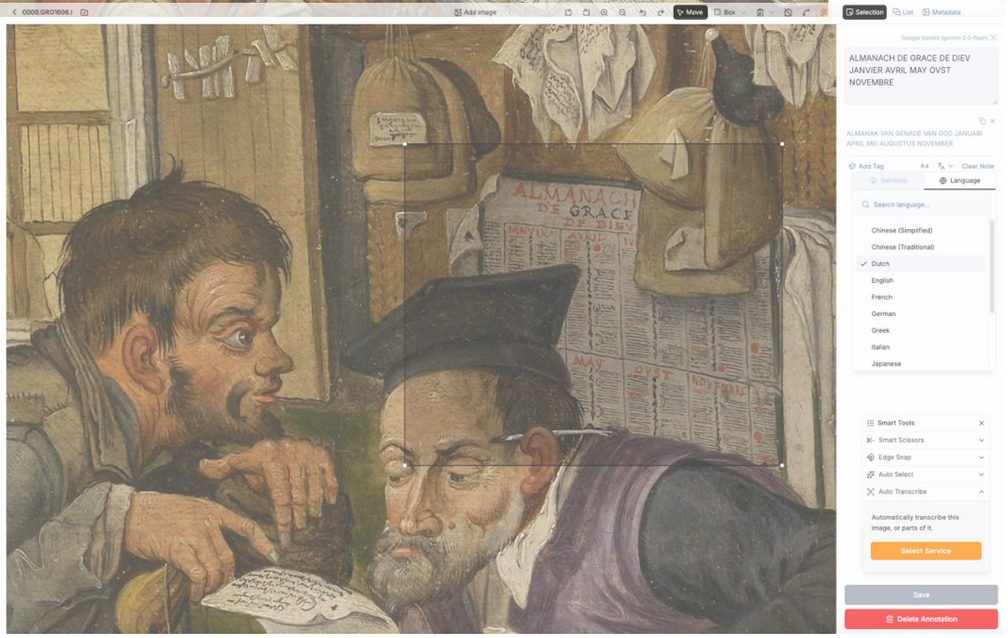
Annotating and Transcribing

IIIF Images

WITH IMMARKUS

Hilde De Weerdt, Rainer Simon, Sunkyu Lee, and Dawn Zhuang

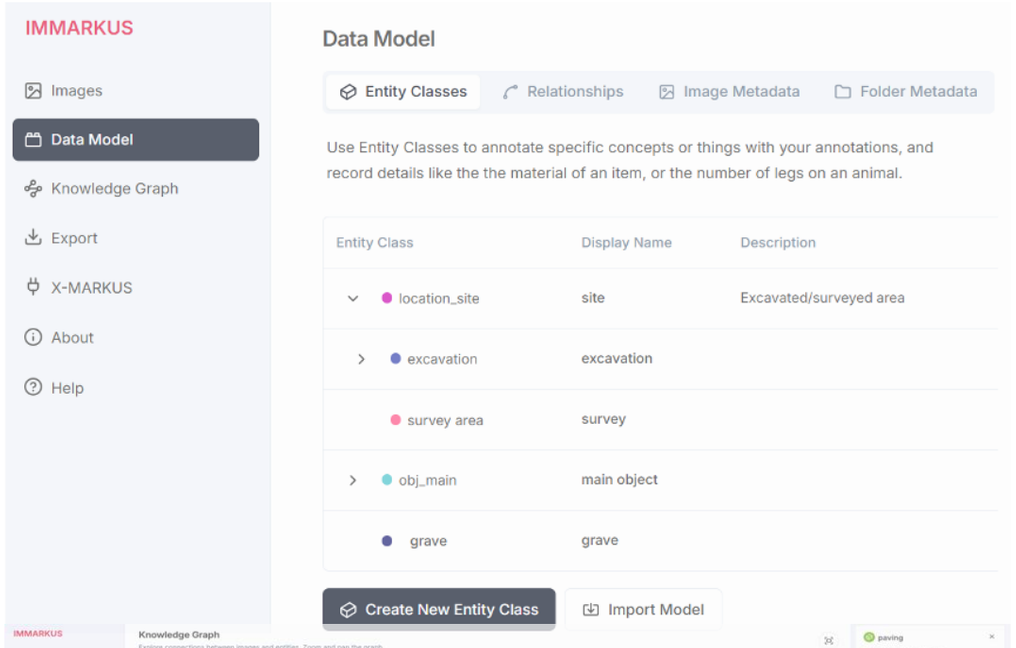
https://www.infrastructurelives.eu/

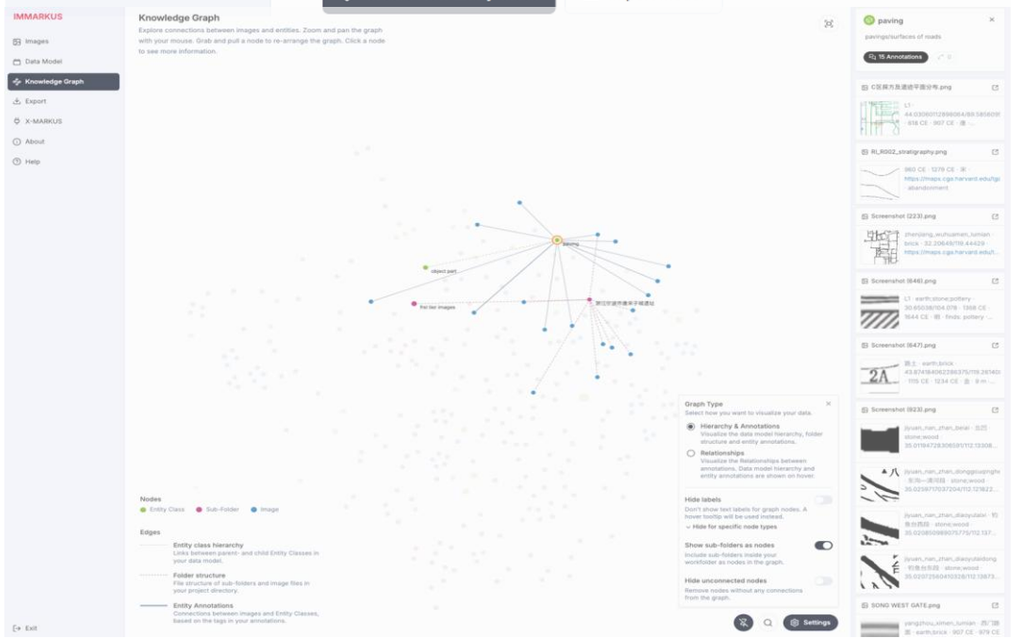


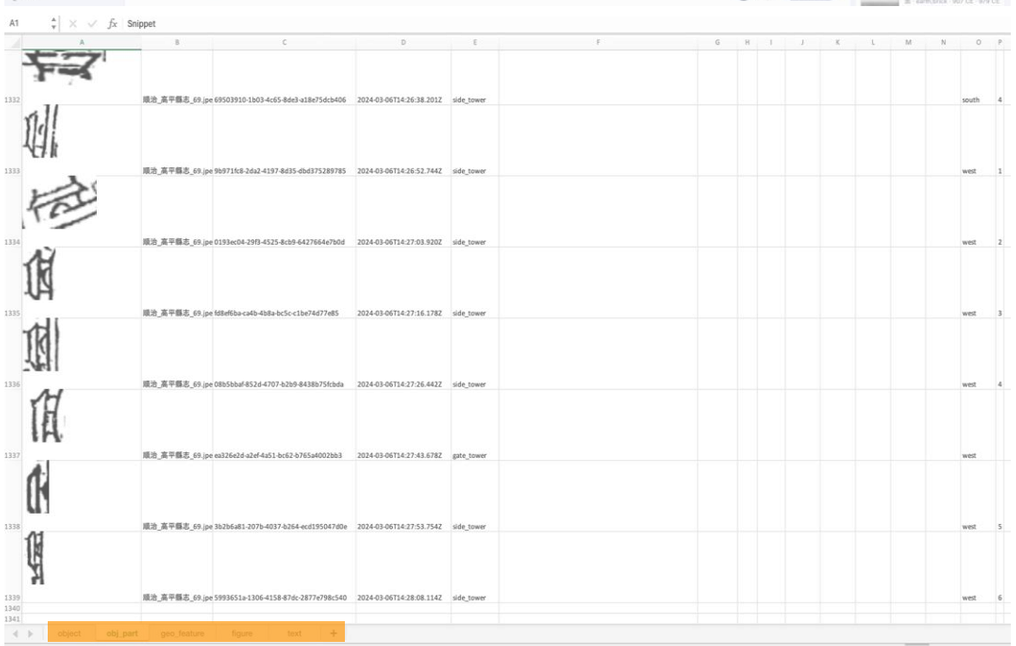
1. Collecting Images
(How and which IIIF manifests can I import?)

2. Annotating Images
