

A Case Report of ‘Digital Archives of Naraehon’

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Shibukawa-kenkyushitsu has carried Naraehon Digital Archive project since February 2001. The aim of this work is to realize Digital Museum by making and exhibiting the image database of collections of Naraehon in Keio University, The British Library and The Chester Beatty Library. Since Jun 2002, we have been opened the prototype database of Keio Naraehon to the public on the World Wide Web (WWW). In this paper we report a series of work process of making the database.

1. Introduction

Shibukawa-kenkyushitsuⁱ (in Faculty of Environment Information, Keio University) participates in the consortium, Keio University HUMI projectⁱⁱ, and until now had digitized rare documents such as “fifty-three-post-stations-of-the-Tokaido *ukiyo*e” and “old maps of Edo, Kyoto and the Yamato-Nara and famous-place pictorial maps”. Naraehon Digital Archive project started in February 2001 with the subsidy from MESSCⁱⁱⁱ for

Open Research Center maintenance expense. The project aims at acquiring digital images of all extant Naraehons in the world, and making browsing available on the WWW. As the structure for realizing this concept, we contend with construction of “digital Naraehon database”.

Naraehon is the picture-book or the picture-scroll which theme is Medieval-times novel (O-togi-soshi) made from the late Muromachi period to the early Edo period. It is valuable not only as text information but as work of art. Digital archive of such rare documents is useful to preservation of source materials and practical use of data. Furthermore it is a part of Digital Museum which provide anyone access to data from anywhere anytime.

Naraehon Digital Archive project plans to acquire digital images of Naraehon that Keio University, The British Library, and The Chester Beatty Library possess (approximately 10,000 cuts as photo),

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ⁱ <http://dewey.sfc.keio.ac.jp/>

ⁱⁱ <http://humi.keio.ac.jp/>

ⁱⁱⁱ The Ministry of Education, Culture, Sports, Science and Technology

and making and exhibiting image database in a period of three years from February 2001 to January 2004. By the August 2002, we had acquired photographs of all 50 titles (88 volume of 4113 cuts) of Keio's possession and 21 titles (41-volume 2152 cuts) of British Library's possession. About Keio Naraehon, it has finished digitizing of all 50 titles and prototype database (34 titles of 2727 pictures are carried) is exhibited on the WWWⁱ. From now on we will acquire digital images of hall other's possession Naraehon, and complete the database that include all images.

This paper describes a series of work process until it results in test public presentation of "digital Naraehon database", and the prospective view of the project.

2. Method of Archive

"Digital Naraehon database" was created in sequence of the work process: 1) analog photography, 2) digitizing, 3) trimming, 4) text data creation, 5) database construction, and 6) public presentation (refer to **Fig.1**). We acquired analog photographs by the silver film photography, scanned it with the film scanner and created the digital image. Then as data stored in a database, trimmed digital images and created bibliography data. These data was unified and the database was built, and further the reference function and the perusal functions were given, and it opened to the public on the WWW.

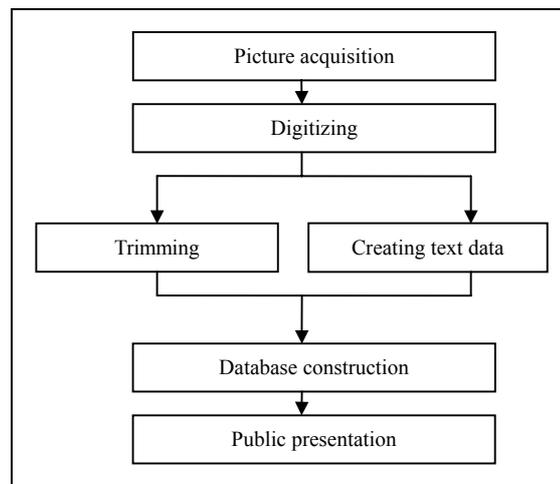


Fig.1 Work process

These works were carried out by Shibukawa-kenkyush-itsu actively with connected efforts to staffs of HUMI project, a pro photographer, staffs of each library. Next, we explain about each process.

2.1 Analog Photography

There are two methods of acquiring digital image of rare book. One is acquiring digital images by using a digital camera. Another is acquiring an analog photograph by using an optical camera first, and then digitizing it with a scanner. HUMI project has been examining both methods.

