IIIF Curation: the concept, its development, and its potential impact on search and discovery

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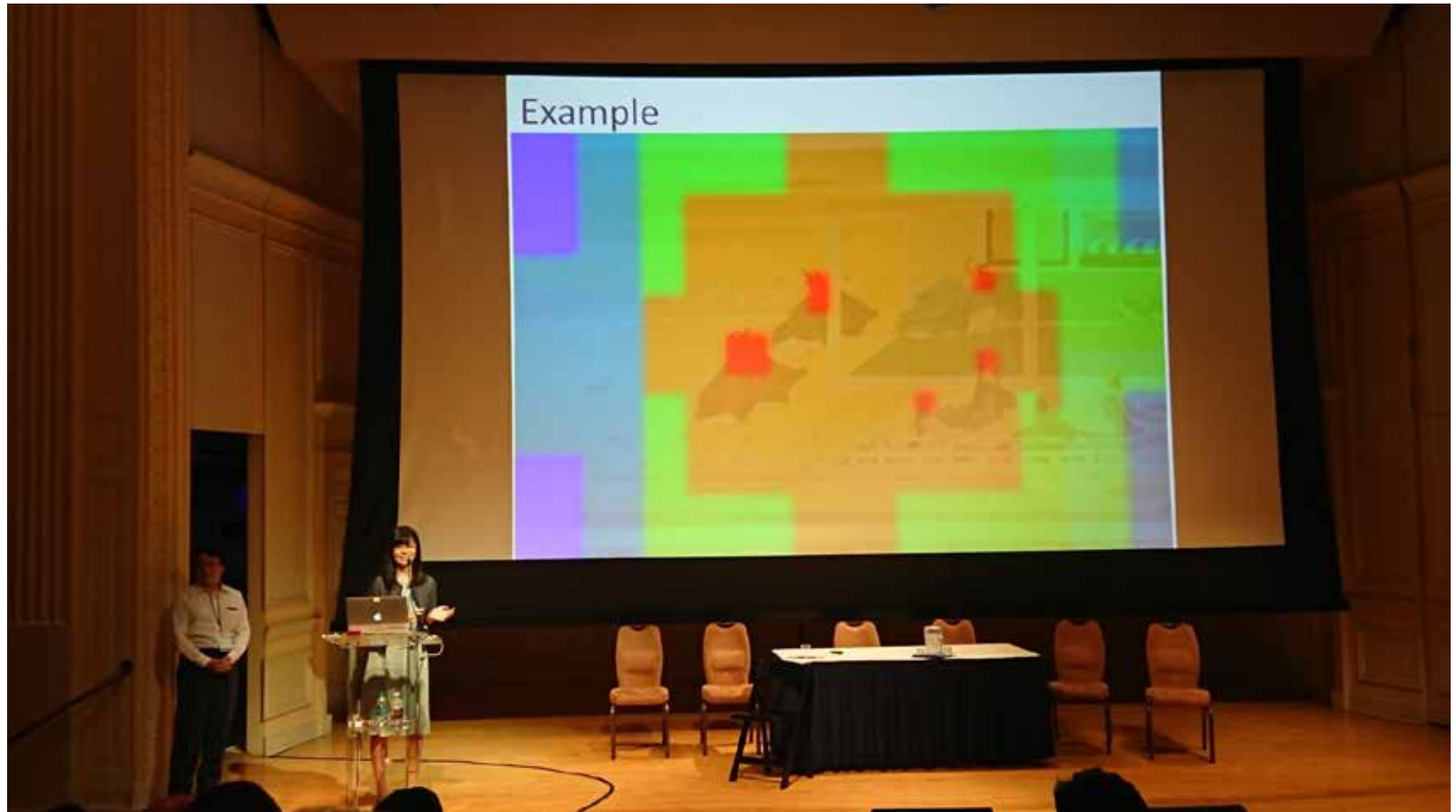
National Institute of Informatics

http://codh.rois.ac.jp/

@rois_codh

Co-authors:
Jun Homma (FIx Style)
Tarek Saier (NII Internship Student, Albert Ludwigs University of Freiburg

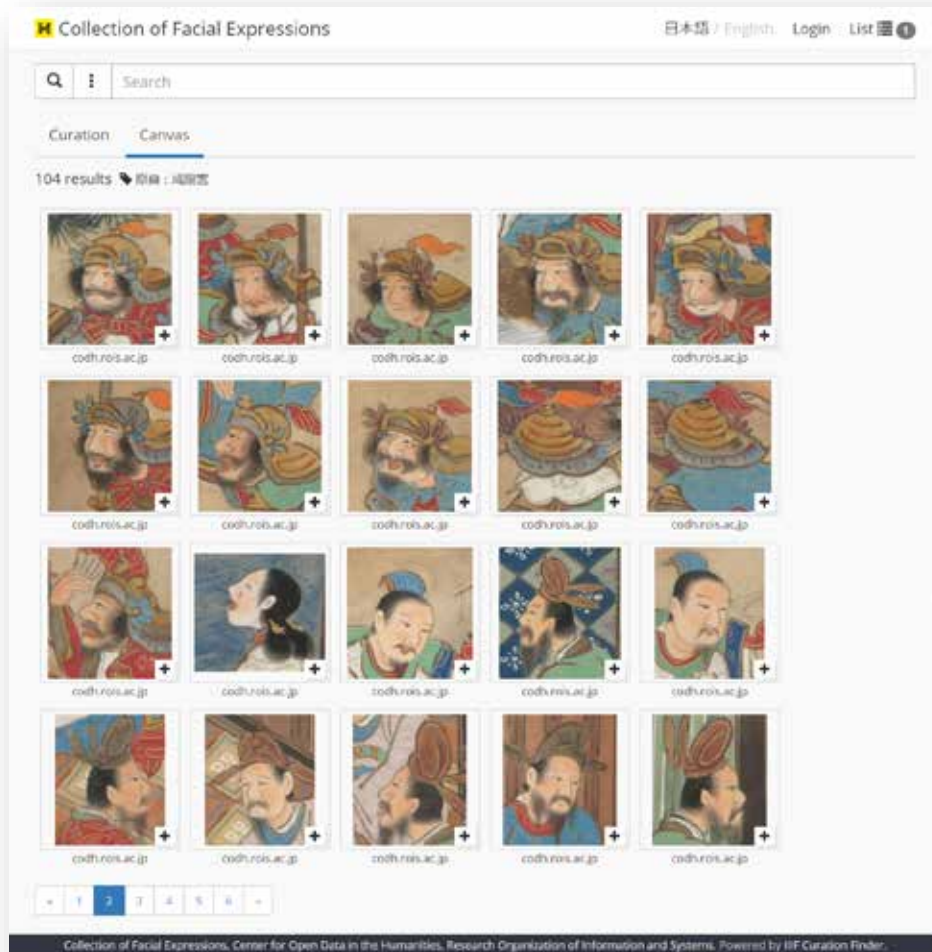# Concept of IIIF Curation

Unusual Access Patterns?

Chifumi Nishioka, Kiyonori Nagasaki, Visualizing which parts of IIIF images are looked by users, 2018 IIIF Conference

Artifacts Caused by Our Service?

http://codh.rois.ac.jp/face/

Released on
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- Collection of Facial Expressions generates "fine-to-coarse" access patterns.