(what methods and AI models can I use for annotating image regions

and for transcribing text in images?)







3. What is a data model?

(should I use data models; how?)

4. Visualising annotations

(what is knowledge graph and how do I use it for exploring annotation data?)

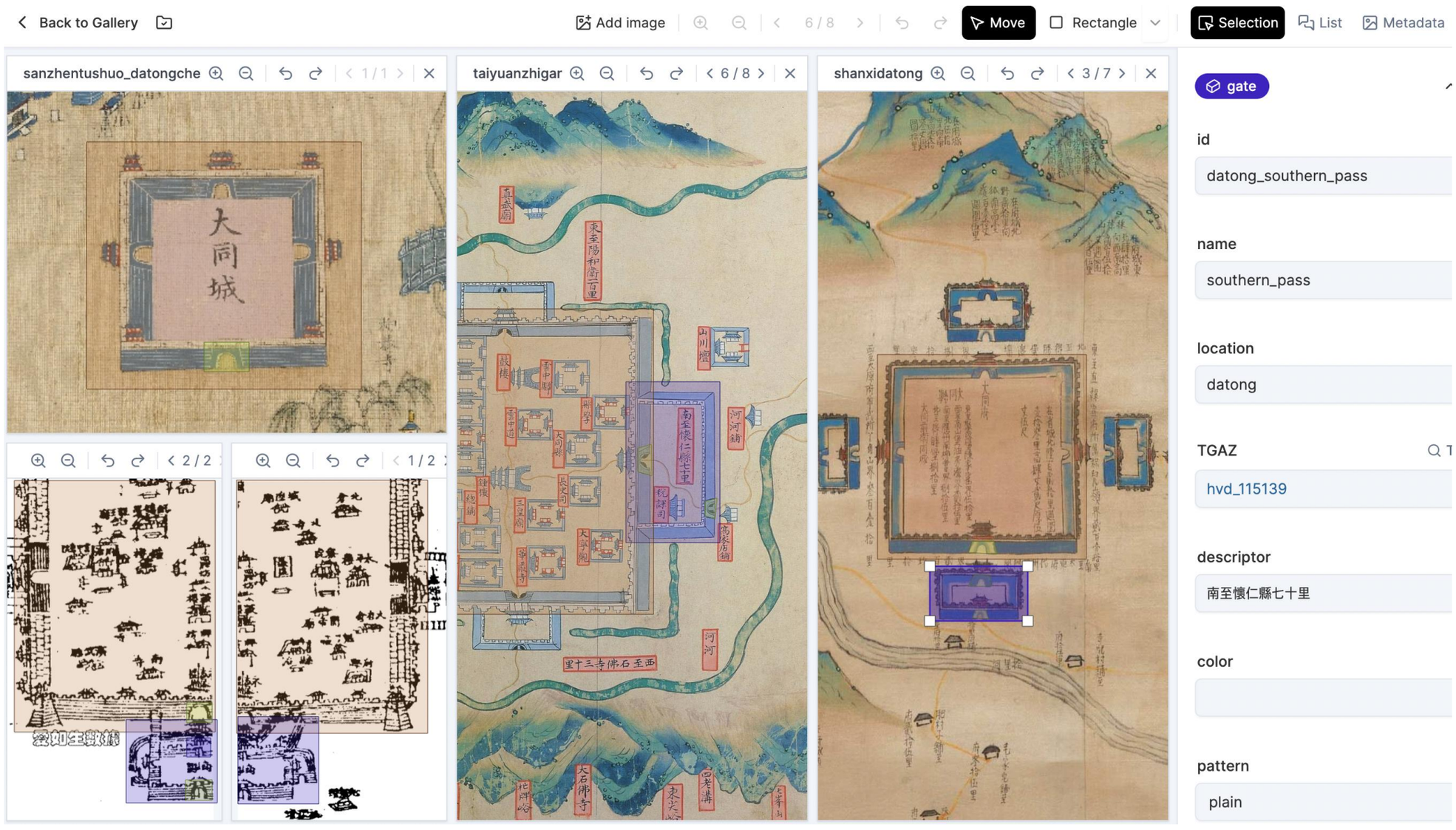
5. Exporting annotations and models

(what other kinds of analysis can I do with image annotations?)

