Development, Collaborations, and Evaluation of the Kyoto University Rare Materials Digital Archive

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KUDH International Conference
Digital Transformation in the Humanities

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京都大学
KYOTO UNIVERSITY

Outline

- Development

- Collaborations

- Evaluation

Preliminary

- Digital archive: Website that provides access to collections of digitized material

- Rare material: Resource including historically important manuscripts, maps, and drawings

I. Development

Digitization over 20 Years

Challenges
➢ Digital archives use a variety of applications such as viewers, resulting in a different user experience at every digital archive and requiring users to learn new features and controls each time.
➢ Developers implement different applications with similar functionalities many times.

IIIF [1/2]

= **International Image Interoperability Framework**

A **Community**
that develops **Shared APIs,**
implements them in **Software,**
and exposes interoperable **Content**

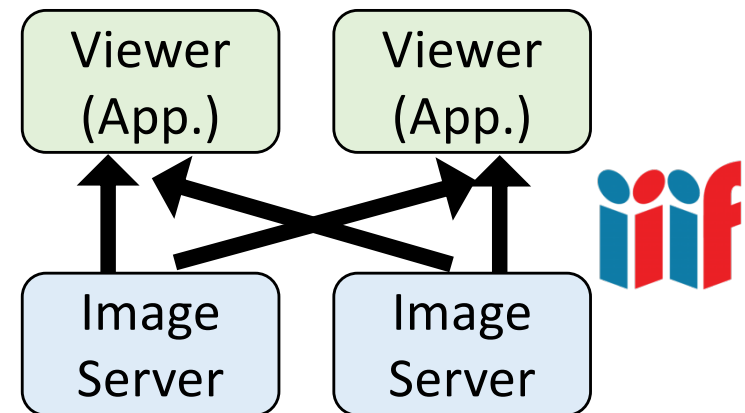NISO, "International Image Interoperability Framework (IIIF)",
https://www.slideshare.net/BaltimoreNISO/cramer-international-image-interoperability-framework-iiif

IIIF [2/2]

IIIF (International Image Interoperability Framework) defines a set of APIs that provide a standardized way of delivering images and structural metadata over the web.

Viewer (App.)

Viewer (App.)

Image Server

Image Server

Institute 1
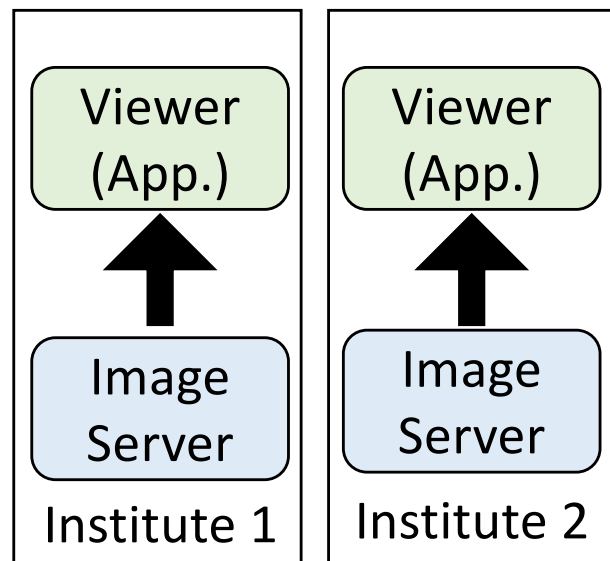
Institute 2

Data on image servers can be used only by specific applications

Viewer (App.)

Viewer (App.)

Image Server

Image Server

Data on image servers can be used by different applications over institutions

Kyoto University Rare Materials Digital Archive

- **Officially launched in December, 2017, supported by Kyoto University Open Access Promotion Project**
- **IIIF compliant**
- **1,663,322 images of 20,564 titles** (as of June 25, 2021)
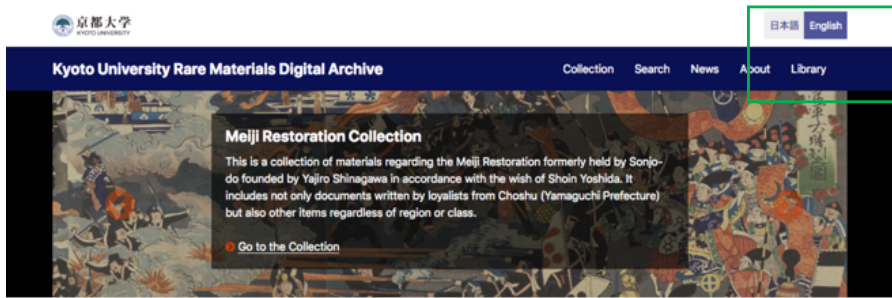
Language: Support Japanese and English. We are adding English metadata.
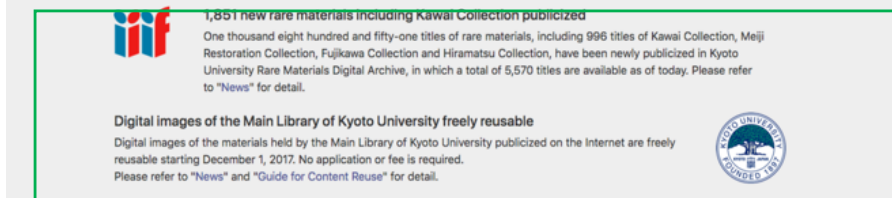
News
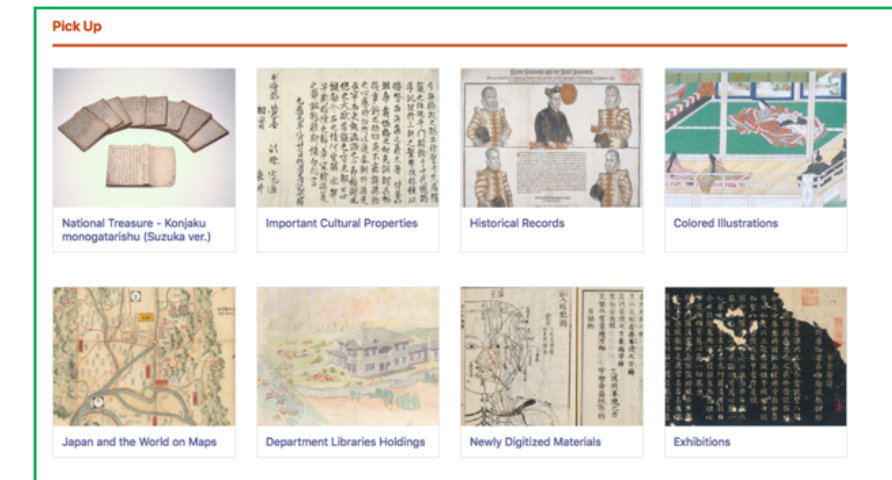
Pick Up: Several categories, in which important or/and popular rare materials are classified.
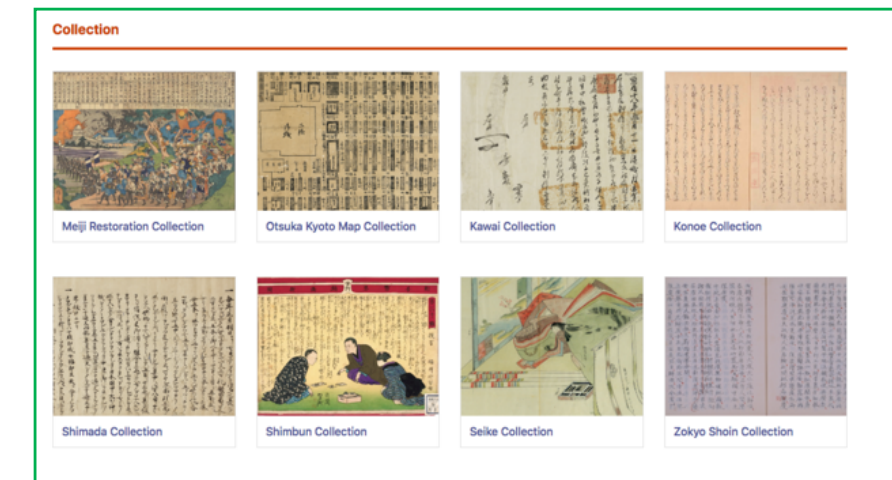
Collections: All collections in the digital archive. Some collections including many bibliographies have sub-collections.