Units of Distribution

https://resources.digirati.com/iiif/an-introduction-to-iiif/looking-up-and-down.html

Good Old Analogue World

1 Scissors **2** Paste

Source: , http://www.irasutoya.com/
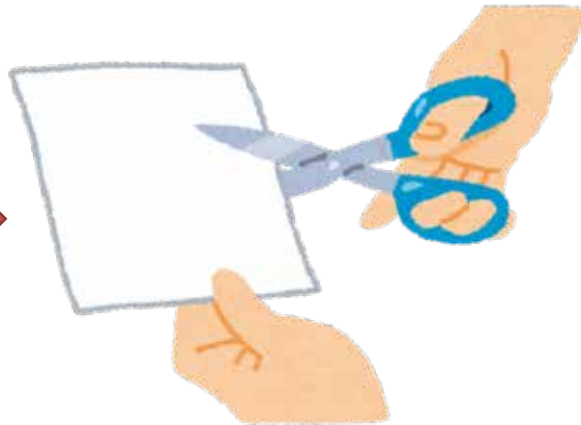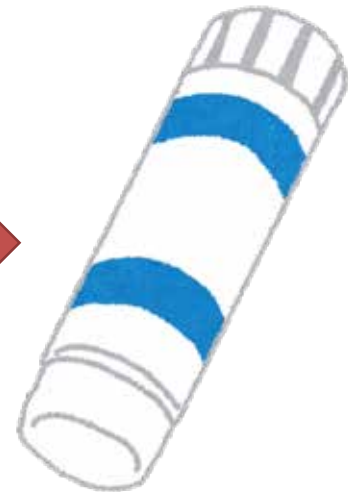
Frictionless Digital World

1. Draw a rectangle.
2. Add to favorites.

Collection of Facial Expressions
http://codh.rois.ac.jp/face/
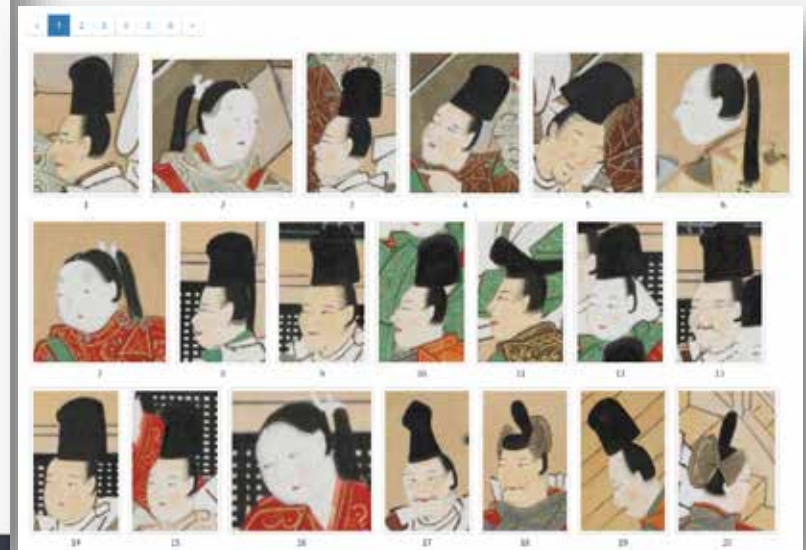
Tag: (https://en.wikipedia.org/wiki/Minamoto_no_Yoshitsune)

rmda.kulib.kyoto-u.ac.jp · rmda.kulib.kyoto-u.ac.jp · rmda.kulib.kyoto-u.ac.jp · rmda.kulib.kyoto-u.ac.jp · rmda.kulib.kyoto-u.ac.jp

rmda.kulib.kyoto-u.ac.jp · rmda.kulib.kyoto-u.ac.jp · rmda.kulib.kyoto-u.ac.jp · iiif.lib.keio.ac.jp · iiif.lib.keio.ac.jp

Curation of the same person appearing in different Japanese Emaki handscroll across IIIF services.

IIIF Curation Viewer (for Timeline)
http://codh.rois.ac.jp/software/iiif-curation-viewer/
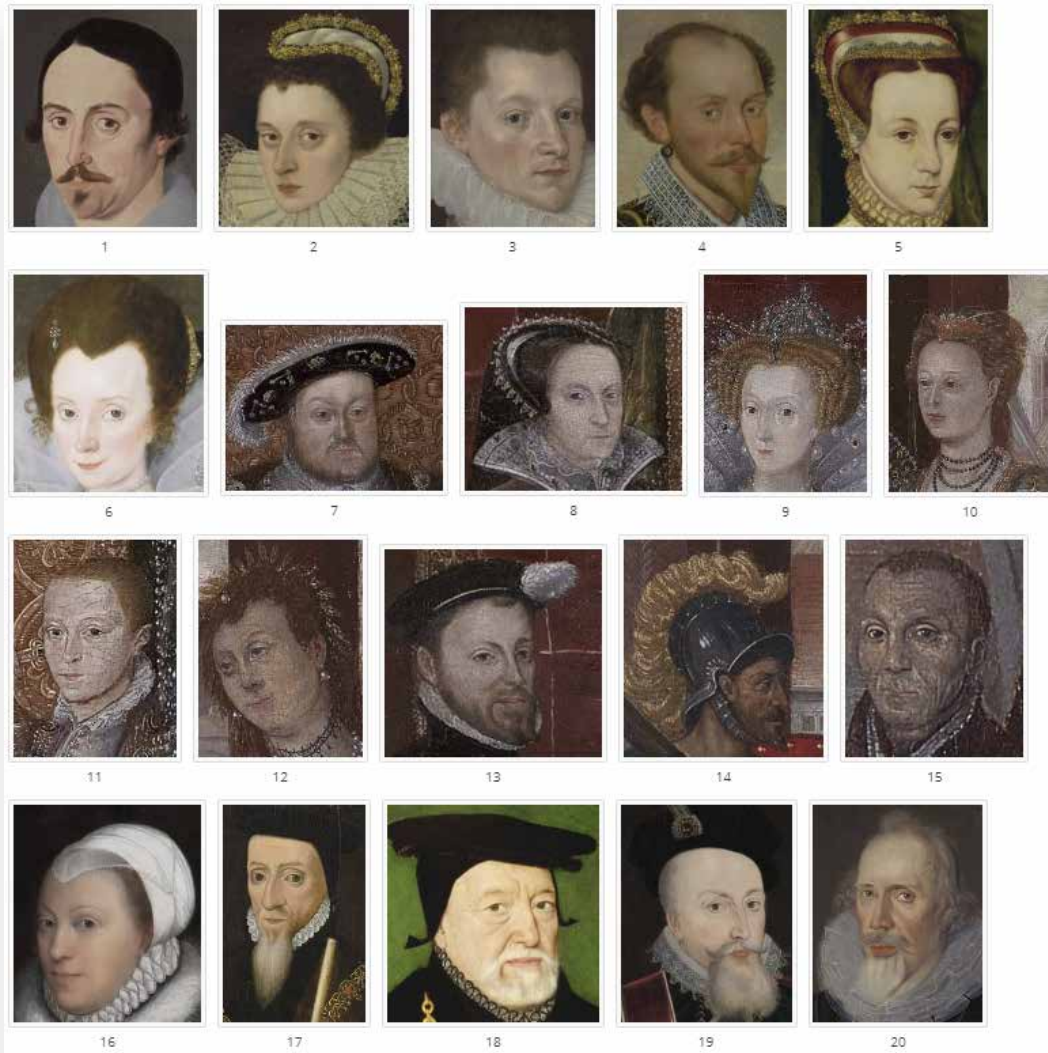

Developed
on Leaflet-IIIF
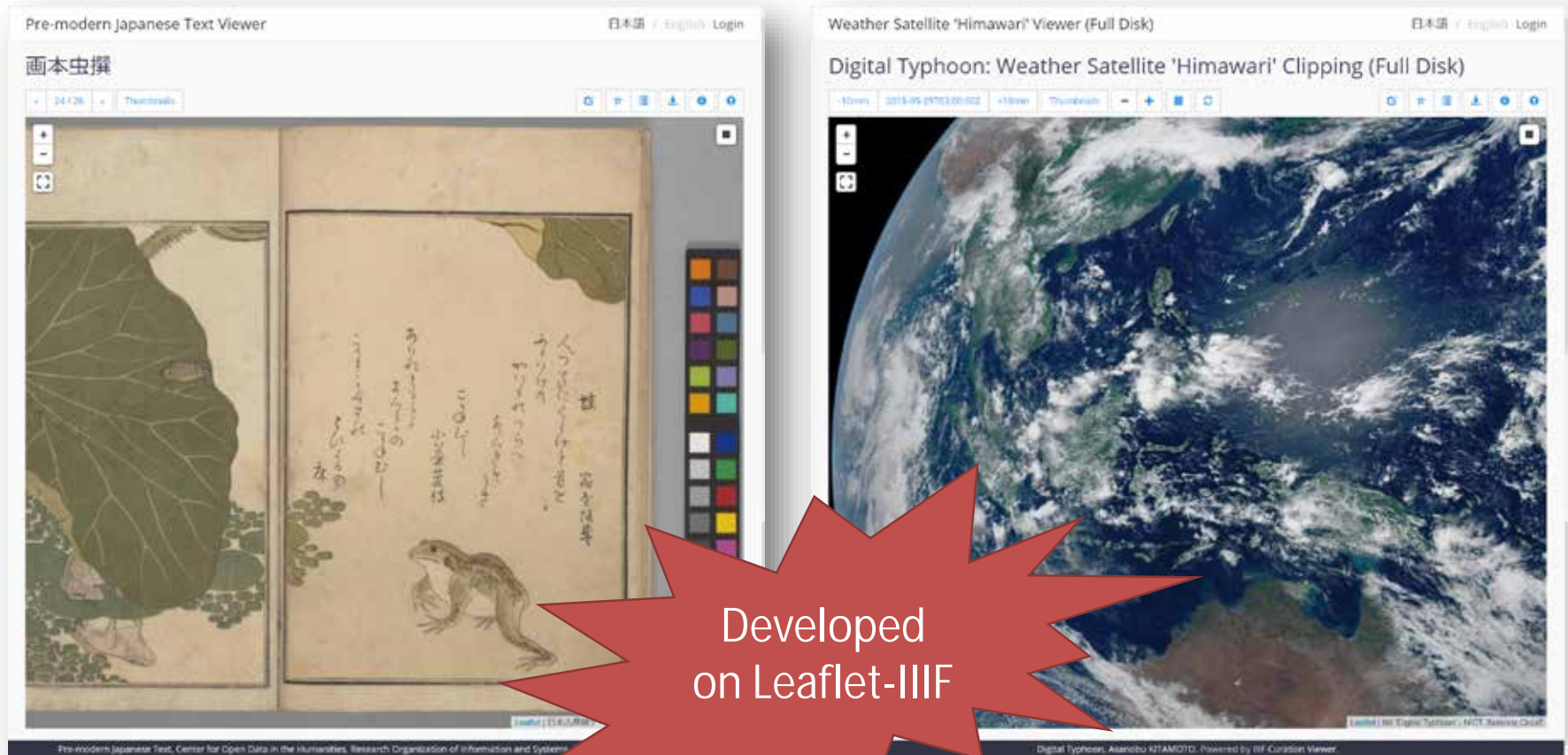
Sixteenth Century

