# Construction Plan of Digital Map for Story Theme Park - Based on the Spatial Characteristics in Traditional Story Materials -

Hee-soo Choi

Professor, Department of History, Sangmyung University, 7 Hongji-dong, Jongno-gu, Seoul, Korea (110-743)

choice@smu.ac.kr

#### Abstract

This article explores how a digital cultural map can be created based on a database of story materials specific to Korea. Since in story materials, spatial characteristics come with contexts, such as points, areas, and routes, it is necessary to create a digital map service that takes those contexts into account. A spatial database that incorporates spatial characteristics allows connections to time, events, characters, high/low-order space data, description data, and multimedia data. It is then possible to design a service system, which enables multidimensional analysis of background, character, and multimedia information centering on a story material. This article also examines metadata used for such a map service because it requires metadata containing more detailed information on time and space than the current version. Ultimately, once this digital map has been created, it will allow a better understanding of spatial characteristics, such as points, areas, and routes, the creation of new knowledge, and the planning of creative content.

Keywords: Digital Cultural Map, Spatial Characteristics, Story Materials

#### **1. Digital Cultural Map and Story Materials**

Advancements in digital technology have led to the development of methodologies to deliver richer information in a more intuitive way. Among them is digital mapping, which visualizes the details of a text and helps better understand the data. A digital map is an embodiment of a variety of events unfolding across a given space. Recently, more object data containing cultural information have been transformed into digital maps. This also means the enlargement of objects that can be realized on a digital map: it is called a digital cultural map. The projects of ECAI are a striking example.

A digital cultural map is a method of visual expression of spatiotemporal interconnection among historical and cultural resources. Interconnection among the resources is the purpose of creating a digital map. In other words, the aim of a digital cultural map is to show the relationship among resources based on their characteristics. However, most existing digital cultural maps only indicate certain resources. They were designed to create location data of objects.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> In reality, many electronic maps constructed in ECAI (Electronic Cultural Atlas Initiative, http://www.ecai.org) do not show the spatial characteristic properly.

Indicating only the location data of objects, which are historical and cultural resources, on a digital map only visualizes spatial data in the text to help understand those resources; a user can do nothing more than search location data as if using a car navigator. However, a digital cultural map identifies the relationship among individual spatial data to produce new knowledge. To show the relationship among individual spatial data on a digital map, it is important to analyze the characteristics of spatial data. In short, it is necessary to identify the type of context information in the text that spatial data contain. A database should then be created to realize a digital map based on such context information.<sup>2</sup>

This study explores how to create a digital map for storytelling by discussing the Story Theme Park project being implemented by the Korean Studies Advancement Center.<sup>3</sup> First, it examines the spatial attributes present in each story and how to structure the context information. Simultaneously, the study provides a summary of organized metadata on story materials to create a digital map, and comments on the type of knowledge that can be created through this digital map service.

# 2. Spatial Characteristics Present in Journal Stories and Structuring Planning

The Korean Studies Advancement Center's Story Theme Park is built based on stories contained in journals dating from the Joseon period. It was the era of Confucianism, and it was scholars in the noble yangban class who wrote those journals. They kept records in Chinese characters, and the subjects of entries vary, such as everyday accounts, office life, records on an emissary mission to China, tourist records on hiking famous mountains, records on political disputes, and construction journals about erecting buildings of special significance or renovations.

Journal entries were written in chronological order. The events contained in them, however, lasted only a day or a few years. Therefore, depending on the data, it contains single or multiple time periods. As for space data, some events individually occurred in difference places and multiple events occurred in a single place, whereas a single event occurred in multiple places. A single space is related to multiple time periods and events. To transfer the spaces specified in the journal entries to a digital map, therefore, it is crucial to incorporate all the spatial attributes in the events faithfully.