Timeline

4:00-4:40	Introduction
	Collecting (IIIF) Images
	Annotating Images
	Transcribing Text from Images
4:40-5:00	Questions and Break
5:00-5:40	Annotation Data Models
	Metadata Models
	Visualising and Querying Annotations in Knowledge Graph
	Exporting Annotations
5:40-6:00	Discussion and Questions

IMMARKUS



Hilde De Weerdt, Rainer Simon, Lee Sunkyu, Iva Stojević, Dawn Zhuang, Meret Meister, and Xi Wangzhi. IMMARKUS: Image Annotation in X-MARKUS. 2024-. immarkus.xmarkus.org

IMMARKUS wiki

05 Annotating Images

fonziedw edited this page 4 days ago · 105 revisions

To add annotations to your images, click the subfolder containing the images you want to work with in the image gallery. This will open the images in the folder, and you can start annotating.

Overview

The following functionalities are available in the annotation mode (numbers correspond to those in **Figure 1**)

1. Add an image
2. Browse the images in the same subfolder / click arrows to display the previous or next image
3. Rotate image 90° to the left or to the right
4. Zoom in or zoom out of an image
5. Undo/redo
6. Move (pan) across the image
7. Draw a shape (select box, polygon, ellipse, or path)
8. Copy image snippet (exact shape or bounding box) to clipboard
9. Hide annotations
10. Add relation between two entities
11. Smart tools for selecting irregular shapes or automatically transcribing an image (or parts of it) with AI models
12. See details of the currently selected annotation
13. List your annotations
14. Add or edit individual image metadata

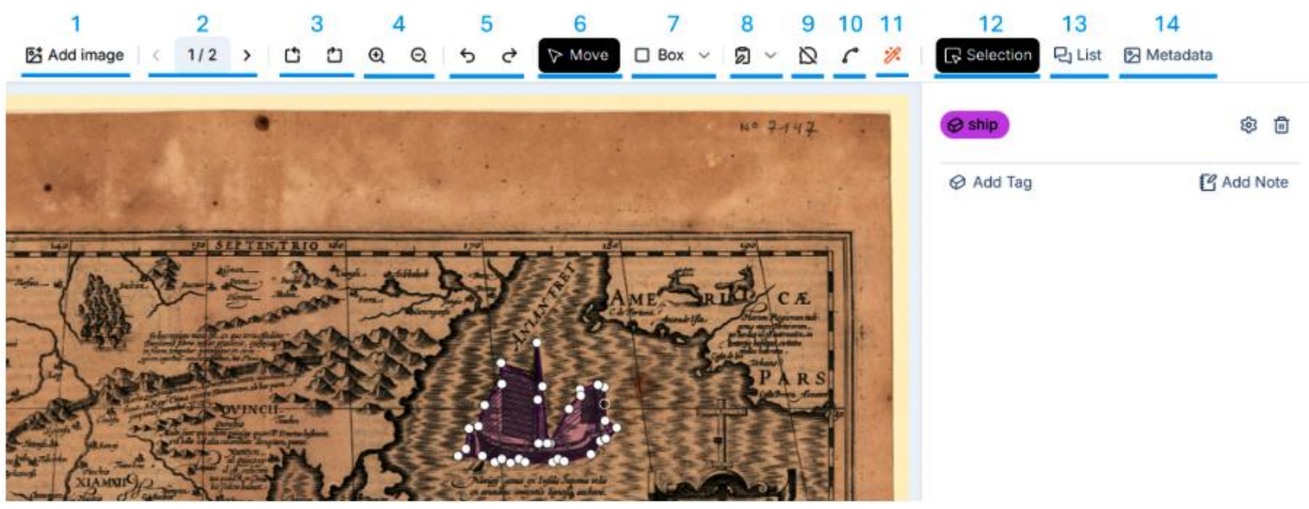


Figure 1. Workspace in Annotation Mode

Clone this wiki locally

https://github.com/rsimon/immarku

Hilde De Weerdt, Rainer Simon, Dawn Zhuang, Lee Sunkyu, and Iva Stojević. Image Annotation in IMMARKUS Wiki. 2024-. github.com/rsimon/immarkus/wiki

Recommended reading:

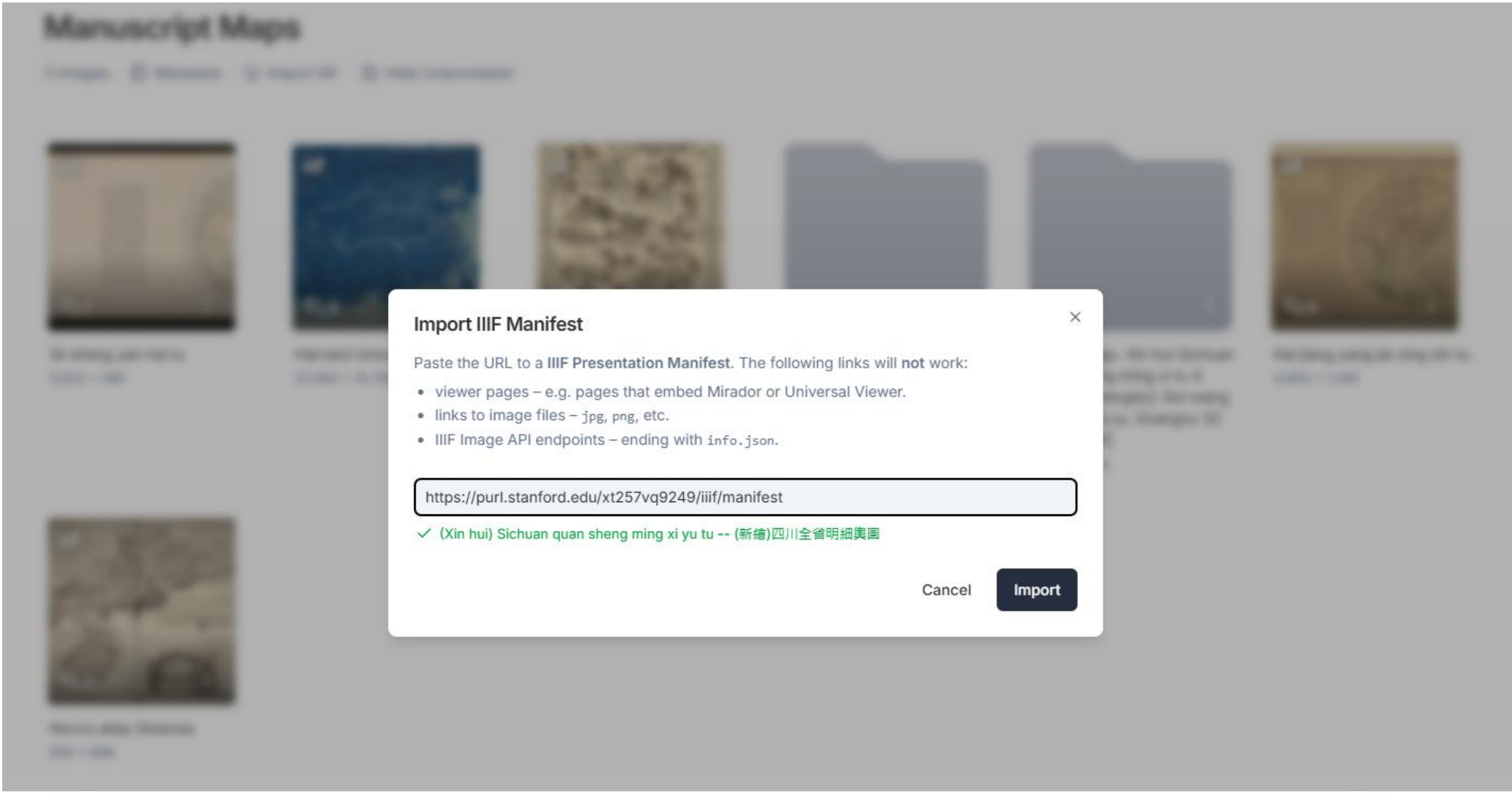
- De Weerdt Hilde. “Creating, Linking, and Analyzing Chinese and Korean Datasets: Digital Text Annotation in MARKUS and COMPARATIVUS,” *Journal of Chinese History* 4.2 (2020): 519-527. https://doi.org/10.1017/jch.2020.23

