 2010 the use of the internet in urban cities is 30-35 percent, it turns that in 2011 it is increased to 40-45 percent. This is reflected by the number of internet users that has reached 55 million people, which is increase from the previous year from only 42 million people [3]. According to [4], the use of technology for the development of culture in Indonesia is still very slow. This is due to the perception that the advent of technology and culture cannot be combined. Therefore, it requires a solution to develop the culture along with the development of the technology. This is also supported by the Research Master Plan of Dian Nuswantoro University in 2013, which is focused on the development of creative industries, arts, and culture of Java.

From the above explanation, it can be applied a kind of preservation of culture (culture knowledge) in the form of centralized cultural heritage data collection in Central Java. The result can be used as a database for a wide range of cultural interests, existing in Central Java. The form of the conservation of tangible cultural heritage is in prototype-based multimedia database documentation.

The purpose of this research is to design an information system to facilitate document management organization for the category of objects of tangible cultural heritage. This system can further more facilitate and ease the Culture and Tourism agency of Central Java Province in attempt to document the cultural heritage collections.

II. LITERATURE REVIEW

A. Art

According to Indonesian dictionary, the meaning of art is the accomplishment to make a quality works, tasks that created with the expertise and the exceptional feeling (eg, painting, writing, dance, or song) [5]. Whereas, according to Ki Hajar Dewantoro, "art is beautiful, art is all human actions that arise with a magnificent feelings that able to motivate the feelings of others" [6]. From those definition, can be concluded that art is a result of human actions that arise and live with the purpose that has been defined by a particular idea and make the people feel calm and happy.

Art has the basic properties consisting of: creativity, individualistic, expression value, everlasting, and universal. In addition, art also has elements that built the art it self. The art elements consist of four parts [7] as follow:

1) Art Structures
Art structures is a system of relationship between a few art elements which is able to build a unity of artwork intact.

2) Theme
Theme is the main idea in an artwork that became a concern in the artwork. The underlying idea of a work of art can be understood or known through the selection of subject matter and the title of the artwork. Subject matter may be associatedtoaesthetic intentions or the value of life, i.e. the form of natural objects, material, atmosphere or events that metaphor or allegory.

3) Medium
The tools used in realizing the idea ofbecoming an artwork through the use of a material and tools as well as mastery of artwork technique.

4) Styles
Is an expression of the personal characteristics that are typical of the artist in presenting his artwork

B. Cultures

According to [8], cultures derived from Sanskrit which is budhayah, the plural of buddhi (intellect), defined as things related to the human intellect. Culture is the result of creativity, sense and human initiative both physically and spiritually, developing and jointly which is owned by a group of people and passed down from generation to generation.

Cultural heritage are the remains of the past that reflects the identity of an ethnic group or nation. Which is containing a traditional values, faith and the achievement of a nation. Cultural heritage consists of [9]:

1) Tangible cultural heritage
Tangible cultural heritage is an objects of movable human artwork, or immovable ones. This includes objects of cultural heritage.

2) Intangible cultural heritage
Intangible cultural heritage is divided into two types:

a) Cultural heritage that can be captured by the senses other than the sense of touch, such as: the art of music, oral literature, theater arts, and dance arts.

b) Abstract cultural heritage, such as the concept and value of culture, language, and science.

C. Cultural Heritage

According to [10], cultural heritage is defined as the product or result of physical culture from a different traditions and spiritual achievements in the form of the value of past, and became the principal element in the identity of a group or nation.

Cultural heritage either physically or culturally valuable must have "owner", even which is genuinly from the beginning either that who is acknowledge it or do the maintenance despite the original propietor are not known anymore. The owner or keeper, or the person who in charge called as the Custodian [11]. The keeper of the culture can manage a whole system of cultural heritage, but that person can also be specialized to manage a particular component of a system of cultural expression. They are who the first in charge of preserving a culture.

D. Documentation

Documentation is a method to collect the data from a records, documentation, an appropriate administration related to the problem under study. In this case the documentation obtained through documents or files of the institution being inspected [12]. According to [13], documentation is seeking data about things or variables in the form of notes, transcripts, books, letters, and magazines.

E. Documentation System

According to [14] in Discovering Computers, system is a number of components, interacting each other to achieve a common goal. While the documentation system means a number of components which is interacting each other in the process of collecting data from records, documentation, appropriate administration related to the problem under research.

F. Cultural Heritage Documentation System

Referring to the definition of documentation systems, can be defined that cultural heritage documentation system is a method of collecting data of physical culture results (tangible) and cultural values(intangible) from the past. Using this documentation system, the data from all cultural heritage in each region can be documented into a database and then be displayed by the information system. The effect is that the searching process of the data of an area's cultural heritage will much fast and effectively. It also speeds up the process of data collection of a cultural heritage. Another benefit is that the data possible to be accessed by the public. Therefore, people will know about the cultural heritage information in a certain region quickly, effectively, and efficiently.