To incorporate spatial attributes, it is essential to understand context information that a space has. The spatial attributes that appear in the journals are largely divided into three types: first, spaces that can be expressed as points on the map; second, spaces that can be expressed as areas on the map; and third, spaces that can be expressed as routes. Some spaces can be expressed as points; some can be expressed as areas; and some can be expressed as routes.<sup>4</sup>

A point on the map implies a certain spot or location. In other words, it refers to a place where a certain event occurred. The spatial attribute here corresponds to the purpose of the occurrence. For example, an event to commemorate the scholar in Chosun Dynasty on

<sup>&</sup>lt;sup>2</sup> Kim Hyeon: Information Compilation Technology for the Electronic Cultural Atlas Databases. Humanities Contents. Vol.4, (2004)

<sup>&</sup>lt;sup>3</sup> The model used for this article is the Story Theme Park(http://story.ugyo.net) constructed by the Korean Studies Advancement Center in Korea. This site is a place for story material service, but the concept of electronic cultural map has not been adopted yet. Therefore, this presentation organizes the necessary information for the future construction of electronic cultural map in Story Theme Park.

<sup>&</sup>lt;sup>4</sup> Kim Sang-heon: Concept and Usage of Cultural Atlas for Culture Studies. The Journal of History and Culture. Vol.34, (2009)

October 8th 1702, Bungangseowon Bunchun-ri Yeanhyun Gyeongsang-do Korea has occurred.<sup>5</sup> Here, Bungangseowon is the specific spot in terms of spatial attribute.

The area on the map implies a certain domain. This is a bundling of numerous dots into a common attribute. The common attribute can include diverse issues such as geographical, economic, cultural, social, and political issues. In 1805, Gyeongsang-do Korea, there had been a fundraising for establishing the Bong Gang Young Dang, and most of what is now Gyeongsangbuk-do is included in the event.<sup>6</sup> In this case, Gyeongsang-do becomes a domain that retains the common attribute as a fundraising area for Bong Gang Young Dang.

The line on the map implies a certain route. This is the connection of various specific spots into a common attribute. The common attribute here corresponds to the purpose of the people who had passed the route. In 1603, Kim Ryeong, a Korean scholar, travels from Gyeongsang-do to Chungju in order to take state examination.<sup>7</sup> Here, the particular spots that he had gone, through becomes Kim Ryeong's route to take the state examination.

As such, regardless of the space marked on the map, the spatial characteristic is regulated according to the past stories that occurred there. Therefore, when constructing an electronic map, there must be a construction plan that reflects the respective spatial characteristic.

In general, the digital map service helps users find desired information by searching it based on time, space, and theme information. Setting the digital map as a service interface is designed for users to search visual data intuitively and find the desired data more easily. A user of the Story Theme Park service may wish to find a single story material or a common theme shared by multiple story materials. Or, it can be the type of events that occurred in multiple spaces at a certain time, or a character that has special attributes. To meet users' various needs requires the diversification of approaches to digital mapping.

To diversify approaches to digital mapping requires structuring the characteristics of spaces in stories. To structure the spatial characteristics in stories, the contexts of that specific space need to be analyzed.

For instance, if a user searches a space called Dosan Seowon through the digital map, Dosan Seowon refers to the name of a single point, but it may not be so in the context of a story. If there was a meeting to hold memorial service for Toegye Yihuang, a famous scholar who lived there, the place becomes a point where the event of preparing the service occurred. However, if a junior scholar who respected Yihuang dropped by Dosan Seowon en route to Cheongryangsan Mountain nearby, then Dosan Seowon becomes a route in the context of the event of visiting Cheongryangsan Mountain; in the event of the Yihuang memorial service, it becomes a point.

To realize such complex context information on a digital map necessitates more detailed structuring. If the map can provide Dosan Seowon as a point, as an area, and as a route when Dosan Seowon has been searched, then users can understand Dosan Seowon in the context of events that occurred in the space called Dosan Seowon. This can be possible only when the information that each spatial data contains is closely connected. The table below summarizes the characteristics of spatial data.

