International Image Interoperability Framework

Building an ecosystem for cultural heritage content

ACOR Archival Methods Workshop
Amman, Jordan – July 2, 2019

Jack Reed
Stanford Libraries
@mejackreed

Stanford | LIBRARIES

Agenda

- What is IIIF?
- Why do we need IIIF?
- What does IIIF do?
- How does IIIF work?
- Case-study examples
- Interdisciplinary use cases

What is IIIF?

International Image Interoperability Framework

(triple-eye-eff)

A **model** for presenting and annotating digital representations of objects

(with lots of other benefits)

A **Community**
that develops shared APIs,
implements them in software,
and exposes interoperable
content

International Leaders

Museums / Galleries

British Museum
National Gallery of Art
The J. Paul Getty Trust
The Walters Art Museum
Yale Center for British Art
Et al.

Aggregators

ARTstor
CONTENTdm
DPLA
Europeana
Internet Archive
Wikimedia Foundation

State / National Libraries

Austria
Bavarian State
British Library
Denmark
Egypt
France
Israel
Japan
Moravian Library
New Zealand
Norway
Poland
Scotland
Serbia
Wales
Qatar
United States (LoC)
Vatican

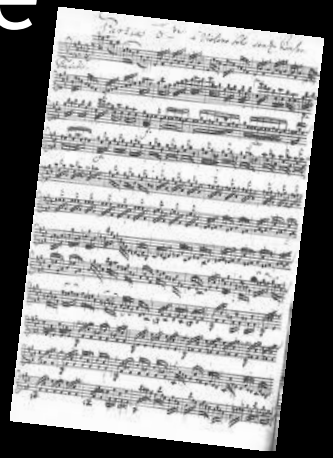
Universities and Research Institutions

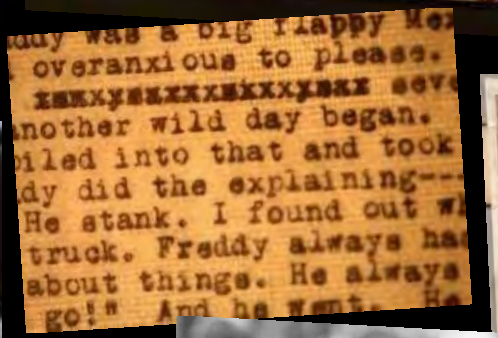
Cambridge
Cornell
Ghent
Gottingen
Harvard
Oxford
Princeton
Stanford
Edinburgh
Toronto
Wellcome Trust
Yale

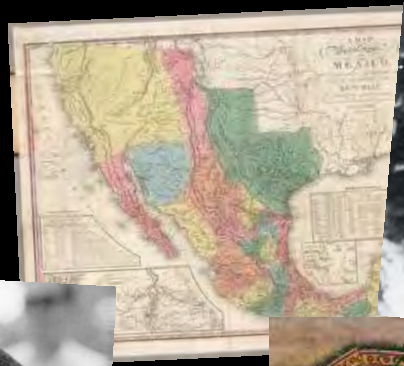
And many more!

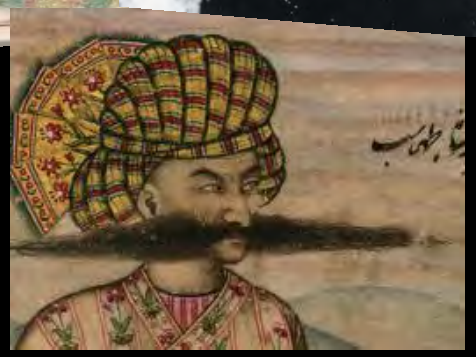
Why do we need IIIF?

Images are fundamental information carriers for cultural heritage







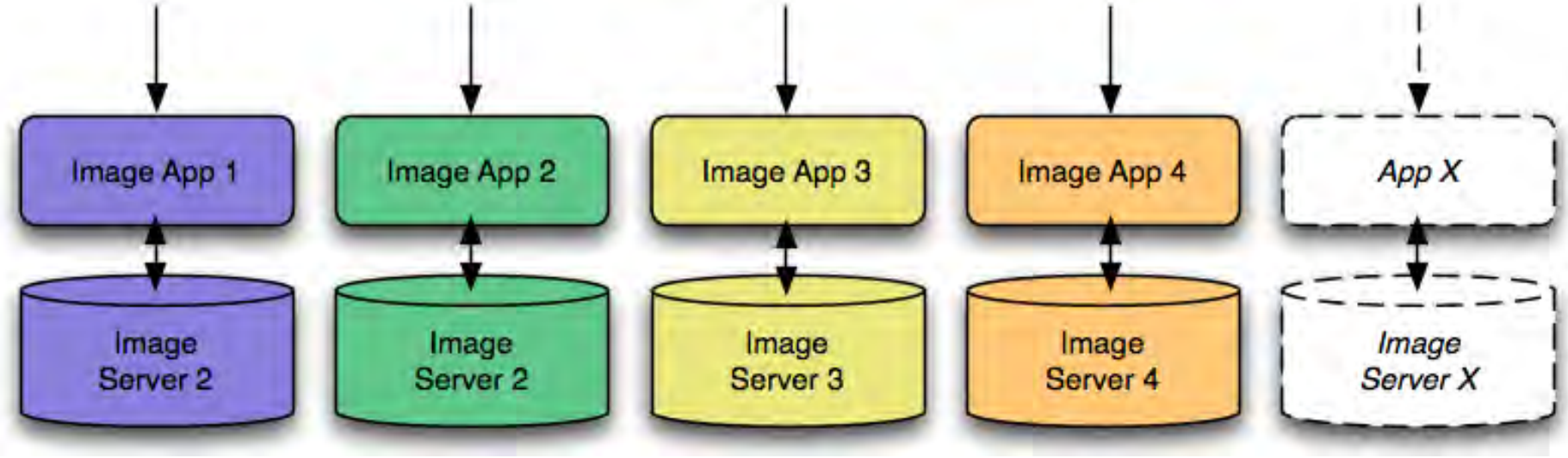


But image delivery on the Web is…

http://www.loc.gov/pictures/resource/fsac.1a34206/

- hard
- slow
- expensive
- disjointed
- locked up
- *siloed*

A world of silos & duplication



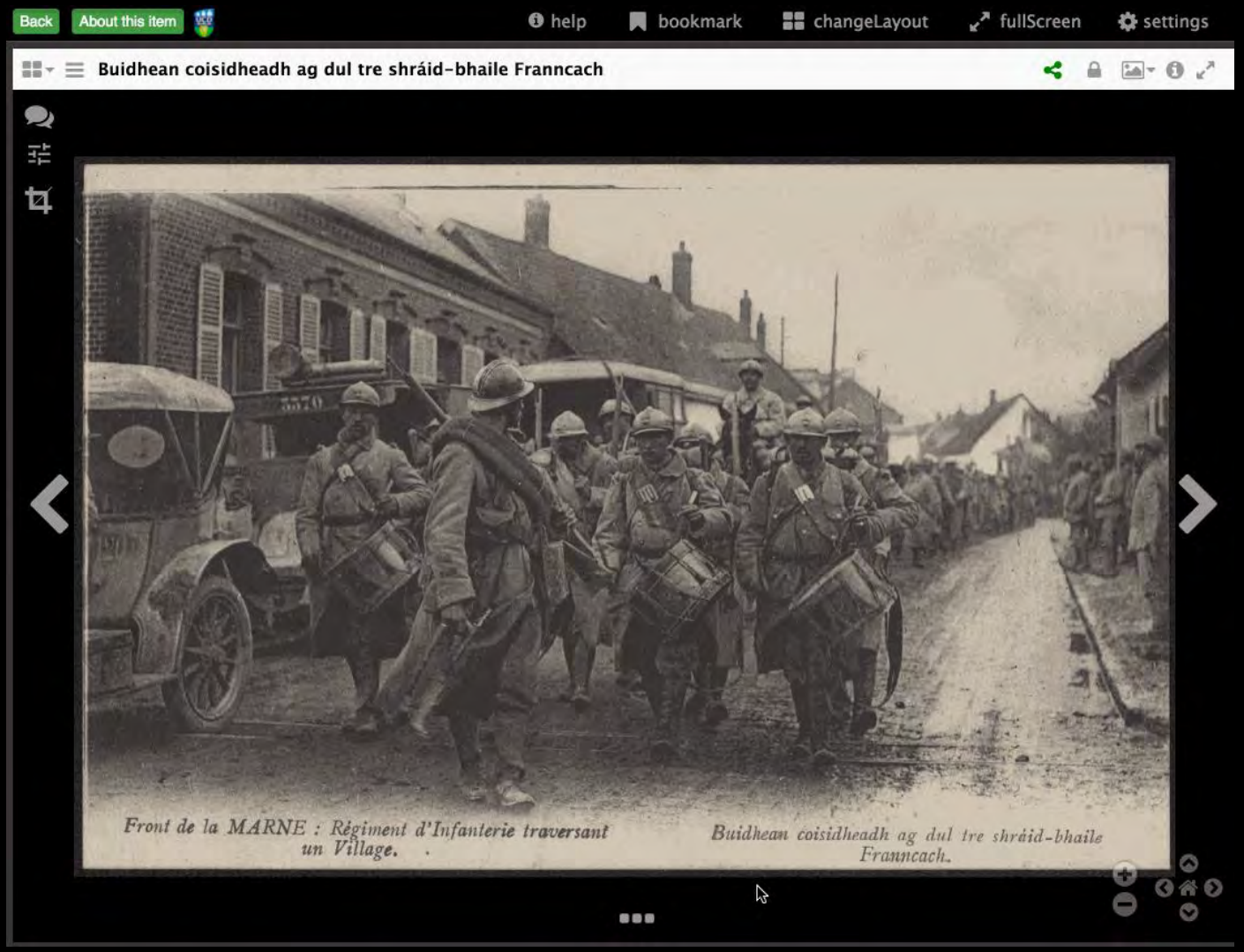
- Every site a silo (→ no interoperability)
- Every app a one-off (→overhead to code and keep)
- Every user forced to cope (→ many UIs, little integration)

What does IIIF do?

Deep zoom with large images

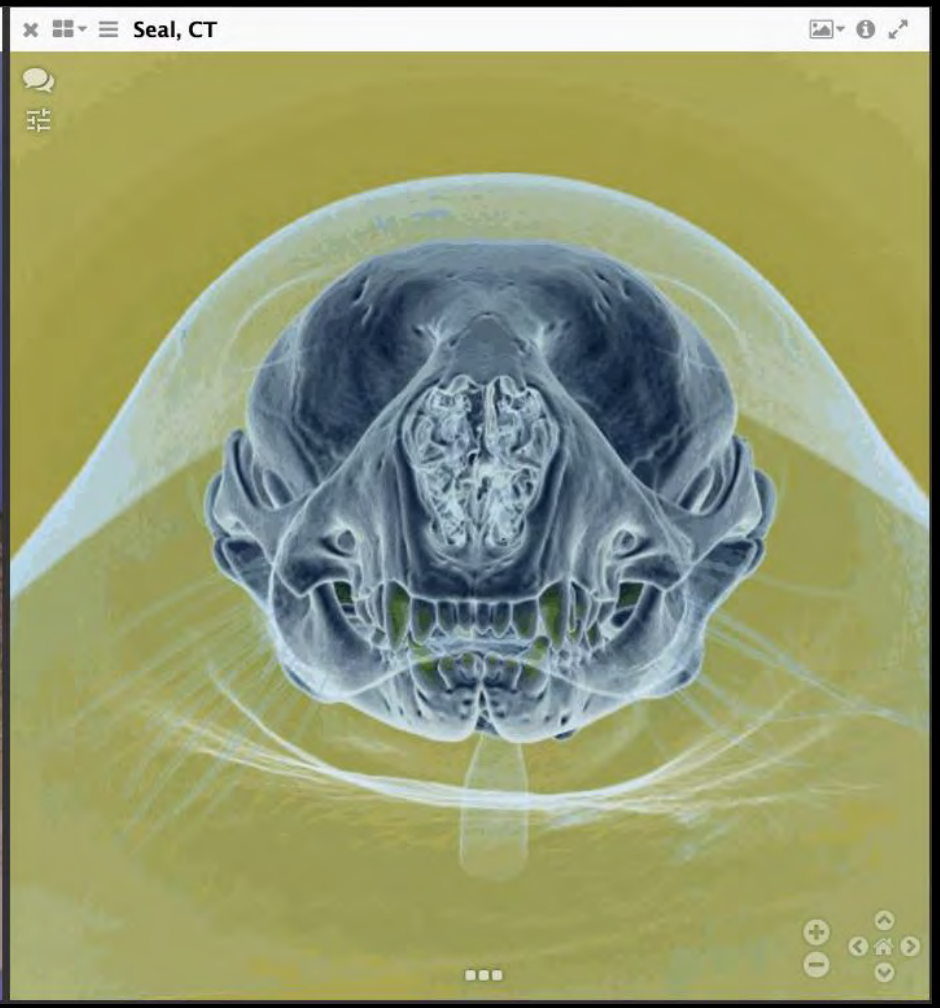
Stanford University | https://purl.stanford.edu/hs631zg4177

Cite and share (including regions of interest)



University College Dublin | https://doi.org/10.7925/drs1.ucdlib_53396

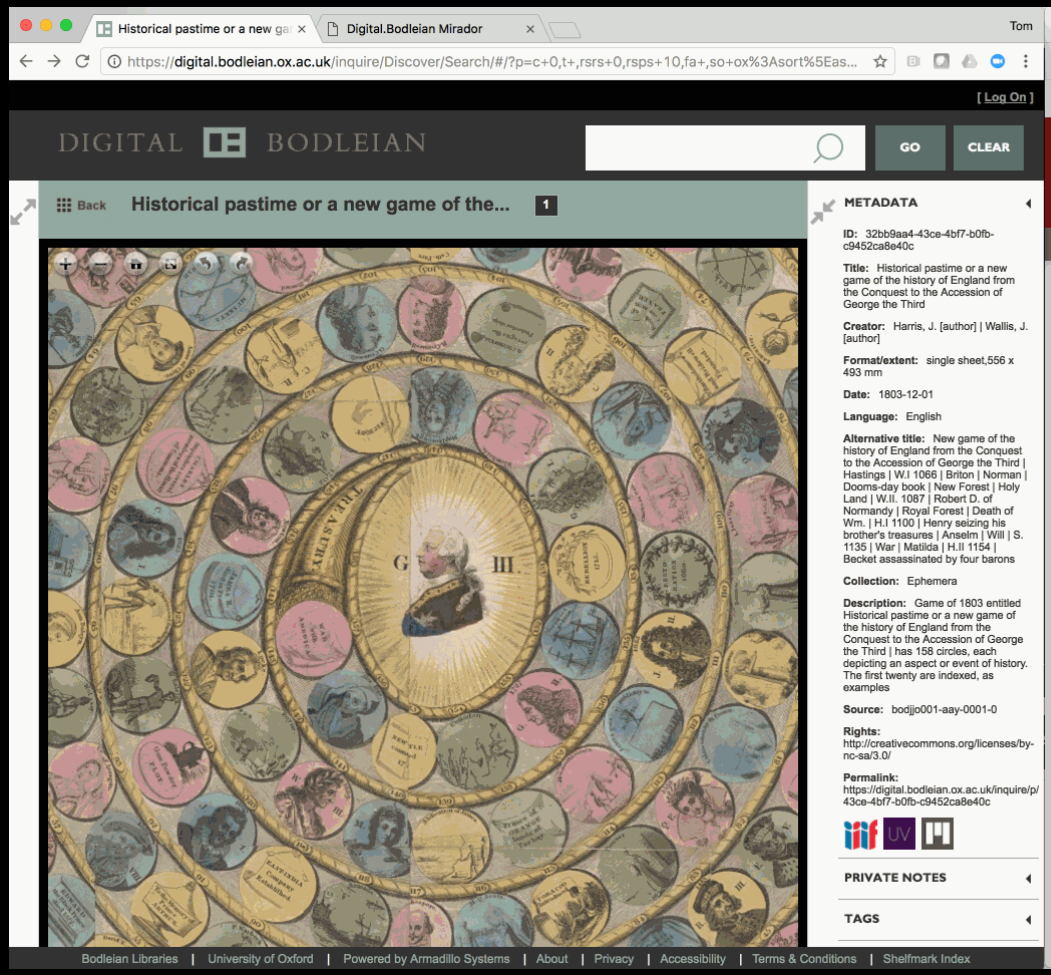
Compare images



Computed Tomography (CT) scans of the head of a seal from the Wellcome Library

https://wellcomelibrary.org/item/b20433141 | https://wellcomelibrary.org/item/b2043313x

Across sites



Shakespeare-related resources from Oxford, Stanford & Yale

https://digital.bodleian.ox.ac.uk/inquire/p/32bb9aa4-43ce-4bf7-b0fb-c9452ca8e40c

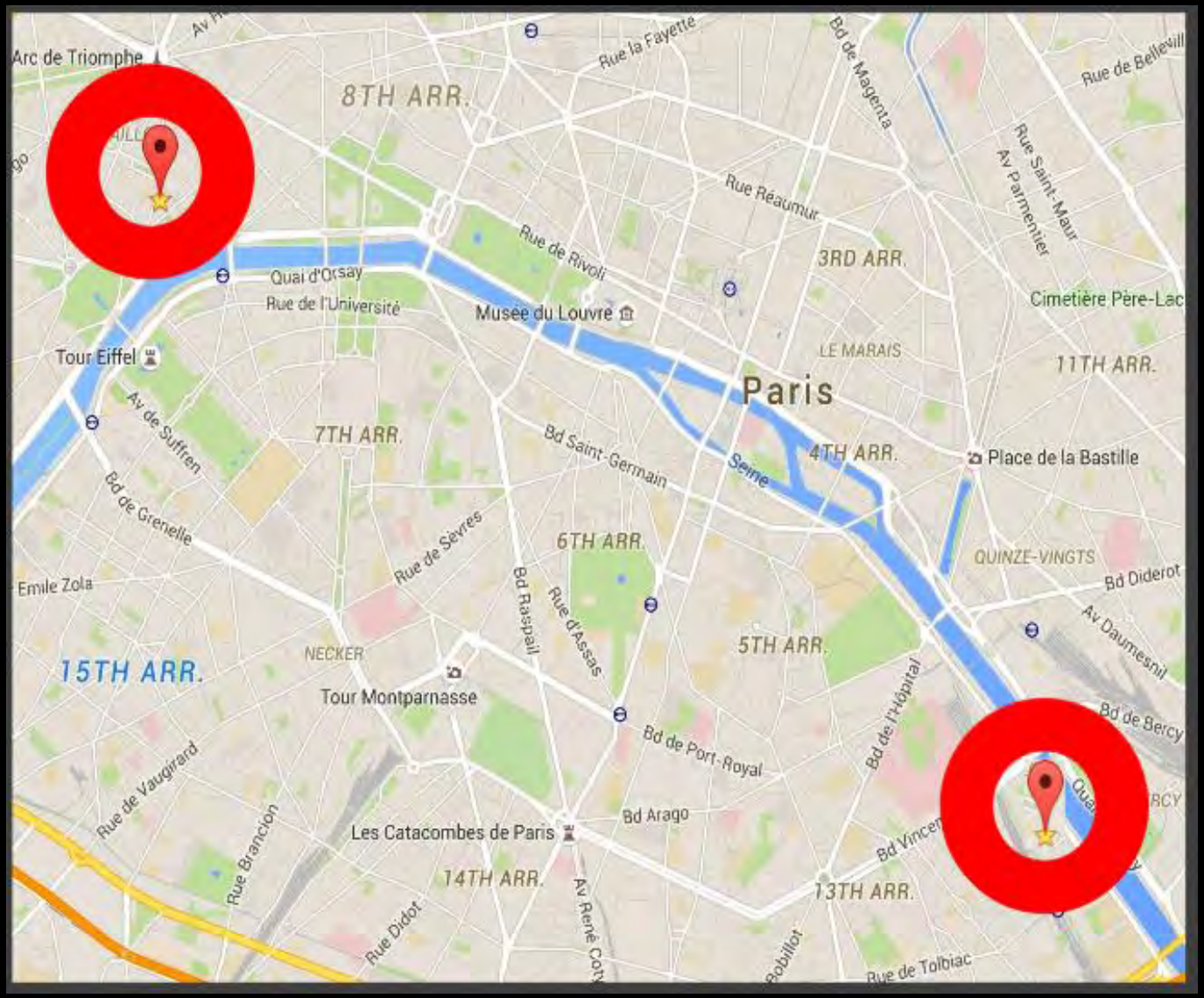
https://searchworks.stanford.edu/view/zj784pt2430 | http://collections.britishart.yale.edu/vufind/Record/1667254