Bibliography Information

Embedded UV

IIIF manifest
UV
Mirador

To improve discoverability of contents, we are adding English metadata.

Universal Viewer
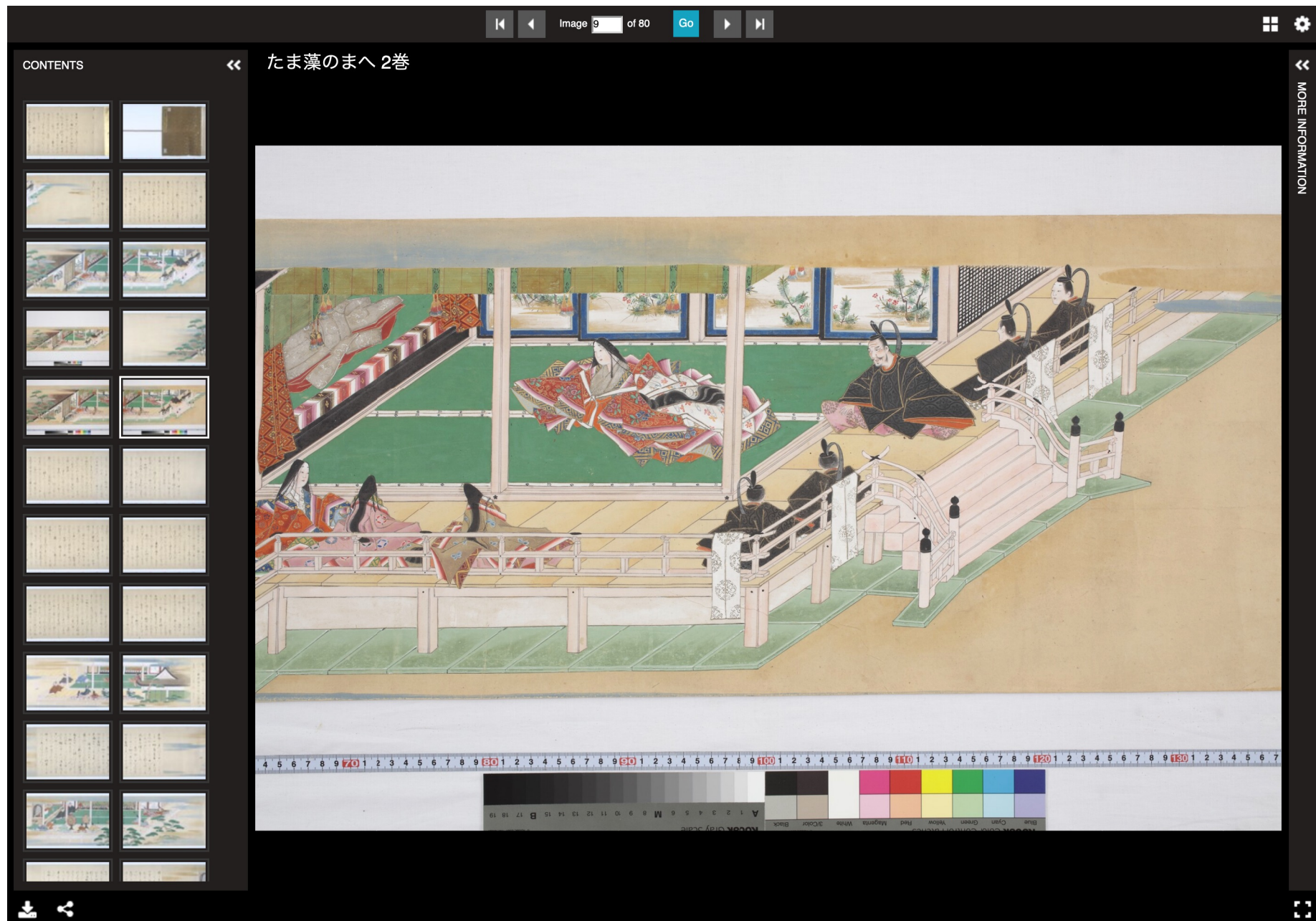
Mirador

System Configuration

1. visit website and get manifest.json

user

2. fetch images
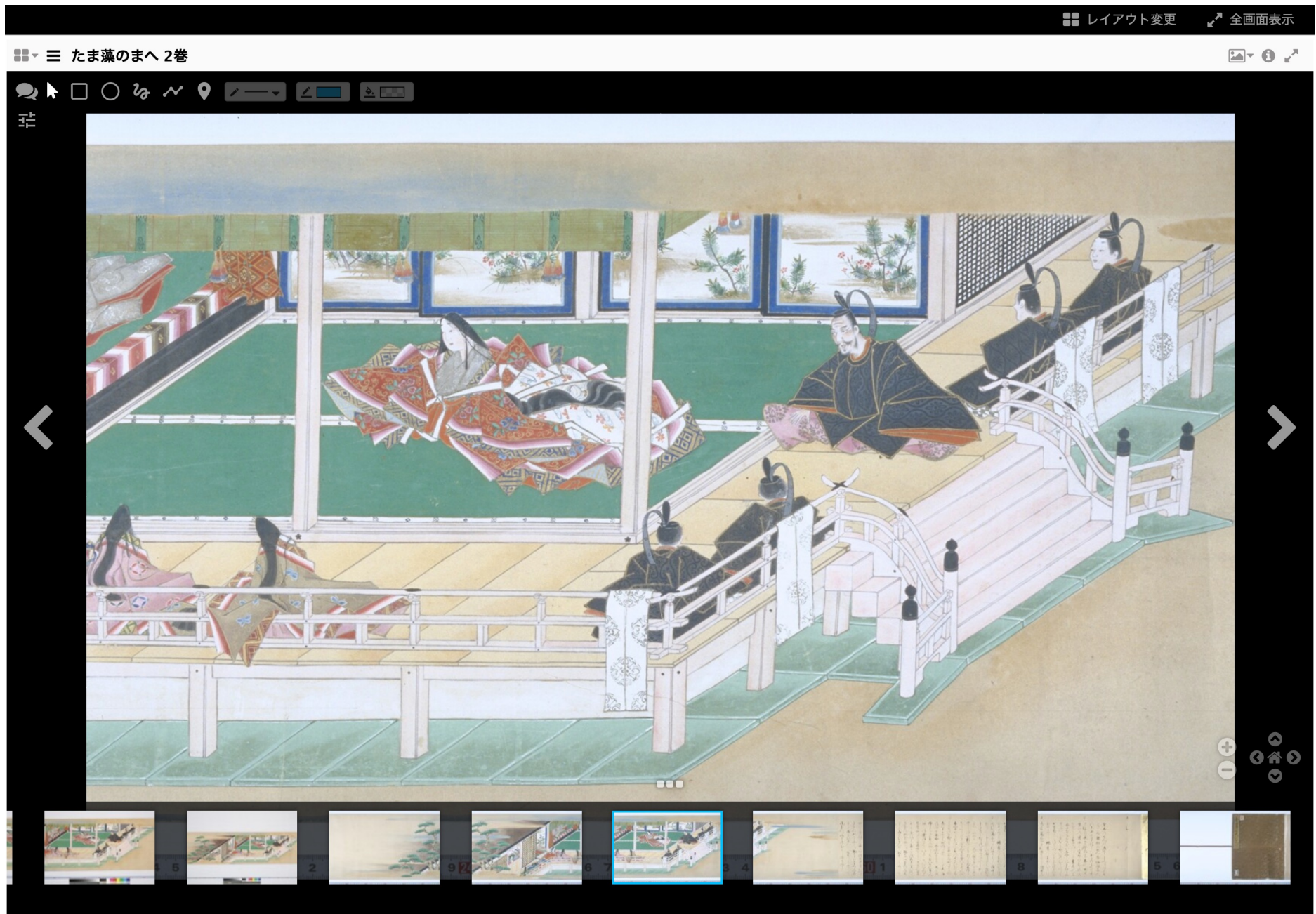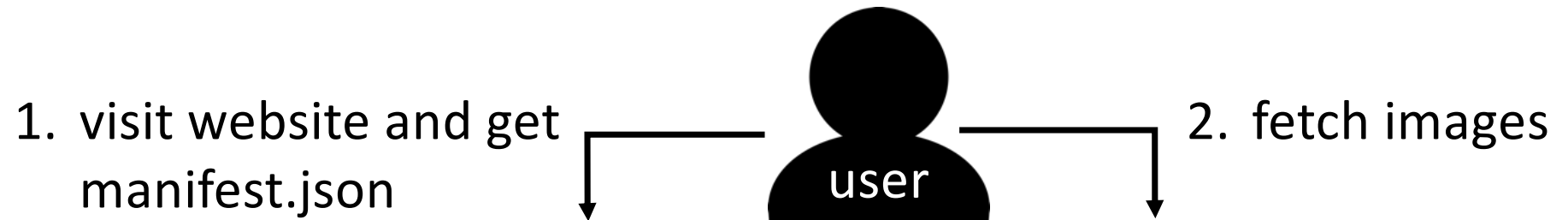
CMS (Drupal)

- Website design, Wireframe
- Metadata
- Viewer
- **manifest.json generator** (customized Drupal module)
- Search (Apache Solr)

Image Server (IIP Image Server)

- Image files (tif)

Links from OPAC to the Digital Arhicve

OPAC provides links to the digital archive.
- OPAC and the digital archive store the identical metadata.
- OPAC enables advanced search.

What's next?

The rare materials are unlocked through IIIF…

II. Collaborations

Collaborations

Collaboration with institutions that hold rare materials

Objective: To improve discoverability and accessibility of rare materials

➢ **Digital Fujikawa –History of Medicine in Japan– (Keio University Media Center / the University of Tokyo)**

Collaborations with research communities

Objective: To add values to rare materials

➢ **SAT Daizōkyō Database (SAT Daizōkyō Text Database Committee)**

➢ NIJL's Collectors' Seal Database (National Institute of Japanese Literature)

➢ Digitization project of the Kawai Collection (the Institute for Research in Humanities, Kyoto University / the Research Institute of Korean Studies, Korea University)

➢ Joint Project for the Tannnowa Collection (Kyoto University Museum / Kyoto University Graduate School of Letters / the Department of East Asian Studies of Princeton University)

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Fujikawa Collection and Motivation

Fujikawa Collection

- The collection is comprised of about 9,000 books formerly held by Dr. Yu Fujikawa (1865-1940)

- Books had been collected for his masterpiece "History of Medicine in Japan"