Generally at the time of photography of rare book, it's required to pay careful attention for not damaging important material; especially it must be avoid irradiation of stroboscope for a long time. In a case of Naraehon, does not leak to an example, it must shorten irradiation time of a stroboscope as much as possible. In addition, as a feature of Naraehon, since there are many picture of rich color included in, it has meaning in reproducing the color faithful to source material. As a result of consideration of the influence on material at the time of

ⁱ <http://dewey.sfc.keio.ac.jp/naraehon/>

photography and the quality of acquirable data, it supposed that analog photography can save an iconographic image and color data more faithfully rather than digital camera photography at the present stage. As above, the silver film photography by the pro photographer was chosen as the picture acquisition method of Naraehon.

Filming session had done twice, from February 7 to March 21 and from August 27 to September 14 in 2001. Using photography setⁱ designed in HUMI project, carried out the silver film photography with 4 x 5 inch films. Photography set was arranged at variance by the case of booklet and scroll, respectively depending on the form of materials (refer to **Fig. 2** and **Fig. 3**).



Fig. 2 Photography set of booklet



Fig. 3 Photography set of scroll



Fig.4 A photographer and assistants

Photography required a pro photographer, two assistants and a record marker (refer to **Fig. 4**). Worked about 6 hour a day, we photographed at the pace of 100 to 150 shot per day. To the consideration of material, photography room air-conditioned so that might be maintained 20 °C of room temperature and 50 % of humidity.

In the case of booklet, carried material on the book maintenance mount, and was photographed one by one every page in order of the cover, odd-numbered pages, even-numbered pages, and the back cover. In this way, sift of the material such as turning over a page or changing its direction can be managed with the minimum move. We placed sponges

ⁱ Photography set of an angle variable camera mount and an angle variable book maintenance mount that developed in order to photography the Gutenberg Bible of Keio University possession

under the material and pressed the part of binding down by hands so that make photography side be flattened.

In the case of scroll, we photographed it by divided portions. Scroll carried on the stand and a glass board is placed on scroll and it was pressed down so that a photography side might become even.

In the photography range, we put in and photographed a title name, photography number (folio) and the color chart besides the target material. (refer to **Fig. 5**, **Fig. 6**, and **Fig. 7**) These information become important for discriminating the film after development and the image data after digitizing. At the same time, we recorded the situation of the photography spot such as photography date, weather, room temperature, humidity, photography title, film number, photography number, filter, and iris diaphragm, and these were used for management of films or image data.



Fig. 5 Material on a photography stand

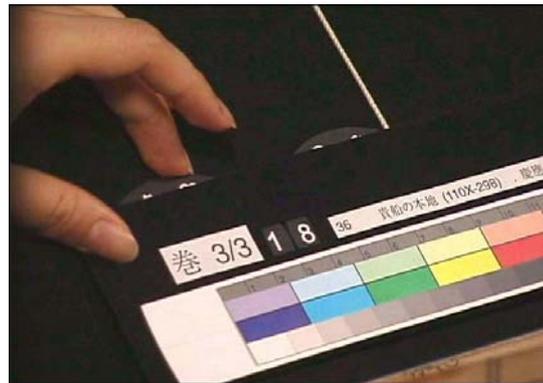


Fig. 6 Folio and color chart

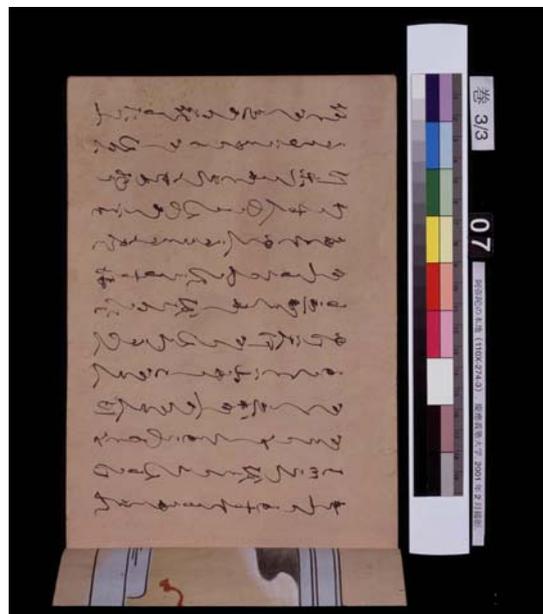


Fig. 7 Example of a photography picture

Such a detailed record at the time of photography reduced the mistake under photography, and was useful to carrying out work certainly

Photography record of Keio's Naraehon is shown in **Table 1**.

