Islandora Image Annotation Framework

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Our main use case
Starting with the goat, create an online anatomical atlas that can be integrated into the curriculum.
**Existing Image Annotation Frameworks**

- Text-Image Linking Environment (TILE)
  - [http://mith.umd.edu/tile/](http://mith.umd.edu/tile/)
- YUMA
- DM : Tools For Digital Annotation and Linking
  - [http://ada.drew.edu/dmproject/](http://ada.drew.edu/dmproject/)
- imageMAT - part of the MARGOT project
  - [http://mat.uwaterloo.ca/MAT/](http://mat.uwaterloo.ca/MAT/)
- SharedCanvas
  - [http://www.shared-canvas.org](http://www.shared-canvas.org)

**Islandora Image Annotation Components**

- Open Annotation Collaboration
- SharedCanvas
- Fedora
- Islandora
- Drupal
- Solr
Open Annotation Collaboration Data Model

An interoperable framework
• a web-centric method, promoting discovery and sharing of annotations
• associations between resources and annotations (body and target)
• content can be embedded within the annotation
• annotation of parts of a resource

http://www.openannotation.org/spec/core/

SharedCanvas

• SharedCanvas is a Distributed Canvas Rendered from Linked Data Annotations and extends the OA model
• The IIAF has simplified the data model to use only OA. But we still rely on javascript developed as part of the SharedCanvas project.

http://www.shared-canvas.org/
**Metadata**

- MODS is used to describe images
  - an Islandora XML Form customized for the project requirements.
- MADS is used to describe anatomical objects (muscles, vessels, bones, etc.)
  - We consider the anatomical objects 'authority' objects.
  - Islandora XML Forms for each type of anatomical part.

**Anatomy Annotations**

- Each Annotation is a separate Fedora Object
- RELS-EXT of each Annotation Object contains the relationship to an Image Object
- Annotation Objects can be related to more than one object (not implemented in the user interface yet)
- Annotation information is stored in an OAC datastream
Annotation RELS-EXT Datastream

```xml
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
    xmlns:fedora="info:fedora/fedora-system:def/relations-external#"
    xmlns:fedora-model="info:fedora/fedora-system:def/model#"
    xmlns:islandora="http://islandora.ca/ontology/relext#"/>
<rdf:Description rdf:about="info:fedora/vdp:518">
  <fedora-model:hasModel rdf:resource="info:fedora/islandora:OACCMModel"/>
  <fedora:isMemberOf rdf:resource="info:fedora/vdp:11"/>
  <islandora:targetedBy rdf:resource="info:fedora/vdp:11"/>
  <islandora:targets rdf:resource="info:fedora/vdp:11"/>
  <fedora:isAnnotationOf rdf:resource="info:fedora/vdp:11"/>
  <islandora:isAnnotationType rdf:resource="Muscles"/>
  <islandora:hasURN rdf:resource="urn:uuid:C5COFA88-A330-0001-C39A-29E8B1C11253"/>
  <islandora:strokeWidth rdf:resource="0.3"/>
</rdf:Description>
</rdf:RDF>

Fedora Data Model
Annotations’ Fedora Relationships
OAC Datastream XML

OAC Annotation Datastream
Image Annotation Module

- Using forked version of SharedCanvas' javascript to render annotations
- Can be configured to work with other Islandora content models/solution packs (eg. large_image, book or newspaper.) ... how? DS-COMPOSITE-MODEL mimetypes?
- Other modules do not need to be aware of the Image Annotation module
- Should also work with future image type solution packs

Drupal Taxonomies

- The module can be configured to use Drupal taxonomies to limit annotation types to certain terms
- These types are stored with the OAC annotation as dc:type element
- If configured these types can also be used in Solr queries to implement a dropdown or type ahead for annotation titles (via a solr query)
Annotation Admin Options - Content Models and Anno. Categories

**Configure Content Models**

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<thead>
<tr>
<th>Enable Annotating</th>
<th>CONTENT MODEL</th>
<th>PID</th>
<th>OSO</th>
<th>Taxonomy</th>
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<tbody>
<tr>
<td>☑</td>
<td>Islandora basic image content model</td>
<td>islandora.basic.image</td>
<td>ONU</td>
<td>[One Anatomy]</td>
</tr>
<tr>
<td>☐</td>
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<td>islandora.bookModel</td>
<td>TN</td>
<td>[name]</td>
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<tr>
<td>☐</td>
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<td>islandora.newspaperModel</td>
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<tr>
<td>☐</td>
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<tr>
<td>☐</td>
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<tr>
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<td>Islandora Page Content Model</td>
<td>islandora.pageModel</td>
<td>ONU</td>
<td>[name]</td>
</tr>
</tbody>
</table>

Allow annotation of objects associated with these content models.

**Annotation Categories**

- **User-defined**
- **Administrator-defined**

Allows administrators to select predefined taxonomies to determine annotation categorization terminology.

**Annotation Type Search Field**

If Annotation Categories is set to User Defined and you want to do auto complete enter a solr field, this field's contents will be used to populate the auto-complete.

Annotation Admin Options - Colors, Stroke Widths, Titles

**Annotation Colors**

- **User-defined** (user selects when creating annotation)
- **Optimized** (colors are selected randomly, recommended for overlapping annotations)

**Annotation Stroke Widths for dropdown**

The width of the lines to use when drawing the annotations. Must be a number, can include a decimal. For instance .5 is valid. You can enter several values here separated by a space.

**Controlled Vocabulary for Titles**

- **Use a Controlled Vocabulary for Annotation Titles**

If checked you must configure a Solr Field to retrieve the titles from.

**Annotation Title Search Field**

This must be a single valued solr field.
Searching and Indexing

- Each annotation object OAC datastream is indexed in Solr
- This allows searching annotation data and also allows data stored in Solr to be used in dropdowns and type ahead form fields.
- Custom search results to link to parent objects instead of annotations
- We also index the MADS and MODS datastreams

Search

Keyword search annotations only - primary access point for students.

Advanced Search used by site admins to search across entire repository.
Search Results

List of annotations matching our query 'origin'. The Islandora Solr module allows us to add/remove display fields.

Search results are customized so annotation type objects link back to the parent image.

Annotation Editing Interface

Existing annotations displayed based on type/category.

Shape tools

Type of Anno.

Stroke Width

Titles (configured to auto populate based on type selected.)

Formatting tools for annotation body and the annotation itself (auto populated in this case.)
Other Use Cases: Digital Humanities

Other Use Cases: Newspapers
Other Use Cases: Manuscript Maps

Other Use Cases: Compound Objects
Next Steps

• Integrate with Islandora OpenSeadragon Zoomable Viewer
• Enhance OAC annotations
  o Add dc:creator to annotation
  o Add dc:format to oa:hasBody (originally we only supported text but now we have HTML as well)
• Explore and integrate ontologies
• Code: https://github.com/roblib/islandora_image_annotation