Books are separately stored in different institutions
→ **Can we bring them to one place in digital space?**
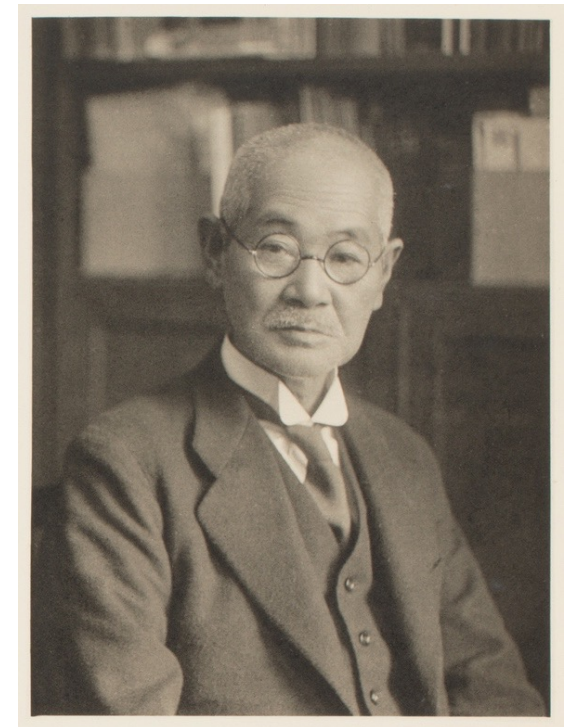
Yearbook of the 14th class, Keio University School of Medicine (1936)

Launch of Digital Fujikawa

Collaboration with institutions that hold rare materials

Project: Digital Fujikawa –History of Medicine in Japan–
by Kyoto Univ. Library Network and Keio Univ. Media Center

➤ **Objective I**: Contribute to the development of the research in the history of medicine in Japan by providing the comprehensive view of the Fujikawa Collection

➤ **Objective II**: Provide a showcase of digital unification utilizing IIIF

In September 2018, we launched the beta version
https://www.kulib.kyoto-u.ac.jp/rdl/digital_fujikawa/en/index.html

Number of Books and Acknowledgement

- Number of books: 5,794 books (as of August, 2020)
  - Kyoto University: 4,711 books
  - Keio University: 911 books
  - The University of Tokyo: 172 books

  > Books from the University of Tokyo are added in February, 2019

- Acknowledgement for digitization
  - 「京都大学附属図書館所蔵『富士川文庫』保存・公開のための修復・電子化事業-わが国の医学の歴史を俯瞰する研究基盤構築のために-（機能強化経費）」by MEXT
  - "Project to Build an International Collaborative Research Network for Pre-modern Japanese Texts (NIJL-NW project)" led by the National Institute of Japanese Literature
  - Kyoto University Open Access Promotion Project
  - Keio University Media Center (ordinary expenses)

Implementation [1/3]

> **Lightweight implementation**
> ➢ Since we can access to the server only via ftp, we do not use any software. Instead, we implement functionalities using JavaScript.

- We show title, author, publication year, and holding institution of books at each row of HTML table

- We add search function and sort function to HTML table using DataTables, a JQuery plugin

Implementation [2/3]

Home   Project   Fujikawa Collection   Links and Contacts   日本語

Digital Fujikawa - History of Medicine in Japan- (Beta ver.)

The Digital Fujikawa is a project which has been jointly launched by Kyoto University Library Network and Keio University Media Center. The project intends to contribute to the development of the research in the history of medicine in Japan by providing the comprehensive view of the Fujikawa Collection that has been physically distributed over different institutions using IIIF (International Interoperability Image Framework).

Show [50] entries   Search: 医学

Title (original)	Title (kana)	Title (romanization)	Author	Year	Library				
医学色葉	イガク イロハ	Igaku iroha	石心子著		京都	iiif	UV		
医学温古弁 2巻	イガク オンコベン	Igaku onkoben	田口矢澄著			iiif	UV		
医学楷梯	イガク カイテイ	Igaku kaitei	向田廸(応斎)著		京都	iiif	UV		
醫學管錐. 總目	イガク カンスイ	Igaku kansui	山田, 業廣		慶應	iiif	UV		
醫學管錐. 内集. 十三	イガク カンスイ	Igaku kansui	山田, 業廣		慶應	iiif	UV		
醫學管錐. 内集. 十五	イガク カンスイ	Igaku kansui	山田, 業廣		慶應	iiif	UV		
醫學管錐. 内集. 一	イガク カンスイ	Igaku kansui	山田, 業廣		慶應	iiif	UV		

Keyword search: search over titles (original, kana, roman), author, publication year, holding institution

Sort function

Link to bibliography page

**IIIF Manifest
Universal Viewer
Mirador
IIIF Curation Viewer**

Implementation [3/3]

Integrated search portal shortens distance between books on digital space and makes such comparison easy.

Influence from Digitization

Number of appointments to physically access to each collection

	FY2014		FY2015		FY2016		FY2017		FY2018	
1	Kawai	1,113	Tanimura	202	Otsuka	312	Otsuka	312	Otsuka	139
2	**Fujikawa**	284	**Fujikawa**	170	Others	142	Others	142	Others	70
3	Others	97	Kawai	131	**Fujikawa**	136	**Fujikawa**	136	Zokyo	34
4	Tanimura	64	Nakai	57	Tanimura	89	Tanimura	89	Kawai	28
5	Kikutei	52	Others	55	Seike	58	Seike	58	Tanimura	22
	total	**1812**	**total**	**903**	**total**	**1,088**	**total**	**903**	**total**	**363**

The total number of appointments has decreased

The Fujikawa collection dropped out of the top five, due to its availability on the web (?)