- De Weerdt, Hilde, Brent Ho, Rainer Simon, Lee Sunkyu, Sander Molenaar, Xi Wangzhi, Dawn Zhuang, Iva Stojević, Tu Hsieh-Chang, Taylor Zaneri, Lin Nung-yao, and Meret Meister. “**Contextual Semantic Text and Image Annotation in the MARKUS Environment**.” *Digital Humanities Quarterly* 19.4 (2025). https://dhq.digitalhumanities.org/vol/19/4/000808/000808.html

On Image Annotation: Uses

- to analyze “large” image corpora by user-defined properties, relations between properties, and metadata
- to allow for linking to external “authorities” (e.g., geo-referencing)
- to transcribe and translate text in images of manuscripts, paintings, printed books, maps, objects, graphs and diagrams, etc.
- to compare transcriptions and translations, edit, *and save them for later use*
- to link text and image sources of different kinds and use them jointly in historical analysis and interpretation
- other uses: create training data for text and image recognition, etc.
- creative uses: logs with images and snippets

1. Collecting (IIIF) Images

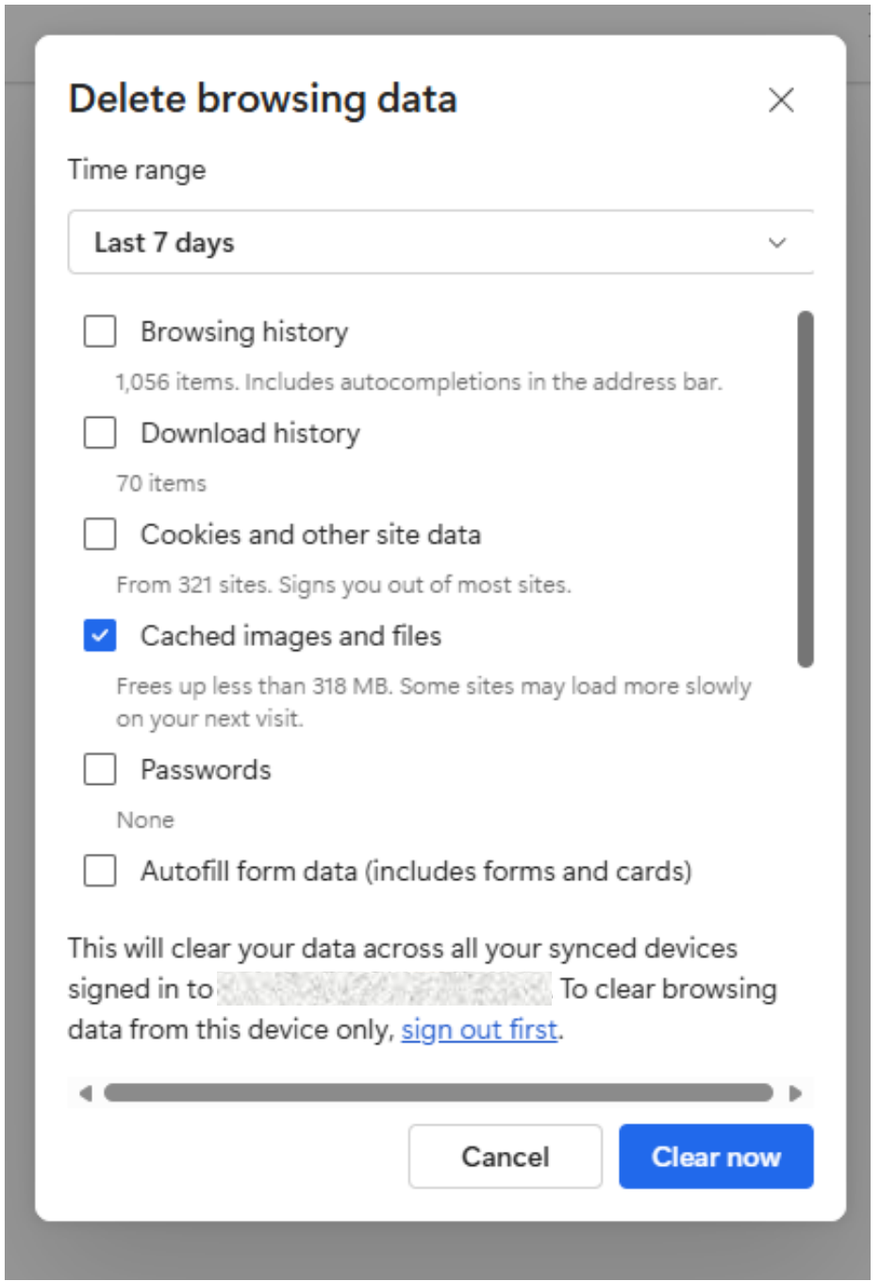


Before We Start

1. Open your browser and clear your browser cache

- On **Chrome** : Go to ⋮ > **Settings** > **Privacy and security** > **Delete browsing data** → Select **Cached images and files** > Click **Delete data** , then restart the browser

- On **Edge** : Go to ··· > **Settings** > **Privacy and security** > **Clear browsing data** → Select **Cached images and files** > Click **Clear now**, then restart the browser



