A LEGAL VIRTUAL REALITY NARRATIVE RECONSTRUCTION OF INTANGIBLE CULTURAL HERITAGE-BOAT SHAPED HOUSE IN HAINAN, CHINA

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ABSTRACT

This paper introduces a method to explore and study the intangible cultural heritage of Hainan from the perspective of virtual reality narrative. The author discusses the significance of the boat-shaped house in the Li nationality from the humanistic meaning and expounds on the primitive lifestyle of the Li nationality and the value concept of the matriarchal clan with the boat-shaped house. The intangible cultural heritage formed on this basis is gradually submerged in social development with the change of the lifestyle. The author puts forward the unique narrative technique of virtual reality in the creation of intangible cultural heritage content. Different intangible cultural heritage is developed from the spatial narrative, plot narrative, interactive narrative, and character narrative. Based on the practice of virtual reality content development of the boathouse, through the in-depth investigation of the boathouse, the design of virtual reality content, and the survey of experiencers, it is concluded that the application of virtual reality in intangible cultural heritage digital content transformation has certain advantages. This paper redesigns the intangible cultural heritage content of the boat-shaped house based on virtual reality narration by adopting the practical methods of research, design content, and display effect, and fills the gap for the digitization of intangible cultural heritage in Hainan.

Keywords: Li Nationality Intangible Cultural Heritage, Legal Virtual Reality, Narrative Structure, Boat-Shaped House Construction, Animation, Interaction.

INTRODUCTION

The intangible cultural heritage of Hainan mainly refers to the intangible cultural heritage created by Li people for thousands of years with a unique humanistic spirit. From the early 20th century to the 1940s, missionaries, and anthropologists from the United States, France and Germany came to Hainan to make a cultural investigation of the Li people. In 1919, a missionary from the United States came to Hainan to preach and wrote a book called "*Palm Island-Hainan Overview*", which introduced the geographical features of Hainan Island and the appearance, customs, costumes, tattoos and other contents of the Li nationality in the mountainous area. In 1928, Francois Marie Savina, a French missionary, recorded in the form of a diary the journey through the mountainous areas of the Li nationality and the vocabulary of the French and Li languages. In 1937, the German Stuber compiled Chronicles of Li Nationality in Hainan Island based on his two field visits to Hainan, which was the first book to study Li Nationality with ethnological theory and the first time to divide Li Nationality into four dialect groups of Run, Qi, Ha, and Mei Luo (after the founding of the People's Republic of China, the Sai dialect group was added). China since the 1950 s have very many works about Hainan Li, more representative is

written Zhongnan institute for nationalities "*Hainan Li social investigation*", Guangdong people press editor-in-chief Wang Xueping Li a brief history of the Wuzhishan fifty years "*Li traditional culture*" "*China's L*" and so on, the results of this study shows that Li social life and traditional culture is worthy of study and discussion (Bagheri, 2016).

With the development of society, the traditional living customs and handicraft skills of Li nationality are no longer suitable for the development of society. However, we cannot deny the civilization created by a nation before. Under the impact of science and technology, the combination of digital technology and creative thinking is an important method for the preservation of intangible cultural heritage to bring this culture that has been derailed from society closer to modern civilization. Virtual reality, the representative of digital technology, has been widely used in material cultural heritage, and has a relatively outstanding performance. For example, the mural restoration of Mogao Grottoesin Dunhuang (Chen et al., 2022), China, can collect the mural of 4430 square meters in 30 caves with the accuracy of 300DPI, and you can use VR glasses to view the exquisite mural. The Digital Yuanmingyuan Project (Chen et al., 2016), which has been carried out by a Tsinghua University team for 18 years, is a virtual reality recreation of the material culture of the Old Summer Palace using the latest technological means including computers and augmented reality technology. The difference between intangible cultural and material culture lies in the fact that the content of non-material culture is mostly dynamic, interactive and reflective. In the realization of intangible cultural heritage by virtual reality, creative thinking is needed to reinterpret the content of intangible cultural heritage. Luo (2016) proposed the application platform of virtual heritage of the ancient Angolan market in Athens, in which digital characters were established to communicate and interact with users and guide players to experience related stories. Carrozzino4 et al established a virtual reality interactive platform based on the bronze investment casting process in Tocasna, Italy. Through the platform, users can track the birth process of bronze artwork in the whole process and feel the cultural value of bronze investment casting in a close distance (Cavazza & Donikian, 2007).