Collect items that belong together

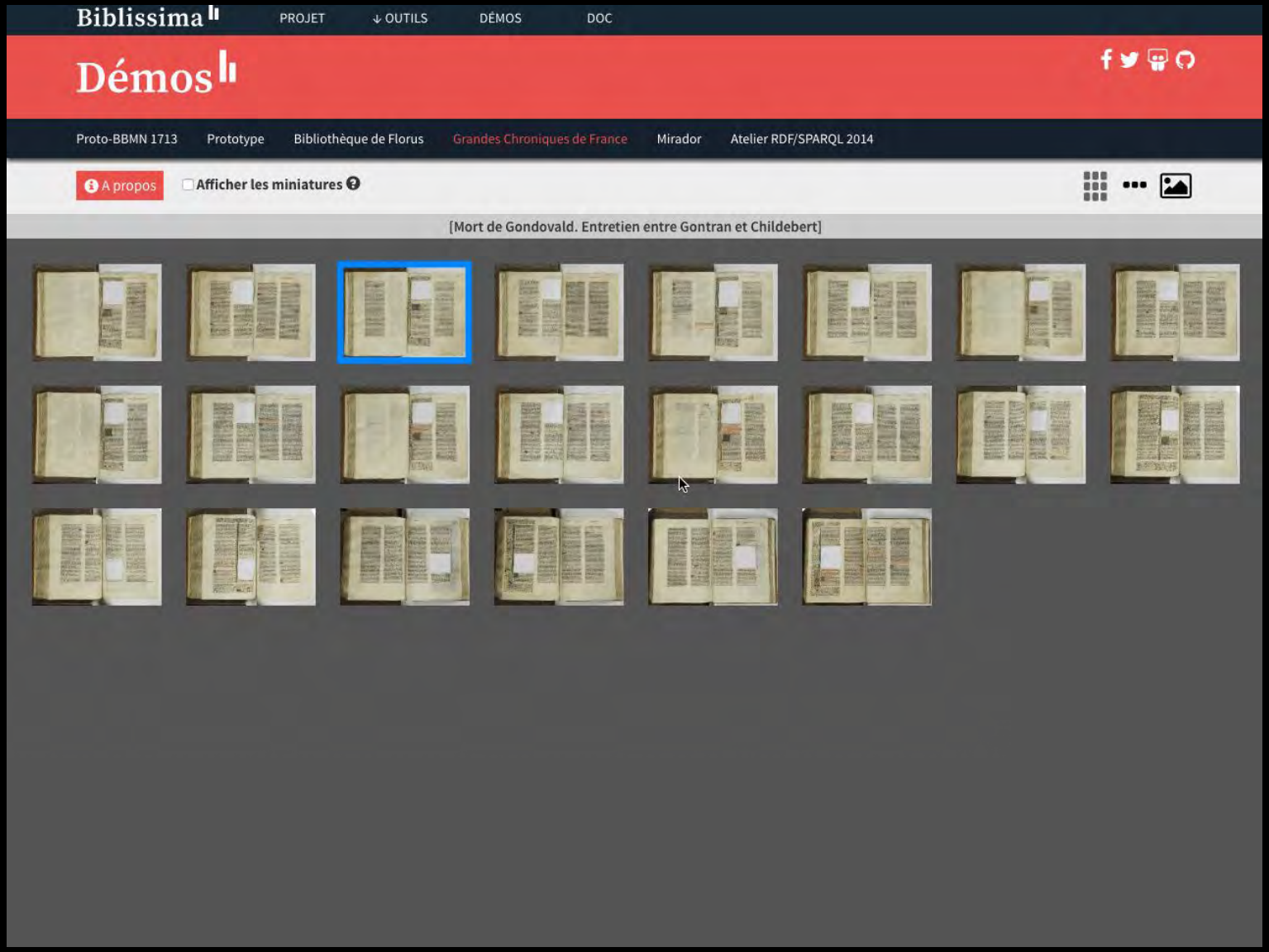
Le manuscrit 5 de la Bibliothèque municipale de Châteauroux, c. 1460

Folio in BVMM
Miniature in the BNF

Collect items that belong together



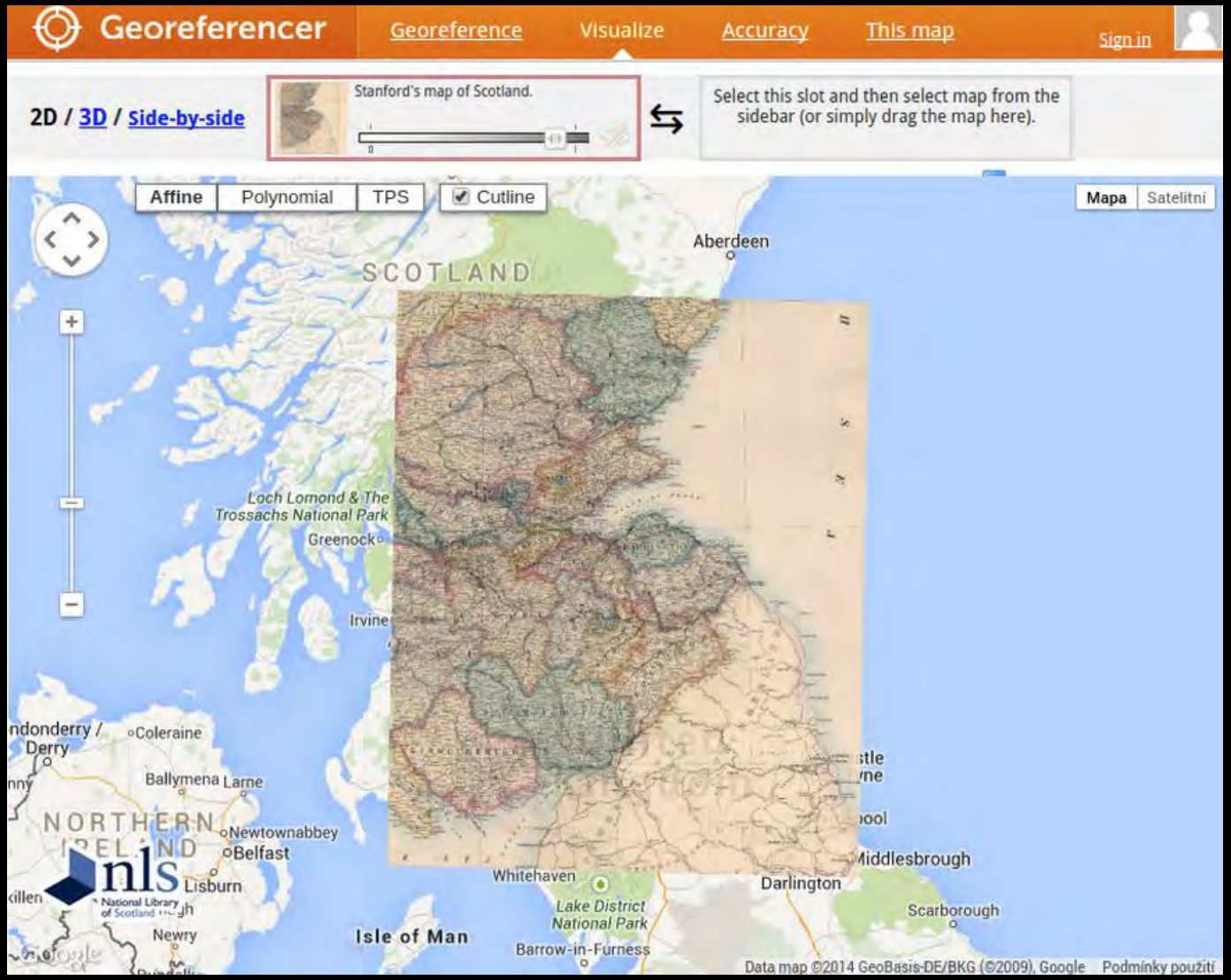
Reunify



http://demos.biblissima-condorcet.fr/chateauroux/demo/

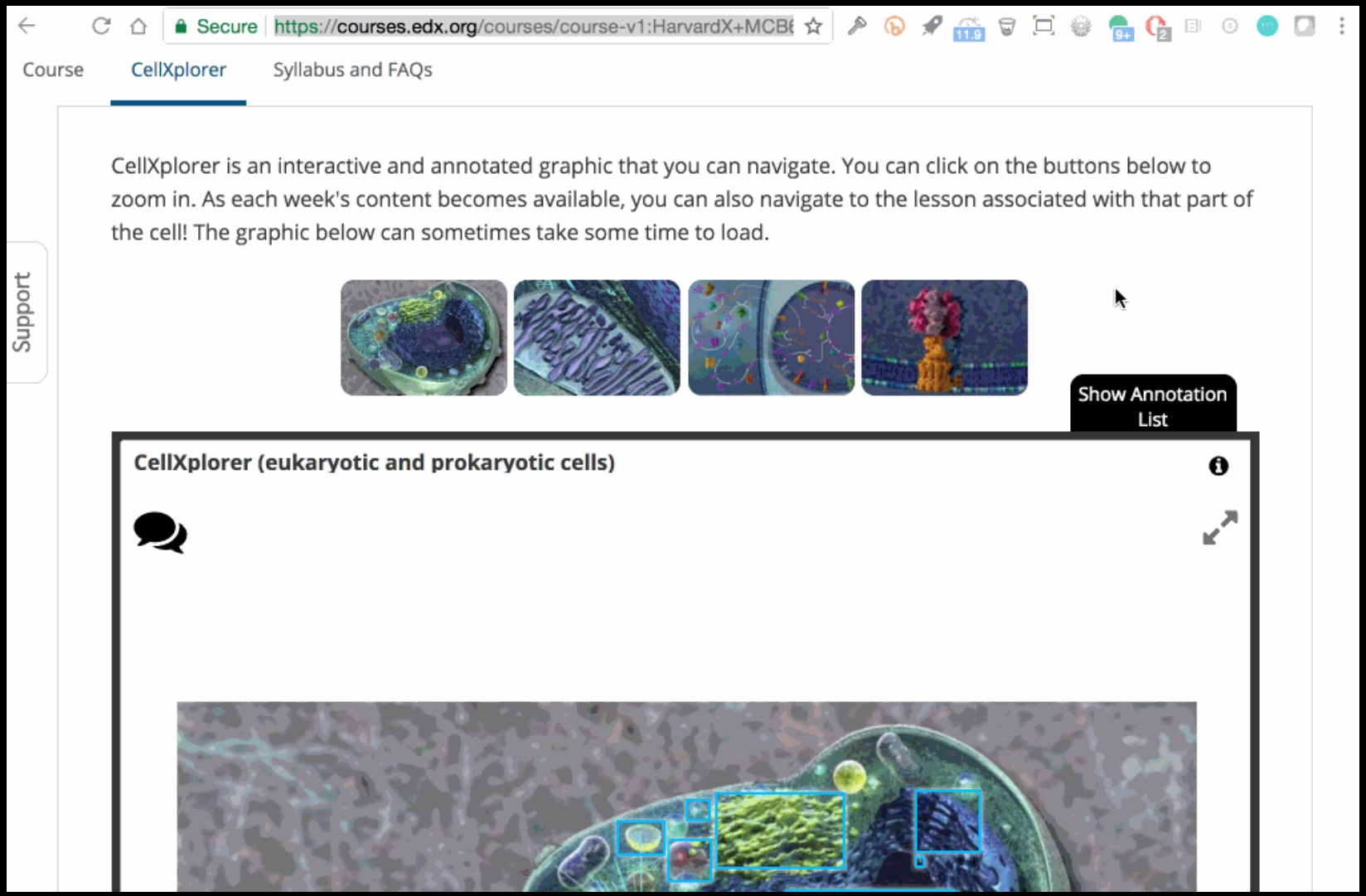
Search within

Analyze



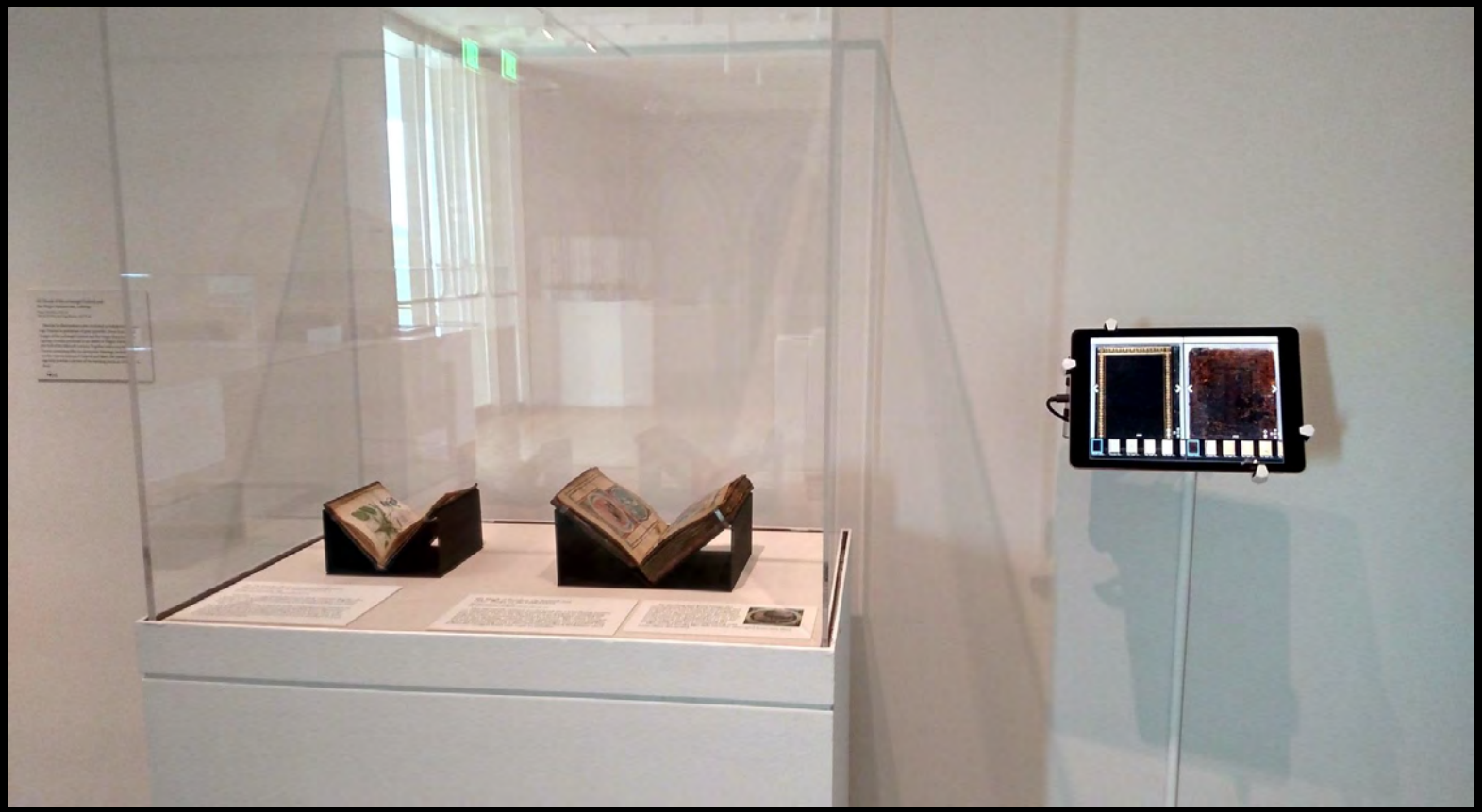
Klokan Technology's Georeferencer

Annotate



https://courses.edx.org/courses/course-v1:HarvardX+MCB64.1x+2T2016/d16e07a5cec442eeb7cd9dfcb695dce0/

Enrich

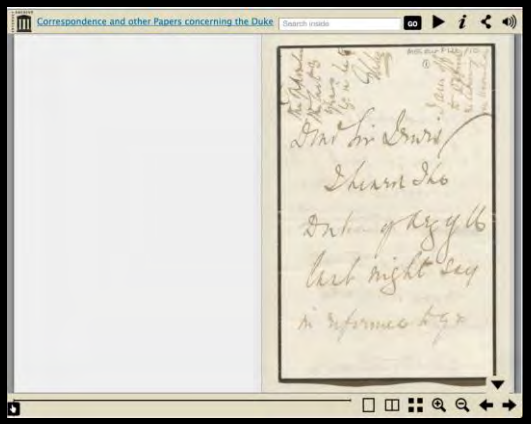


Mirador instances on display at McMullen Museum, Boston College.