Table 1 Keio's Naraehon photography record

□	7/Feb/2001~21/Mar/2001			
	book :	21 titles	41 volumes	
	2070 cuts			
	roll :	13 titles	21 volumes	
	804 cuts			
	total :	34 titles	62 volumes	
	2874 cuts			
□	27/Aug/2001~14/Sep/2001			
	book :	11 titles	18 volumes	
	844 cuts			
	roll :	5 titles	8 volumes	
	395 cuts			
	total :	16 titles	26 volumes	1239
	cuts			
	total :	52 titles	88 volumes	4113
	cuts			

2.2 Digitizing

The color positive film acquired by analog photography is scanned with the film scanner and digitized. The scanner is high performance CCD film scanner for desk, FlexTightPROGRESSION made by imacon, which has spread in the publication industry. For consideration of the time that used digitization, the total capacity of a database, and picture resolution required for perusal, we created digital data under such condition: its color depth is 12 bits for each color of RGB, input resolution is 900dpi and file format is un-compressing TIFF (file size per picture is about 50MB). It takes 5

minute for digitizing the film of one sheet. Included the exchange time of a film, the number of pictures that can be created at 1 hour is about 10 pictures. In addition, at the time of scanning, the worker carried the glove for edit so that film might not be damaged, and also he kept in mind that fine garbage might be reflected by using air blow splay for cleaning films.

In order to reproduce the color of source material as faithfully as possible, in respect of color management, we did monitor calibration and created the ICC profile, performed optimization of the tone color of the monitor, and kept homogenization of the color between each input/output device by using Optical made by Color Vision. It purposed improving the performance of the automatic picture analysis function and the color optimization adjustment function that ColorFlex, interface of FlexTight, has. And also we did RGB compensation of input picture by using the photographed color chart so that adjusted fluctuation of the tone color on ground of changes of the photography environment or delicate differences of the finish of film development.

2.3 Database work

Some organizations have tried sending the digital image of Naraehon on the WWW^{i,ii,iii,iv}. In this project, we also exhibit the digital image of Naraehon on

ⁱ Kyoto-daigaku denshi toshokan
<http://ddb.libnet.kulib.kyoto-u.ac.jp/minds.html>

ⁱⁱ Nara-kyoiku-daigaku kyoiku-shiryokan naraehon gazou
<http://www.nara-edu.ac.jp/LIB/ehon/ehon.htm>

ⁱⁱⁱ Aoyama-gakuin-toshokan digital siryo
<http://www.agulin.aoyama.ac.jp/img/misframe.htm>

^{iv} Jissen-jyoshi-daigaku-doshokan denshiten dai1kai
<http://www.jissen.ac.jp/library/documents/etenji/tenji1.htm>

the WWW.

There are many Naraehon treated in this project and many digital images created from scanning. The number of digital images that are created from film scanning is about 2,700 sheets. In order to select the picture of the specific page of a specific work out of huge number of sheets, we need the bibliography database of Naraehon with simply interface and the presentation system to display images. So, our project constructed 'the digital Naraehon database' (refer to Fig. 8). This database stored with the bibliography on Naraehon and provide with reference tool. Next, we explain this database.



Fig. 8 Naraehon database screen

2.3.1 Bibliography information

The bibliography information on the Naraehon shot by this project is quoted from "Keiogijuku-Tosyokan zou Otogisoushi ten" ("Otogisoushi" catalog in possession of Keio Library). Database was input all items (a cover, a cover material, manufactured time, a title, another title, an outer title, an inner title, the number of lines, the feature, the number of volumes, a call number, a size of a book, the text height and a character) indicated by this catalog.

There are not values because it is unknown. Searching database, we cannot use all items effectively. However the system provide all items when reference results are displayed. (refer to Fig. 9)

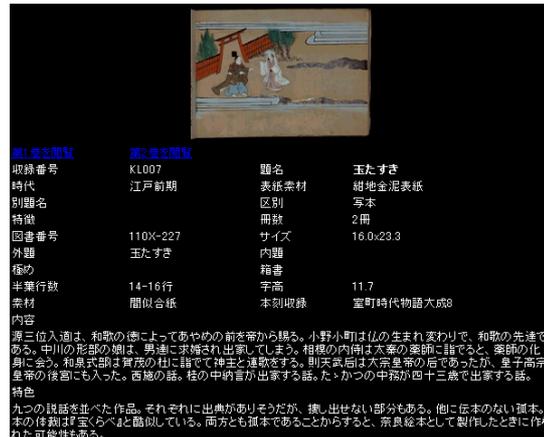


Fig. 9 Bibliography information display screen

In creation of a database, we use PostgreSQL that operates on UNIX. PostgreSQL is the highly efficient database that can be used gratuitously. In coding, we use the script language PHP that may unite with PostgreSQL. Using bibliography information for reference, we think unknown items as mentioned above. It is necessary to examine with items provided for users.