Seventeenth Century

Facial expression data: Portrait http://codh.rois.ac.jp/curation/exhibition/2/index.html.en
Originally from Yale Center For British Art
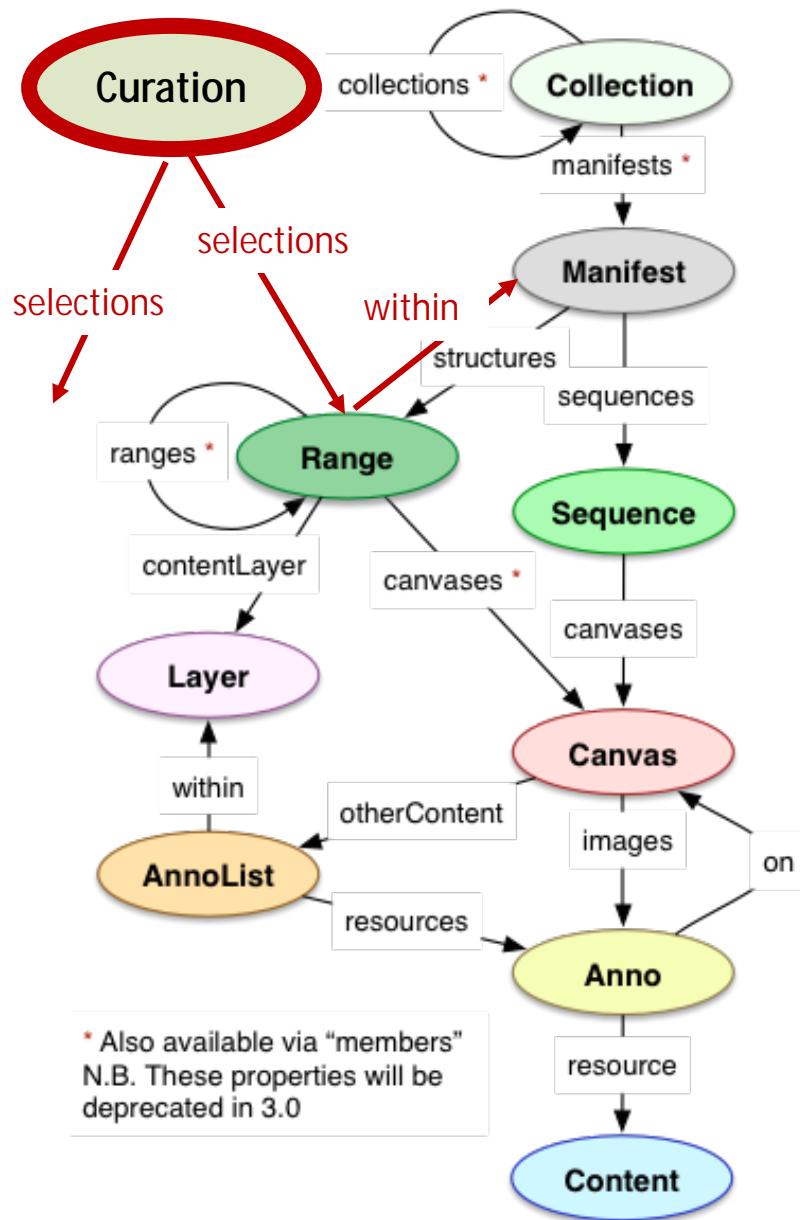
Extension to Presentation API 2

- Curation is another upper element of Range.

- Range points to Manifest using "within" property.

- **Curation is an array of ranges across multiple manifests.**

Selection of (a part of) Canvases

http://codh.rois.ac.jp/software/iiif-curation-viewer/

"selections": [{
 "@id": "http://codh.rois.ac.jp/pmjt/book/200014778/range/r1",
"@type": "sc:Range",
"label": "Curated contents from   ",
"canvases": [
"http://codh.rois.ac.jp/pmjt/iiif/200014778/canvas/00000",
"http://codh.rois.ac.jp/pmjt/iiif/200014778/canvas/00023",
"http://codh.rois.ac.jp/pmjt/iiif/200014778/canvas/00023#xywh=3435,2487,840,750"],
"within": "http://codh.rois.ac.jp/pmjt/book/200014778/manifest.json" }, {
"@id": "http://codh.rois.ac.jp/pmjt/book/200003067/range/r1",
"@type": "sc:Range",
"label": "Curated contents from   ",
"members": [
{ "@id": "http://codh.rois.ac.jp/pmjt/iiif/200003067/canvas/00000", "@type": "sc:Canvas", "label":
"p.1" },
{ "@id": "http://codh.rois.ac.jp/pmjt/iiif/200003067/canvas/00010", "@type": "sc:Canvas", "label":
"p.11" },
{ "@id": "http://codh.rois.ac.jp/pmjt/iiif/200003067/canvas/00010#xywh=2850,1000,730,680",
"@type": "sc:Canvas", "label": "p.11" }],
"within": { "@id": "http://codh.rois.ac.jp/pmjt/book/200003067/manifest.json", "@type":
"sc:Manifest", "label": "   " } }]

Manifest and Curation

Manifest	Curation
• A digital representation of a physical object in the world.	• A representation of a semantic object in the digital content.
• Authoritative information from content providers.	• Third-party information from content consumers.
• **Physical ordering**.	• **Logical ordering**.
• **Coarse-to-fine viewing**.	• **Fine-to-coarse viewing**.

Fragmentation + Recombination

Manifest
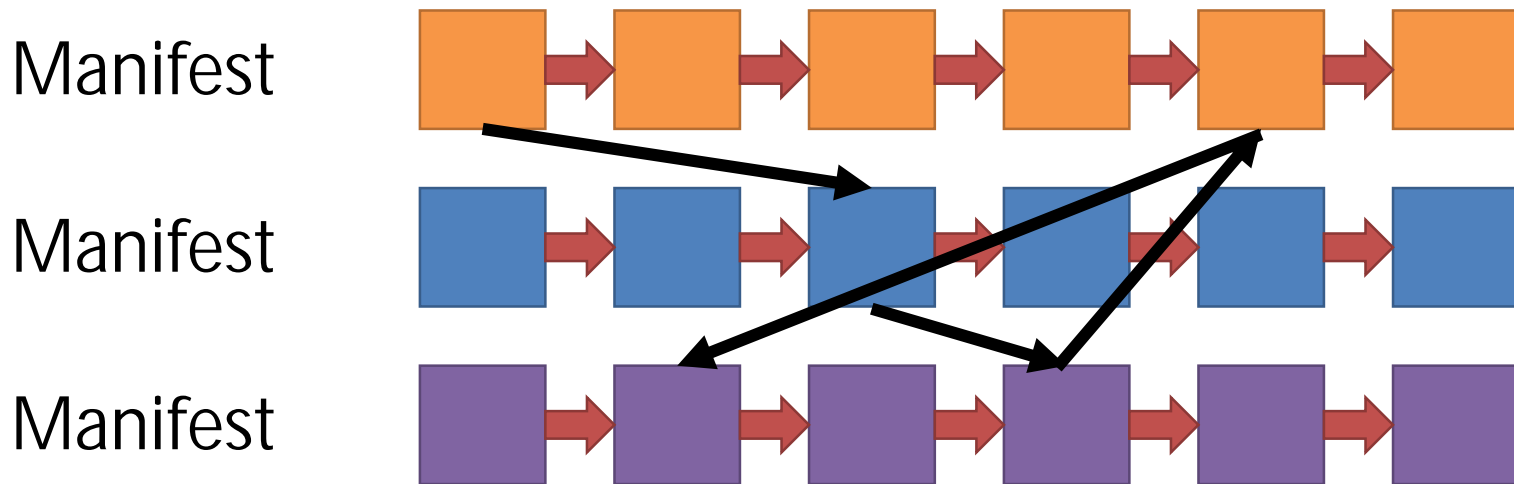
Manifest

Manifest

- A manifest is fragmented into canvases, and recombined by a curator.
- Physical ordering and logical ordering offer two different contexts for interpretation.

