

# Introduction to Kyoto University Rare Materials Digital Archive

Towards Open Access of Rare Material Images

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## ABSTRACT

Over the decade the Open Access movement has evolved with the support by academic communities. In this context, we recently promote to make rare materials (e.g., manuscripts) public on the web, in order to support researchers in humanities. We have digitized the rare materials and investigated how to make them public. In this paper, we introduce our novel digital archive system *Kyoto University Rare Materials Digital Archive*. The digital archive system provides free access to the digitized rare materials to academic communities. It supports the IIF (International Image Interoperable Framework), which promotes interoperable image delivery on the web. The digital archive system is composed of two main components, content management system based on Drupal and IIF image server. In the future, we investigate how to assess the usage of the rare material images and how to present transcriptions and translations for them.

## CCS CONCEPTS

• Information systems → Digital libraries and archives; • Applied computing → Arts and humanities; Publishing;

## KEYWORDS

digital archive, open access, IIF

## 1 INTRODUCTION

Open access to scientific articles refers to the removal of barriers (including price barriers and permission barriers) from accessing them [2]. Over the decade the Open Access movement has evolved with the support by academic communities. In this context, Kyoto University adopted the Kyoto University Open Access Policy<sup>1</sup> in 2015. The policy mandates faculty members of Kyoto University to make their academic articles public on the web using the institutional repository Kyoto University Research Information Repository (KURENAI)<sup>2</sup>. In addition to academic articles, we recently promote to make rare materials (e.g., manuscripts) public on the web, in order to support researchers in humanities. We have digitized the rare materials and investigated how to release them onto the web. To this end, we launched the *Kyoto University Rare Materials Digital Archive* (<http://rmda.kulib.kyoto-u.ac.jp/>), a digital archive system, which provides free access to the rare material images.

<sup>1</sup><http://www.kulib.kyoto-u.ac.jp/uploads/oapolicy.pdf>

<sup>2</sup><https://repository.kulib.kyoto-u.ac.jp/dspace/?locale=en>

This paper elaborates on the digital archive system. It supports the IIF (International Image Interoperable Framework)<sup>3</sup>, which promotes interoperable image delivery on the web. The IIF is a community of libraries, research institutions, museums, archives, nonprofits and commercial organizations that are committed to interoperable image delivery on the web [1]. The community has defined a set of application programming interfaces (APIs) for delivery of images as well as their metadata. Thus, the rare material images available in the digital archive system can be accessed and reused by using these APIs.

Section 2 provides the details of our digital archive system. Thereafter, we describe what we investigate for the digital archive system in the future in Section 3.

## 2 DIGITAL ARCHIVE SYSTEM

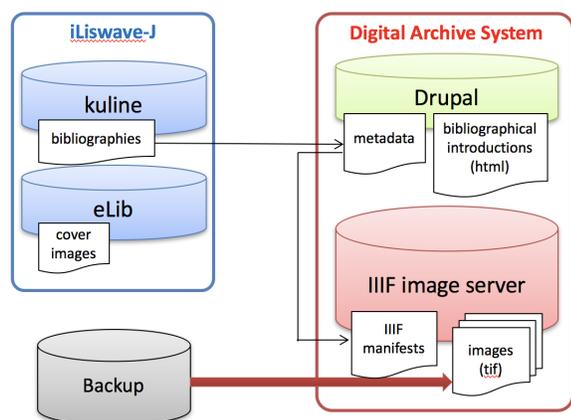
This section describes the details of our digital archive system. Section 2.1 provides the system architecture of the digital archive system. Subsequently, we show the user interface in Section 2.2.

### 2.1 System Architecture

Figure 1 illustrates the system architecture of the digital archive system. The system comprises two main components: content management system (CMS) based on Drupal and IIF image server. The CMS keeps metadata of the rare materials and their bibliographical introductions. The administrator manages contents of the digital archive system through the CMS. Users can search images by executing queries on the CMS. The IIF image server stores images as well as IIF manifests, which describe metadata. The images are delivered to the CMS via the IIF Image APIs. The IIF manifests are generated based on metadata stored in the CMS. They are brought to the CMS via the IIF Presentation APIs. The images are stored in the Tagged Image File Format (TIFF). The backup server keeps copies of the images.