<sup>&</sup>lt;sup>5</sup> http://story.ugyo.net/front/sub01/sub0103.do?chkId=S\_KKH\_0032

<sup>&</sup>lt;sup>6</sup> http://story.ugyo.net/front/sub01/sub0103.do?chkId=S\_KKH\_0056

<sup>&</sup>lt;sup>7</sup> http://story.ugyo.net/front/sub01/sub0103.do?chkId=S\_PHS\_1005

Space	Spatial Characteristic	Connection Data	Form	Additional Data
Space Name	Point / Area / Route	Description		
		Time Data	Single/Multiple	Super-/Subordinate Time
		Event Data	Single/Multiple	Super-/Subordinate Event
		Character Data	Single/Multiple	Character Genealogy
		Multimedia Data	Single/Multiple	
		High-order Space		
		Data		
		Low-order Space		
		Data		

Table 1.	<b>Classification of Spatial</b>	<b>Characteristics</b>	in Stories and (	Connection
		Data		

Once the service provides information based on the spatial characteristics, users will understand the overall context of the story material related to that space. For instance, in the story that students met at Dosan Seowon to submit an appeal on May 10, 1610, the event is the meeting to prepare an appeal, the time is May 10, and the characters are students. But the gathering to prepare an appeal was to oppose the installation of the biological mother of Gwanghaegun as Queen Consort. Then, it can be classified as a low-order event in terms of appeals that occurred in Gyeongsangbuk-do. Also, the time of the appeal is a low-order time period during the month in question.

An event in a single space constitutes a single time period, event, and space, but it also contains multiple data, either high- or low-order. Therefore, an accurate summary of spatial characteristics increases the probability of reading the relevant data. That is why a full description of a space should be provided, as well as interpretive information on the characters and events that existed in that space. The service will be even more useful if it can connect to multimedia data related to the space in question. The diagram below illustrates the concept of the service.



Figure 1. Conceptual Diagram of an Integrated Information Service for Story Materials

## 3. Organizing Metadata of Story Materials to Create a Digital Map

To create a digital map based on spatial characteristics requires the segmentation of metadata components, because the spatial characteristics in the metadata have to be incorporated. The table below represents the metadata components used for Story Theme Park of the Korean Studies Advancement Center:<sup>8</sup>

Field	Description	
ID	Identifier	
Classification	Classification system of content	
Title	Story Title	
Space-Location	Location in the story(multiple)	
Space-Route	Route in the story	
Time	Period of the beginning and end of the story	
Character	Characters that appear	
Topic Word	Key word	
Story	Story plot	
Image Link	Original image link	
Text Link	Original text link	
Source	Story's source	
Reference	Reference materials	
Writer	Meta-writer	

 Table 2. Current Version of Story Theme Park Metadata

The spatial fields in the current Store Theme Park metadata are divided into spacelocation and space-route fields. They have only the names of spaces but not the descriptions of spaces. Therefore, to identify the characteristics of spaces in a story requires reading the whole story material. With the current metadata alone, it is extremely difficult to create a digital map that incorporates the required spatial characteristics. In some story materials, only certain points are present; others contain a multitude of places. These spaces may have the same time period or different time periods. In one story material, spaces can be classified into single time and single space, single time period and multiple spaces, multiple time periods and single space, and multiple time periods and multiple spaces.

<sup>&</sup>lt;sup>8</sup> Story Theme Park is a service that provides information derived from the diaries of scholars from the Chosun dynasty that contain contents for creation material(http://story.ugyo.net/)

It is necessary to organize metadata to incorporate these temporal and spatial characteristics of a story material. Most digital map services offer separate service menus to resolve this challenge.<sup>9</sup> The table below shows organized metadata based on this:

Field	Description
ID	Identifier
Classification	Content's classification system
Title	Story's title
Time	Single time or Multiple time Period
Space	Single space Multiple space (Time Database Table Link)
Theme	Topic of Story Material
Character	Character that appears in Story (Human Database Table Link)
Topic word	Keyword
Story	Story plot
Image link	Original image link
Text link	Original text link
Source	Story's source
Reference	Reference material
Writer	Meta-writer

Table 3. Story material meta-data construction solution for the electronic map

## 4. Spatial Interconnection Service and Creative Content

The digital map of Story Theme Park requires the division of time and space data in each story material. The separated data should be incorporated into the metadata to be applied to the map in accordance with the spatial characteristics of the story. Users can experience a more user-friendly service once they are provided with spatial attributes through connection with the space table. Using the conceived metadata and spatial database can help provide the digital map services below.