Development of IIIF Curation Platform

IIIF Curation Platform

Software

1. November 2016: **IIIF Curation Viewer**
2. December 2017: **JSONkeeper**
3. May 23, 2018: **IIIF Curation Finder** and **Canvas Indexer**

Applications

1. **Collection of Facial Expressions**
2. **Bukan Complete Collection**
3. **Weather Satellite 'Himawari' Pictorial Collection**

IIIF Curation Platform

Image

Manifest

	Developed by Mr. Homma
	Developed by Mr. Saier

IIIF Curation Viewer

Curation JSON

JSONkeeper

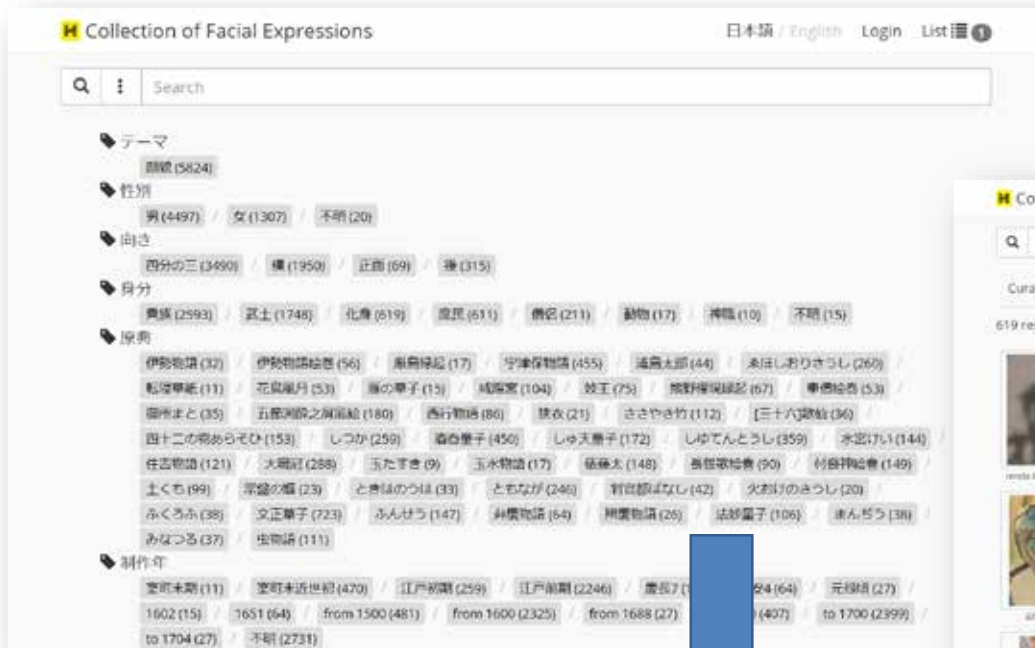Activity Stream
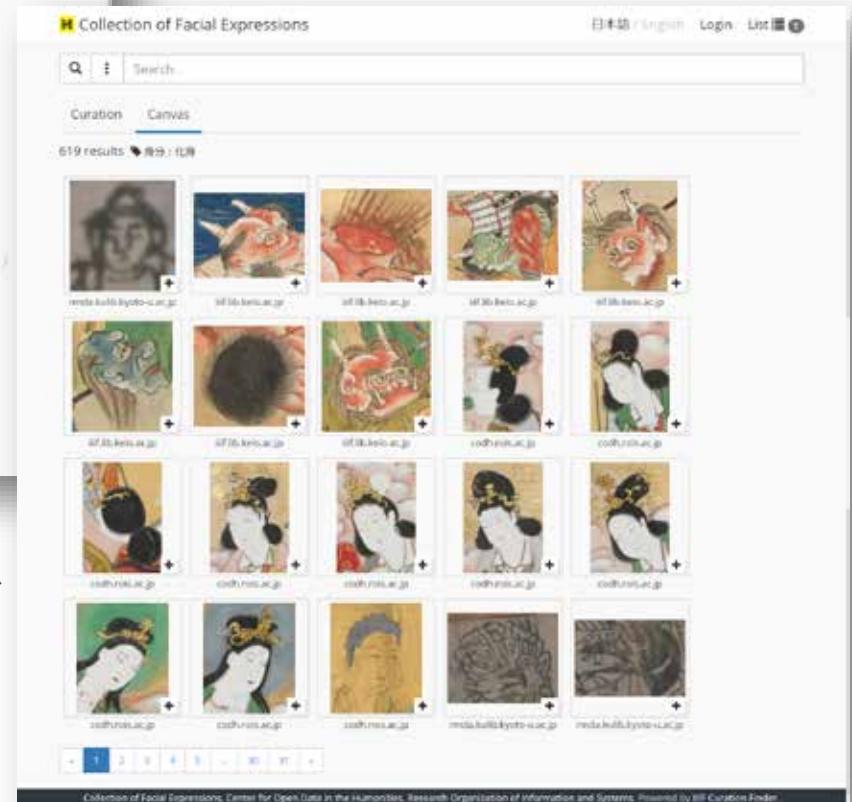
Curation JSON