KULINE is an online catalog, which stores metadata of materials held by the Kyoto University Library Network. It includes metadata of the rare materials in addition to those of books and journals. Thus, users can search the rare materials not only on the digital archive system but also on the online catalog. The cover images of the rare materials are stored for providing thumbnails. In the future, we have to investigate how to synchronize metadata in the digital archive system with those in the online catalog.

<sup>3</sup><http://iiif.io/>



**Figure 1: System architecture of the Kyoto University Rare Materials Digital Archive.**

## 2.2 User Interface

Figure 2 is a screenshot of the top page of the digital archive system. “Pick Up” in the middle provides several categories, in which important or/and popular rare materials are classified. Collections are given in “Collection” in the bottom. Users can execute queries for searching rare materials. In terms of viewers for the rare material images, we support both Universal Viewer<sup>4</sup> and Mirador<sup>5</sup> that are most popular in the IIF.

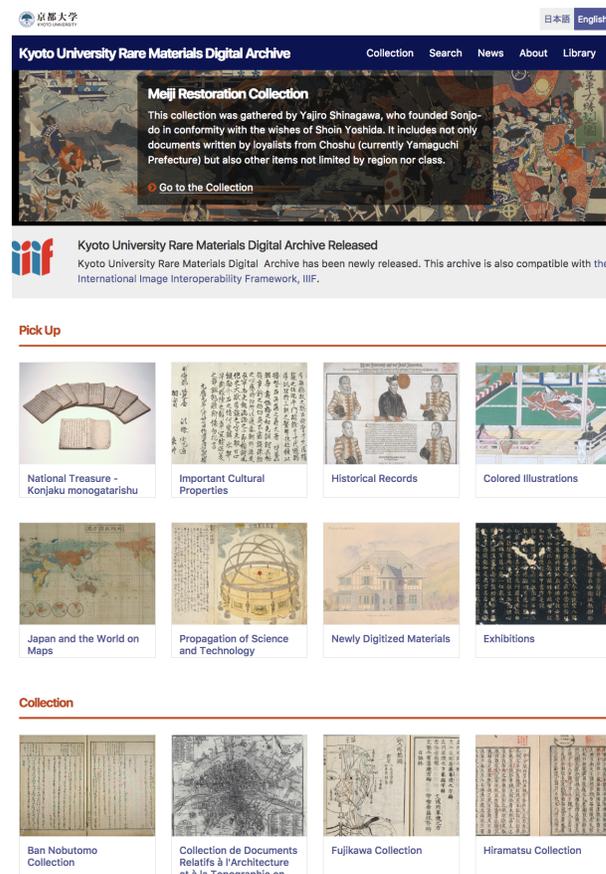
## 3 FUTURE WORK

Basing on the digital archive system introduced in Section 2, we will further tackle the following issues to improve it.

**Metric of image usage** It is important to evaluate the detailed usage of the rare material images. In the case of traditional digital archive systems, we can assess it using page views (PVs). In contrast, it is inappropriate for our digital archive system, since the images are stored in the IIF image server. Although we may use the number of IIF Image API calls as metric, it does not reflect the actual usage. Because IIF Image APIs are called every time users zoom-in and zoom-out images. Therefore, we will develop an appropriate metric by investigating the correlation between actual usage (e.g., dwell time) of images and the number of IIF Image API calls.

**Understanding user activity patterns** Furthermore, we will analyze IIF Image APIs calls, in order to understand user activity patterns on the digital archive system. Since IIF image APIs are called every time users zoom-in and zoom-out images, we can see more precise patterns. These patterns may reveal, for instance, when users get difficulties and stop browsing images. This insight helps us to improve the digital archive system.

**Generating transcriptions and translations** The IIF allows to present annotations over images. Thus, it allows to show



**Figure 2: Top page of the Kyoto University Rare Materials Digital Archive.**

transcriptions and translations, which assist users in understanding contents better. However, only a few rare materials have transcriptions or/and translations. In order to populate metadata of rare materials, it is necessary that these rare materials are studied by researchers. By making the rare materials public, we hope that studies in the rare materials make progress and researchers generate metadata for them.

**Presentation of transcriptions and translations** The IIF provides functionalities of presenting transcriptions and translations as annotations over images. We have to investigate how to align images and annotations, since annotations do not have positions over images.

## REFERENCES

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<sup>4</sup><https://universalviewer.io/>

<sup>5</sup><https://mirador.stanford.edu/>