Collaborations

Collaboration with institutions that hold rare materials

Objective: To improve discoverability and accessibility of rare materials

➢ **Digital Fujikawa –History of Medicine in Japan– (Keio University Media Center / the University of Tokyo)**

Collaboration with research communities

Objective: To add values to rare materials

➢ **SAT Daizōkyō Database (SAT Daizōkyō Text Database Committee)**

➢ NIJL's Collectors' Seal Database (National Institute of Japanese Literature)

➢ Digitization project of the Kawai Collection (the Institute for Research in Humanities, Kyoto University / the Research Institute of Korean Studies, Korea University)

➢ Joint Project for the Tannnowa Collection (Kyoto University Museum / Kyoto University Graduate School of Letters / the Department of East Asian Studies of Princeton University)

Reciprocal Links with the SAT Daizōkyō Database [1/3]
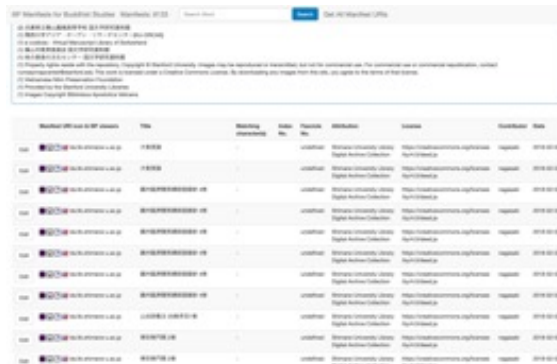
Collaboration with a research community (i.e., the SAT Daizōkyō Text Database Committee)

➤ **SAT Daizōkyō Database** is a full text-search service for the texts of 85 volumes of the Taishō Shinshū Daizōkyō.

➤ The Taishō Shinshū Daizōkyō is a definitive edition of the Chinese Buddhist canon, including Japanese commentaries used by scholars.

Reciprocal links connect a bibliography page on the Kyoto University Rare Materials Digital Archive and the corresponding page on the SAT Daizōkyō Database. Users can see full texts on the SAT Daizōkyō Database.

Reciprocal Links with the SAT Daizōkyō Database [2/3]

images of the rare materials through IIIF

added metadata

reciprocal link

IIIF Manifests for Buddhist Studies
A platform where researchers browse images of the rare materials and add metadata (e.g., catalog numbers, volume numbers) to the images.

Kyoto University Rare Materials Digital Archive

SAT Daizōkyō Database
full text-search service for the texts of eighty-five volumes of the Taishō Shinshū Daizōkyō provided by the SAT Daizōkyō Text Database Committee

Reciprocal Links with the SAT Daizōkyō Database [3/3]

- This collaboration shows a pathway in which users provide added value (i.e., metadata including catalog numbers and volume numbers) to rare materials.

- Then, the added value is given back to institutions that made the digitized rare materials available.

- Thus, the distribution of the rare materials through IIIF brings benefits to both users and institutions that hold material.

永﨑研宣, 下田正弘. オープン化が拓くデジタルアーカイブの高度利活用: IIIF Manifests for Buddhist Studiesの運用を通じて.人文科学とコンピュータシンポジウム, pp.389-394, 2018.

III. Evaluation

Evaluation

- Evaluation of a digital archive
  - To find better ways to digitize, publish, and share rare materials
  - Accountability for stakeholders
- Evaluation frameworks and guidelines
  - Europeana Impact Playbook
  - Guidelines for the Evaluation of Digital Scholarship in Historians

Common principle: Evaluation should be conducted in accordance with the objective of a digital archive

We will measure "to what extent rare materials available on the Kyoto University Rare Materials Digital Archive have been reflected in research"

Evaluation Strategies [1/2]

- We encourage users to share scholarly outcomes that use the rare materials.

> *"When using the Contents in academic publications, <u>users are encouraged to donate physical copies of them to the libraries</u> that hold the original materials. Please note the libraries may make the copies available for their users."*
>
> (https://rmda.kulib.kyoto-u.ac.jp/en/reuse)

- However, most users do not. We receive less than ten scholarly outcomes per year, but we know much more scholarly outcomes use the rare materials.

- Thus, we need an automatic procedure that identifies scholarly articles using the rare materials.

Evaluation Strategies [1/2]

How can we identify scholarly articles using the rare materials?

- **Strategy I: Usage statistics**
  - Identify the most accessed materials to understand trends of research
  - Search scholarly records (e.g., journal articles, department bulletins) that mention the most accessed rare materials

- **Strategy II: Retrieval of scholarly articles using API**
  - Retrieve scholarly articles that mention a rare material using API

Usage Statistics

- Metrics
  - **Number of pages**: Accesses to HTML, PHP, and ASP files
  - **Number of hits**: Accesses to all files, including CSS, image, and JavaScript files that are requested as a result of loading a page