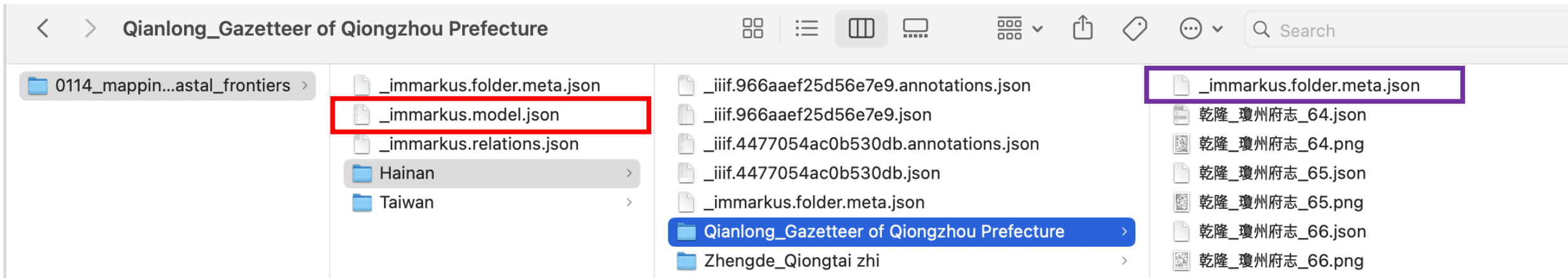
Before We Start

2. Prepare a folder on your computer

- Create an **(empty) folder** even if you plan to use only IIIF images

- This folder may also contain **locally saved image files (.jpeg or .png)** if you use both IIIF and local images

- In case you use locally saved images, you may organize images into **one or more subfolders** based on shared features (e.g. same publication)