All with the application of your choice

Mirador

Universal Viewer



IA Book Reader

Qatar Digital Library
Archival papers shown in 4 different viewers.

http://labs.cogapp.com/iiif

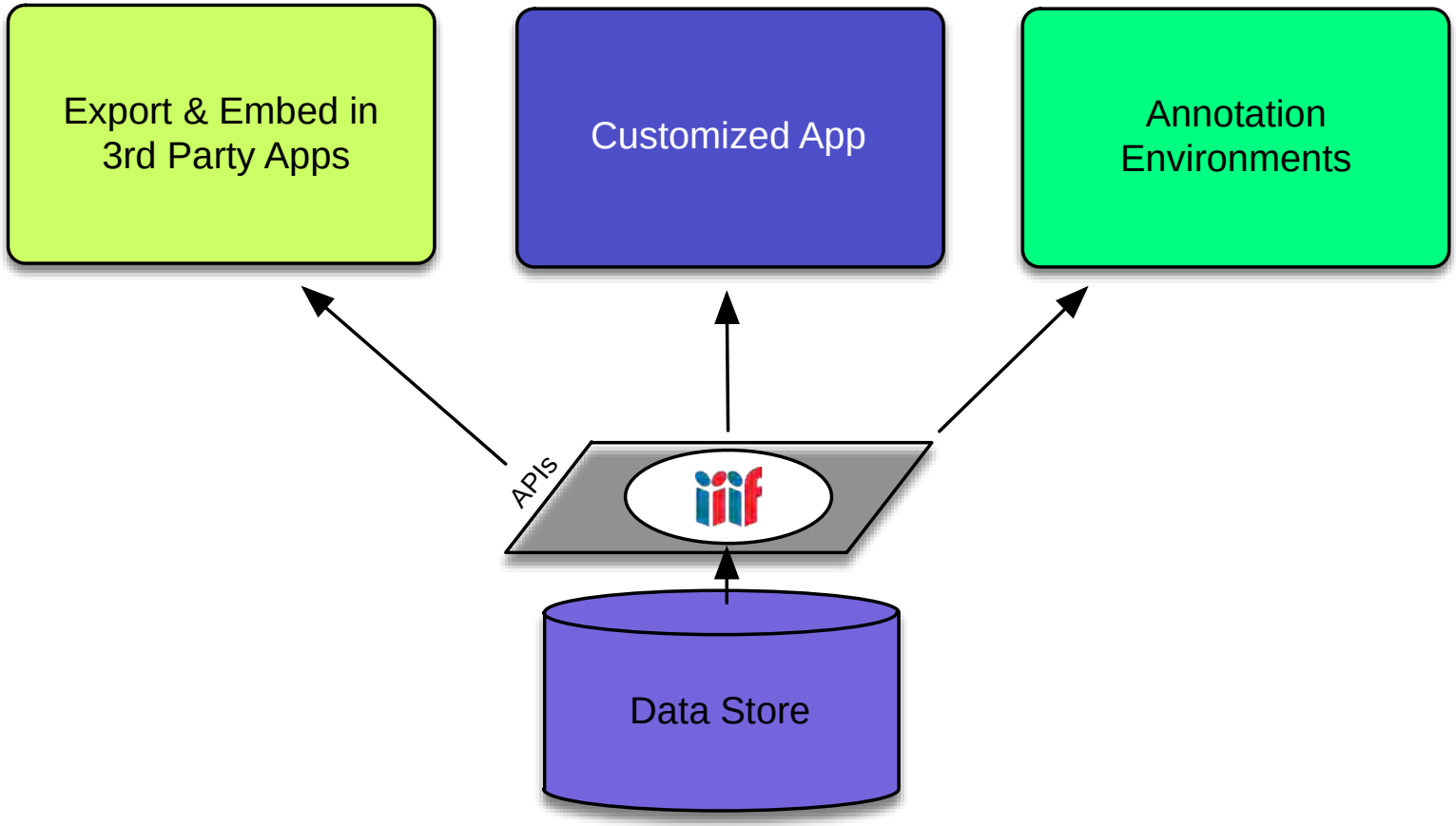
How does IIIF work?

IIIF uses Application Programming Interfaces

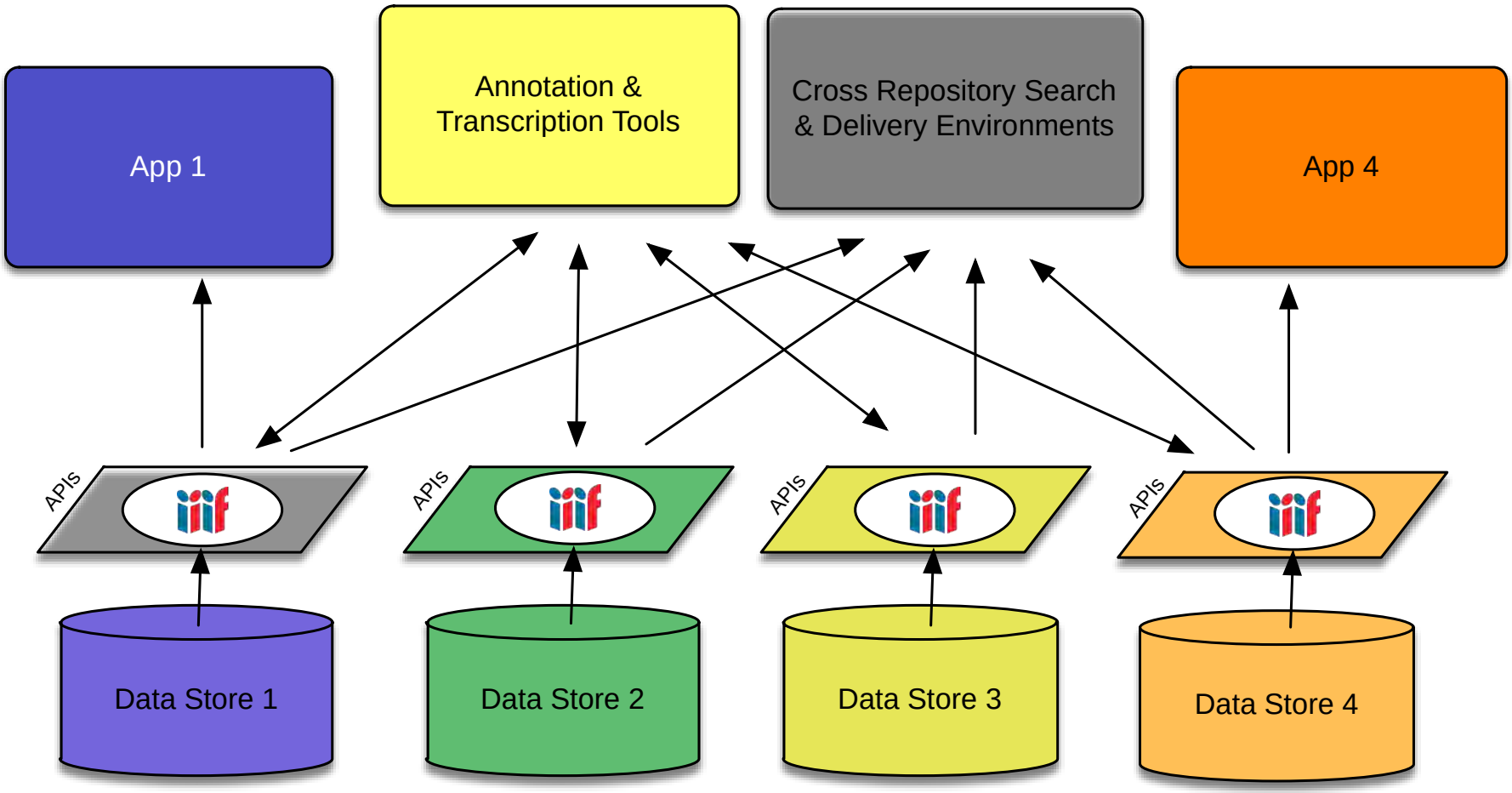
APIs provide a structured way for connecting systems

"City02_Park_05" by bluesstilllife is licensed under CC BY 2.0

APIs enable reuse



APIs -> Framework -> Ecosystem



IIIF Vision

Create a global framework by which image-based resources (images, books, maps, scrolls, manuscripts, musical scores, videos, etc.)

…from **any** participating institution can be delivered in a standard way

…via **any** compatible image server

…for display, manipulation and annotation in **any** application,

…to **any** user on the Web.

IIIF: Two Core APIs

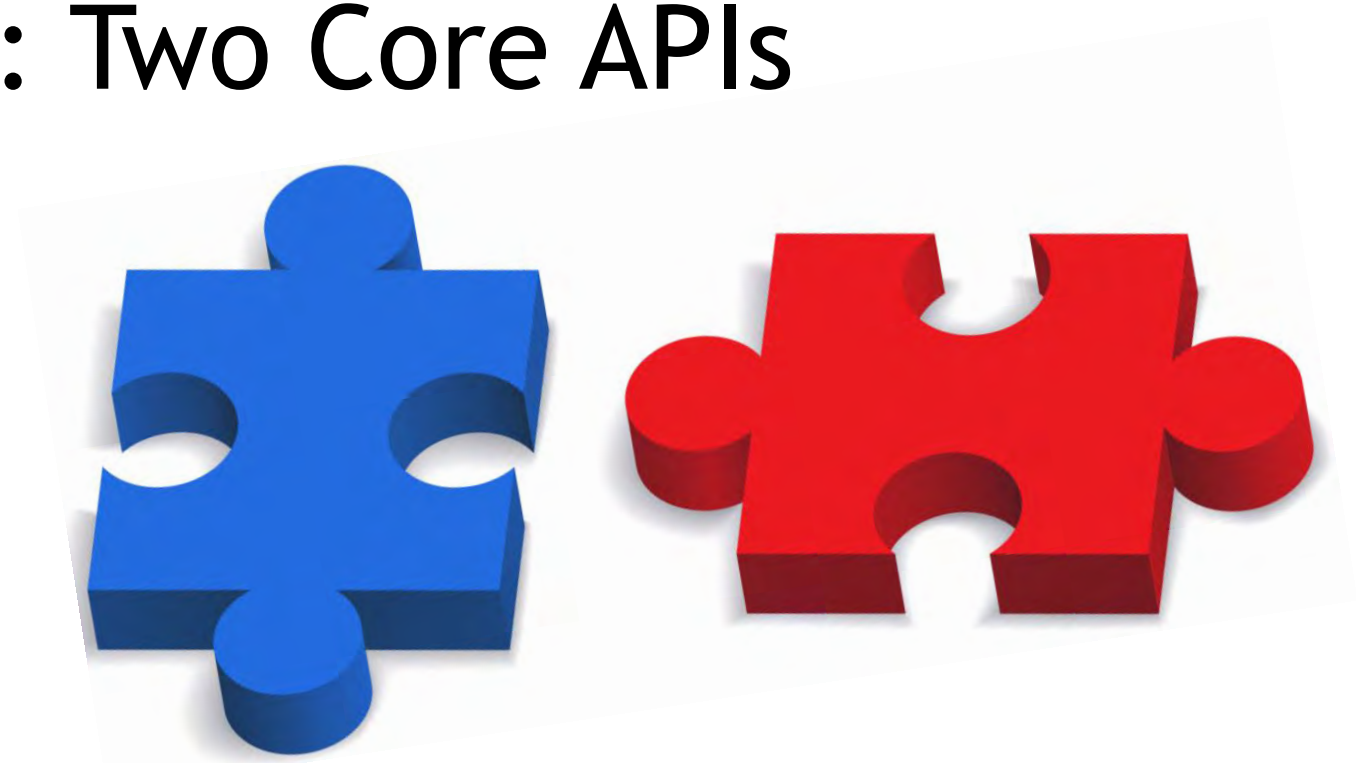


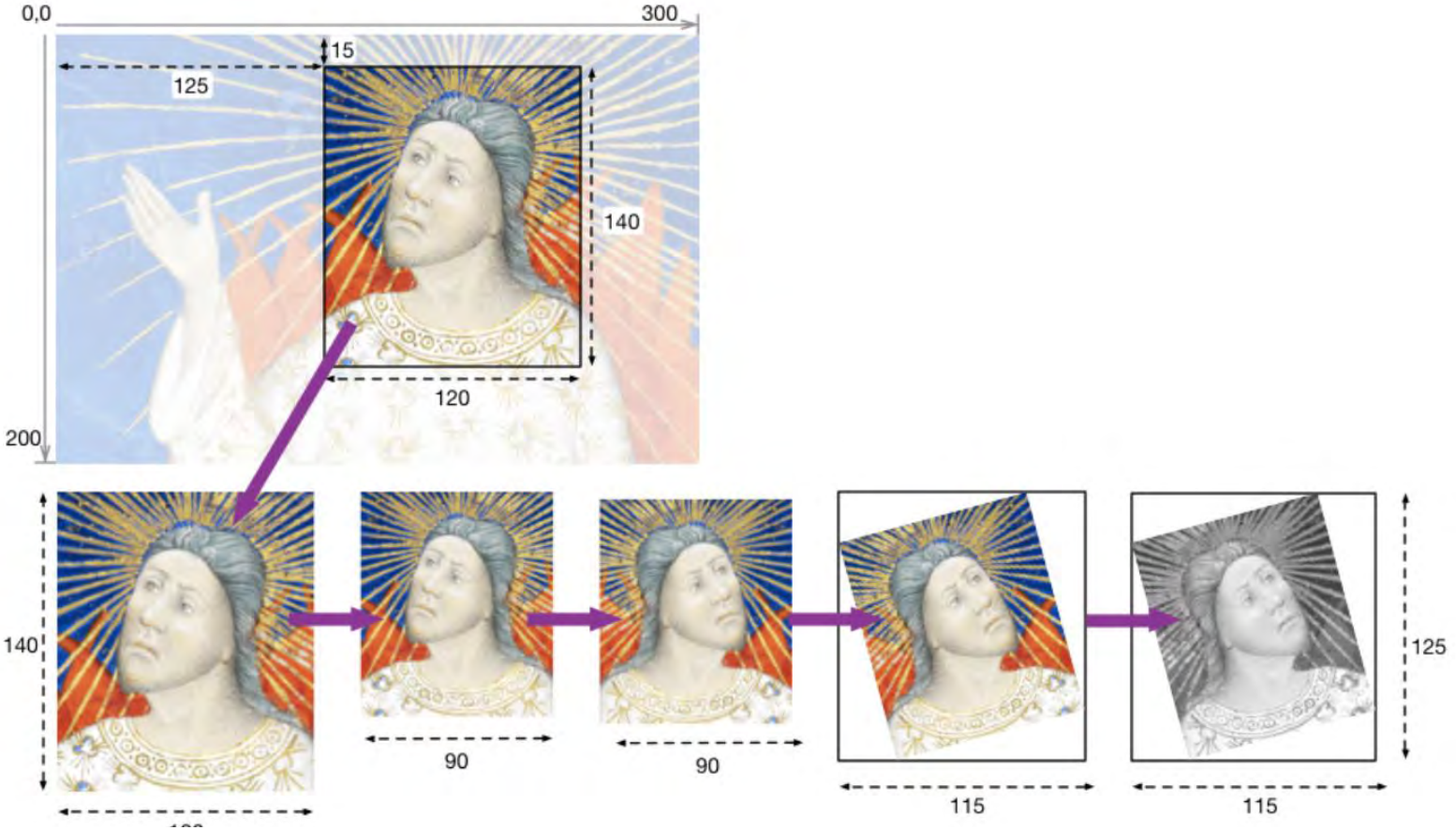
Image API

"get pixels" via a simple, RESTful, web service

Presentation API

Just enough metadata to drive a remote viewing experience

Image Delivery API




```
{scheme}://{server}{/prefix}/{identifier}/{region}/{size}/{rotation}/{quality}.{format}
```

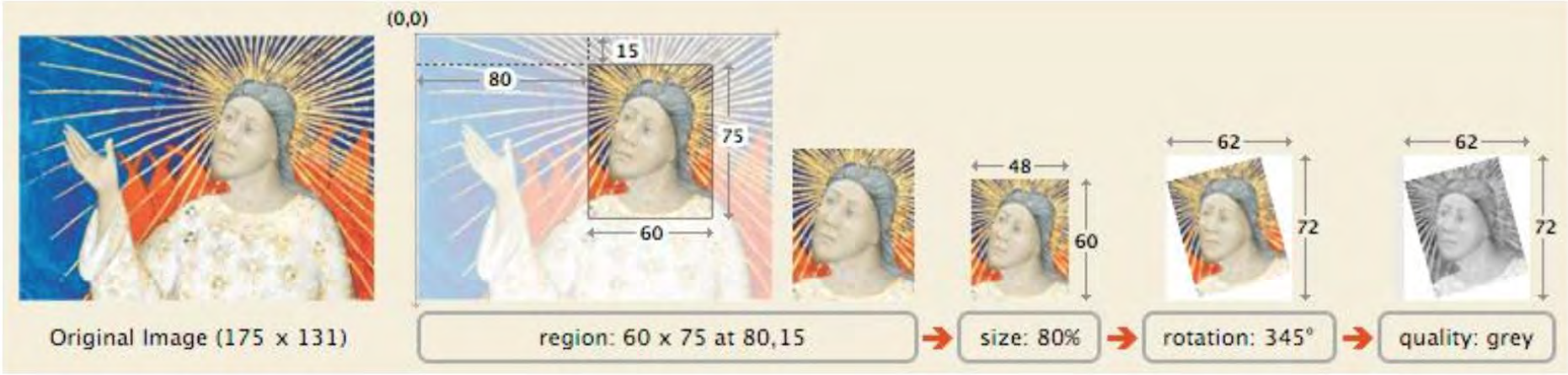
http://iiif.io/api/image/2.1/

Image Delivery API

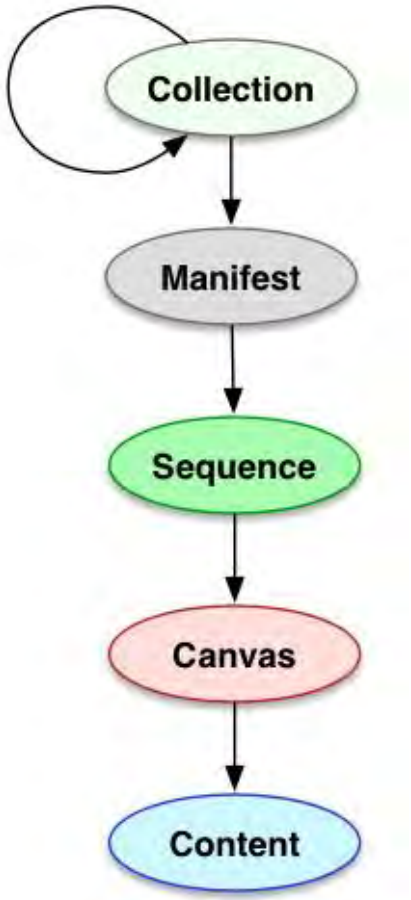
Order of Implementation

http://www.example.org/image-service/abcd1234/80,15,60,75/pct:80/345/grey.jpg

region size rotation quality format



Presentation API



- Structure
  - Collection, Item, Sequence, Parts
- Properties
  - Labels, description, license, attribution, links