In the digital Naraehon database as trial version, system searches from the field of 'title', 'another title', 'inner title' inputted in the database when user select the field of 'title' searching database. And the 'manufactured time' 'form' inputted in large numbers are set up as reference items. In this way this system prevent fall recall ratio.

2.3.2 Display system

In the picture database exhibits the picture of huge number of sheets, systems

need to be provided the means for the picture that a user needs coming to hand quickly. One of the means is a substantial bibliography database. In a picture database with correspondence which one work calls the picture of one sheet, bibliography information functions effective in reference. In the case of a book, it is possible to describe bibliography information for every work, but it is difficult to describe a bibliography to each page in a work. And it is difficult to search a picture only with bibliography information in a work.

Then, in order to search a picture effectively for every work, it is necessary to provide the display method with the list of illustration. In the digital Naraehon database, there are two display systems which different with a book and scroll. These display system is built with Macromedia Flash5. Flash5 is software created the dynamic contents on the Internet. When we design display systems on Naraehon database, we use this software to aim to build the dynamic and more intelligible display.

In the book, a thumbnail list is displayed on the left side in the interface, and large image that expanded from the selected thumbnail is displayed on the right side. Then, it is possible to get the more detailed information that cannot be checked in thumbnail (refer to **Fig.10**, **Fig.11**).

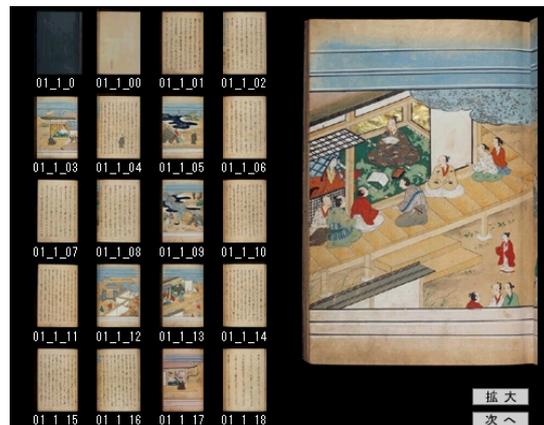


Fig. 10 Display of booklet (1)



Fig. 11 Display of booklet (2)

In the scroll, the whole scroll is displayed on the upper part in the interface by scroll on a scroll. This is a joined picture that divided at the time of photography, and the role of thumbnail. Like a book, when you require a more detailed picture, clicking arbitrary parts and it is possible to display the large image on the lower part (refer to **Fig. 12**).



Fig. 12 Display of scroll

3. Conclusion

In this article we reported case of "Digital Archives of Naraehon" since February 2001. The process of digital archives has three stages; acquisition of a digital image, construction of a database, and open of the Internet. As a next problem it is necessary to consider how it improves systems based on user's feedback. Moreover, we aim at acquisition and its open of the digital image of the Naraehon scattered all over the world.

Our project is a brunch of 'Digital Museum' tree. Digitizing the Naraehon and archiving their image we aim to archive the Naraehon comprehensively in the world.

In order to realize the digital museum

Appendix

A.1 Bibliographic data of titles included in digital Naraehon database

ID_No	Title	The Manufactured time	Form	Volumes	Cover	Size	Text height	Material
KL001	Bunsyonosoushi	Muromachi-Early Edo	Booklet	2	Hnadairo	33.4x23.9	27.4	Hishi

which access somewhere at anytime, it is important to consider the way that how it treat contents and how it open contents on the Internet.

By realizing the digital museum, more easily we can acquire the various knowledges accumulated until now. This will give the opportunities for improving the environment that surrounds human's knowledge information world and extending one.

It is the fundamental subject for us to create the digital museum as social system that has such a role.