Although VR technology has not been widely used in the dissemination of intangible cultural heritage, there are still some tentative VR projects of intangible cultural heritage in China (Table 1), which are mainly used in traditional drama, folk literature, traditional sports, traditional art, traditional dance, traditional skills and folk activities Table1.

Cai Feilong's doctoral thesis "*Research on the Digital Modeling and Rendering Technology of Peking Opera Facial Makeup*" mainly discusses the relevant digital modeling and rendering technology of Peking Opera Facial Makeup. Xu Jinlong, in his doctoral thesis discussed the integration of intangible cultural heritage of folk literature and digital animation technology. Luo Min discussed the way of constructing virtual scenes of Sichuan Opera in her paper, which interacted through gestures, postures and other ways. From the above projects and scholars' papers, we can see that China's virtual reality is more widely used in the intangible cultural heritage of drama. There are relatively few virtual displays of traditional handicrafts, which will lead to a fault in the transmission of intangible cultural heritage. Some intangible cultural heritages are highly valued and preserved, while some less popular ones will die out at a faster pace. Different ethnic groups pay different attention to it. For example, Peking Opera is the focus of research, while minority groups, especially the Li people, pay little attention to it. Li ethnic group is a relatively small ethnic group in China. It lives in Hainan, which is far away. Up to now, the intangible cultural heritage of Li ethnic group relies on "*living*" display, and digital transformation is almost absent.

Table 1 ANALYSIS AND COMPARISON OF VR PROJECTS APPLIED TO INTANGIBLE CULTURAL HERITAGE IN CHINA			
Classification	Project name	Project characteristics	Advantages and disadvantages of project
Traditional drama and folk art	Kunqu Opera: Kunqu Nirvana	Real Reality VR Documentary	Zhang Jun, the inheritor of Kunqu Opera, watched the live performance from the perspective of VR, but changed the way of viewing and did not give play to the characteristics of VR.
	Digital Beijing Opera charm	The 2019 Spring Festival event uses motion-capture, 3D scanning and other technologies to watch Peking Opera	Virtual Peking Opera stage, you can walk around and watch closely, but also have a certain amount of interactive content
	Beijing Opera "Virtual Actors in Chinese Opera"	Computer algorithms perform Peking Opera movements	Computer data generation, with a sense of science and technology but lack of humanistic feelings, and without the makeup and costumes that are representative of Beijing Opera, cannot extend the culture of Beijing Opera
Folk literature	The Legend of Emperor Yan Shen Nong/The Legend of Darkness	He retold the story of Shen Nong tasting a hundred herbs in a VR narrative way, and was selected in the VR competition of the 75th Venice International Film Festival in 2018	To interpret folk stories from the immersive perspective of VR is the future development direction of folk stories
Tradition al art	VR game "Sanguo Warriors VR"	Three Kingdoms period of war fighting game	Game-based designed the characters with the characteristics of the Three Kingdoms period and added a certain plot
	"Riverside Scene at Qingming Festival" VR short film	Shuttle in the Qingming River map, feel a thousand years ago the prosperity	The famous paintings of the Northern Song Dynasty are displayed from a three-dimensional immersive perspective, but they lack the charm of traditional Chinese painting, and there is no interactive content of virtual reality

The virtual reality content design of the boat house in the intangible cultural heritage of Li nationality established in this paper is a supplement to the display of the intangible cultural heritage. Especially now, because of the Coronavirus epidemic, people's lifestyle has further changed, and the digital display of intangible cultural heritage allows more people who live at home to have a channel to know about the intangible cultural heritage.

Analysis on the Status of Li Nationality and its Intangible Cultural Heritage in Hainan Literature

Cultural Origin and Current Situation of the Development of Li Nationality in Hainan

The Origin of Li culture in Hainan: Li nationality is the descendant of the "*Luoyue*" branch of the "*Baiyue*" tribe in pre-Qin period of China. The word "*Li*" is a name given by the Han people to the Li people. Because the Li people mainly live in Hainan Island, far away from the land, they have little contact with the Han people, so "*Li*" means *"Stay away from"*, that is, surrounded by the sea, far away from the land. The Li ethnic group is the earliest group of

residents on Hainan Island. The ancestors of the Li ethnic group have landed on Hainan Island since the Stone Age. Due to its unique geographical position, Hainan was called "*a place of exile*" by the ancient Han people. The Li people who live there preserve a strong primitive culture. They have been slash-and-burn farming, fishing, hunting and gathering, and hunting in the mountains for a long time. They also retain the living habits of the matriarchal clan, worshiping nature and ancestors, and fearing ghosts and gods. They use straw for their roof, mud for their walls, wood for their clothing, and clay for their vessels. Because the primitive life did not form the national writing, so no historical classics of Li nationality left behind.