http://iiif.io/api/presentation/2.1/

Image + Presentation = Object

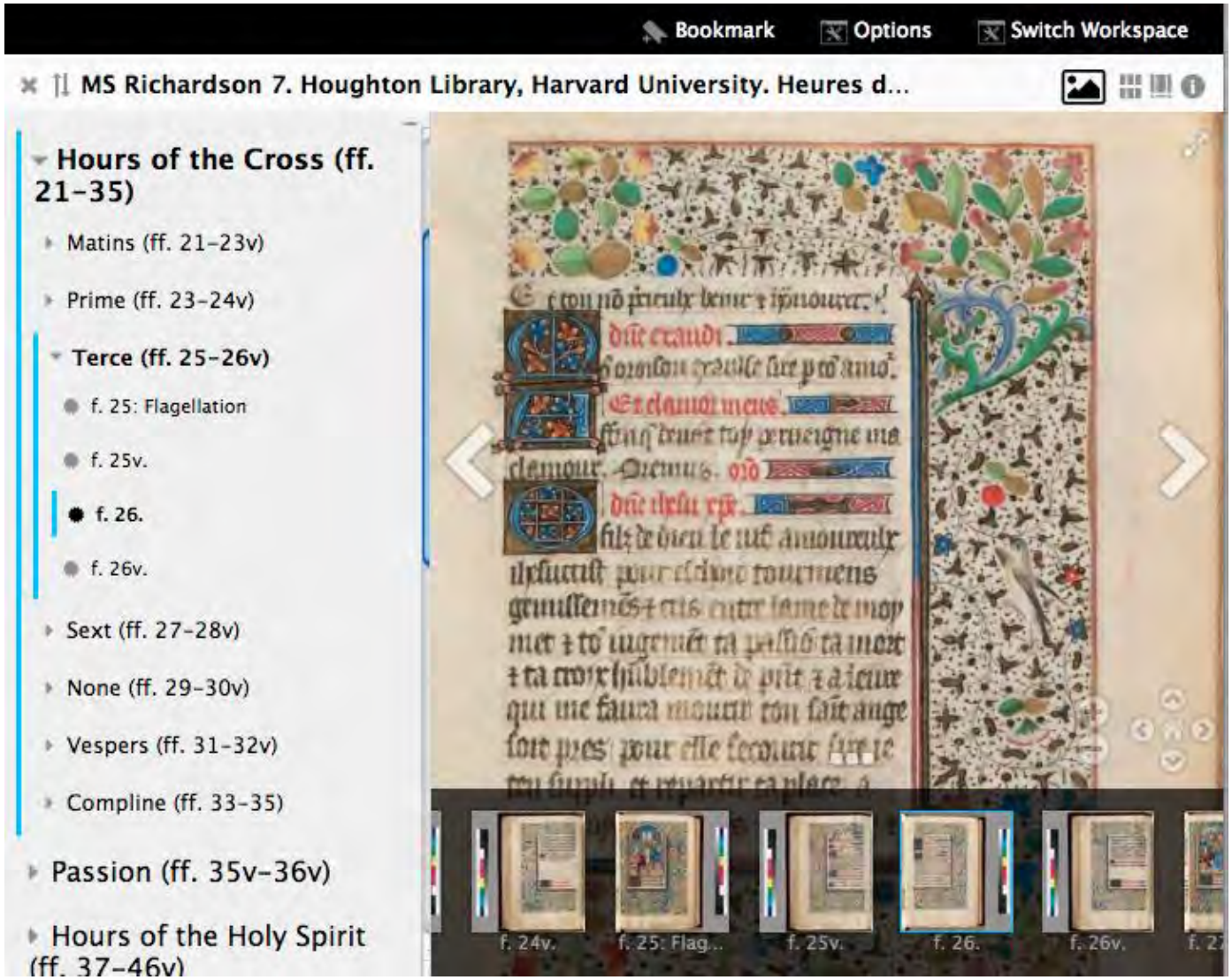
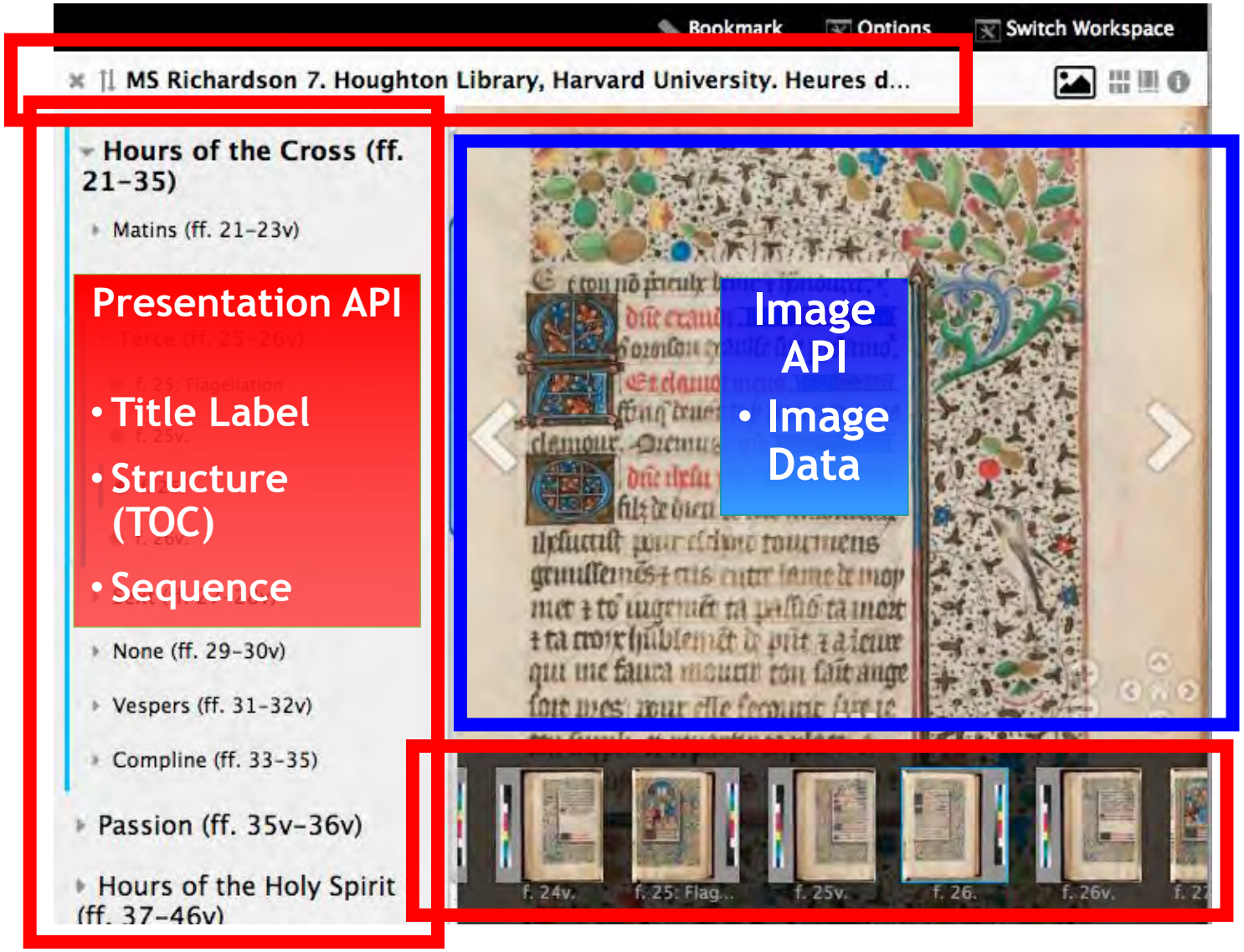


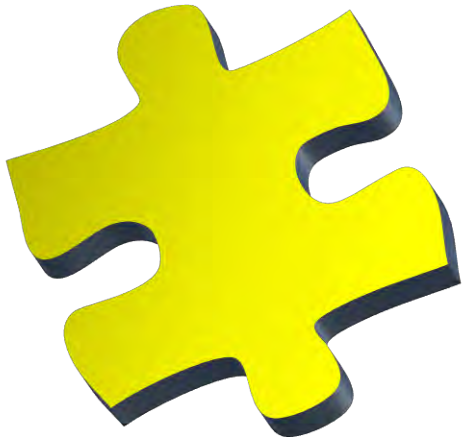
Image + Presentation = Object



IIIF: Two More APIs

Content Search API

Search within an object, such as the full text of a book or newspaper

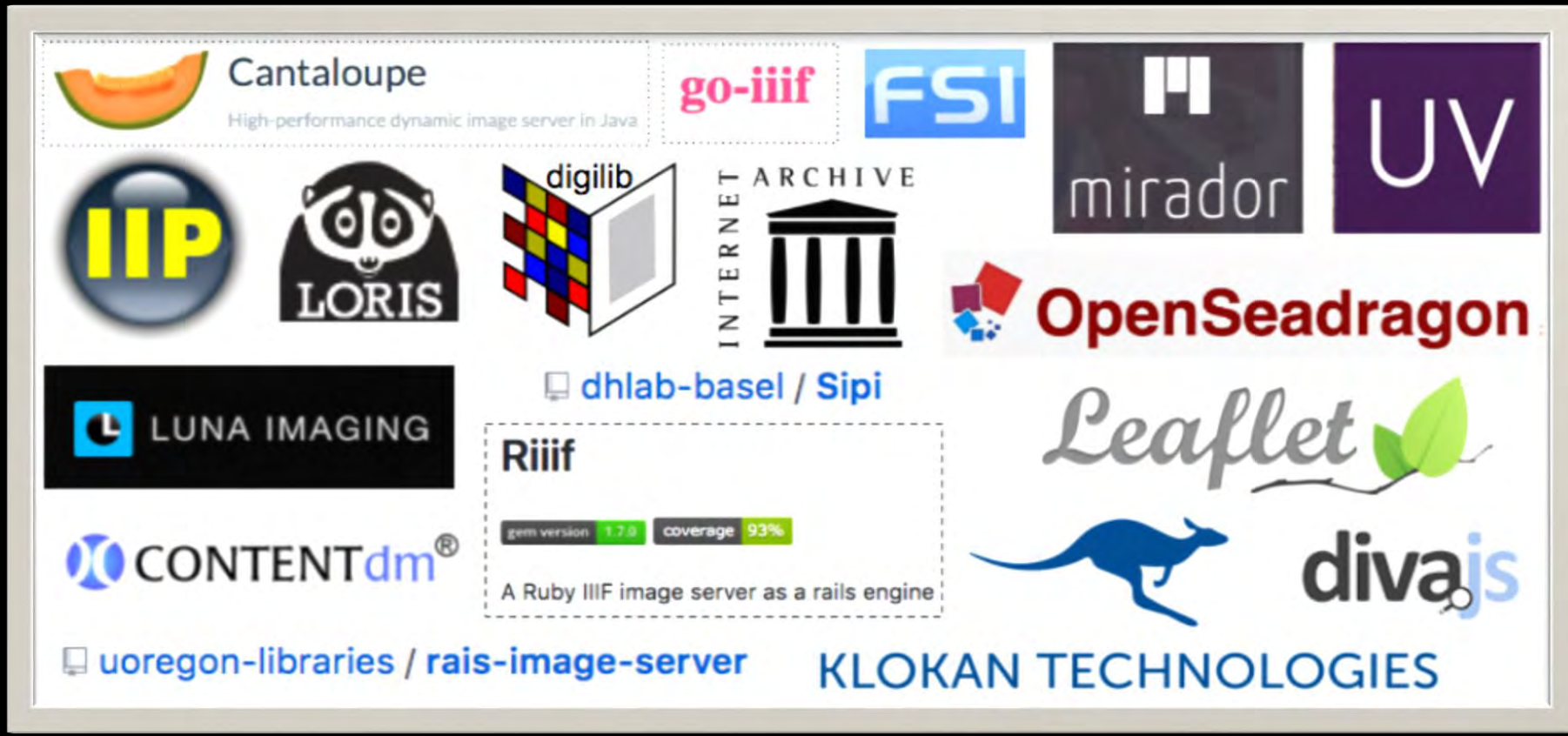


Authentication API

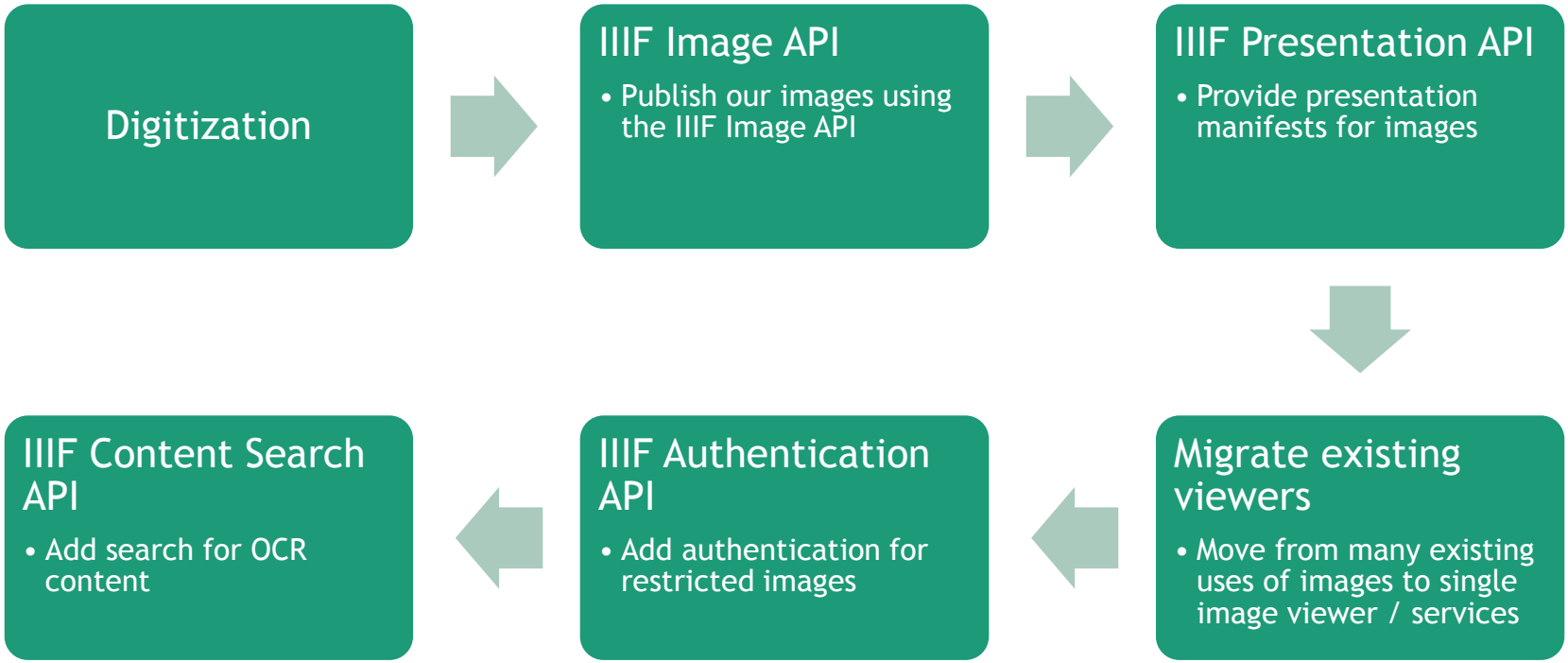
To support login, and differential access to resources.

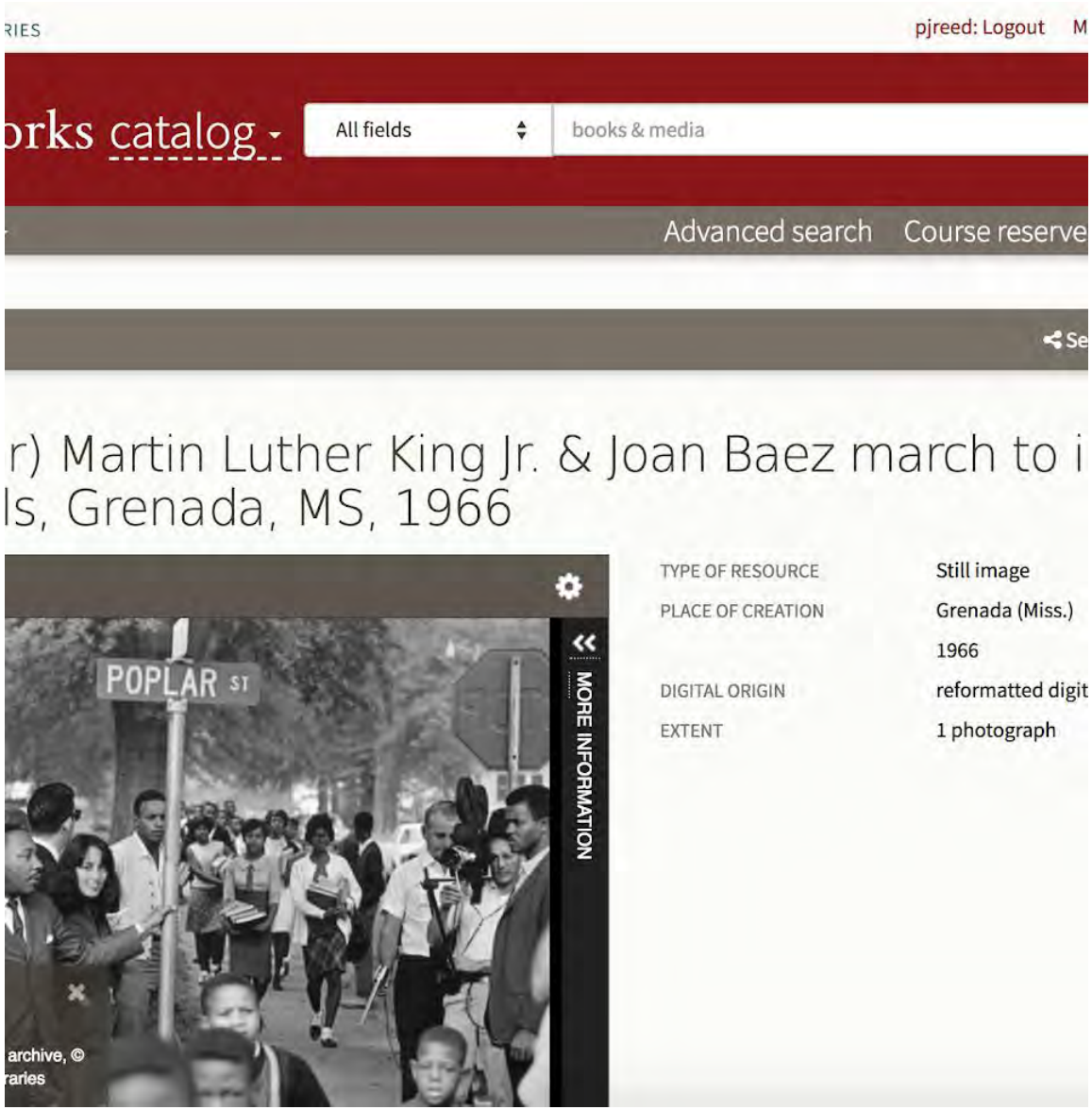
How do you get started with IIIF?