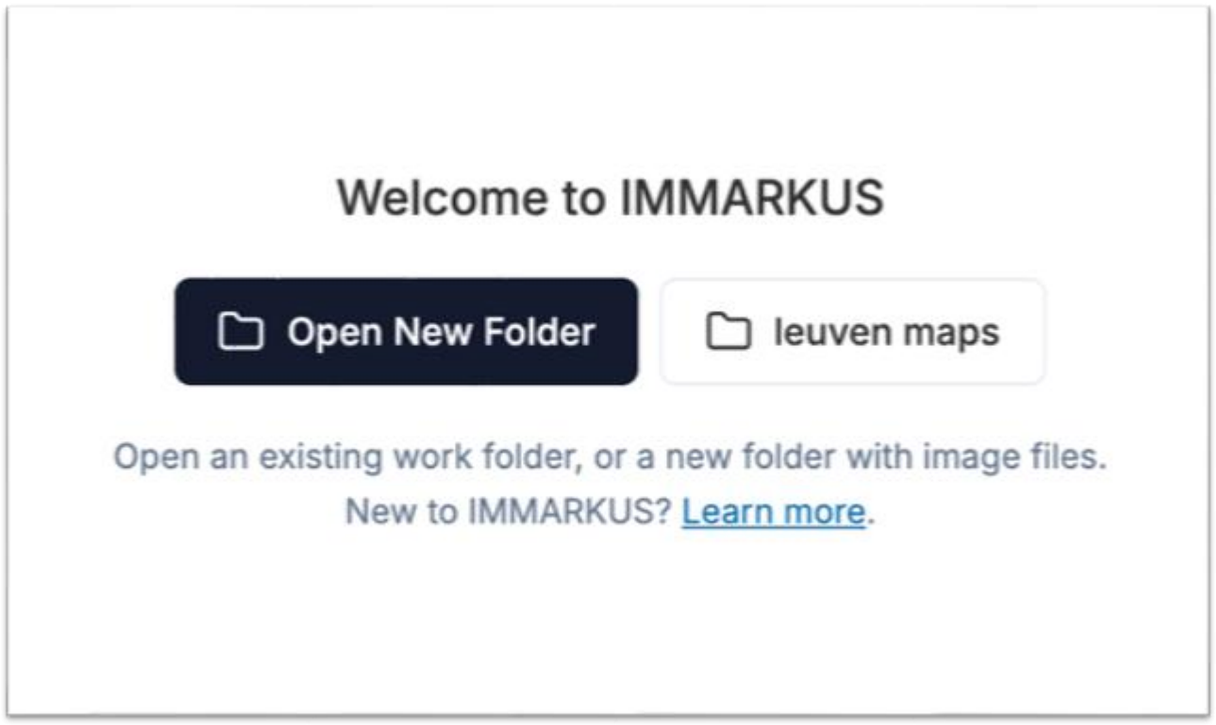
Importing a Folder

1. Go to **IMMARKUS** immarkus.xmarkus.org

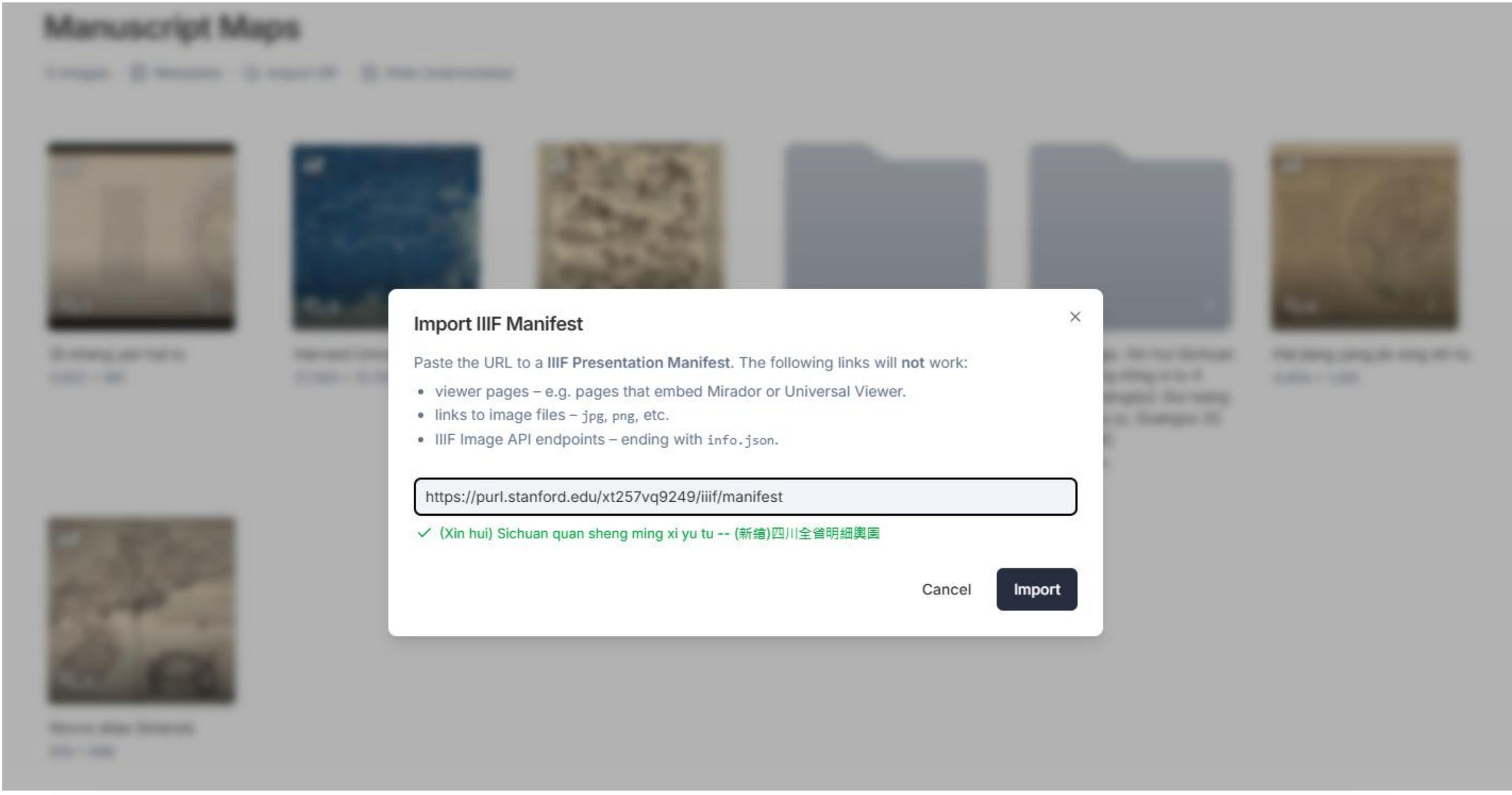
   - Use Chrome or Edge

2. Click **Open New Folder** and select your image folder

3. Click **Edit Files** to allow IMMARKUS to edit the files