Usage Statistics: Result

Usage Statistics: Result

36
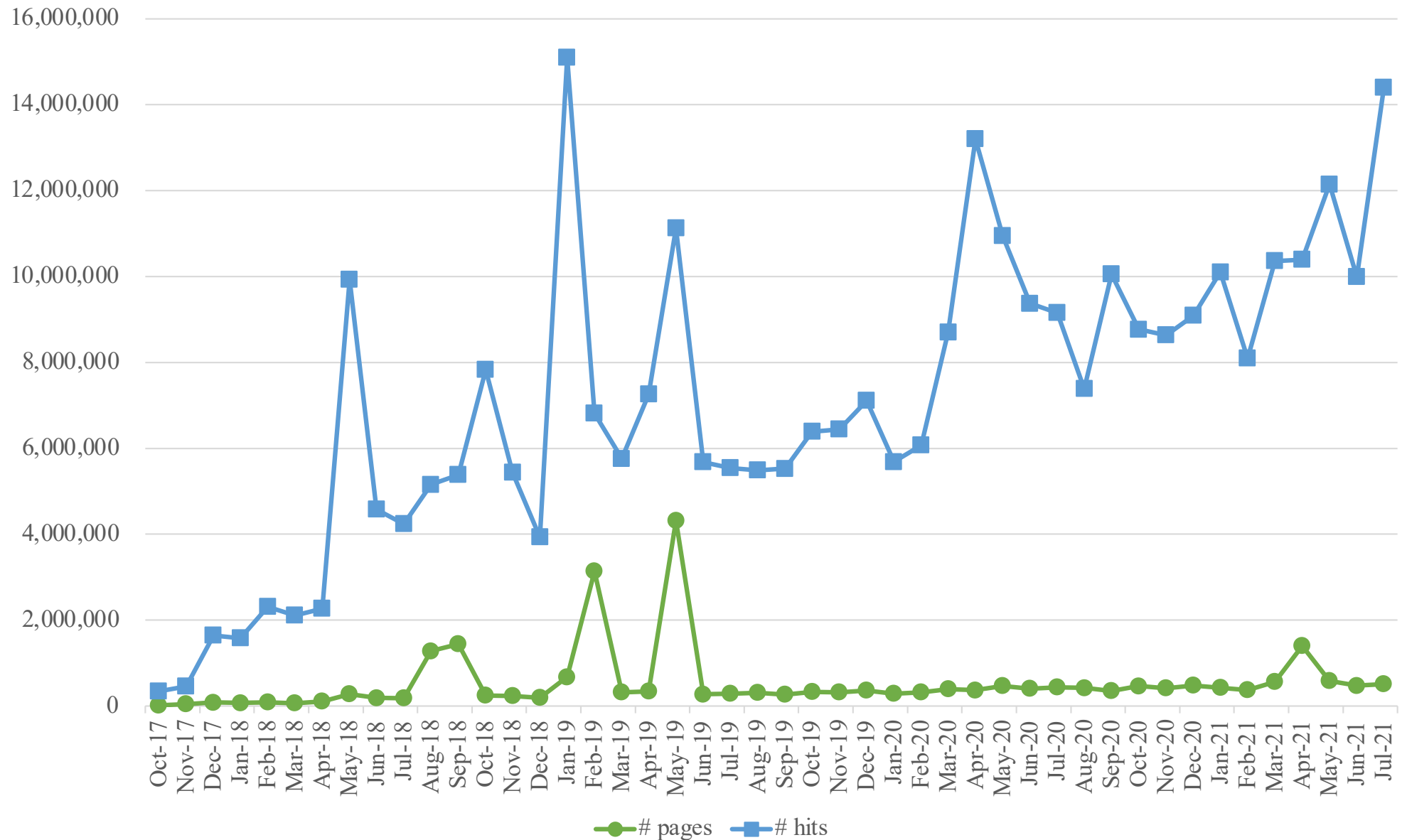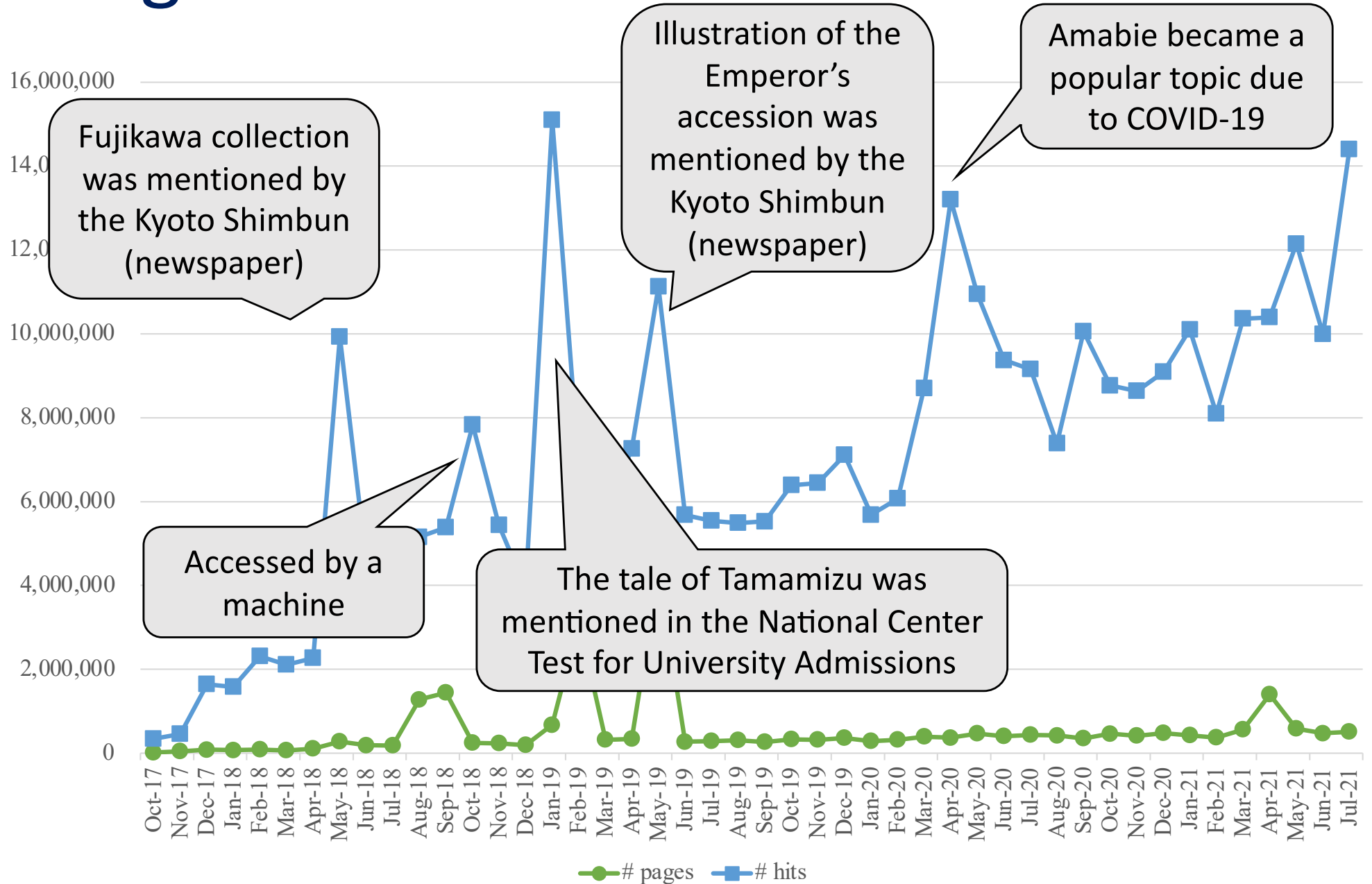
Accession of the Emperor

- The rare materials included in the Nakai Collection illustrate plans regarding the accessions of Emperor Sakurammachi and Empress Gosakuramachi.

- The Emperor's Accession took place on May 1, 2019.