Changes of Li nationality in Social development

The Li nationality in Hainan is the place where the Hainan culture is concentrated. In the investigation of Li nationality, it is found that the culture of Li nationality contains the unique Marine culture of Hainan and occupies an important position on the "*Silk Road*" in the South China Sea. In history, archaeologists have found Han Dynasty tombs and burial objects in places such as Ledong, Changjiang and Dongfang1. These areas are also inhabited by the Li ethnic group, whose population in Hainan was 1,020,539 in the 1990 census, accounting for 15.56 percent of the total population of the province. The population of Li nationality in the 2010 census2 was 1,277,359, accounting for 14.73 percent of the total population. In the past 20 years, the population of Li nationality has increased by 256,820 million, while the proportion of total population has decreased. The area where the Li people live is also shrinking. Since 1990, Dongfang, Ledong, Wuzhishan, Qiongzhong, Baisha, Changjiang, Lingshui, Sanya and Wanning have gradually started to shrink with Wuzhishan as the center. In 2010, Dongfang, Changjiang, Qiongzhong and Wanning only occupy part of the area. Therefore, the intangible cultural heritages of Li nationality are mostly distributed in Wuzhishan, Baoting and Qiongzhong. Among them, there is one world-class intangible cultural heritage, 12 national intangible cultural heritage and 27 provincial intangible cultural heritage, covering 7 categories such as traditional music, traditional dance, traditional drama, traditional fine arts, traditional skills, folk customs and others. Among the intangible cultural heritages of Li people, there are ten items in terms of traditional skills (Table 2), including the craft of building boat houses.

Table 2 HAINAN LI NATIONALITY HANDICRAFT INTANGIBLE CULTURAL HERITAGE			
Traditional skill	Construction technology of boat shaped house of Li nationality	Dongfang	National
	Li bark cloth making skills	Baoting	National
	Li's skill of drilling wood and making fire	Baoting	National
	The original pottery making skill of Li nationality	Changjiang, Baisha, Sanya	National
	Li bone ware making skills	Baisha	Provincial
	Construction technology of Li nationality rail type	Wuzhishang Baoting	Provincial
	Li rattan and bamboo weaving skills	Lingshui, Baiting	Provincial
	The craft of making single wood utensils of li nationality	Baoting	Provincial
	Li traditionally dyed spun silk embroideries skills	Wuzhishan, Ledong, Dongfang, Baoting,	Provincial
	Li jin spinning, dyeing and embroidering tool making skills	Baisha, Changjiang Qiongzhong	National

The Development of Intangible Cultural Heritage of Li Nationality's Handicrafts

With the development of society, the intangible cultural heritage of Li nationality has been greatly impacted, and the inheritance of the intangible cultural heritage of Li nationality has encountered many difficulties. The handicraft skills in the intangible cultural heritage of Li nationality are especially facing the danger of extinction. Table 3 analyzes the six problems of traditional handicraft as the reasons for its demise.