The process of documentation of cultural heritage is expected to bring a new, more creative way in the effort to preserve the cultural heritage of a region. The positive impact is that the existence of cultural heritage in an area can always be well maintained and documented.

In the book Pedoman Pengelolaan Pemanfaatan Warisan Budaya untuk Kepariwisataan Kementerian Kebudayaan dan Pariwisata Direktorat Jenderal Pengembangan Destinasi Pariwisata Direktorat Produk Pariwisata Pemerintah Republik

Indonesia [9], managing institutions and the Indonesian people are obliged to take steps in the policy of preservation, protection and maintenance, management, utilization and supervision of both physical and non-physical.

Cultural heritage is publicly owned, and must be returned to the community, and vice versa. In order to preserve the conservation process, it must be balanced with public access so that people have the need to maintain the cultural heritage

G. *Multimedia*

Lauer [15] defines the term multimedia as an integration of two or more communications media. This integration involves the use of text and sound, pictures and video, to explain an ideas, sell products, and/or entertaining. Multimedia also described as an integration of multiple forms of media, such as text, graphics, audio, video, and others [15]. For example, a presentation involving audio and video clips is referred as multimedia presentation. Educational software that uses animation, sound, and text called as multimedia software.

III. RESEARCH METHOD

In this research, qualitative methods is applied by mean implementing the system design through the stages of System Development Life Cycle (SDLC), under object-oriented approach. The stages are:

1) Stage of Communication toward Research Object

At this stage, the authors conducted a survey and collect data and facts existing on research object in the form of collection of cultural heritage that has been previously recorded manually. In addition, it was also conducted interviews with sources at the Department of Culture and Tourism of the Central Java Province for data collection, including collecting essential attributes of a collection of cultural heritage.

2) Stage of System Planning

At this stage, doing the system planning based on problem obtained at the time of the communication stage. The complexity of tangible cultural heritage data collection with its various attributes can be used as a basis for planning the system.

3) Stage of System Analysis

This stage was performed to determine the requirements of the system, what needs to be exist in the documentation system of cultural heritage. This phase is also performed to find the most appropriate solution to address the main problems that arise. The realization of the analysis process is in the form of a documentation system that can be used for the process of documenting and cataloging the cultural heritage in Central Java, so that the contents of the cultural heritage can be documented and informed to the general public.

4) Stage of System Development and Implementation

At this stage, the process of construction a documentation system is performed. Using object-oriented approach, the processes is conducted consisting of the interface design, database design, writing a code, building the system, compiling, and system implementation.

5) Trial Stage

At this stage, cultural heritage documentation system which has been made previously were eligibility tested about the feasibility of the main goals of the system. Testing was performed using a black box testing, a test by looking at the input and the output being generated. In addition, white box testing is also conducted, by looking at the flow to see the logical complexity of the design found on the system.

6) Stage of Evaluation

At this stage, documentation system of cultural heritage is evaluated for possible deficiencies or weaknesses that can be improved and developed further. The evaluation was conducted using an online questionnaire which will be performed after documentation system was formed

B. *Location and Research Object*

The research activities was carried out at the Department of Culture and Tourism of the Central Java Province, Jl. Pemuda No. 136 Semarang 50138.

The object of the research is the Javanese cultural heritage that has been documented by the Historical Archaeology Departement and Culture Value Departement, Art, and Film at the Department of Culture and Tourism of the Central Java Province.

C. *Data Collection Method*

Method of data collection covers:

1) Interviews Method

In this research, the source is came from Culture and Tourism of the Central Java Province Agency.

2) Literature Study

By studying books, scientific journals, and information from the internet, as well as the related reference about all things related to this research needs.

D. *Software Design*

Method for software design covers:

1) Design of Use Case

Business performer in this system are

a) Administrator

Administrator or admin is system user whose the highest authority in the system. Admin can manage the content in the system. Manage and maintain the system to keeps running is an admin task.

b) Registered User

Registered user is user whose registered to the system. Registered users have more authority than a normal user in the system. The excess of registered user is the right to submit additional cultural and cultural categories.

c) Unregistered User

Unregistered user is the lowest level of user. The users at this level only able to see the global system. This user can have higher authorization after registering via the menu on the system.

From those three business performer, there are several processes that describe specific use case of the interaction of each of the systems business performer. Each of business performer establishes interaction in accordance with the process by which they accessing the system. These processes are divided into several functions, which are:

- Use case of Login Function
  This use case describes what can be found before the login process, during the login process, and after the login process which can be done by business performer in the system.
- Use case of Cultural Participation Function
  Describing cultural participation done by the user, and then clarified by admin to be added into the culture database.
- Use Case of News and Discussion Function
  In this use case, the functions and processes of cultural news and discussion are described. News that have been fed by the admin can be reviewed and commented by the user, as well as the culture discussion that has been posted by the user or admin.