- The illustration represents *Takamikura* (Imperial throne) and attending courtiers, all of them so colorfully and finely depicted.
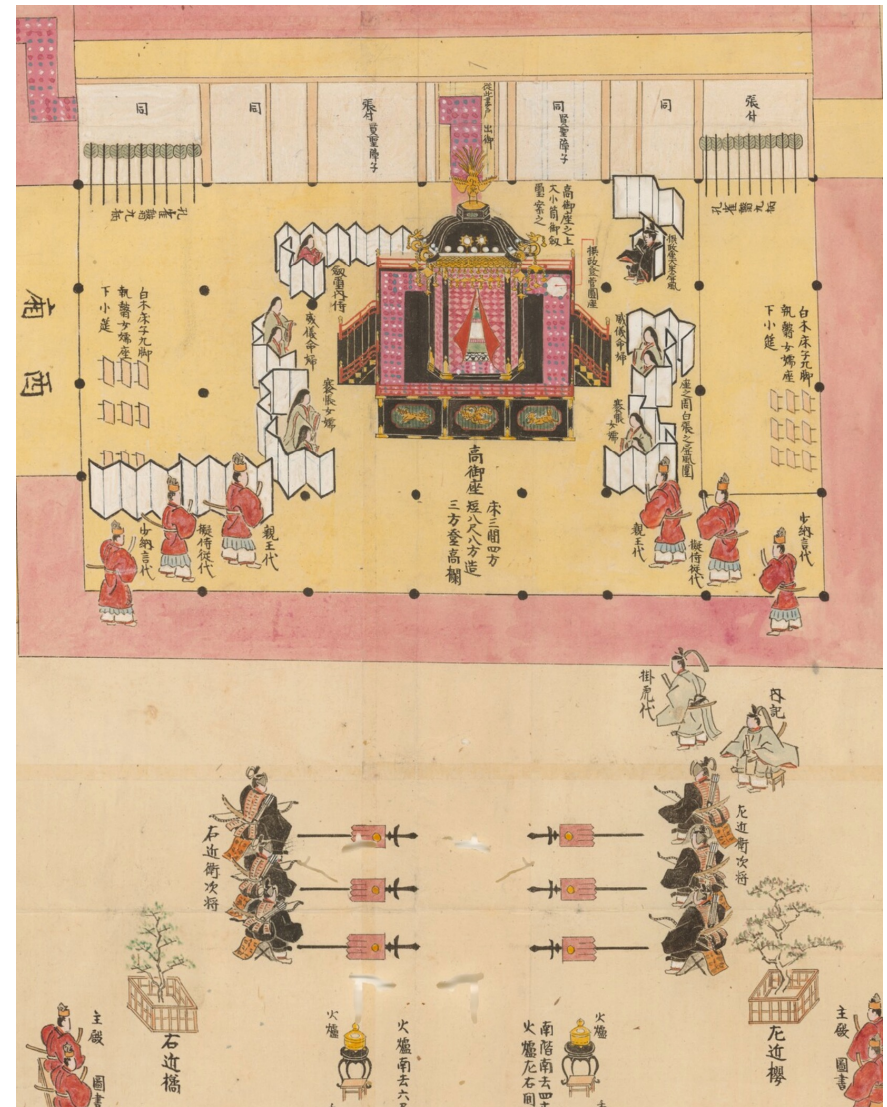
Kyōhō nijū kinotō no toshi jūichigatsu mikka gosokui tōshō tōka kazari gokisiki no zu narabini Seiryōden reifuku goran zu (Main Library, Kyoto University), https://rmda.kulib.kyoto-u.ac.jp/en/item/rb00025164

Amabie [1/2]

- Amabie is a legendary Japanese mermaid or merman [...], who allegedly emerges from the sea, prophesies either an abundant harvest or an epidemic, and instructed people to make copies of its likeness to defend against illness.

https://en.wikipedia.org/wiki/Amabie

Photograph courtesy of the Main Library, Kyoto University – Amabie
https://rmda.kulib.kyoto-u.ac.jp/item/rb00000122

Amabie [2/2]

- During the COVID-19 pandemic in Japan, Amabie got popular.
- Many artists published their illustrations of Amabie on social networks.

FROM JAPAN, A MASCOT FOR THE PANDEMIC

By Matt Alt

April 9, 2020

Sometimes it seems as if Japan's human population is outnumbered by cute characters. A few, such as Hello Kitty and Pikachu, have achieved international superstardom. But many more quietly populate the daily lives of citizens. Illustrated signs that feature choruses of anthropomorphic garbage exhort citizens not to litter; super-cute drawings of tsunamis warn residents away from dangerous shorelines. In drugstores, grinning enemas helpfully guide those in gastrointestinal distress to the proper medicine. Every prefecture has its own furry-costumed cheerleader, usually a whimsical personification of a regional dish or tourist attraction. Even Japan's military, the Self-Defense Forces, has a great many of them—deployed for the purposes of civilian outreach. And then there is the national Quarantine Information Office, which advises on customs procedures. In late 2019, with eerie timing, it debuted Quaran, which must be the world's first official quarantine mascot.

So it makes sense that, amid troubling times, Japanese have turned to a character for solace. The twist is that this particular one dates back to the nineteenth century. Its name is Amabié. It was first documented in an early form of newspaper known as a

https://www.newyorker.com/culture/cultural-comment/from-japan-a-mascot-for-the-pandemic
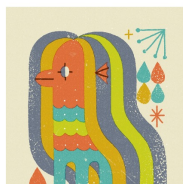
A poster advising to stop the spread of COVID-19 by Ministry of Health, Labour and Welfare

Usage Statistics: Conclusion

- We observed several spikes in the figure. They are caused by media such as a newspaper or tweets.

- Thus, usage statistics reflect societal impacts of the rare materials to some degree.

- However, it is difficult to see trends of research and to what extent the rare materials are used in scholarly outputs.

Retrieval of Scholarly Articles Using API [1/2]

- We retrieve scholarly articles that mention the rare materials using CiNii Articles API (i.e., CiNii Articles Open Search for Full Text).
  - CiNii Articles is a database that indices scholarly articles published in Japan.
  - We set queries as follows:
    [title of a material] + [space] + "Kyoto Unversity Library" (in Japanese)
    (example) "The tale of Tamamizu Kyoto University Library"（玉水物語　京都大学附属図書館）

> We got a lot of false positives (i.e., scholarly articles that are identified as mentioning a rare material but actually do not). Therefore, it is difficult to identify scholarly articles that use a rare material automatically only using CiNii Articles API.

Retrieval of Scholarly Articles Using API [2/2]

- Another challenge…
  - Usage statistics revealed that 40% of hits come from foreign countries such as China and the United States. This indicates the rare materials are possibly mentioned in scholarly articles in foreign countries.
  - Thus, we need to investigate an automatic procedure for scholarly articles in English and other languages.