IIIF Compatible Software



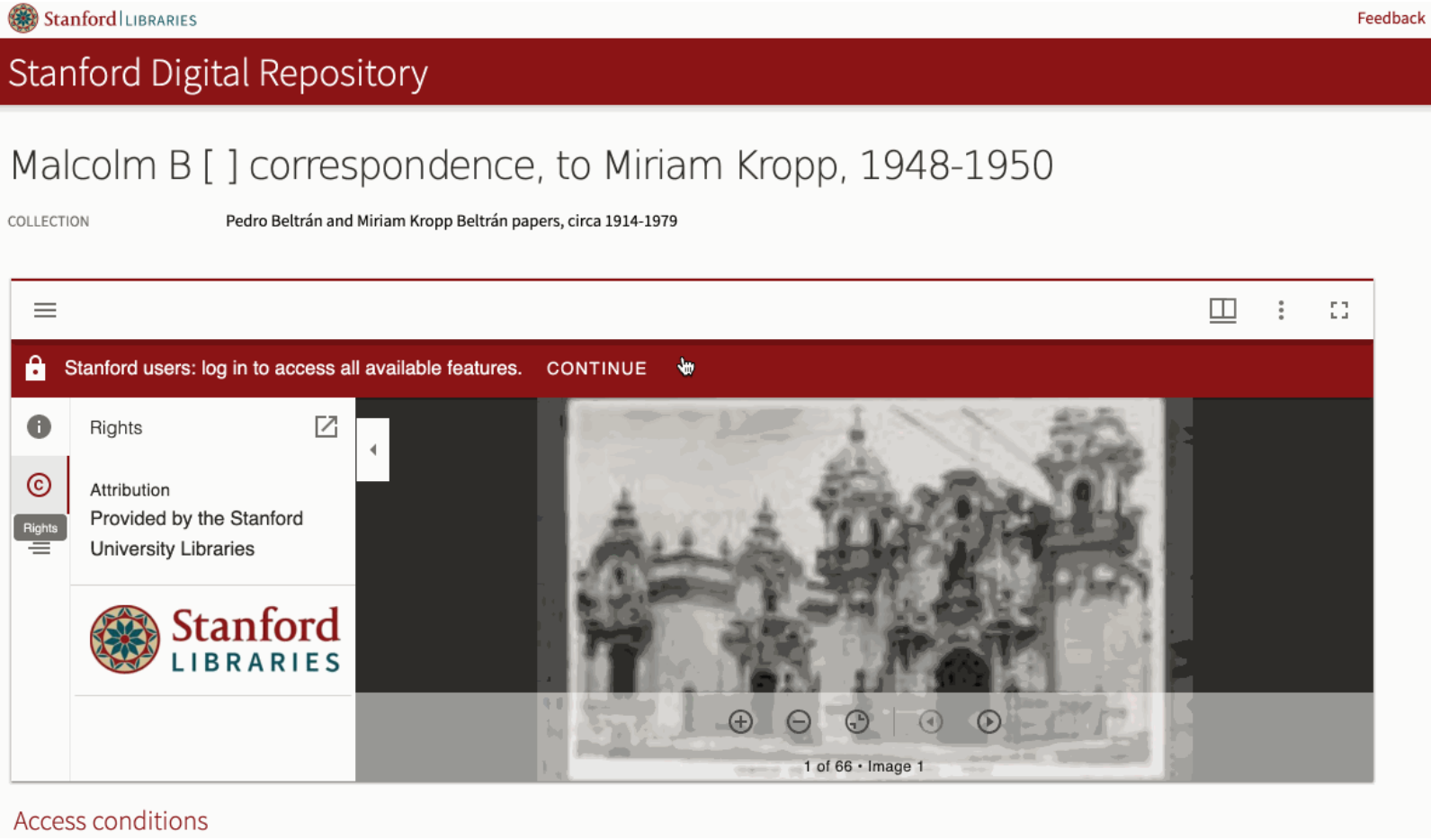
Adoption at Stanford Libraries





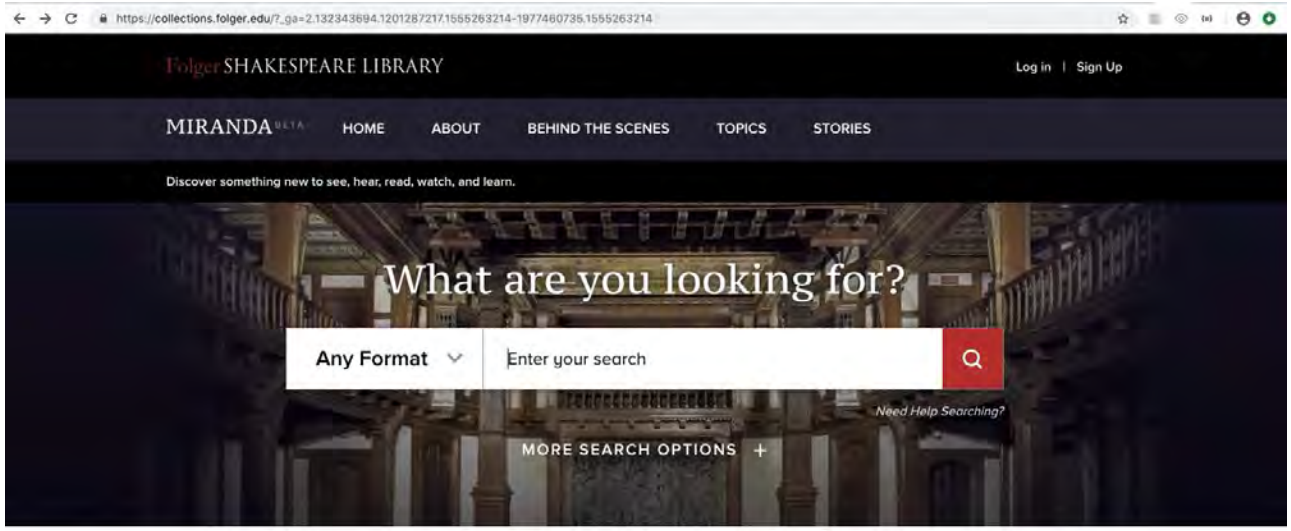
IIIF content available through many platforms from Stanford Libraries

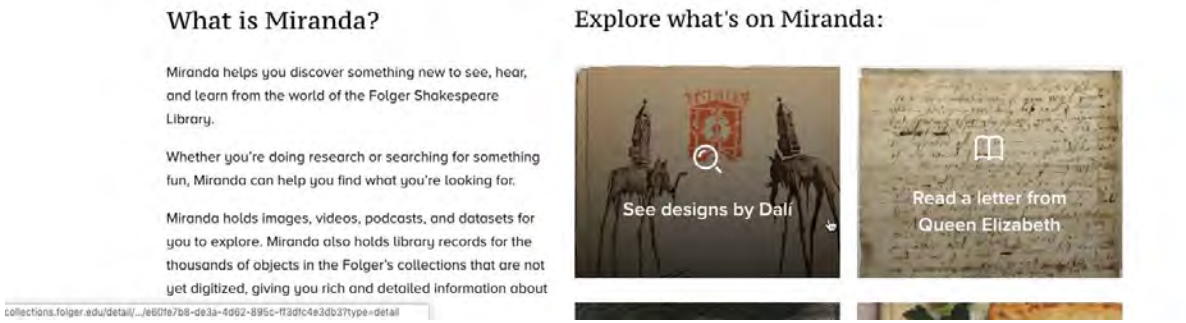
IIIF Authentication API



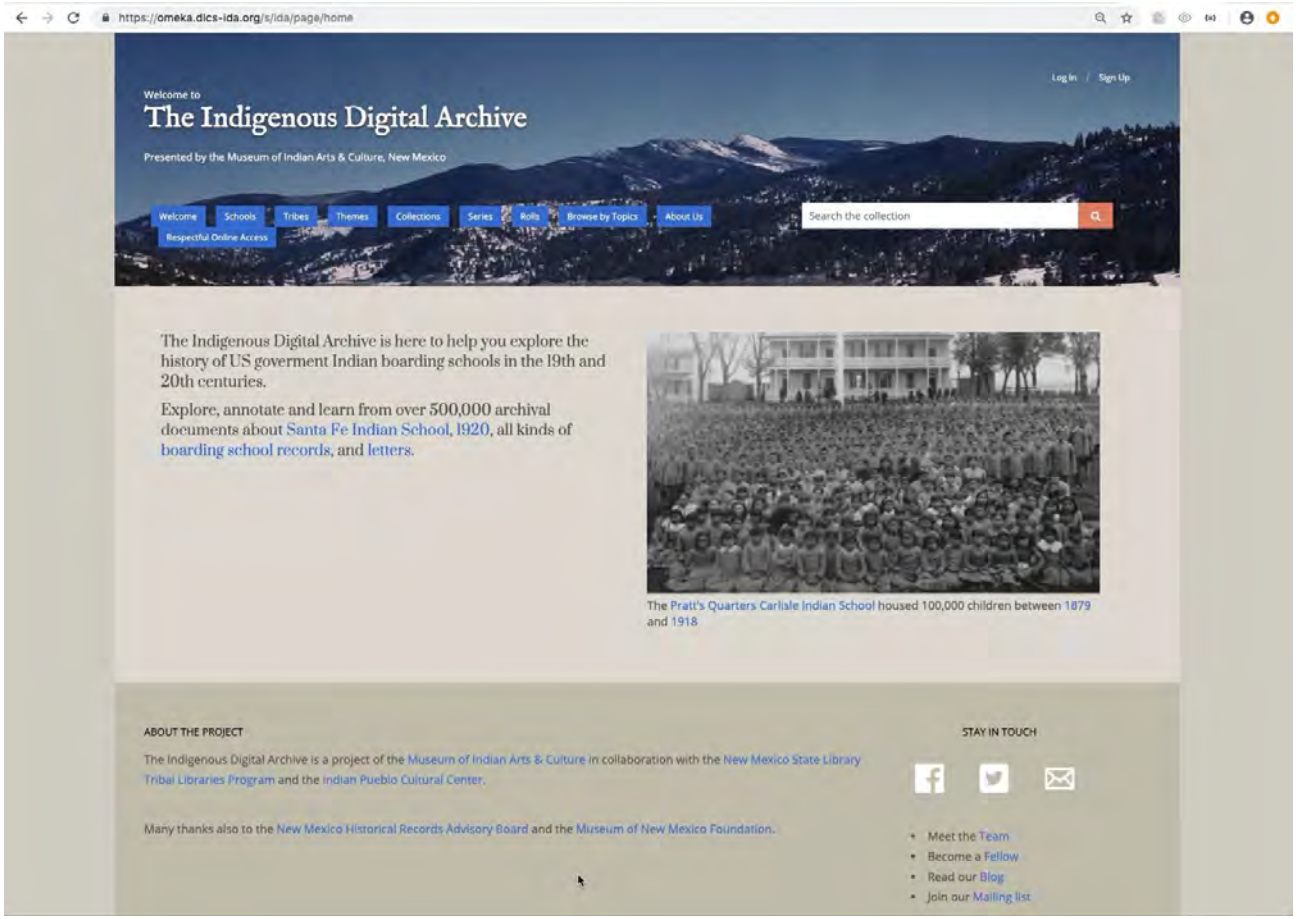
How others use IIIF

Embedded in Catalog (Folger Library)

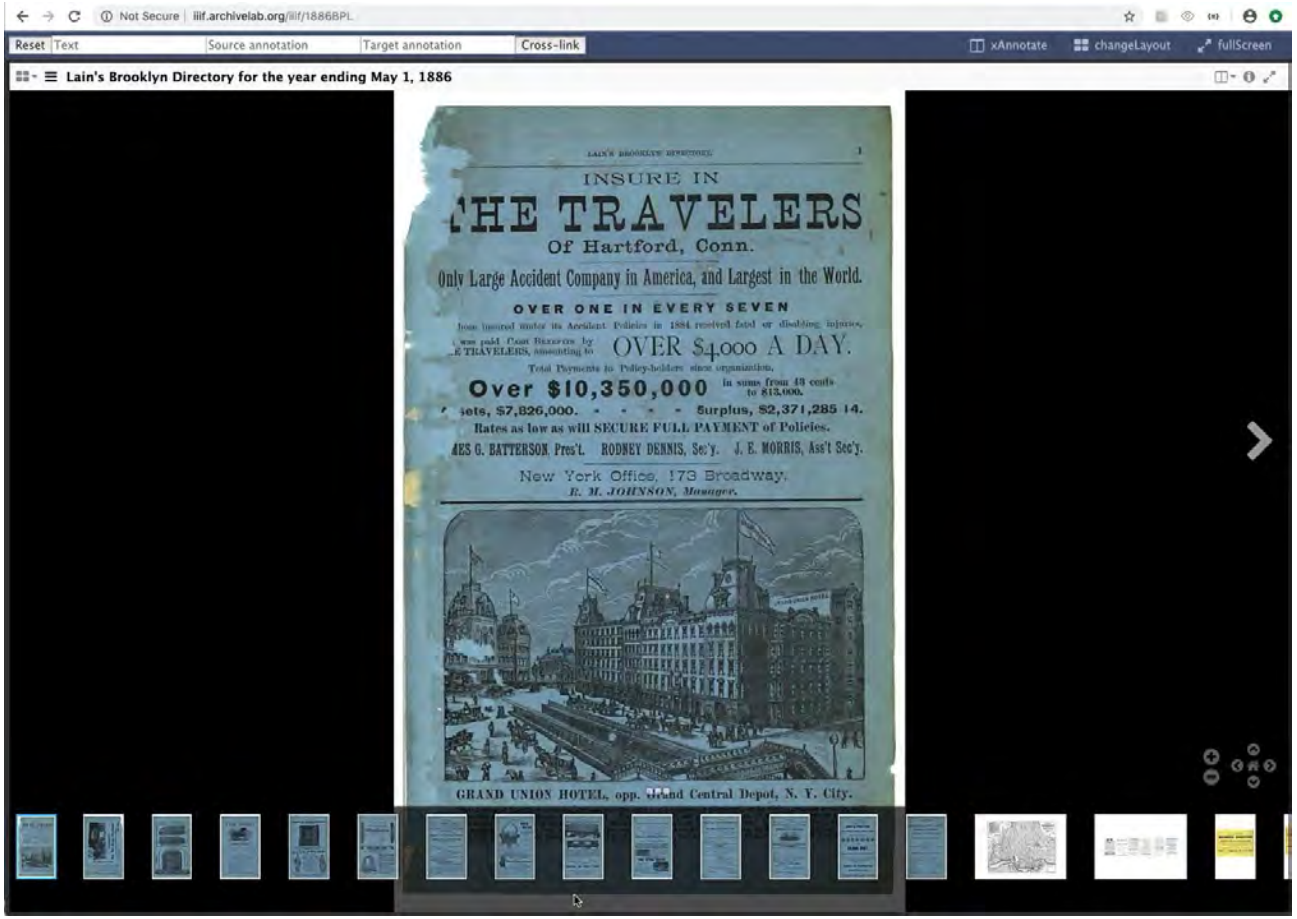




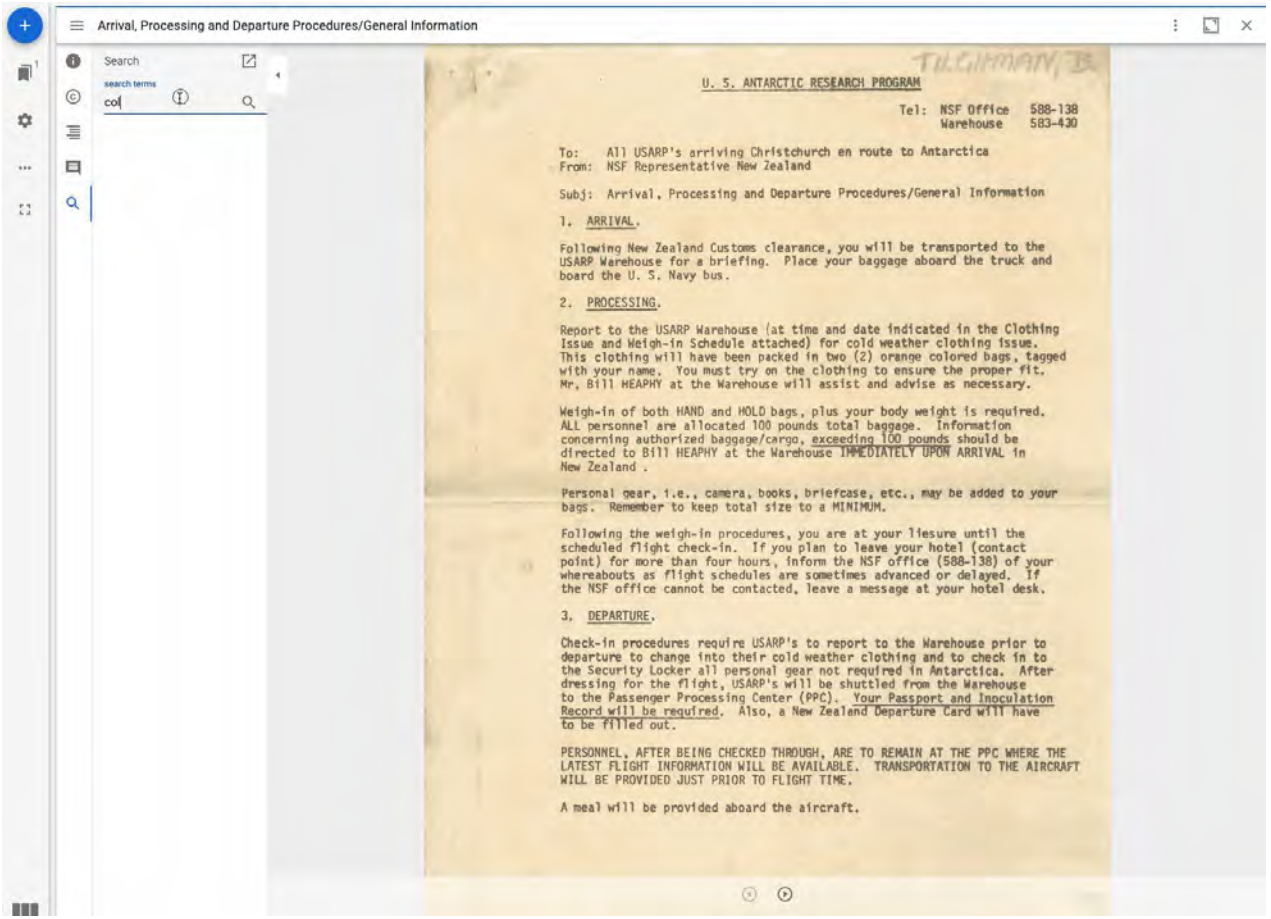
Small Collection Presentation: Indigenous Digital Archive