Canvas Indexer

IIIF Curation Finder
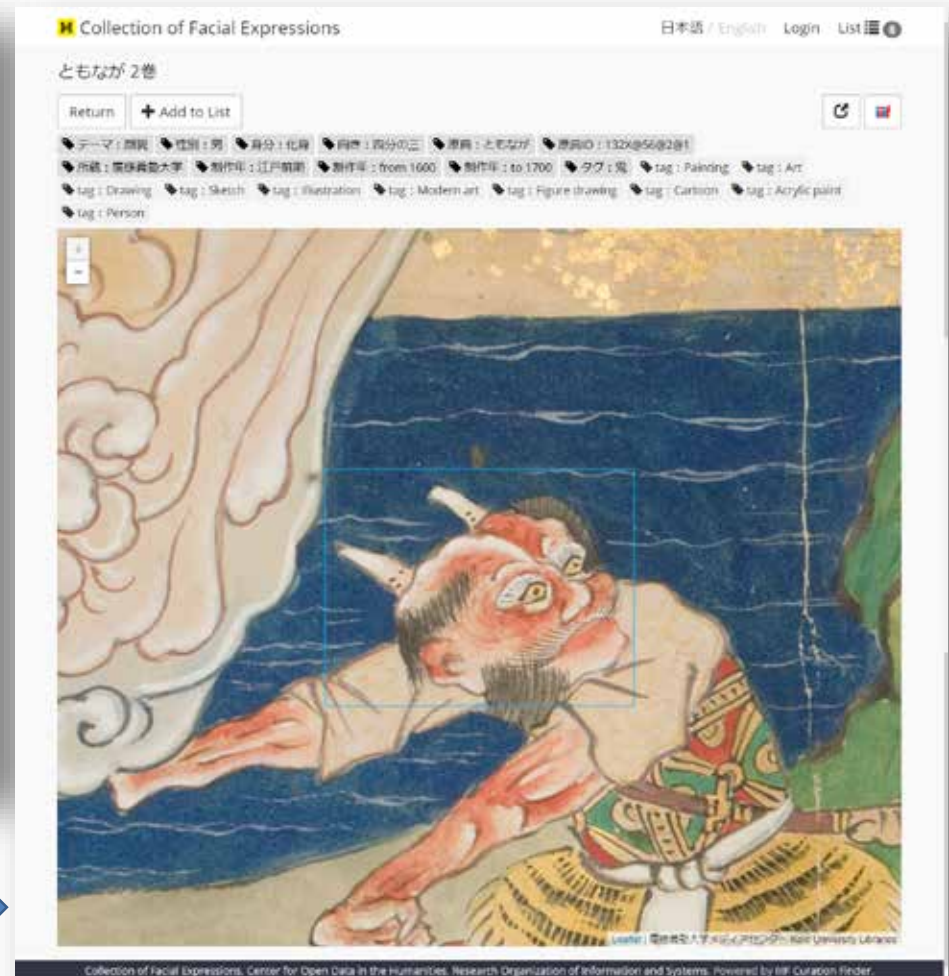
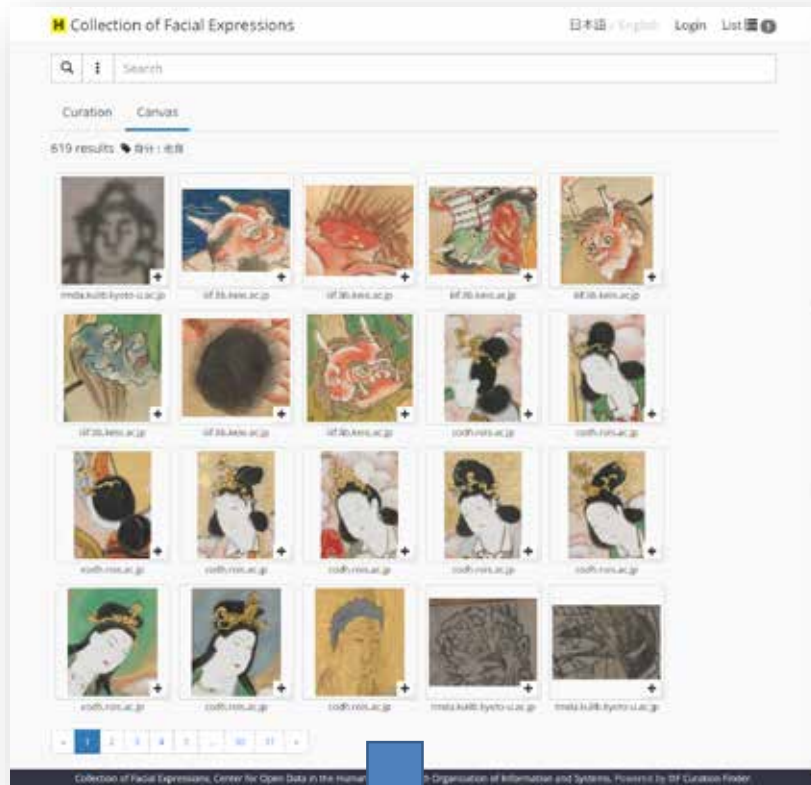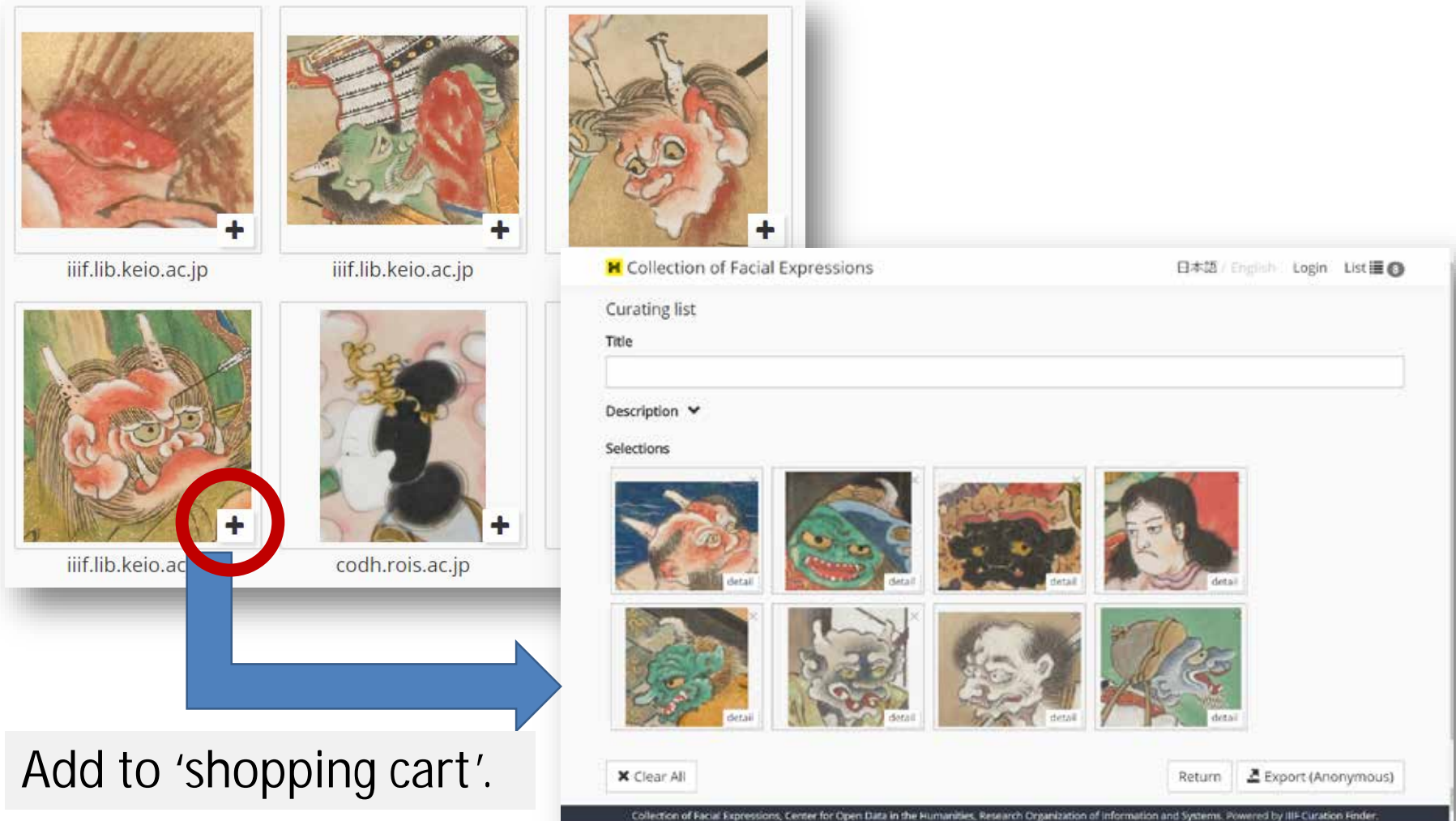Image Tagging bot

IIIF Curation Finder
http://codh.rois.ac.jp/software/iiif-curation-viewer/

Click the tag, and get the list of a part of canvases annotated by the tag.

From Content to Context

Creating Derivative Curations

Add to 'shopping cart'.

Human-Generated Metadata
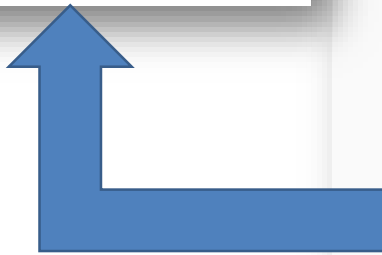
Automated Image Tagging by Machine Learning

https://medium.com/@siddharthdas_32104/cnns-architectures-lenet-alexnet-vgg-googlenet-resnet-and-more-666091488df5

- ResNet 101 classifier learns 5000 tags from 9 million images (Open Images Dataset V2).

- We used the model already trained on general photographs, not on our dataset.

Machine-Generated Metadata

```
{
        "label": "tag",
        "value": "Sketch",
        "agent": "machine",
        "score": 0.4955078363418579
},
{
        "label": "tag",
        "value": "Drawing",
        "agent": "machine",
        "score": 0.480587363243103
},
{
        "label": "tag",
        "value": "Art",
        "agent": "machine",
        "score": 0.44167378544807434
},
{
        "label": "tag",
        "value": "Cartoon",
        "agent": "machine",
        "score": 0.3943924605846405
},
{
        "label": "tag",
        "value": "Illustration",
        "agent": "machine",
        "score": 0.3196071684360504
},
```

- "agent": "machine" indicates machine-generated tags.
- "score" is the output of a machine learning system.
- Canvas Indexer accepts an image tagging bot for machine-generated metadata.