- Use Case of Multimedia Files Upload Function
  This use case described the process of upload and saving multimedia files needed to complete the information about culture.

2) Interface Design

After completing the functional and nonfunctional design, then do the design of the system interface. System interface design is based on human computer interaction technique. System interface design process is divided into two parts, they are:

a) Backend System Design

It is divided into several subsections based on the function and process of the backend system. The backend interface design includes admin home menu, add menu, menu management, and the print menu.

b) Frontend System Design

In this part, designing system interface is related to direct display to the user.

All user interface design from backend and frontend system is then implemented in the form of web interface. For that, user is expected to be able to use the system properly and correctly, in accordance with the function of this system.

3) System Implementation

In this process, the design in which has been done will be implemented and displayed. The results of the implementation is a user interface, source-code, system screenshots, and database implementations.

The system uses a web-based programming, using HTML, CSS, Javascript, and PHP. Implementation of this system can be viewed from two sides, which is called the backend and the frontend. The backend side is shown as an administrator page which shows a media page to handle the data flow in the system. Backend display is divided into several sections, such as cultural heritage management, culture category management, culture news management, cultural site management, user management, report and user discussion management, and print management. Frontend display is divided into several sections, they are: the main page, culture menu, news menu, and discussion menu.

The user menu consists of several submenus: the discussion menu after login, cultur participation menu, comments menu, favorites menu, settings menu, profile menu, add a culture data, and proposing cultural categories.

4) System Testing

System testing is performed using a black box testing, by looking at the input and output that will be generated and also a white box testing to see the flow of the test case to see the logical complexity of procedural design of the system

a) Black Box Testing

Black Box testing is done on the system by testing the system display and also some testcase that will be tested. The testcase that will be tested are :

- Add a Cultural Testing
  Tests is done by adding the culture by the admin or the user to enter the data and multimedia which is suit the cultural heritage.
- Reports Print Testing
  Print a report contain a list of culture on the system and print the details of the culture.
- Search Culture Testing
  Testing is done by entering a specific keywords such as name, city, date, and category.
- Multimedia File Upload Testing

Testing is done by selecting a multimedia files (images or videos) about the culture and upload it into the system.

b) White Box Testing

White box testing is done by testing and add culture function on the system.

There are an option to add multimedia files required either an image or a video to supply the information presented to the public. As seen in Fig. 1, where the admin can select the category of documentation and or the culture that will be uploaded. At the time of uploading, information manager will be presented with the choice of the type of file to be uploaded to supply the information that already available, which looks like in the Fig. 2.

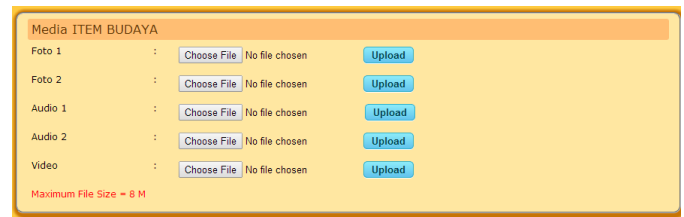Figure 1.   Multimedia upload menu interface

Figure 2.   Multimedia files upload process

After the multimedia files such as pictures and videos are uploaded successfully, then the information will be displayed in the page as shown in Fig. 3.
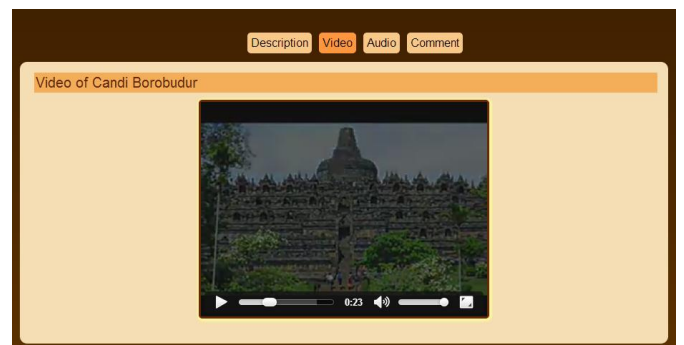

Figure 3.   Interface of an uploaded file

IV.   RESULT OF THE STUDY

Outcome realization from this study is the addition on the system that allows to upload multimedia files about the culture into the database storage. These multimedia files can be either an image or a video which can visualize the tangible cultural heritage. And automatically the size of the multimedia files that can be uploaded also limited.

V.   CONCLUSION

Management of multimedia information systems dedicated to data recording activities and attributes of cultural heritage objects category of tangible cultural heritage is one solution to

preserve the culture and the media into data sources support of the Department of Culture and Tourism of the Central Java Province. Information on cultural knowledge are easier to obtain by the general public, so that people have feel the need to keep the cultural heritage.

This study can be used as a reference for the relevant department or agency in an effort to manage and preserve the cultural heritage for the category of objects of touchable cultural heritage in another region that has a legacy of cultural heritage or history.

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