Importance of Understanding Scholarly Usage

- The two strategies could not capture scholarly outputs that use a rare material well.

- Understanding scholarly usage of a rare material is important not only for the evaluation of digital archives but also for supporting research, because information regarding related works of rare materials and how they are used will assist researchers. It allows researchers to see what research has been conducted so far on a rare material.

Presenting Use Cases

Kyoto University Rare Materials Digital Archive

Collection　Search　News　About　Library

Exhibitions And Application In Research

Home / Exhibitions and application in research

Digital Archive Data In Publication

"Nijo gojochu ezu" appears in the Official Guidebook of Nijo Castle

Nijo gojochu ezu of Nakai Collection the Main Library holds appears in *World Heritage Nijo Castle Official Guidebook* (in Japanese) published on October 25, 2019.

Nijo gojochu ezu, created in 1843, is a plan of the whole Ni… the names of the buildings, why the buildings are color-coo…

This is the first official guidebook of the castle published i… to-read book will provide you with so much information, fro… of the current Nijo Castle.

Exhibitions Outside Kyoto University

The exhibitions below will display actual materials of our holdings.
Please refer to more detailed/latest information on the websites of relevant institutions.

Material	Institution	Exhibition	Period (Our materials may be exhibited during part of this period.)
坂本龍馬書状（維新特別資料文庫）	The Sakamoto Ryoma Memorial Museum	特別展「龍馬と北の大地」第1部　蝦夷地へのまなざし－龍馬と幕末の志士	Oct. 5 - Dec. 3, 2021
癸巳西遊日記（谷村文庫）	Nezu Museum	Special Exhibition Commemorating Designation as an Important Cultural Proper Mountain Streams in Summe	
年中行事（重要文化財）	Saiku Historical Museum	三重とこわか国体・三重とこ「斎宮平安五種競技－弓・馬	
万葉集（尼崎本）巻16（重要文化財）万葉集 巻1・9　近衛文庫 [曼朱院本]萬葉集 巻1・6・20　一般貴重書(和)	Osaka Museum of History	特別展「難波(なにわ)をうた－」	
【Past event】今昔物語集（鈴鹿本）9冊中2冊（国宝）27・29巻	Kyoto National Museum	Special Exhibition National T Preserving the Cultural Herit Ancient Capital	
【Past event】[中院日記] 中院文庫 [RB00007056]	KARIYA city Museum of History	企画展「歴史へのいざない－カー」	

As of Oct. 7, 2021

Research Projects Using The Data Of This Digital Archive

Since one of Kyoto University Library Network's missions is to contribute to the promotion of academic research by making our rare collections open access, we welcome researchers to use our digital data for their research.
Here are examples of research projects using our digital data.

Database of Pre-Modern Japanese Works (NIJL)	Kyoto University is participating the "Project to Build an International Collaborative Research Network for Pre-modern Japanese Texts" by the National Institute of Japanese Literature. As a cooperation with the project, images and metadata that created by Kyoto University were provided. (京都大学附属図書館 画像一覧 / Kyoto University Library List)
IIIF Manifests for Buddhist Studies by The SAT Daizōkyō Text Database Committee	This is a website released by the SAT Daizōkyō Text Database Committee to share IIIF Manifest URIs related to the research in Buddhism. Clicking "Kyoto University Rare Materials Digital Archive" from Attributions can filter the list to show Kyoto University's holdings only. The list includes multiple icons, each linking to a different IIIF-compliant viewer to show digital images. The committee also provides the SAT Daizōkyō Text Database, a database of the full text of 85 volumes of *Taishō Shinshū Daizōkyō* (大正新脩大藏經).
Project On Digital Unification Of Fujikawa Collection (Digital Fujikawa)	Kyoto University Library Network and Keio University Media Center concluded an agreement on the Joint Project on Digital Unification of Fujikawa Collection (Digital Fujikawa) and launched an integrated website that virtually brings together the holdings of both universities in one place by using the International Image Interoperability Framework (IIIF) protocol on September 28, 2018. This project intends to contribute to the development of the research in the history of medicine in Japan by providing the comprehensive view of Fujikawa Collection that has been physically divided into several parts, each currently held by a different institution. This is also a showcase of digital unification utilizing IIIF features.
Collection of Facial Expressions, Center for Open Data in the Humanities (CODH)	Collection of Facial Expressions by CODH is the project to gather clippings of facial expressions from art works in order to utilize them for the research in history of art, especially artistic styles. Facial expression is one of the most important research objects, because their styles tend to show characteristics of artists or their studios. Comparing facial expression clippings from art works across the world, mainly Japanese picture scrolls, enables identifying the artists or studios that created the art works and finding the influence on each other.
Collectors' Seal Database (NIJL)	The database has accumulated images of collectors' seals and their information, which users can search by what is inscribed on the seal, the number of characters, the placement of each character, the number of lines, where the text is broken in lines, etc. Seals collected from Tanimura Collection held by Kyoto University Library are also included in the database.

https://rmda.kulib.kyoto-u.ac.jp/en/classification/pickup-exhibit

Exhibitions and research that use rare materials

Towards Revealing Scholarly Usage

We need a framework that instructs how to cite a rare material and extract citations

- Promote open access of different scholarly resources in the field of the humanities
  - Many scholarly articles in the humanities remain in print and are not available online. In this case, it is difficult to detect citations.
  - Scholarly resources other than articles should be made available online. Researchers in the humanities produce scholarly outputs in various forms, including monographs.
- Citations among different types of scholarly resources should be made available in line with an international standard such as the one defined by the Initiative for Open Citations (I4OC) for broad distribution.

Summary

Kyoto University Rare Materials Digital Archive
supported by Kyoto University Open Access Promotion Project
to enhance resources for research in humanities by digitizing our rare materials and making them open access

- IIIF-compatible implementation

- Collaborations
    - Digital Fujikawa
    - Reciprocal links with the SAT Daizōkyō Database

- Evaluation
    - Usage statistics reflect societal impacts of rare materials
    - Challenge: How can we capture scholarly outputs that use rare materials?

We would like to facilitate distribution of scholarly resources including rare materials through IIIF and other standards

Acknowledgement

- Institutions and research communities that work with us
- Kyoto University Open Access Promotion Project
- Kyoto University Library Network

Thank you!