Ranking of Tags for Faces

🏷 tag

Art (5775) / Drawing (5503) / Sketch (5317) / Illustration (4893) /
Cartoon (4459) / Person (4280) / Painting (4071) / Poster (3127) / Face (2597) /
Clothing (2238) / Modern art (1777) / Comics (1081) / Mural (996) /
Figure drawing (850) / Head (804) / Animal (679) / Pattern (670) /
Carving (488) / Portrait (459) / Organ (442) / Ancient history (404) /
Sculpture (381) / Iron (362) / Comic book (306) / Graffiti (277) / Pet (257) /
Hand (236) / Relief (225) / Man (224) / Calligraphy (217) / Textile (209) /
Font (204) / Arm (195) / Album cover (189) / Bird (182) / Mammal (169) /
Food (162) / Text (155) / Wood (149) / Wing (127) / Vehicle (122) /
Green (114) / Human body (99) / Street art (98) / Invertebrate (92) /
Footwear (92) / Statue (89) / Money (89) / Currency (86) / Insect (84) /
Wall (83) / Toy (81) / Limb (73) / Stone carving (71) / Flower (69) /
Glass (68) / Hair (68) / Dog (67) / Number (59) / Fashion accessory (56) /
Nose (52) / Woman (51) / Design (49) / Leaf (48) / Sports (36) /
Hairstyle (35) / Monument (33) / Dessert (32) / Produce (32) / Cash (31) /

Serendipity by Machine Learning

Tag: Circle
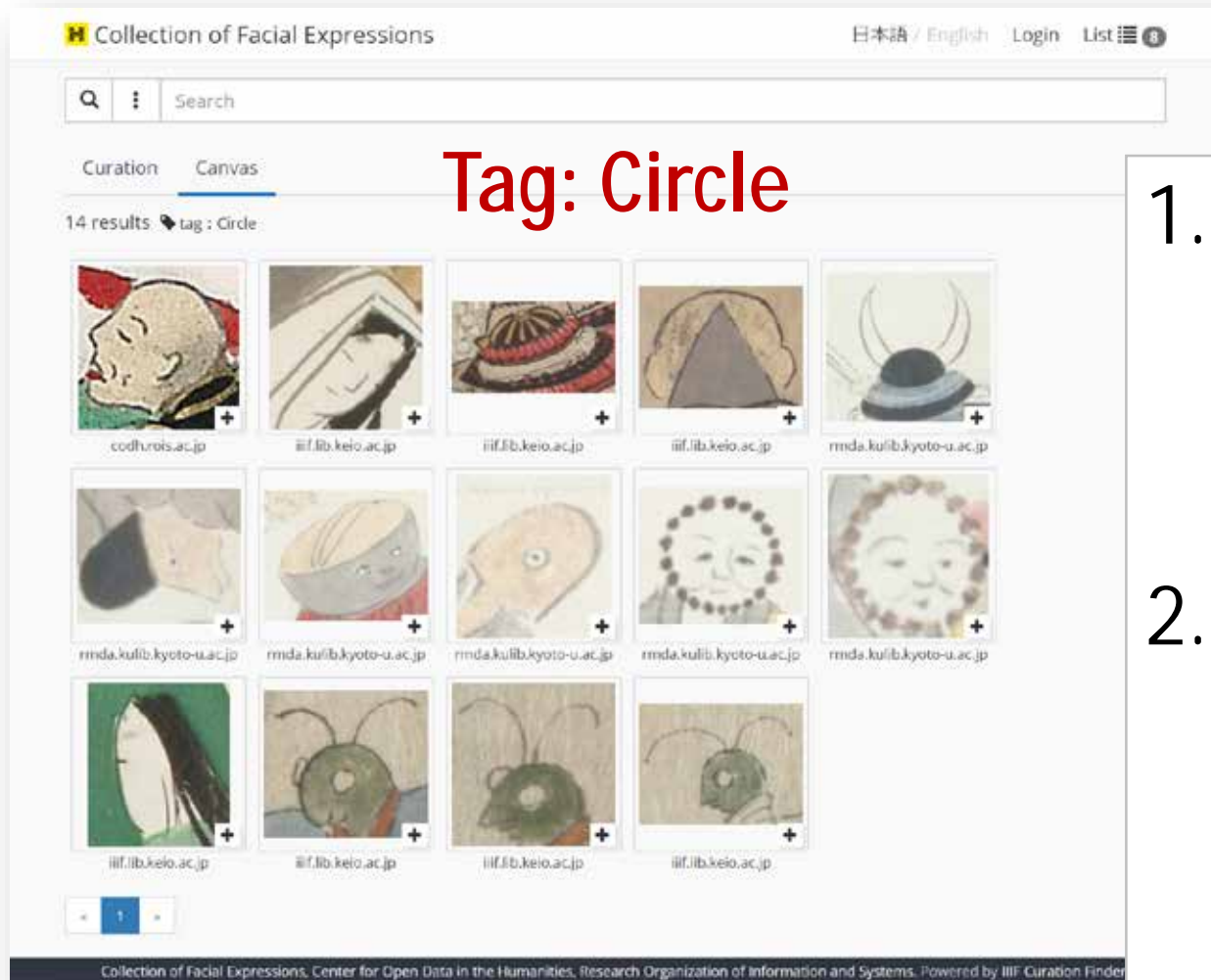
1. Correct or not correct, that is not the question.
2. Serendipity: unexpected encounter with images.

Backend Software

Activity Streams
Change Discovery API 0.1
Conformance level 1

JSONkeeper

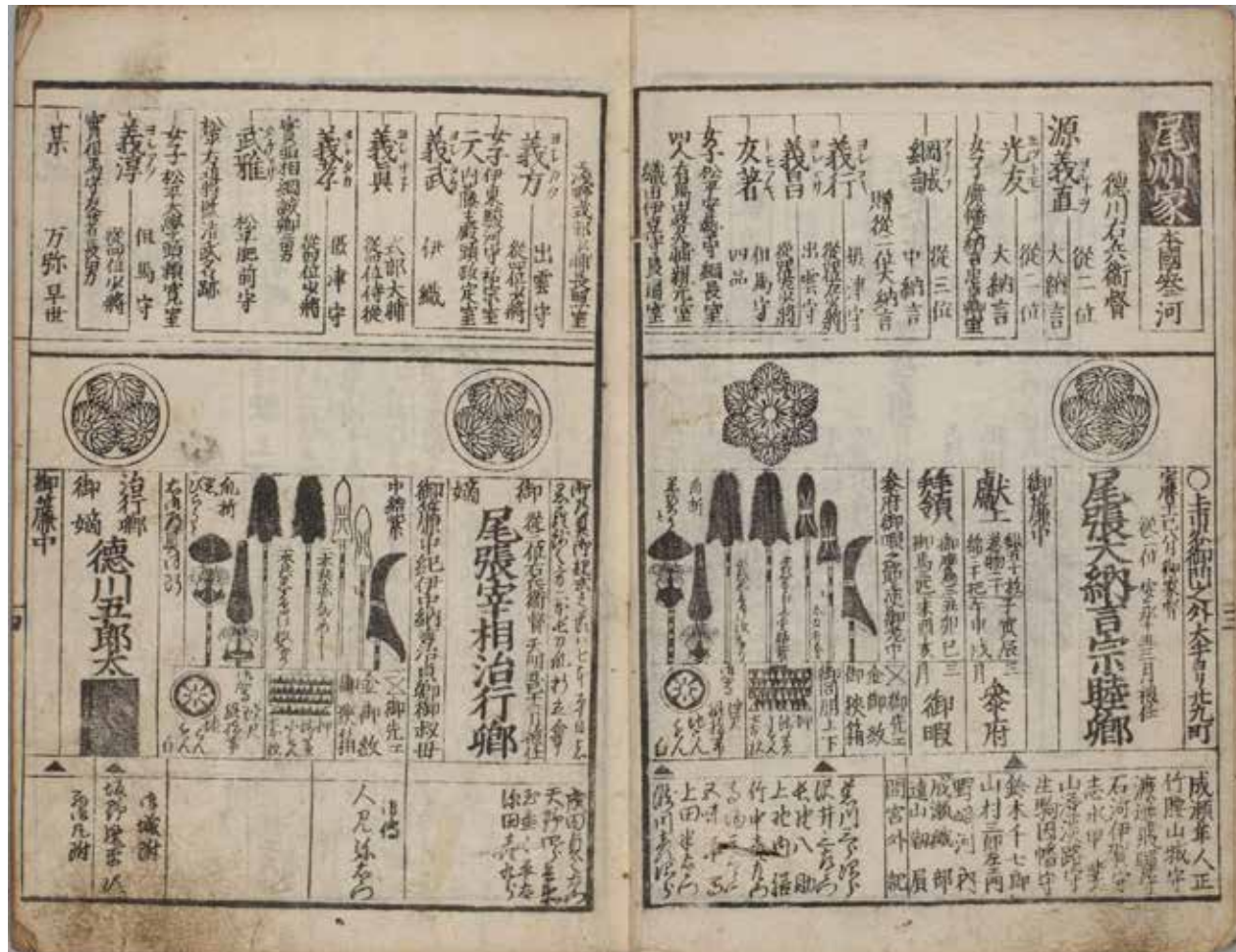A flask web application for storing JSON documents; with some special functions for JSON-LD.