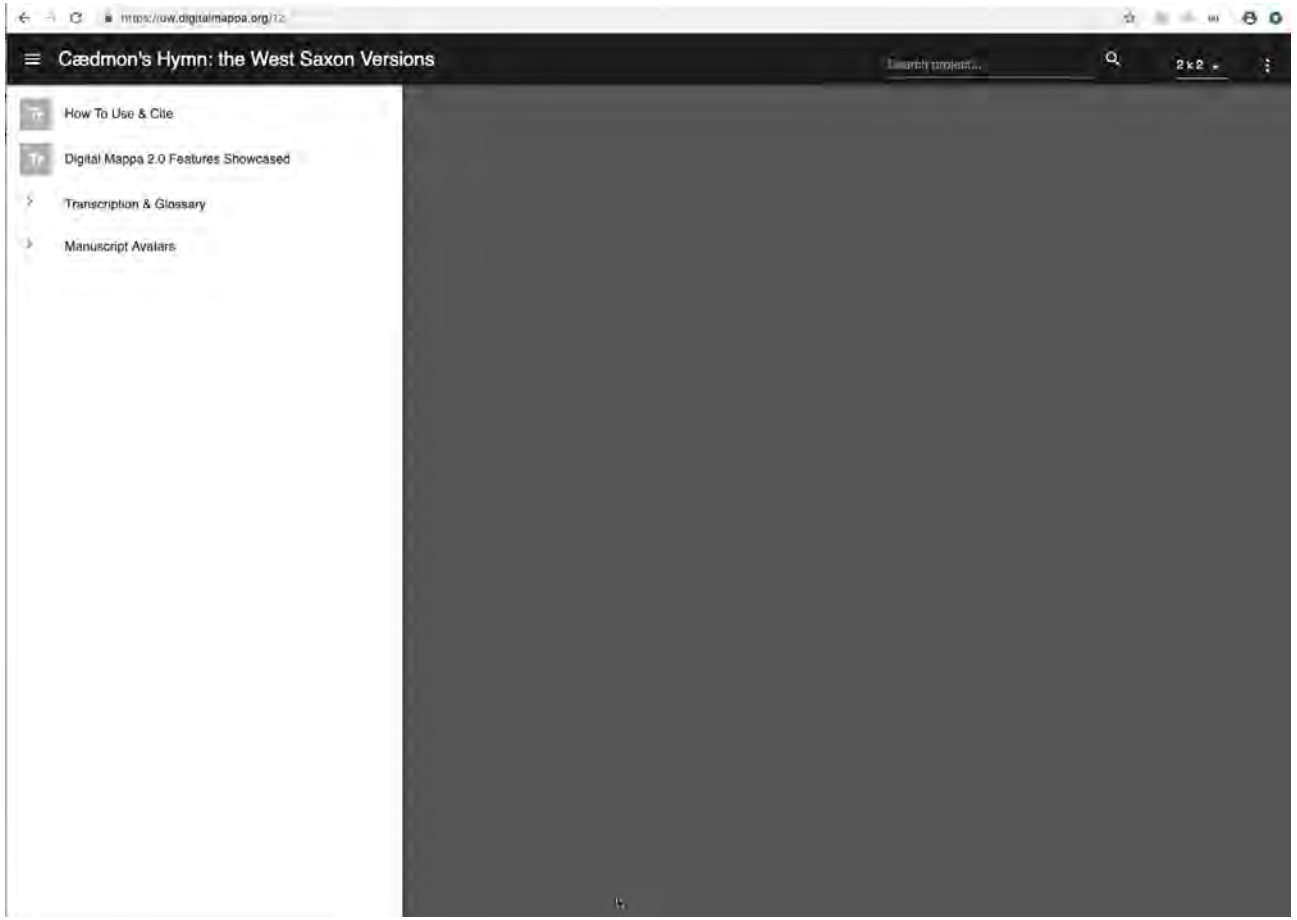
Book Viewer (Internet Archive)



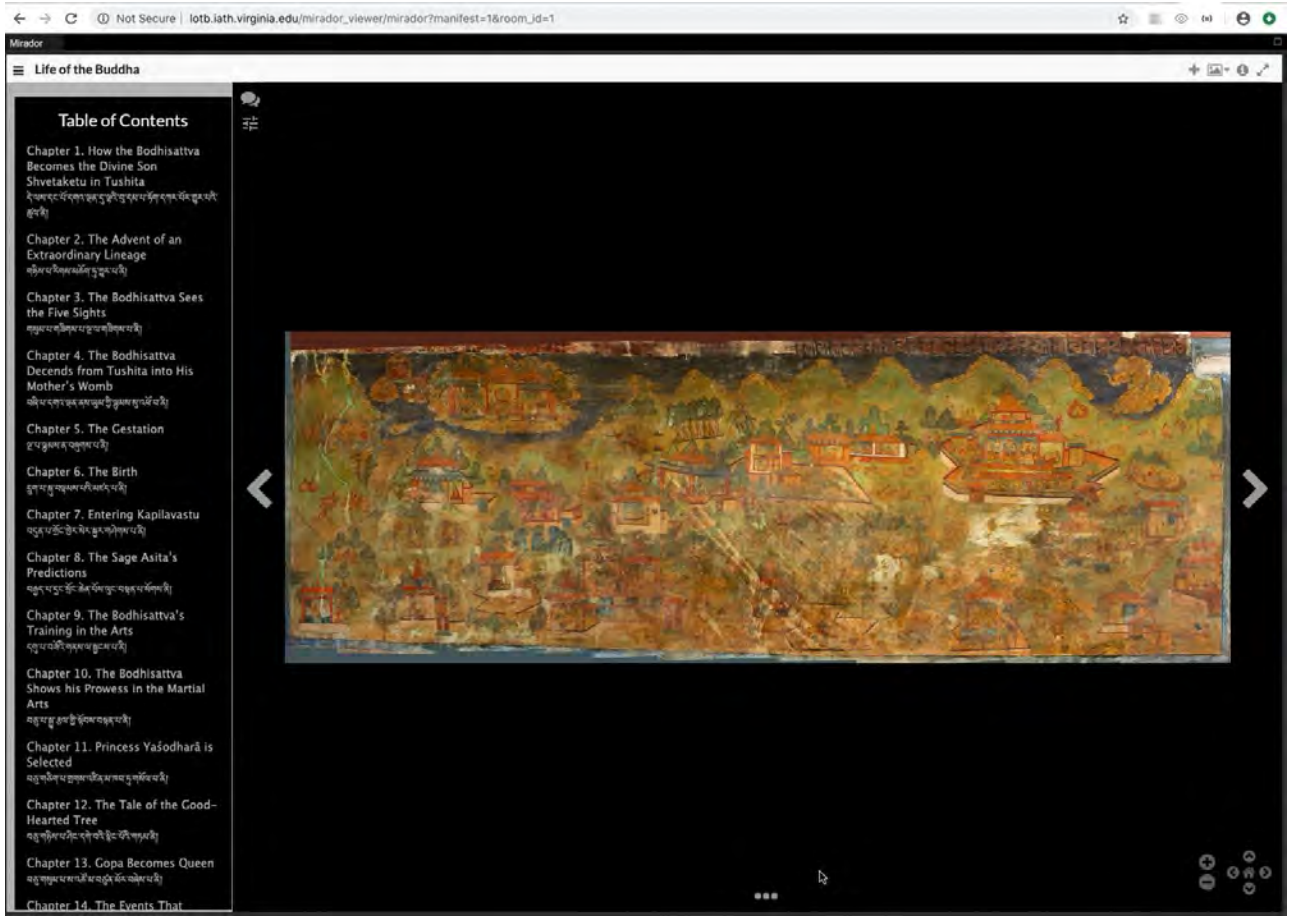
Content search documents



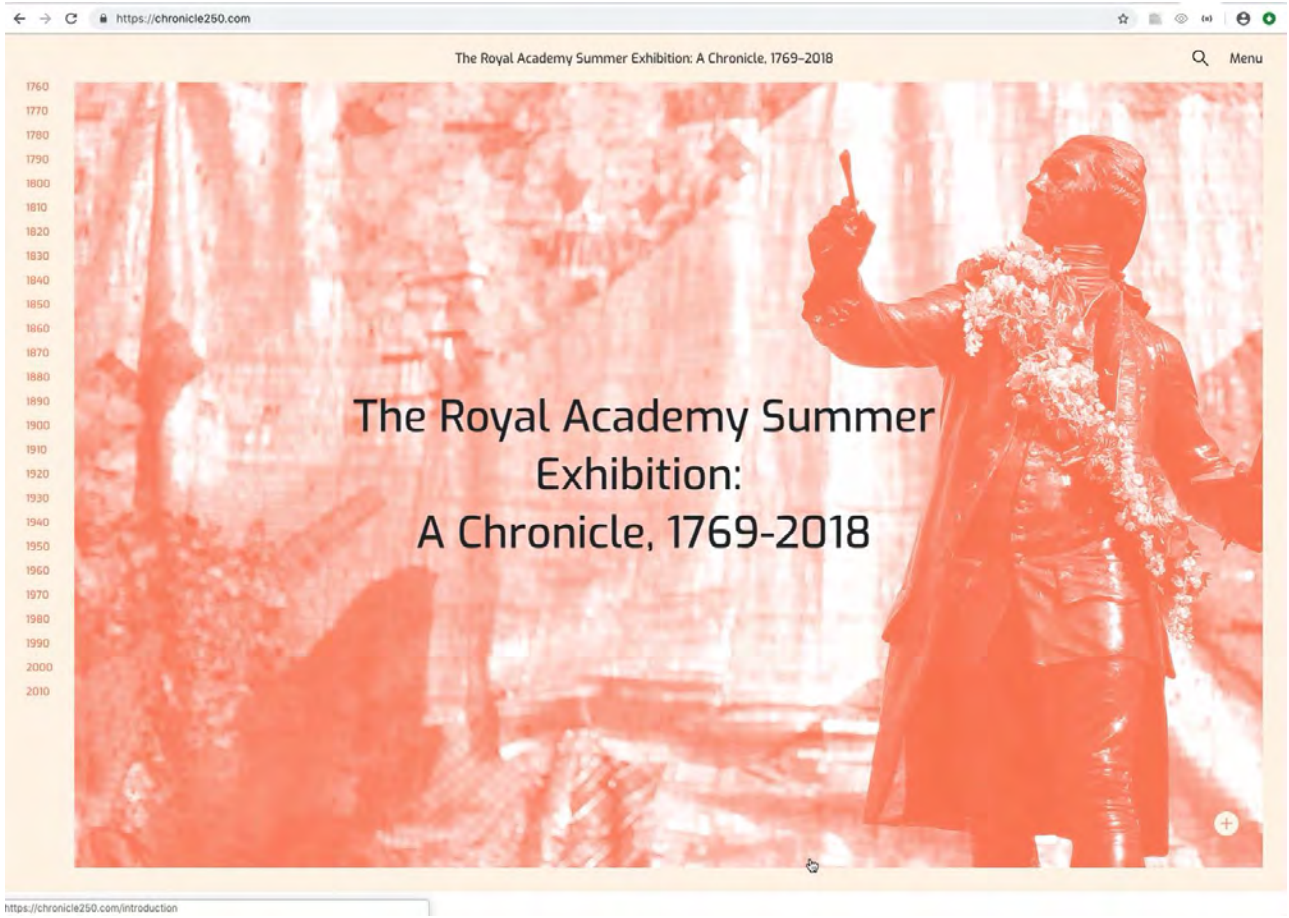
Digital Scholarship (Digital Mappa)



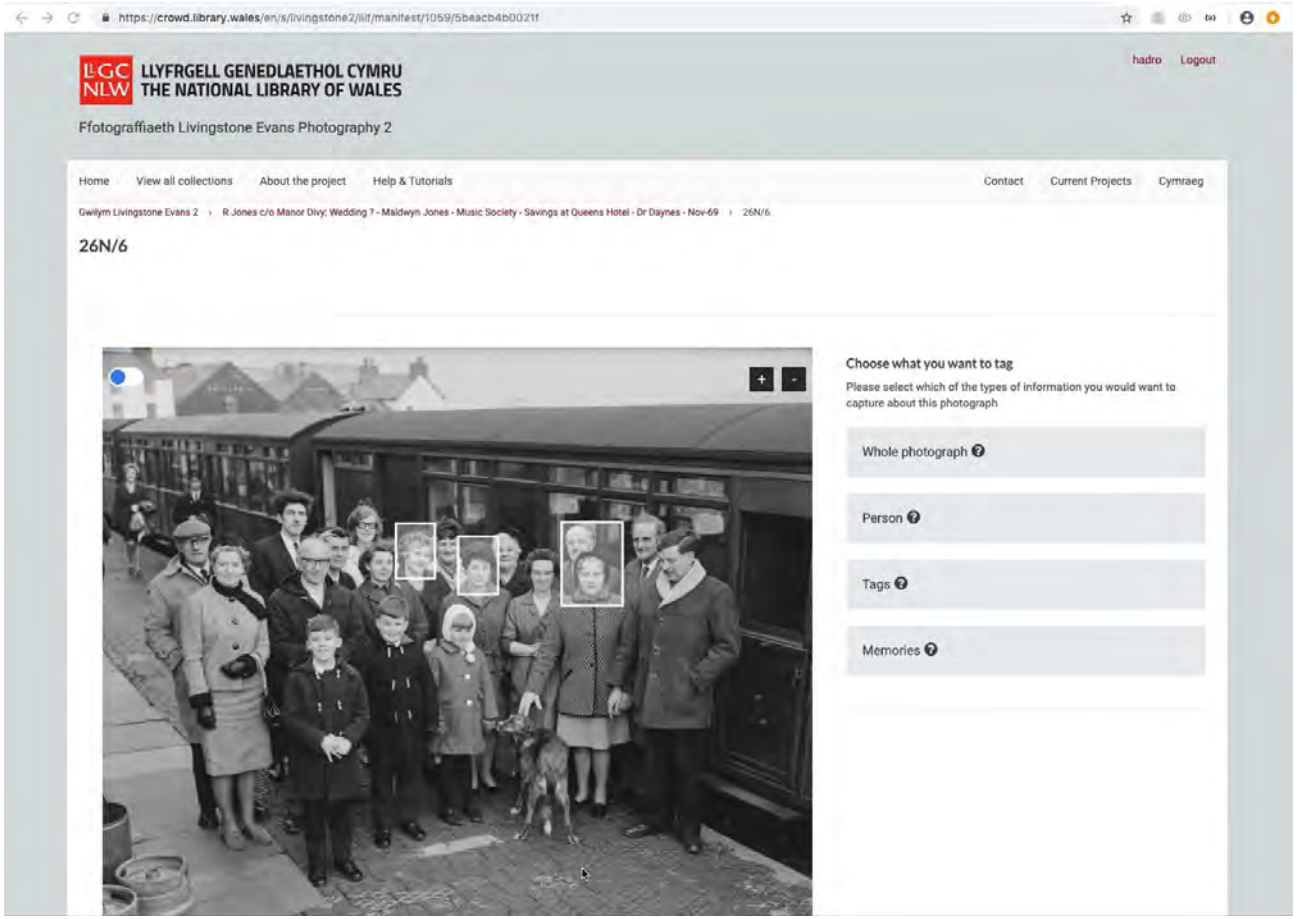
Collaborative Annotation (Life of Buddha)



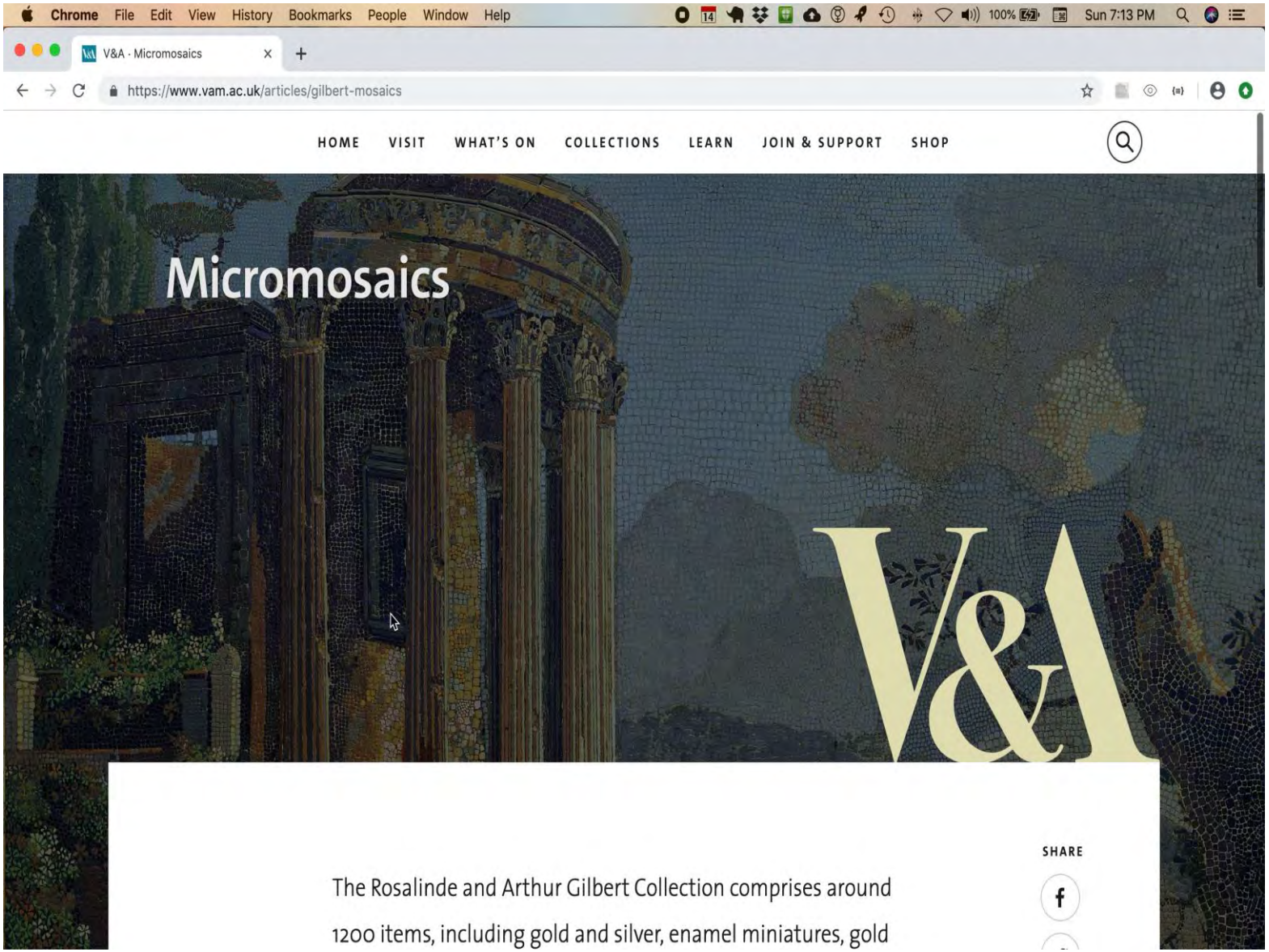
Name-Entity Recognition (Royal Academy)