<sup>&</sup>lt;sup>9</sup> To solve such problem, most electronic map services have separated the service menu of the composition. The railway conducted from University of Nebraska and the modern times era U.S. construction project maps are servicing different menus according to time and subject. (http://railroads.unl.edu/)

First, there is a point-based space service. The following image represents a map on which the locations of private institutions (*seowon*), where Kim Sung-il, a noted scholar in the Joseon period, held memorial service, and the years of service are indicated. With the locations of seowon indicated as points, they have a common spatial characteristic as a point in terms of Kim Sung-il's memorial service. Though they are different kinds of seowon located in Gyeongsangbuk-do, they have in common the characteristic that the scholar Kim Sung-il held memorial service from the early to late 17<sup>th</sup> century. Normally, these data have to be found individually as information in the text. The map demonstrates interconnectedness between the points.



Figure 3. Points on the Digital Map: Seowon for Kim Sung-il's Memorial Service in Gyeongsangbuk-do

Second, there is an area-based space service. The following image represents a map on which fundraising areas are indicated. In 1675, there was a fundraising movement organized by students who sent people to each area to raise funds to establish Sabin Seowon for Kim Jin, another noted scholar. Though the names of all areas are stated in the text, it does not provide an intuitive understanding of the entire scope of the movement. However, the digital map shows that the movement was spread to most areas that currently belong to Gyeongsangbuk-do. Aside from the areas close to Andong, where Sabin Seowon was established, the movement occurred in Gyeongju, Seonsan, and Yeognhae, far from the institution, which confirms that Kim Jin was indeed a very a famous and respected scholar in Gyeongsangbuk-do. These areas are proof of interconnection among the students who respected Kim Jin.



Figure 4. Areas on the Digital Map: Areas of Fundraising for the Establishment of Sabin Seowon



Figure 5. Routes on the Digital Map: The Japanese Army's Advance during the Imjin War in April, 1593

Third, there is a route-based space service. The upper image represents a map that depicts the state of affairs during the Imjin War in the Joseon period. It shows the

routes and places through which, in April of 1593, the Japanese army moved and fought with the Joseon army. The dates indicated on the map show the number of days required for the army to move between points as well as the routes they took. These points are interconnected as the advance routes of the Japanese army. Based on the data, it is possible to produce additional knowledge, such as the Japanese army's strategy and the defense line of the Joseon army.

## 5. Conclusion

A digital map is not merely designed to map spaces in a text. It also aims to create new knowledge assets by illustrating interconnectedness among various spaces based on these spatial characteristics. Therefore, spatial data indicated on a digital map should be extremely detailed.

The Story Theme Park service reviewed in this article is a database created by extracting stories suitable for storytelling from journals by scholars in the Joseon period. Up until now, story materials have had to be searched by theme, or by character. However, for future creators to find materials more easily, digital maps are essential. Digital mapping services are based on space. However, space has a variety of characteristics depending on the context of a text. Since different stories have different contexts even if set in the same space, it is important to create a database of detailed space information and revise the metadata based on such information.

The aim of digitalization is not merely to digitize given data; it is also to enable timely access to useful knowledge.<sup>10</sup> Aside from reading and understanding a text, it is equally important to help intuitively identify interconnection among coordinates on a digital map. It is thus necessary to adopt the concepts of hierarchy (high- and low-order) and of thesaurus (providing interconnection) as well as spatial characteristics. Furthermore, when a multiplicity of objects present on a space, such as time, events, and characters, should be interconnected through a precise database and grouped by theme or concept, a proper digital cultural map service can be provided.

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<sup>&</sup>lt;sup>10</sup> Kim Dong-Hun, Kim Sang-Hyeon, Moon Hyun-Joo : A Study on Knowledge Information Service with Electronic Culture Maps. The Conference of HCI.(2009)

# Author



### Hee Soo, Choi

He received B.A., M.A., and Ph.D degrees in Korean History from Sogang University, Korea in 1989, 1991, and 2009 respectively. Since 1995, he has been a office worker and CEO of Contents development Company. And also since 2012, he was an professor of Sangmyung University, Department of History and Historical Content. His current research interests include Cultural Contents development, Information in Museum, Exhibition and Archives, Cultural heritage and Traditional Knowledge service