Canvas Indexer

A flask web application that crawls Activity Streams for IIIF Canvases and offers a search API.

Bukan Complete Collections
http://codh.rois.ac.jp/bukan/
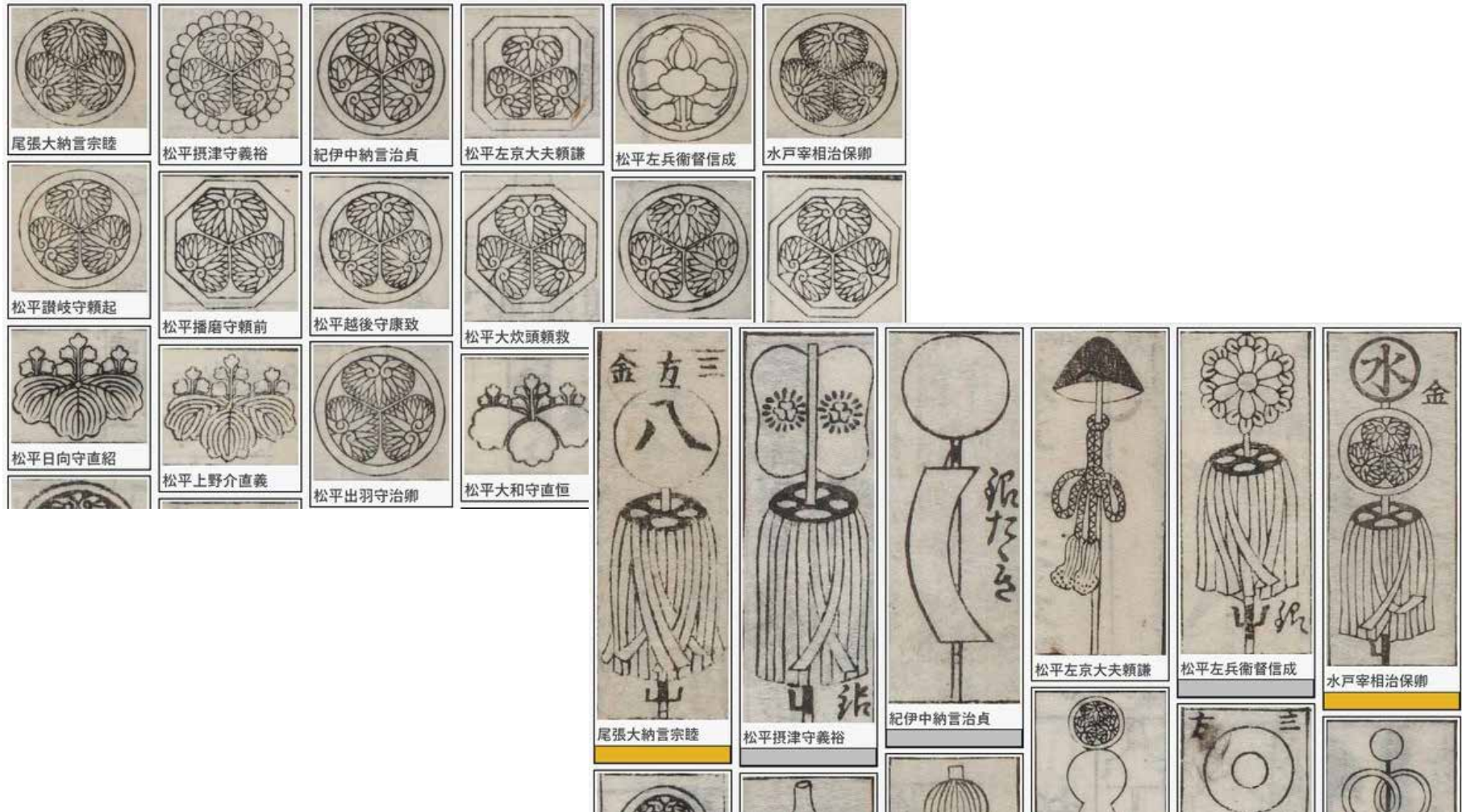

Bukan offers the directory of families of the state king (Daimyo) and bureaucrats of the central government (Bakufu) in the Edo period.
Source :
　　　(1789), Dataset of Pre-modern Japanese Text (National Institute of Japanese Literature)

Curation of Emblems and Tools

Scientific Applications

http://agora.ex.nii.ac.jp/digital-typhoon/himawari-3g/iiif/
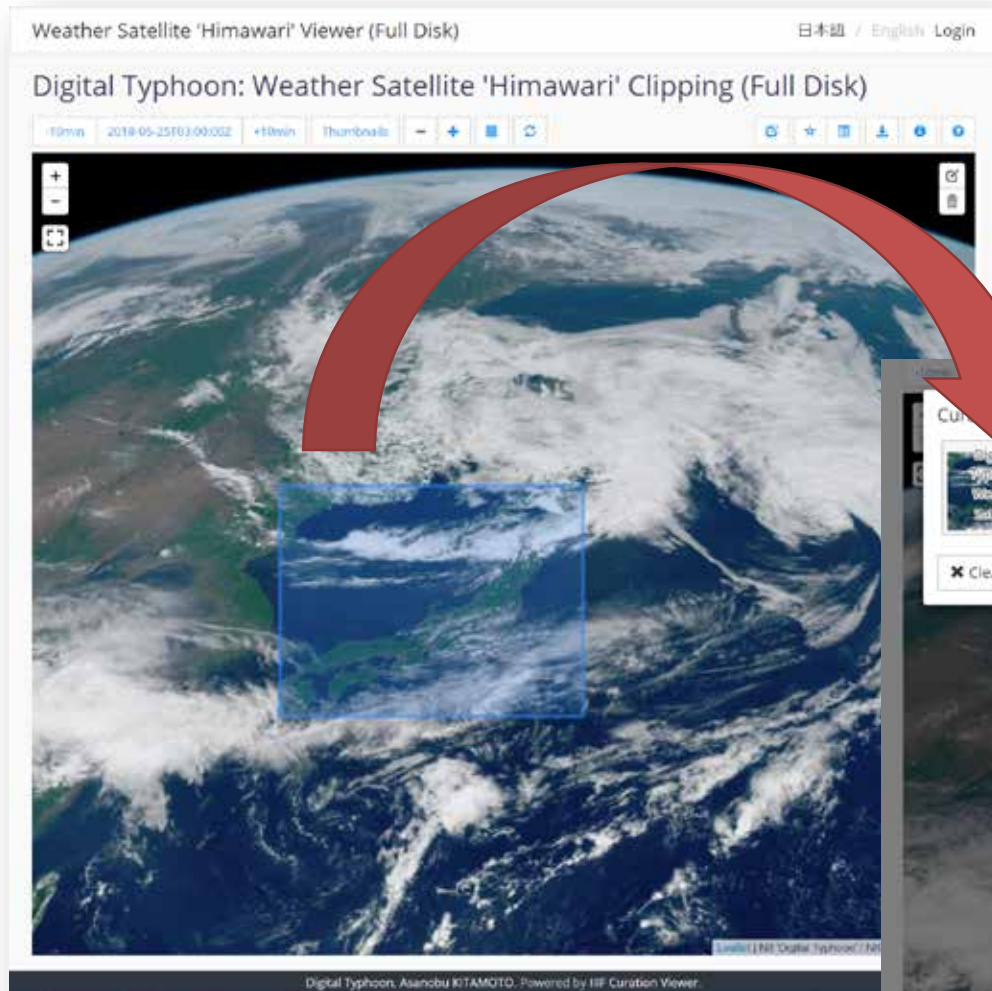
Clipping important events from an image.