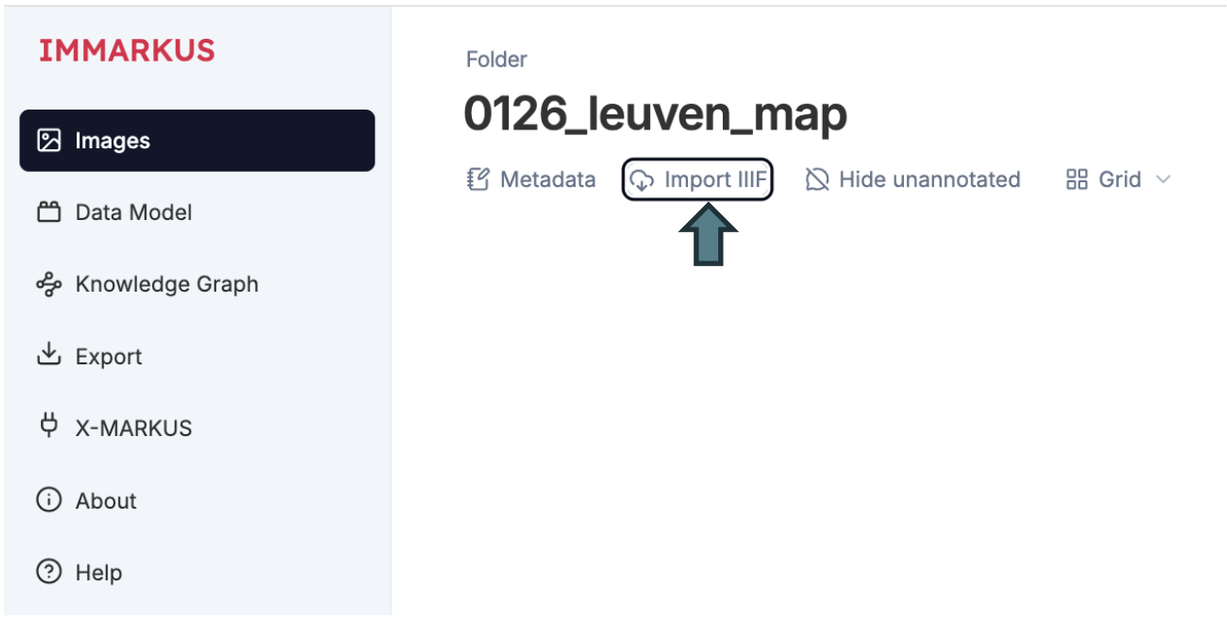


Importing IIIF URLs



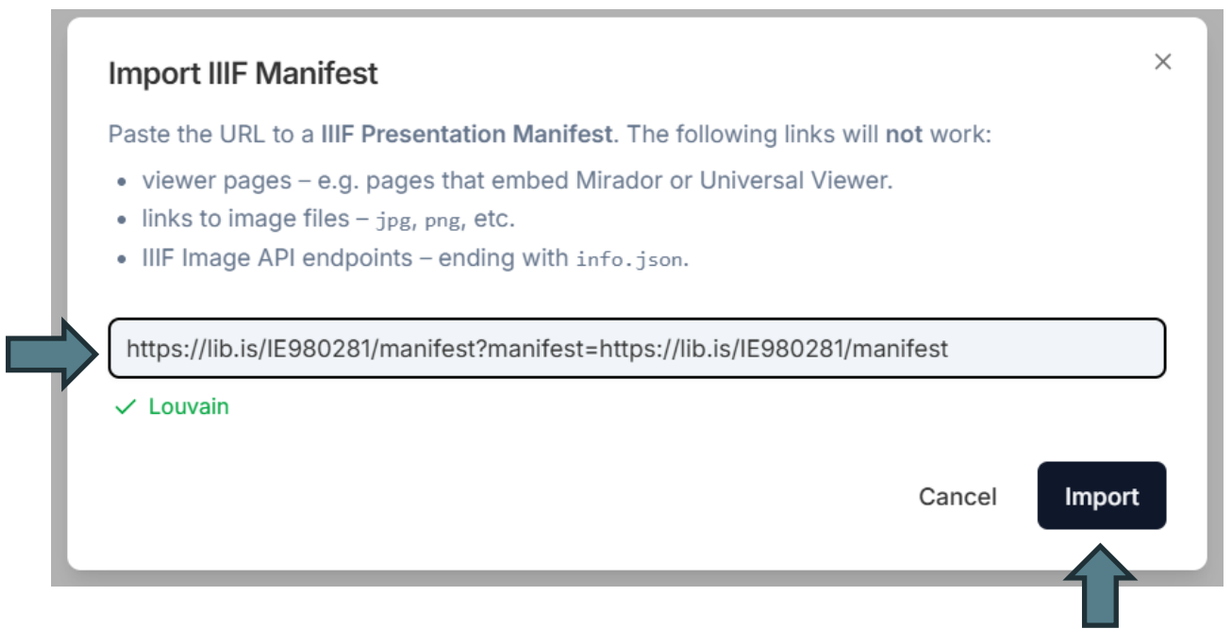
Importing IIIF URLs

1. Click **Import IIIF**



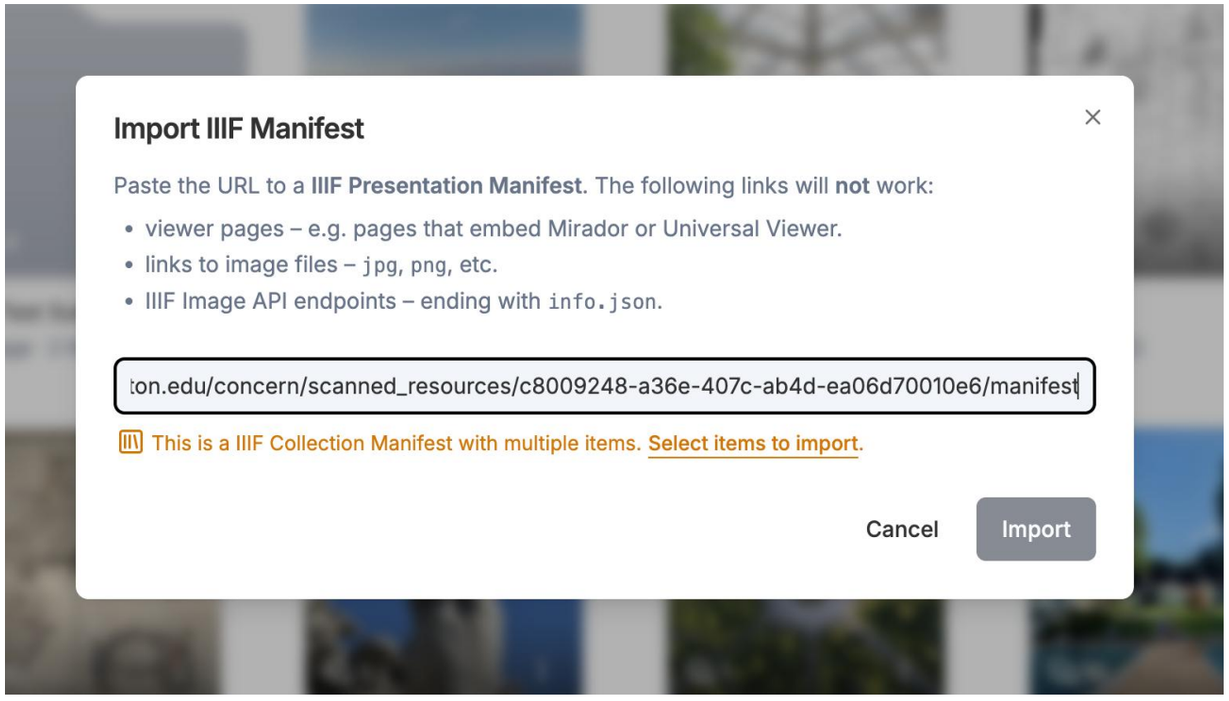
2. Paste the URL to the dialogue box

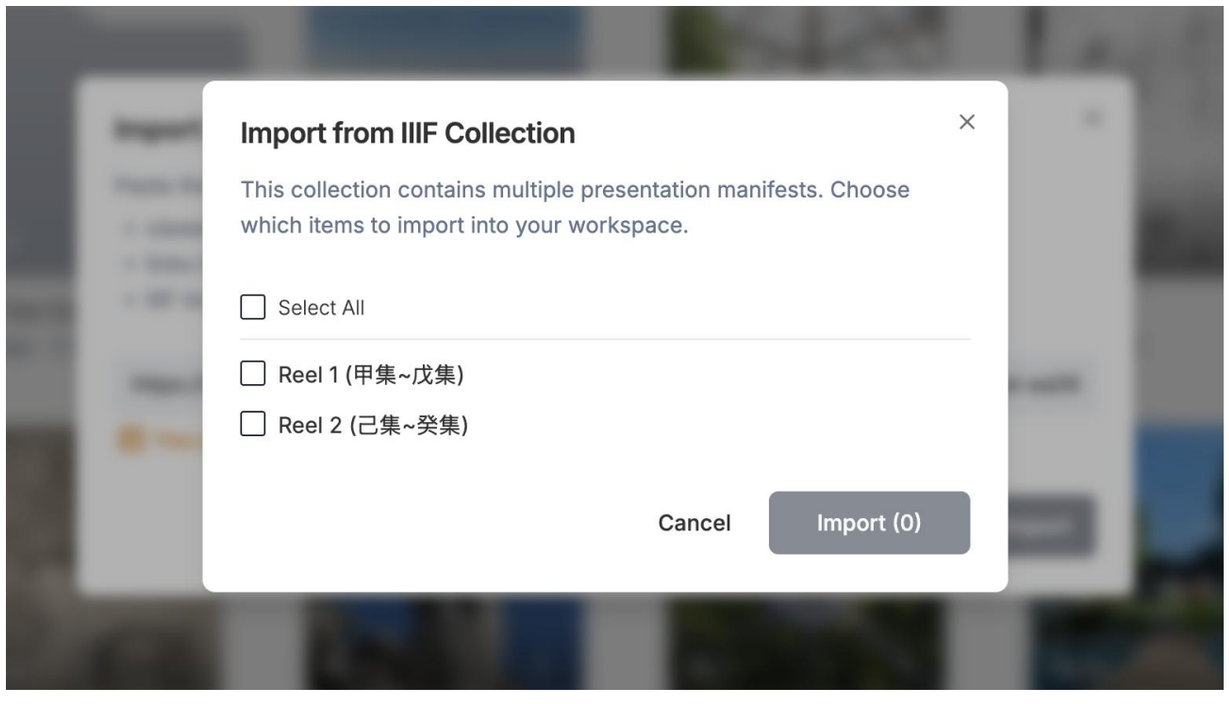
3. Click **Import**