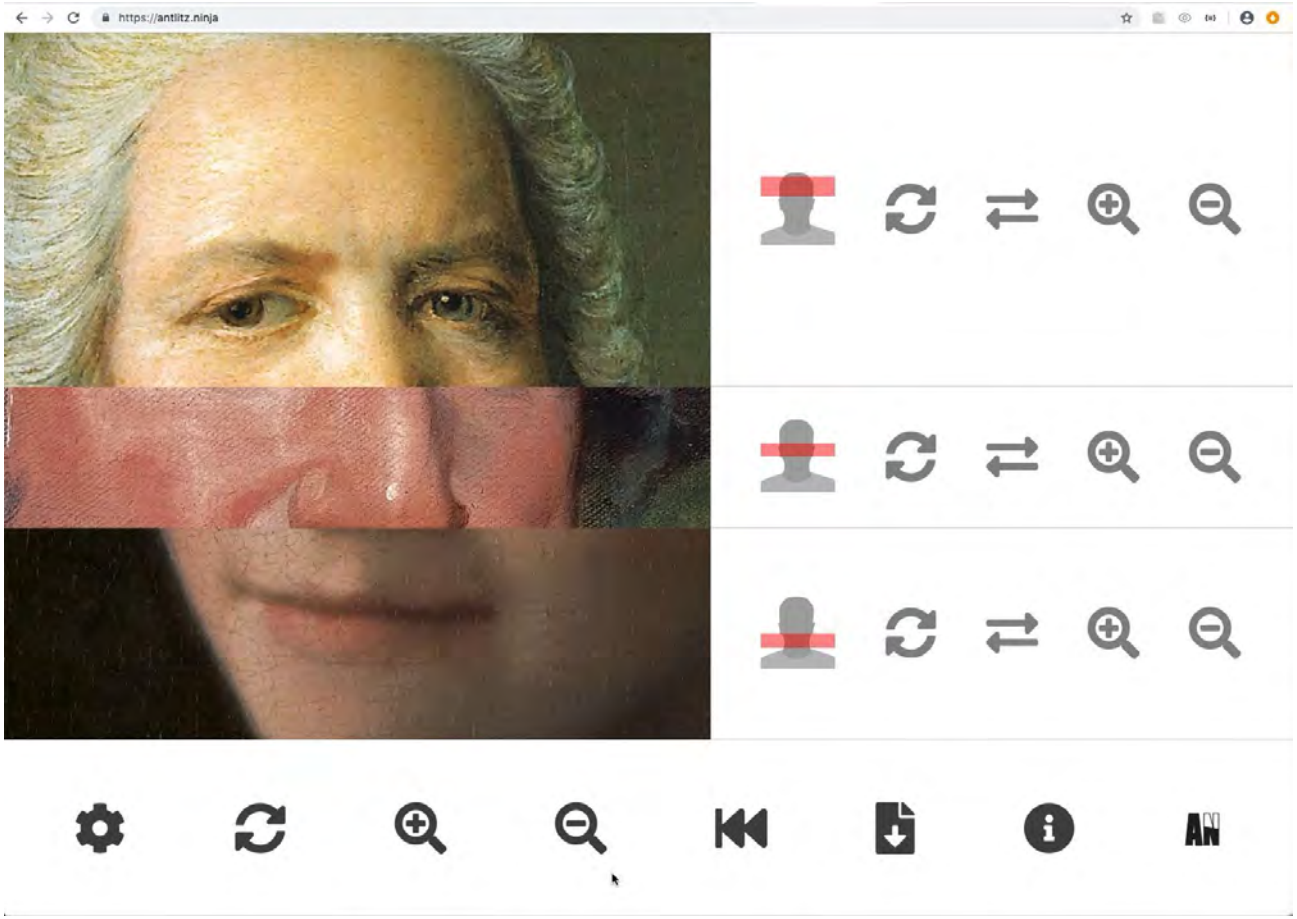
Crowdsourcing (National Library of Wales)



Guided Viewing and Stories (V&A)



Exquisite Corpse with Portraits



IN ASPEC
QVADRA
TV
TO
LVNA IN ORBE
IN SI NVATA
IN ASP
TV TRINO
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NOMINA
PHASIVM
ET ASPECTVVM
LVNÆ
Interlunium
Luna prima
Luna Seuex
Luna Corniculata
Luna Falcata
Luna Cornigena
Luna Curvata
Senescens
Decilis
Octilis
Sextilis
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36
45
50

Nemerov Group A new map of the terr...

Nueva Hispania tabula nova

The North part of America conteyning Newfoundla...

AMERICA with those known parts in that unknown...

AUDIENCA DE GUADALAJARA, NOVA MEXICO CALI...

Paskaerte van NOVA GRANADA, en t'Eylandt CALI...

New MEXICO

Carte generale du monde, ou description du mond...

[Americas]

Mapemonde planisphere ou carte generale du mon...

CARTE DE LA CALIFORNIE Suivant I. la Carte man...

Kaart van de geheele wereld na de alderlaatste on...

[Oranda shinyaku chikyu zenzu : The complete ma...

Old Map Room

https://www.jack-reed.com/old-map-room/

Download on Apple TV

1812 - Asia. (Boston: Published by Thomas & Andrews. 1812)

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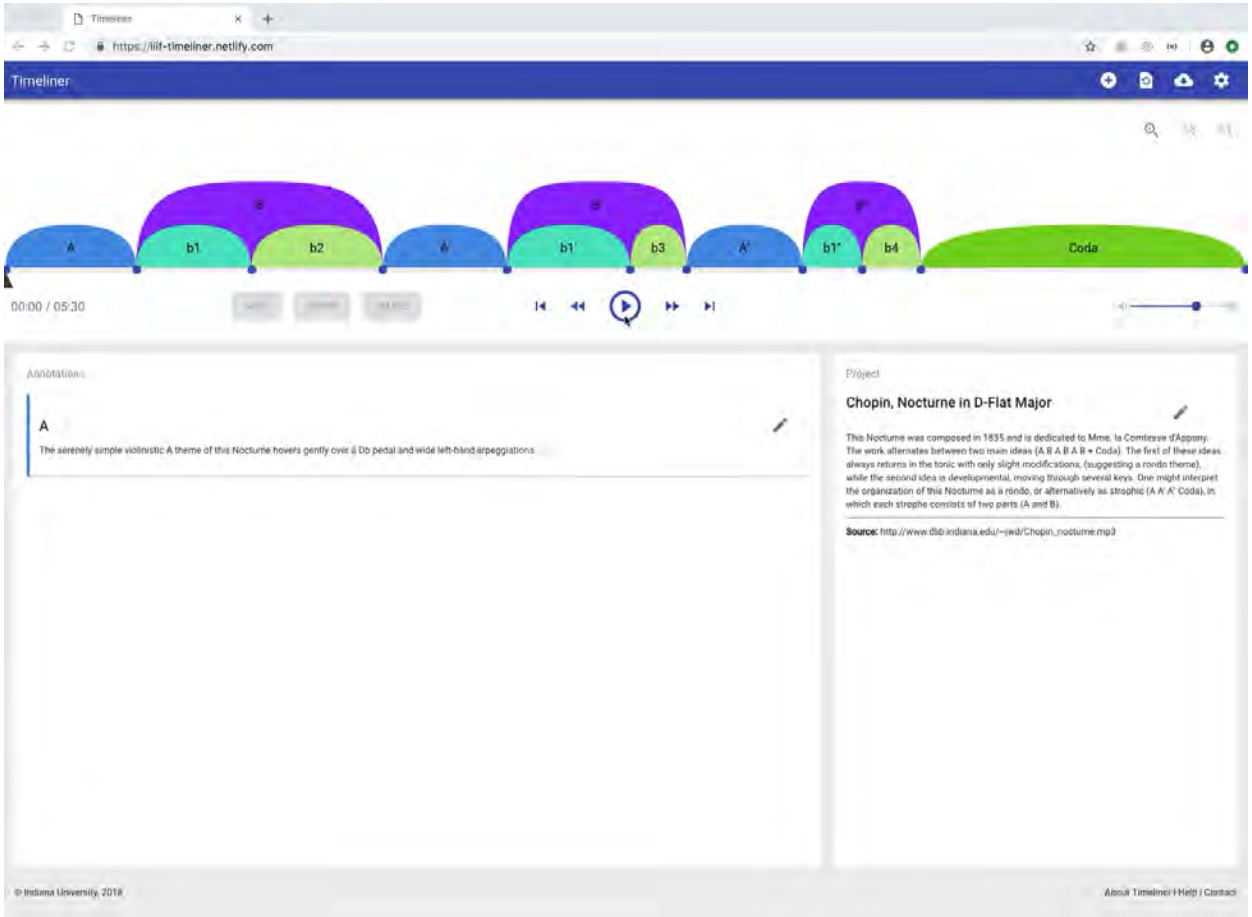
State of the Art with IIIF

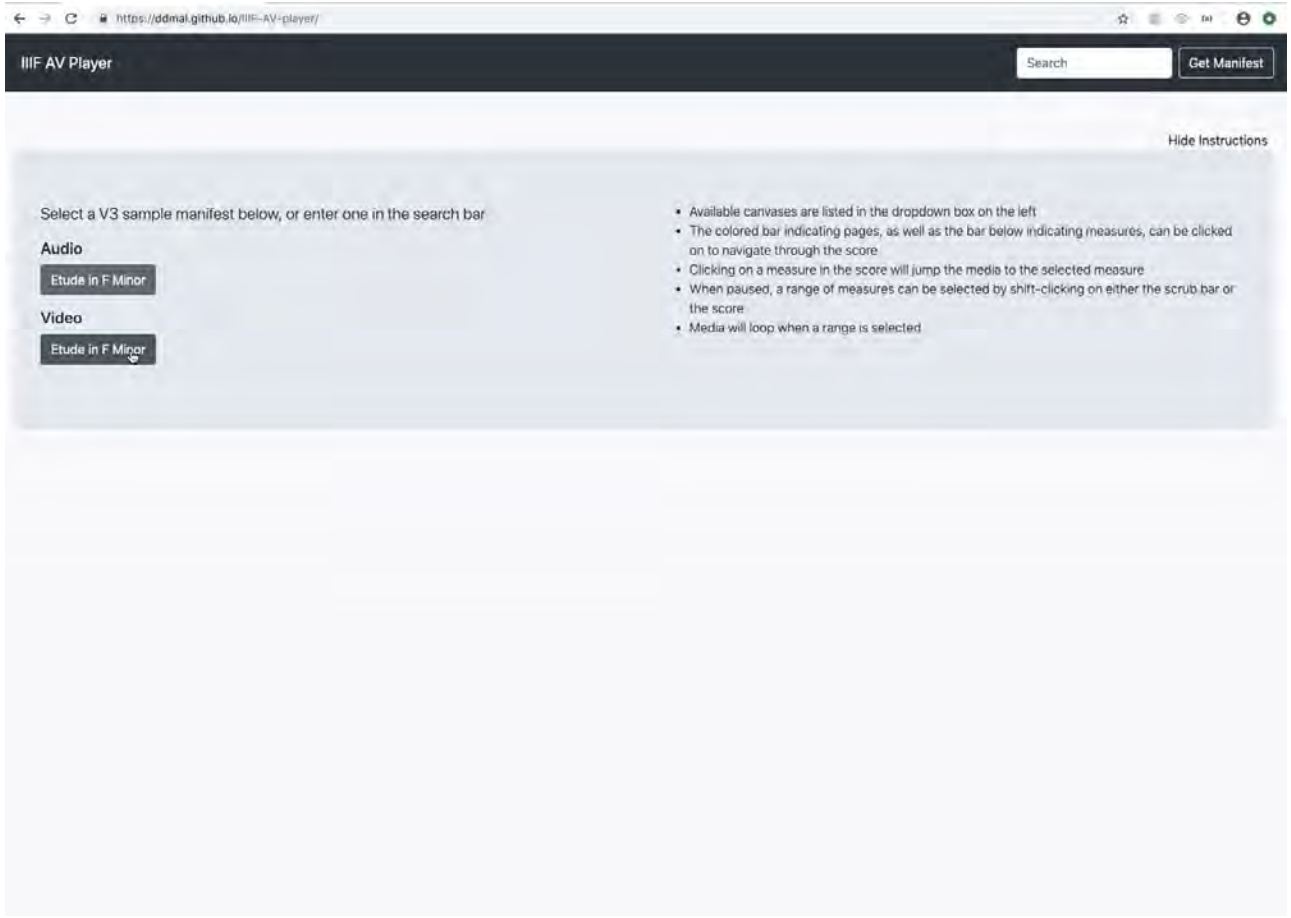
Audio and Moving Image

Interactive Transcripts

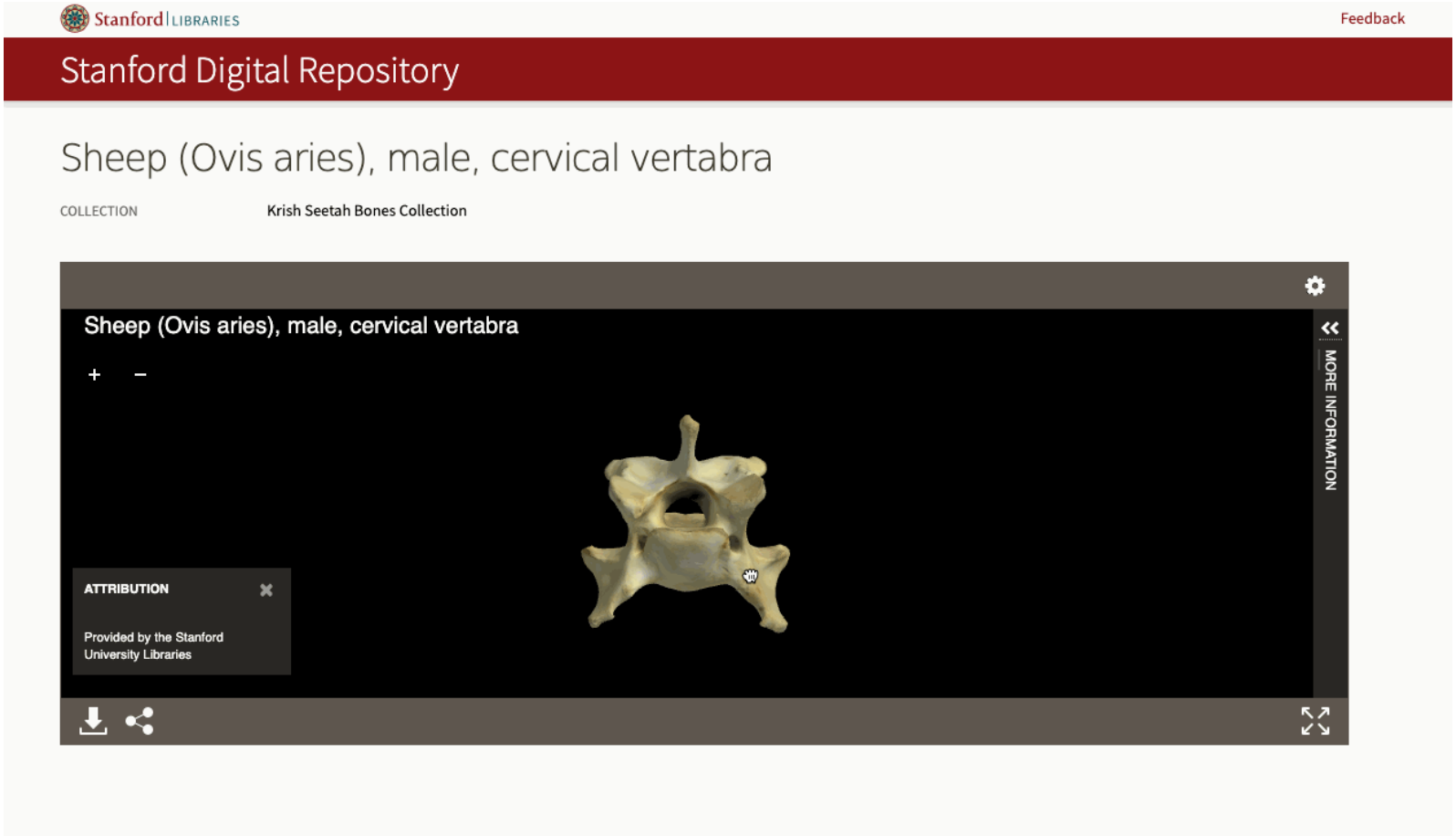
Timeliner by Digirati/Indiana Univ.