Static Images to Time Lapse

2016-07-14 Development of thunderstorms
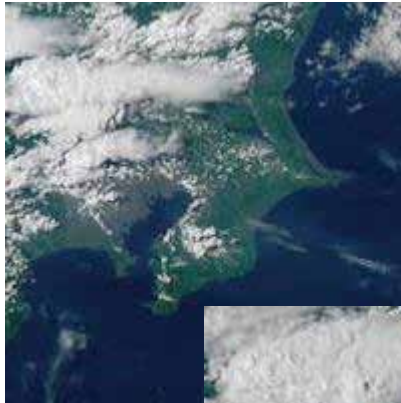
Linear interpolation
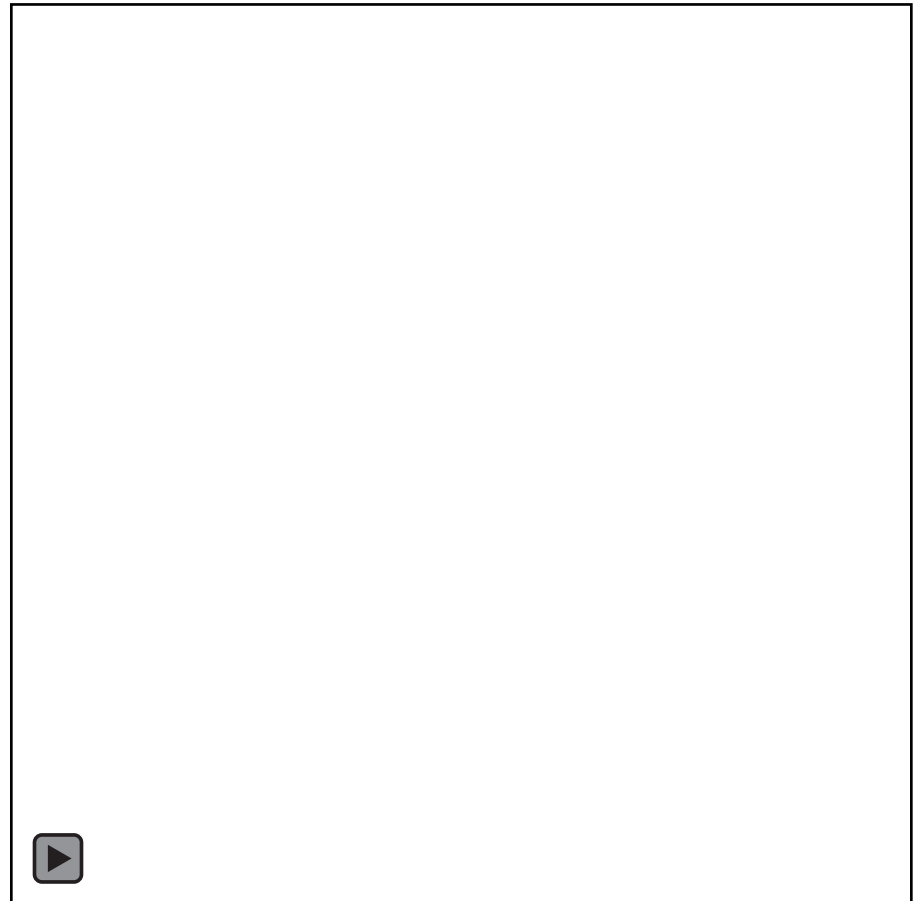
Example of Time-Based Cursor
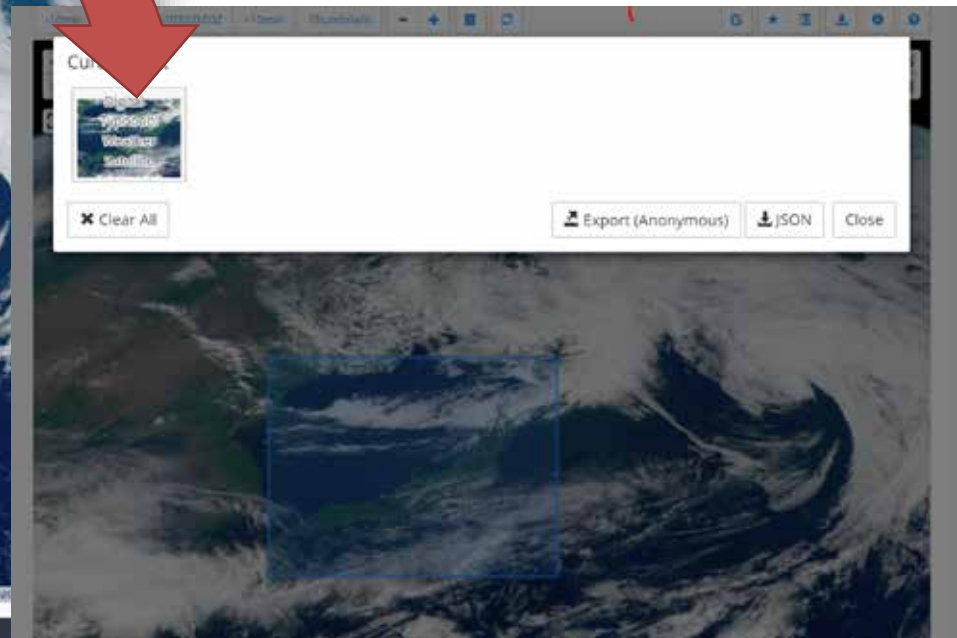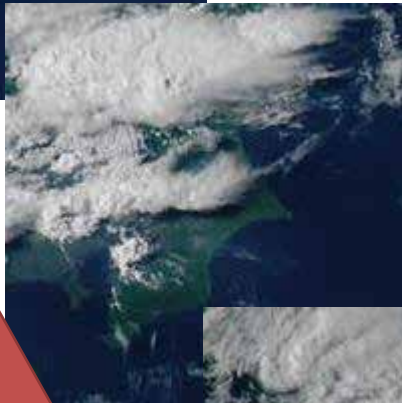## http://codh.rois.ac.jp/iiif/timeline/

```
"viewingHint": "time",
"cursors": [
{
"@id": "http://agora.ex.nii.ac.jp/digital-typhoon/service/iiif/Hsfd/cursor",
"service":
{
"@context": "http://codh.rois.ac.jp/iiif/cursor/1/context.json",
"@id": "http://agora.ex.nii.ac.jp/digital-typhoon/service/iiif/Hsfd/cursor",
"profile": "http://codh.rois.ac.jp/iiif/cursor/1/cursor"
},
"first": 1436234400,
"last": 1498867200,
"default": 1498867200,
"step": 600 }]
```

Request and Response
http://codh.rois.ac.jp/iiif/cursor/

Request for Cursor API

http://agora.ex.nii.ac.jp/digital-typhoon/service/iiif/Hsfd/cursor?cursorIndex=1493596800

Response from Cursor API

```
"within": "http://codh.rois.ac.jp/iiif/iiif-curation-viewer/sample/himawari/timeline.json",
"sequence": {
"@id": "http://agora.ex.nii.ac.jp/digital-typhoon/service/iiif/Hsfd/cursor?cursorIndex=1493596800",
"@type": "sc:Sequence",
"label": "2017-05-01T00:00:00Z     2017-05-01T23:50:00Z",
"canvases": [ {
 "@id": "http://agora.ex.nii.ac.jp/digital-typhoon/iiif/2017/05/01/20170501000000",
"@type": "codh:Canvas",
"label": "2017-05-01T00:00:00Z",
"height": 11000,
"width": 11000,
"cursorIndex": 1493596800,
"images": [
```

Potential Impact on Search and Discovery

Curation for Search and Discovery

1. **Bottom-up approach for discovery**: (a part of) a canvas to a curation and a manifest.

2. **Third-party information**: user-generated curation can diversify interpretations.

3. **Metadata for the object level**, such as face, offers fine-grained search for IIIF images.

4. **Humans and machines can help each other** to enhance metadata (tagging).

Remaining Challenges

1. IIIF Curation Platform has missing tools that need to be developed.

2. Three extensions to IIIF specifications: can we put them into the registry?

3. Presentation API 3: for a small group like us, adoption of the new spec is a huge burden.

4. Digital humanities: use this platform for collaborative research with art historians.

Acknowledgment

- Mr. Jack Reed for the development of Leaflet-IIIF.
- Mr. Chikahiko Suzuki (CODH) for creating curations of facial expressions.
- Mr. Hoàng Văn, Hà (NII internship student, Vietnam National University, HCMC) for automated image tagging.
- IIIF Curation Platform
  - http://codh.rois.ac.jp/iiif-curation-platform/