Table 3 AN ANALYSIS OF THE DIFFICULTIES FACING TRADITIONAL HANDICRAFTS IN HAINAN	
Difficult to save	Intangible cultural heritage has relatively few physical objects, and most of them rely on verbal inheritance and mentoring, resulting in the gradual disappearance of inheritance interruptions
Inheritance is missing	Changes in the environment in which young people grow up, the variety of jobs provided by society, and the society's demand for intangible cultural heritage are too small, resulting in young people's lack of interest in the inheritance of intangible cultural heritage. The content of the times is of interest, so the intangible cultural heritage cannot continue because of the lack of inheritors;
Trending performance	With the development of tourism, the spread of ICH has gradually moved towards folk performances. In order to increase the drama and Trending time constraints, the performance of the stage will greatly reduce the content of ICH, and the layout of clothing, props and scenes is relatively rough, and even deviates from the content of local ICH
Process deletion	The raw material processing is difficult to sustain, and the technological process is deleted, resulting in some skills cannot be inherited. The production process of cotton hemp yarn in the traditional textile technology of the Li nationality is to manually pick cotton and hemp plants-stripping their fibers and spinning into threads-making dyes with plants- Repeated dyeing and rinsing of various colors of cotton twine for air-drying and brocade. But this step has been replaced by the cheap and easy-to-use industrial line that is currently available in the market.
Weakening alienation of practical functions of products	The life of the Li people has also undergone great changes Traditional handicraft products that have been widely used have basically withdrawn from daily life and turned to performances and crafts that cater to the needs of tourism, resulting in changes in craft products. As shown in the Li pottery jars, from the past, only the pots, pots (steamed edible utensils in ancient China), pots, etc. were
Narrow spread	From the current situation of the development of Hainan ICH, it is generally developed and utilized in three ways. One is the conversion of handicrafts, souvenirs, and other non-legacy resources such as traditional skills, traditional fine arts, folk literature, etc. in Hainan, such as coconut carving, Li Jin, etc., for industrial development and management to achieve ICH development protection. Second, through the ICH museum's concentrated display and dissemination of the Li culture, the museum's education and dissemination of the Li culture can be realized. For example, the Hainan Provincial Museum includes the Hainan ICH Area and the Material Culture Exhibition Area. The third is to develop cultural tourism for intangible culture, build ICH ecological, folk villages, ethnic customs gardens and other cultural tourism scenic spots to spread tourists through live performances. The above three forms has a common feature: local display and sales. This has caused geographical and temporal limitations.

The Boat House of Li Nationality is the Concentrated Expression of Li Nationality Culture

Among the many intangible cultural heritages left by Li nationality in thousands of years of development, the craft of making boat house and pottery are the most representative. The building of the house is a living culture gradually formed according to the geographical environment and people's living habits. In the process of human development, humans will first make some tools by hand for their own survival. Handicraft can reflect the three aspects of skill,

skill and technology 9, which is the result of the cooperation of human intelligence and body. In addition, personal style, unique technological process and rules can be formed in the handicraft skills. Therefore, most Chinese handicraft skills need the mentoring system to complete the inheritance. Li people have no written language, so there is no recorded text or pattern of handicraft. Han people's description of Li people also lacks detailed text record of handicraft skills. The inheritance of Li people's handicraft skills is through the relationship between teachers and apprentices (Dincelli & Yayla, 2022).

Boat-Shaped House-Reflects the Residential Life of Li Nationality

The original bamboo and wood structure of the traditional residential building of the Li nationality looks like an upside-down boat, so it is called the boat house. There are two theories about the origin of the boat house. One is that the boat house was built according to the shape of the boat in memory of the ancestors of the Li nationality who came across the sea. This theory is spread in a romantic and magical folklore called *"Princess Danya"*. The other is the dwelling which gradually evolves according to the living environment of Li people. In the past, most of the Li people lived in the deep mountains of Hainan. The mountains were humid and often infested with poisonous snakes and wild insects. In order to adapt to the nature, the Li people lived in groups. In the early days, the Li people lived by hunting and gathering. In order to meet the primitive mode of production and resist the attack of wild animals, they built temporary and simple thatched huts, which were called *"Mountain liao"*. As the Li people began to practice farming, they took the former *"Mountain liao"* as the prototype of the boat house and built the stilted trap- type buildings. Of course, the first one is the folk stories of Li people with mythological color, which is a kind of spiritual sustenance for the worship of ancestors of Li people. In Princess Danya, women are regarded as the founders of the ancestors of the Li nationality, which is also an example of the matriarchal clan of the Li nationality. In addition, it can also be concluded that the Li people moved from water to land, and the boat could be used as their residence. After they gradually moved from water to land, they retained some living habits on the boat (Subsol, 2005).

The Construction of a Boat House

The structure of the boat house has evolved from the *"Mountain squatter"* to the building with the Ganlan structure. The Ganlan structure is common among China's minorities, such as the Miao and Dai nationalities, who all choose the cantilever structure. The lower shelf height of this structure can raise some poultry and other livestock, above for living. Ganlan style architecture in hot climate, rainwater enough, snake bug infested area can have the effective isolation effect, but at the same time brought travel and life inconvenience, as the human use of fire technology mature, withstand natural wet method has improved after Li gradually remove the overhead structure (Figure 1), became the ground construction (Figure 2).