References

- 1) Tomioka, M., : Kichosyo no digital-ka Gutenberg Bible no jirei, record management, No.44, pp. 49-58 (2002).

KL002	Sijyuninomonooarasoi	Muromachi-Early Edo	Booklet	1	Uchikumori	31.8x24.9	28.3	Hishi
KL003	Katyoufuugetsu	Last part of Muromachi	Booklet	1	Uchikumori	27.4x22.0	22.5	Hishi
KL004	Wotokiri	Early Edo	Booklet	2	Konjikindei	24.3x17.5	18.3	Hishi
KL005	Tanabata	Early Edo	Booklet	3	Konjikindei	24.2x18.1	19.3	Hishi
KL006	Monjyuhime	Early Edo	Booklet	2	Sorairojikin dei	23.7x17.8	18.7	Hishi
KL007	Tamatasuki	Early Edo		2	Konjikindei	16.0x23.3	11.7	Maniai gami
KL008	Hashihime	Early Edo	Booklet	2	Konjikindei	16.0x23.1	12.6	Maniai gami
KL009	Takarakurabe	Early Edo	Booklet	2	Konjikindei	15.9x23.6	12.5	Maniai gami
KL010	Yumetsugi	Early Edo	Booklet	2	Konjikindei	15.8x23.5	12.6	Maniai gami
KL011	Kannonhonji	Early Edo	Booklet	2	Konjikindei	16.6x24.1	12.6	Maniai gami
KL012	Rokudai	Early Edo		3	Konjikindei	16.6x24.3	12.7	Maniai gami
KL013	Amidanohonji	Early Edo	Booklet	3	Konjikindei	16.7x24.2	12.6	Maniai gami
KL014	Bisamonnohonji	Early Edo	Booklet	3	Niuro	16.7x24.8	13.5	Hishi
KL015	Sakuranotyujyou	Early Edo	Booklet	3	Uchikumori	17.2x24.8	13.3	Hishi
KL016	Kazashinohime	Early Edo	Booklet	1	Uchikumori	17.1x25.5	13.7	Hishi
KL017	Fushiyanomonogatariri	Early Edo	Booklet	1	Hnadairo	17.9x25.3	14.3	Maniai gami
KL018	Hanganmiyakobanashi	Early Edo	Booklet	1	Awakiuro	18.3x27.1	14	Hishi
KL019	Giou	Early Edo	Booklet	2	Uchikumori	18.5x28.5	14	Hishi
KL020	Nanakusahime	Early Edo	Booklet	1	Tyairo	24.6x32.3	19.5	Maniai gami
KL021	Isozaki	Early Edo	Booklet	2	Konjikindei	25.8x34.0	20.5	Hishi
KL022	Tuchikumo	Early Edo	Scroll	2	Usutyairojikin syu	32.2	26.9	Hishi

KL0 23	Tomonaga	Early Edo	Scrol l	2	Konjikin syu	32.2	26	Hishi
KL0 24	Hikohohodeminomi kotoekotoba	Early Edo	Scrol l	1	Konjikin syu	31.3	27.6	Hishi
KL0 25	Kumanonohonji	Early Edo	Scrol l	1	Nashikojiret su	31.6	26	Hishi
KL0 26	Aizomegawa	Last part of Muromachi	Scrol l	1	Noukonjikin kirihakuchir ashi	27.8	23.5	Hishi
KL0 27	Kakurezato	Early Edo	Scrol l	1	Kinsyuretsu	27.7	26.2	Hishi
KL0 28	Syutendouji	Early Edo	Scrol l	3	Usutyairojik insyu	25	20	Hishi
KL0 29	Rokuharajizoumon ogatari	Early Edo	Scrol l	2	Shiroirojiug uisuiromoyo u	24.3	19.4	Hishi
KL0 30	Koatsumori	Last part of Muromachi	Scrol l	1	Kinsyuretsu	23.2	21.2	Hishi
KL0 31	Suzumenohosshin	Last part of Muromachi	Scrol l	1	Kouirojirets u	22.2	18.2	Hishi
KL0 32	Zegaibou		Scrol l	1	Usutyairojik insyu	20.8	16	Hishi
KL0 33	Yahyouenezumi	Early Edo	Scrol l	2	Kouirojitanr yokushyoku moyou	18	16.2	Hishi
KL0 34	Mushimonogatari	Early Edo	Scrol l	1	Konjikin dei	16.9	14.5	Hishi