Music Annotation by McGill DDMAL



IIIF 3D Community Group



https://purl.stanford.edu/hc941fm6529

Machine Learning/AI

- Web native APIs provide a consistent way to access images (and parts of images)
- IIIF speaks annotations out of the box, perfect for classification and shape detection

Pattern Recognition (Proof of Concept)

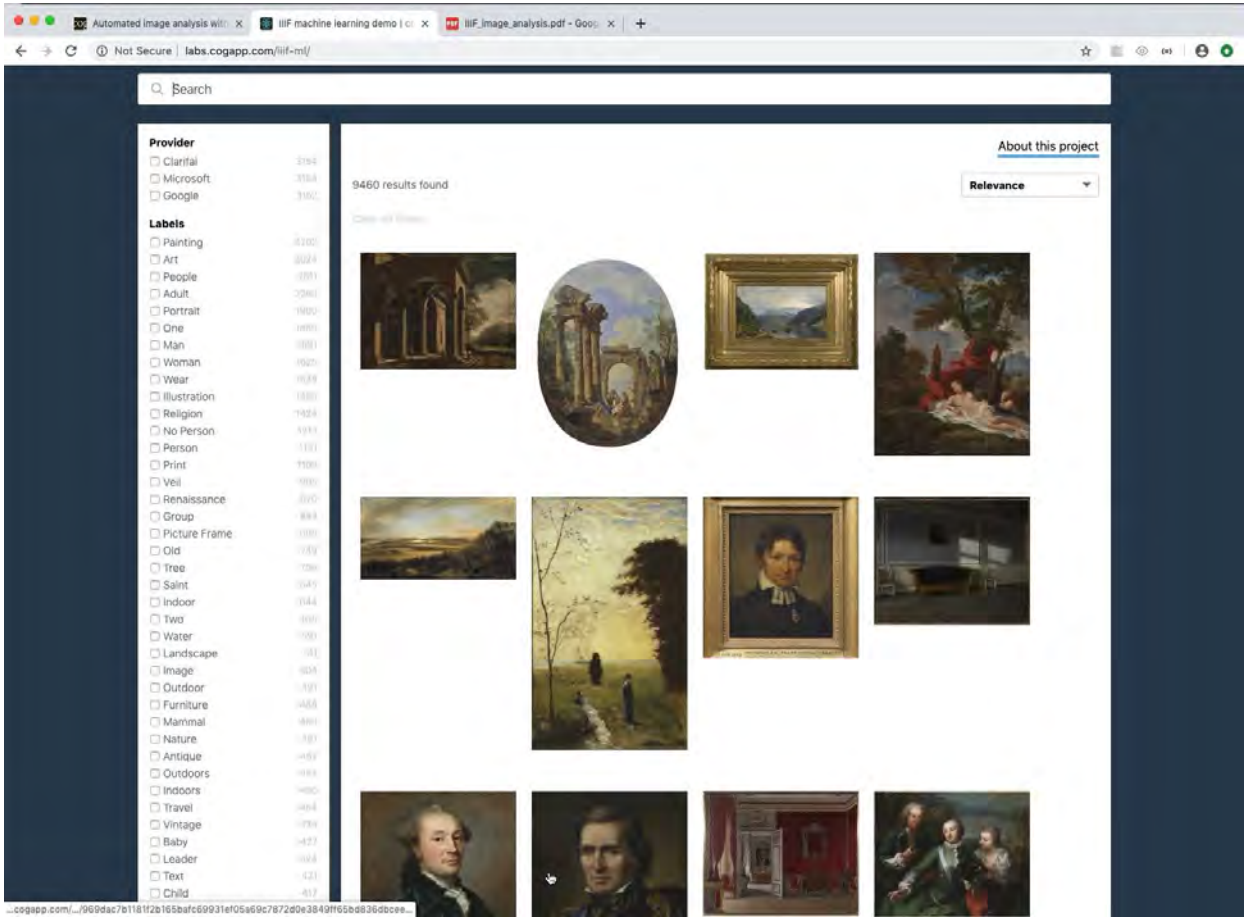
Create Image Templates

Move around the image to find templates to use for intersection finding.

Add template of cropped area

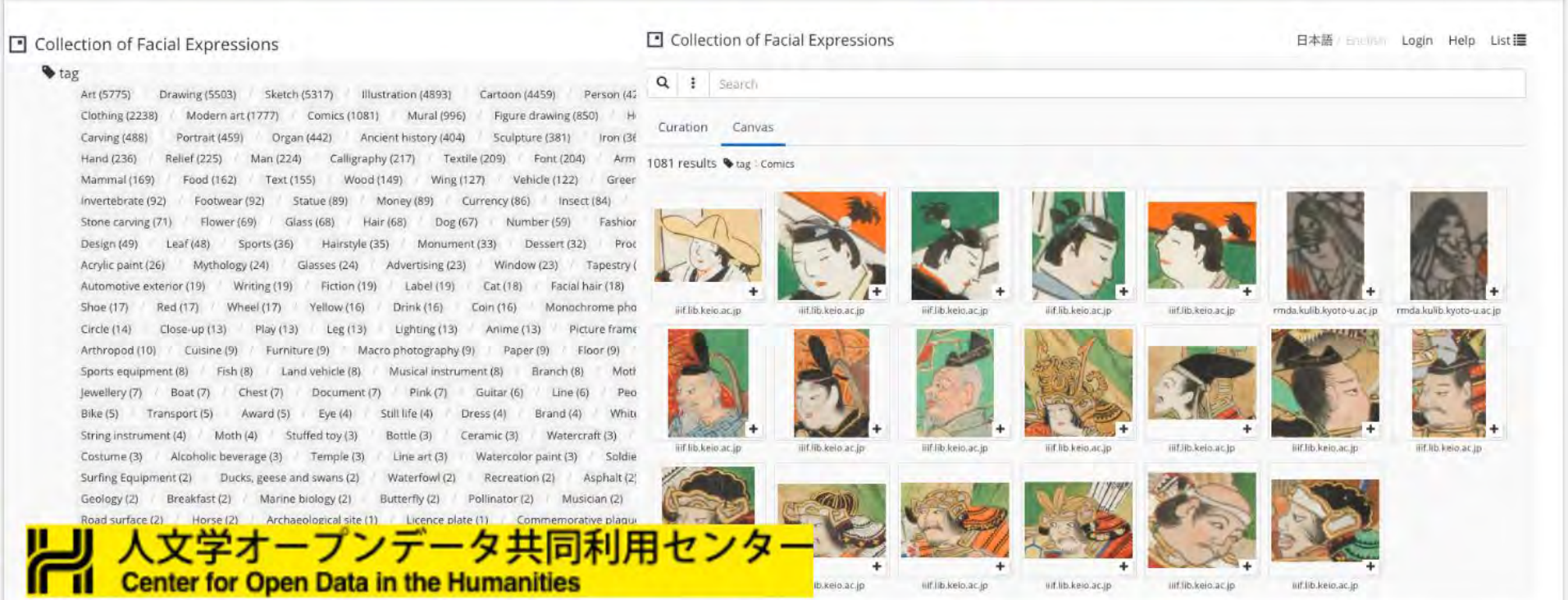
Next Step

Feature Extraction (Proof of Concept)



Feature Extraction for Scholarship

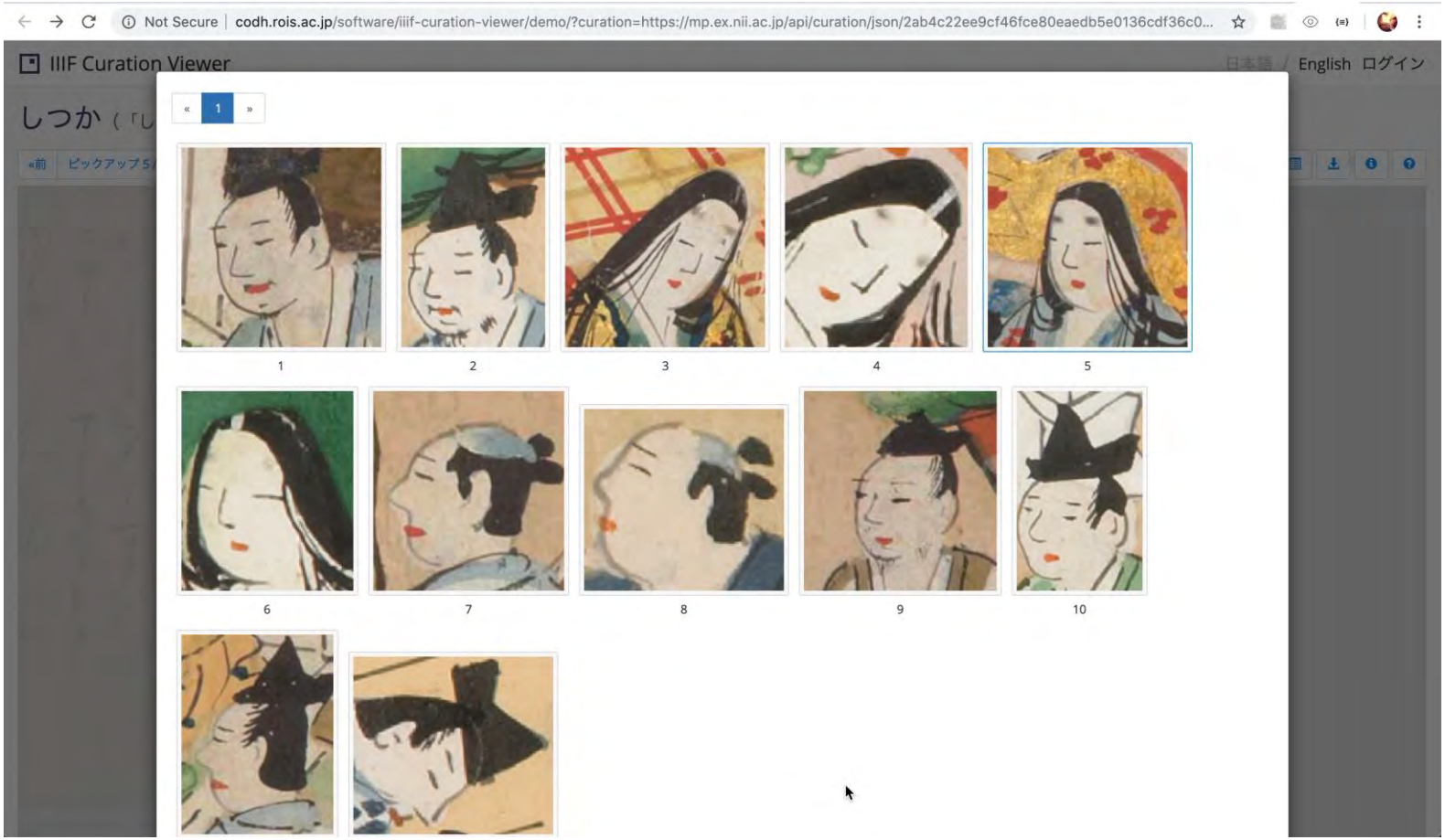
Japanese Center for Open Data in the Humanities: IIIF-based "Collection of Facial Expressions"



人文学オープンデータ共同利用センター
Center for Open Data in the Humanities

http://codh.rois.ac.jp/face/iiif-curation-finder/?lang=en

Feature Extraction for Scholarship



Interdisciplinary Use Cases

- High resolution viewing
- Comparison
- Interoperability across platforms / institutions
- Annotation
- Integration with geospatial data

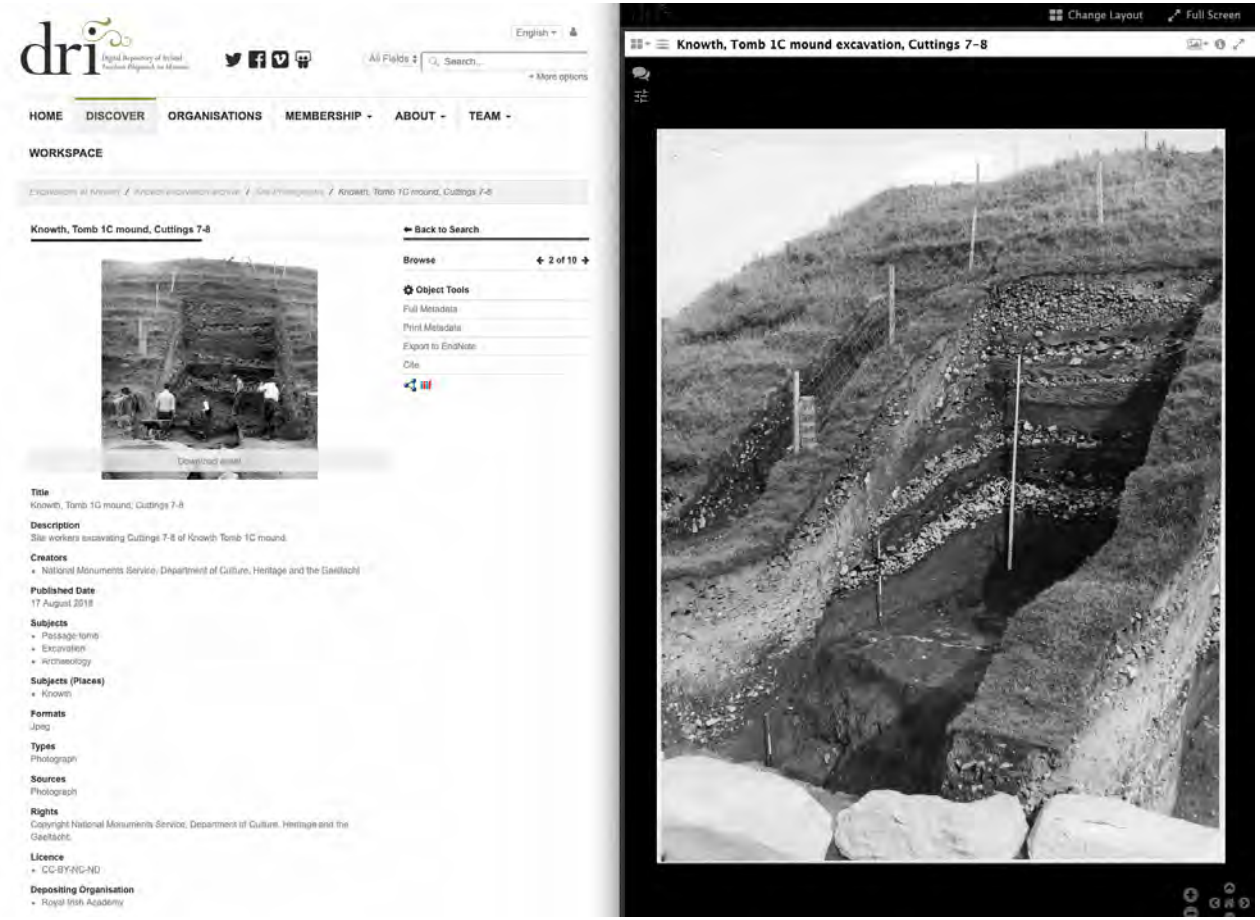
Existing archaeological content

- Digital Repository of Ireland
- Salmon Pueblo Archaeological Research Collection

https://repository.dri.ie/catalog/8910z856b

https://salmonpueblo.org/

Comparison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Knowth, Tomb 1C mound, Cuttings 7-8
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2 of 10
Object Tools
Full Metadata
Print Metadata
Export to EndNote
Cite
Title
Knowth, Tomb 1G mound, Cuttings 7-8
Description
Site workers excavating Cuttings 7-8 of Knowth Tomb 1C mound.
Creators
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Published Date
17 August 2018
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Passage tomb
Excavation
Archaeology
Subjects (Places)
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004B Documents [See data about unit]

Extended Strat Info

Image 1 of 2 Go

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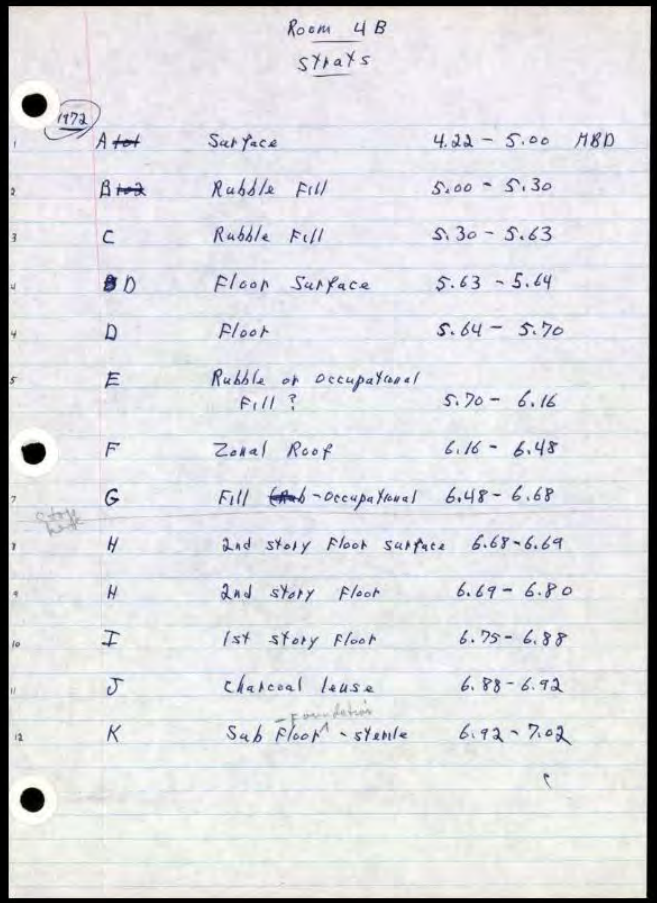
Room 004B Extended Strat Info



Room 4B
Strats

1973

1	A ~~tot~~	Surface	4.22 - 5.00 MBD
2	B ~~tot~~	Rubble Fill	5.00 - 5.30
3	C	Rubble Fill	5.30 - 5.63
4	~~B~~ D	Floor Surface	5.63 - 5.64
4	D	Floor	5.64 - 5.70
5	E	Rubble or occupational Fill ?	5.70 - 6.16
	F	Zonal Roof	6.16 - 6.48
7	G	Fill ~~Floor~~ - occupational	6.48 - 6.68
8	H	2nd story Floor surface	6.68 - 6.69
9	H	2nd story Floor	6.69 - 6.80
10	I	1st story Floor	6.75 - 6.88
11	J	charcoal lense	6.88 - 6.92
12	K	Sub Floor (Foundation) - sterile	6.92 - 7.02

MORE INFORMATION

https://salmonpueblo.org/documents/unit/004B

Hundreds of adopters

Scores of applications

Millions of digital objects

Revolutionary promise

Why embrace IIIF?

1. State of the art functionality
2. Cheaper, faster and more efficient
3. Benefits of an international standard
4. Maximize impact, use and value of your content
   …without giving it away
5. Be at the forefront of digital innovation
   …with a global community of leaders

How to Participate

1. Expose your collections via IIIF
2. Use IIIF-compatible software
3. Ask your software suppliers to become IIIF-compatible
4. Participate in the IIIF community
5. Join the IIIF Consortium

IIIF Communication Channels

- IIIF Website: http://iiif.io
- iiif-discuss@googlegroups.com
- IIIF Slack Team – Join at http://bit.ly/iiif-slack
- Twitter: @iiif_io and #IIIF
- Awesome-IIIF on GitHub
- IIIF YouTube Channel
- IIIF Events

Thank you!

Jack Reed
Stanford Libraries
@mejackreed

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