FIGURE 1
ELEVATED BOAT HOUSE IN THE INITIAL STAGE

FIGURE 2
FLOOR BOAT HOUSE AFTER RECONSTRUCTION

Automatic Image Tagging with Neural Networks

Through our image tagging process, we learned that human tagging is time- consuming and that the results are likely to be inconsistent. Therefore, we explored ways to automate tagging and experimented with neural networks. Our results were surprisingly good, which led us to propose a web-based tool and workflow that would allow users to define a project-specific tagging scheme, train automatic neural network models based on a small set of manual tagging, and propagate consistent tagging to the rest of the image collection (Hassan, 2020).

In 2015, researchers at the ImageNet Large Scale Visual Recognition Challenge (ILSVRC) first reported that software exceeded human ability in image recognition. In 2017, 29 of the 38 ILSVRC's competing teams achieved a<5% error rate, which was lower than the human's. In order to increase tagging consistency, reduce human labor and batch-process automatically, we decided to use a machine learning method–the neural networks (NN) approach. Artificial NN are computing systems inspired by the biological neural networks that constitute animal brains. Tensor Flow is an open-source software library for machine learning applications (including NN).16 Here we use a Convolutional Neural Network (CNN) as our

model. We use Tensor Flow to experiment with automatic tagging of our images. Tensor Flow contains two steps: first, it uses a small set of images to train a CNN model, which captures the decision-making procedure behind our image tagging; second, it then uses the trained model to tag images that were not in the training set (Feigenson, 2006).

Training Images

We manually selected high-quality training images from our manually tagged images. We chose 210 images from a total of nine tags; about 20 images per tag (Table 1). We also selected a few test images to verify the obtained CNN model. The nine tags that we have chosen out of 16 tags are those with distinct features. For example, the tag '*human*' and the tag '*agriculture*' do not have much in common, thus allowing classification with high efficacy. Meanwhile, the '*ritual*' tag was not selected because often there are musical instruments, dancer and animal sacrifices involved in Chinese rituals, which could lead to undesired tag assignment with our current CNN model.

Accuracy of Validation

The validation module provided in Tensor Flow shows that our model yielded an 87.1% accuracy rate of prediction. This model's high accuracy encouraged us to apply this model to the rest of our 63,467 images for alternative tag suggestions. By comparing the tags assigned manually and the ones suggested by the model, we were easily able to find inconsistencies and proceed to more suitable tags.

Examples

Below we show some examples of our result. Figure 1 gives the thumbnails of 28 training images for the tag '*Human figure*'. Ten of them are portraits and photos. The rest are illustrations of human figures of full body-length. We then used the image of a man in full body-length on the left to test our model. The highest tag suggested by our model for this image is '*Human figure*' with a probability of 0.955, while the second and third highest tags are '*Flora and fauna*' with 0.029 probability and '*Agriculture*' with 0.007. The most likely tag for this image out- scored the rest.

In the second test, we chose an image that in fact contains two separate images (Figure 1). One is a farmhouse and the other contains three human figures. The top three tags given by our model are: '*Building or building complex*' (with probability 0.271), '*Human figure*' (0.258) and '*Agriculture*' (0.148). While the top two tags are with relatively low probabilities, (around 0.25) this result correctly reflects the situation.

We chose the second image from '*Ritual*' (Figure 1). Note that no images with this tag were included in our training dataset. This image contains four human figures demonstrating a ritual performance, where the performer holds a long ritual object that appears to be a large feather or plant. The top three tags given by our model are: '*Flora and fauna*' (with probability 0.864), '*Human figure*' (0.067), and '*Agriculture*' (0.029). This result very closely reflects the image content.

A Semi-Automatic Image Tagging System

Our experiment demonstrated the feasibility of combining manual tagging and NN to quickly propagate the model trained from a small set of manually tagged to the rest of the collection. With a sufficiently friendly web user interface, the whole process of human tagging, training NN models, validation and testing (of a trained model), and automatic tagging of the rest of the collection can be realized seamlessly. Such a semi-automatic tagging system might only need a small set of training images from human taggers, and thus could be an efficient basis for providing content-based search and exploration for large image collections.

Web GIS-Based Finding Aid

In order to explore and study these local gazetteer images and to easily contextualize them in space, we implemented a web GIS with content and location based finding aids. Furthermore, our web GIS provides functions analogous to the relationship between Google Street View and Google Maps, where users could toggle between the close and relative illustrations of space found in local gazetteers as pop-ups, with a set of precise and scientifically produced historical maps of China as base layers. Overlaying the two would help examine how local communities in historical China thought about and described their lands and living spaces in relation to modern depictions of space.

We used a published collection of Land Survey Maps of China produced between the late 19th and early 20th century as the precise base-maps. From the last decades of the Qing dynasty (1644-1911) to the end of the Republican era (1912-1949), China's central and provincial governments and the Land Survey Department of the Japanese Army conducted geographical surveys across the country and produced maps that contain detailed topographical and administrative information. Over 4,000 of these maps were compiled and published by the Japanese publisher Kagaku Shoin between 1986 and 1998. They are the earliest maps of China produced with modern cartographic techniques, and they cover most of China's major cities   and counties. More importantly, these maps provide a cartographic snapshot closest to an undeveloped historical China, due to the limited progress of architectural technology before China's full modernization.

We designed this web GIS using the JavaScript library Leaflet. Users can search images from local gazetteers by tag filtering (Table 1). The tagged images are displayed on web GIS (and clustered when appropriate) according to the geographic coordinates of their specific gazetteer title. In addition, users can also zoom to a particular region, and our tool would return images from that region. Therefore, this web GIS functions as both content- and location-based finding aids.

We provide two novel modes of displaying images to make this web GIS more useful for research purposes (Figure 2). We call them '*Images in Map*' (IIM) and '*Maps in Map*' (MIM). IIM displays the thumbnails of image search results directly on a modern base-map.

Through IIM, researchers can see not only the geographical distribution of the search results but also the images directly. It allows researchers to easily observe patterns and identity phenomena across geographical regions. For example, filtering for the '*Human figure*' tag, one can see all such images displayed on the map and can vide more contexts. For example, a user can zoom to a historical city. Our interface would then show the corresponding portion of the Land Survey Maps, which are overlaid with spatial representations about this city from local gazetteers, such as city layout map and detailed buildings complex (Figure 2). Since many

images from local gazetteers depict spatial configurations of places, MIM is especially useful for researchers to quickly compare the spatial depictions from the relative, illustrative historical maps given in local gazetteers and the absolute, scientific historical maps given by the Land Survey Maps. While the georeferenced Land Survey Maps represent China from the 1930s in GIS, the non-precise maps from local gazetteers actually provide more subjective details about the city, such as the relative positions of elements of the city that were important to the editors and the building facades. Therefore, the spatial visual materials from local gazetteers, despite being relative and non-precise, nonetheless provide additional details, while the Land Survey Maps, due to their consistent city layouts for military purposes, also help researchers to find the precise locations of buildings and other elements illustrated in local gazetteers (Mills et al., 2020).

There are also some spatial images in the local gazetteers that have even higher resolution. For example, some images depict objects for ritual ceremonies, laid out inside a temple-school-government building complex or some building interior. This level of granularity is not found in the Land Survey Maps or other scientifically produced historical maps.

In summary, by providing both content and location based finding aids for historical images, displaying image thumbnails directly, and bringing different spatial epistemologies together in one environment, we believe our web GIS interface is not just a way to digitally represent these images. Rather, it is a research tool to allow exploration of large image collections according to the spatial and bibliographical dimensions, to allow contextualization of historical images through different levels of spatial configurations, and to allow discovery of patterns. It can help scholars achieve new understandings about visual materials in local gazetteers and can inspire new research questions by treating all the images together and by putting them back into historical contexts.

Displaying Spatial Epistemologies: An Example

In this section, we use an example to illustrate how our web GIS allow researchers to study historical China by displaying different spatial epistemologies together: namely, the modern spatial understanding of current China based on GIS and modern base.

CONCLUSION

In this paper, we made several major contributions in creating tools and methods for historians to explore a large image collection from Chinese local gazetteers. First, in order to provide content-based finding aids for this collection, we defined sixteen tags and finished tagging for our 63,467 images by human.

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