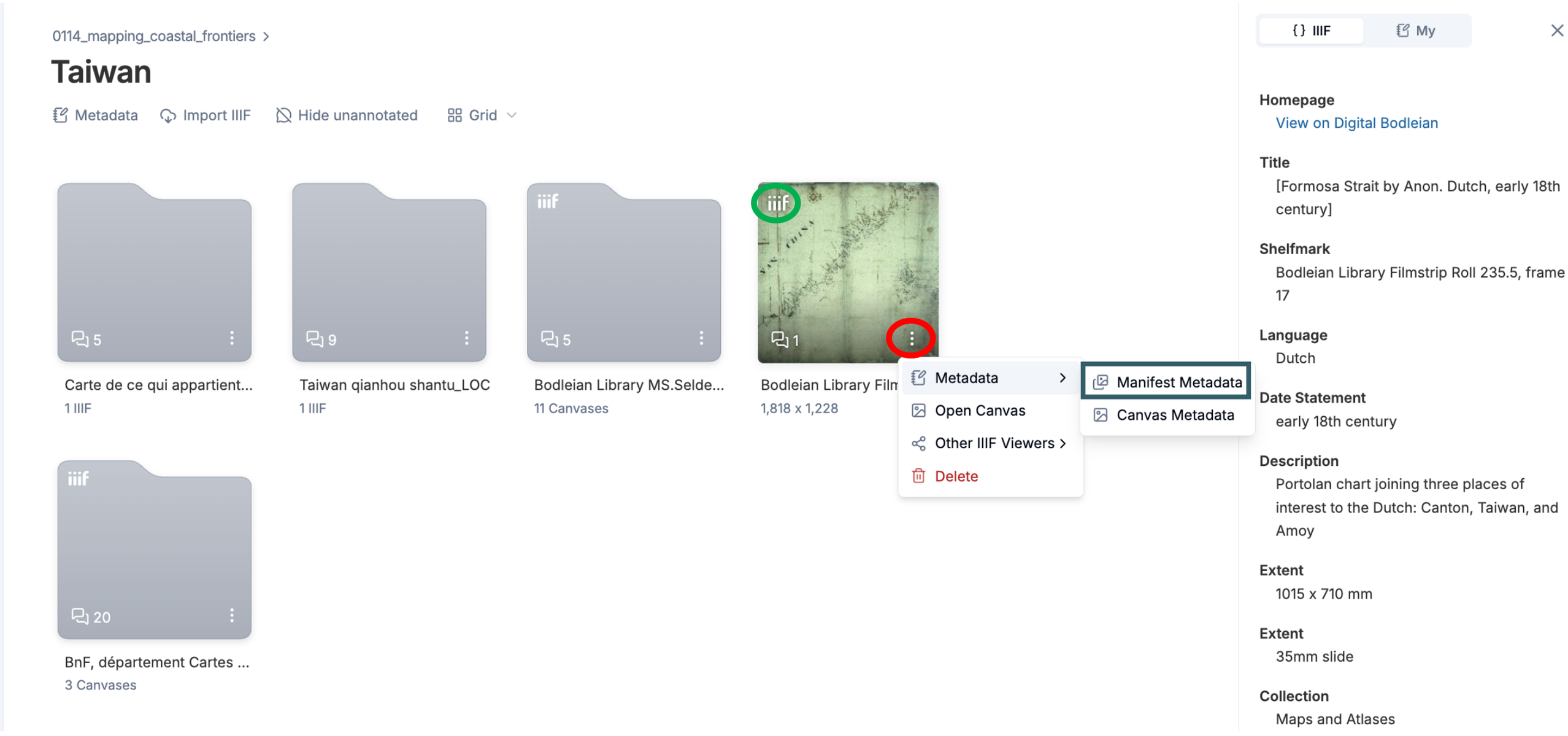
Supported Manifest Types

1. Presentation API 2 & 3
2. Collection manifests
3. Full support for simple image and Level 0 (!)
4. But **NOT** Image API directly (info.json URLs)

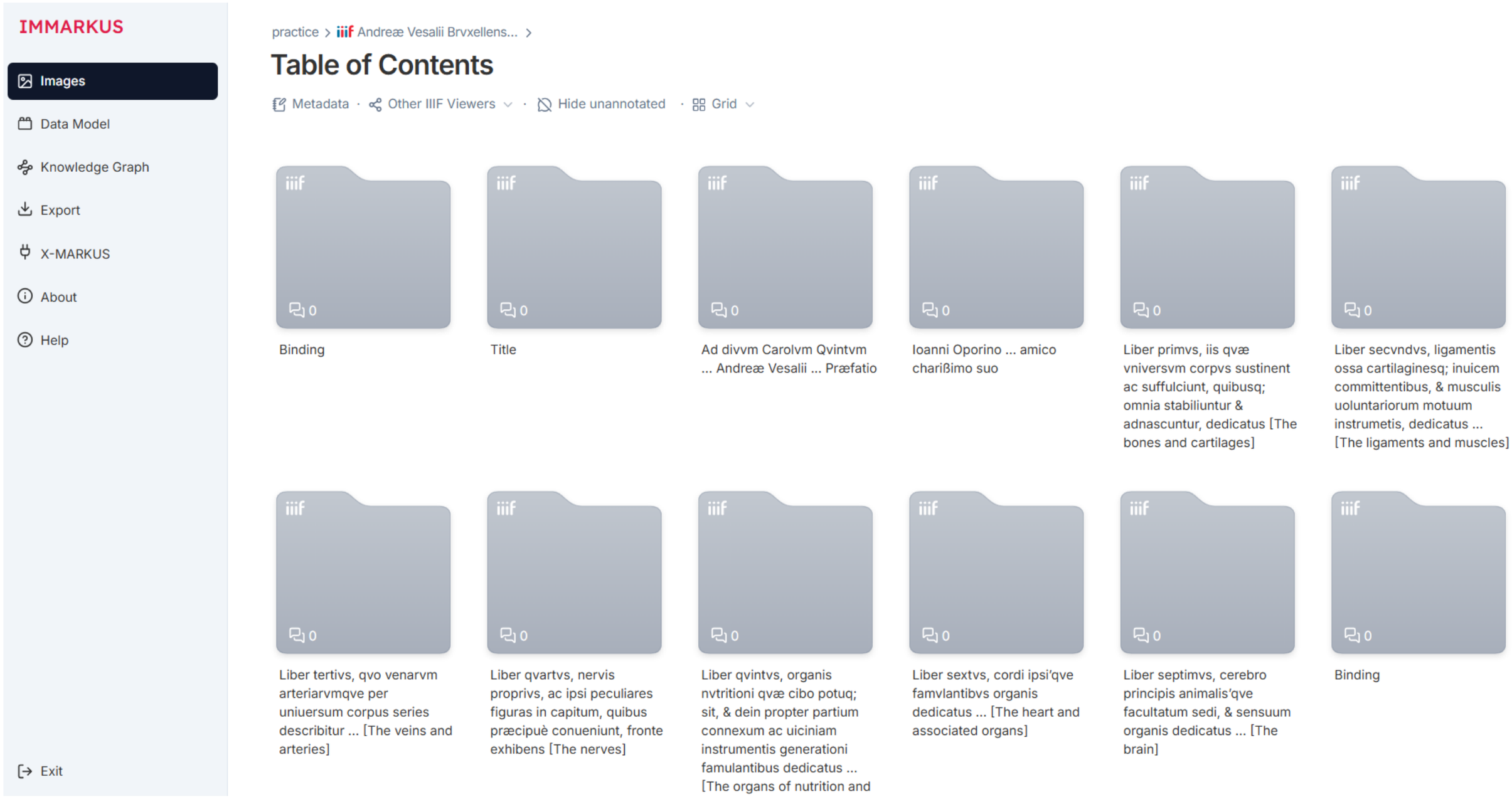




Importing IIIF URLs

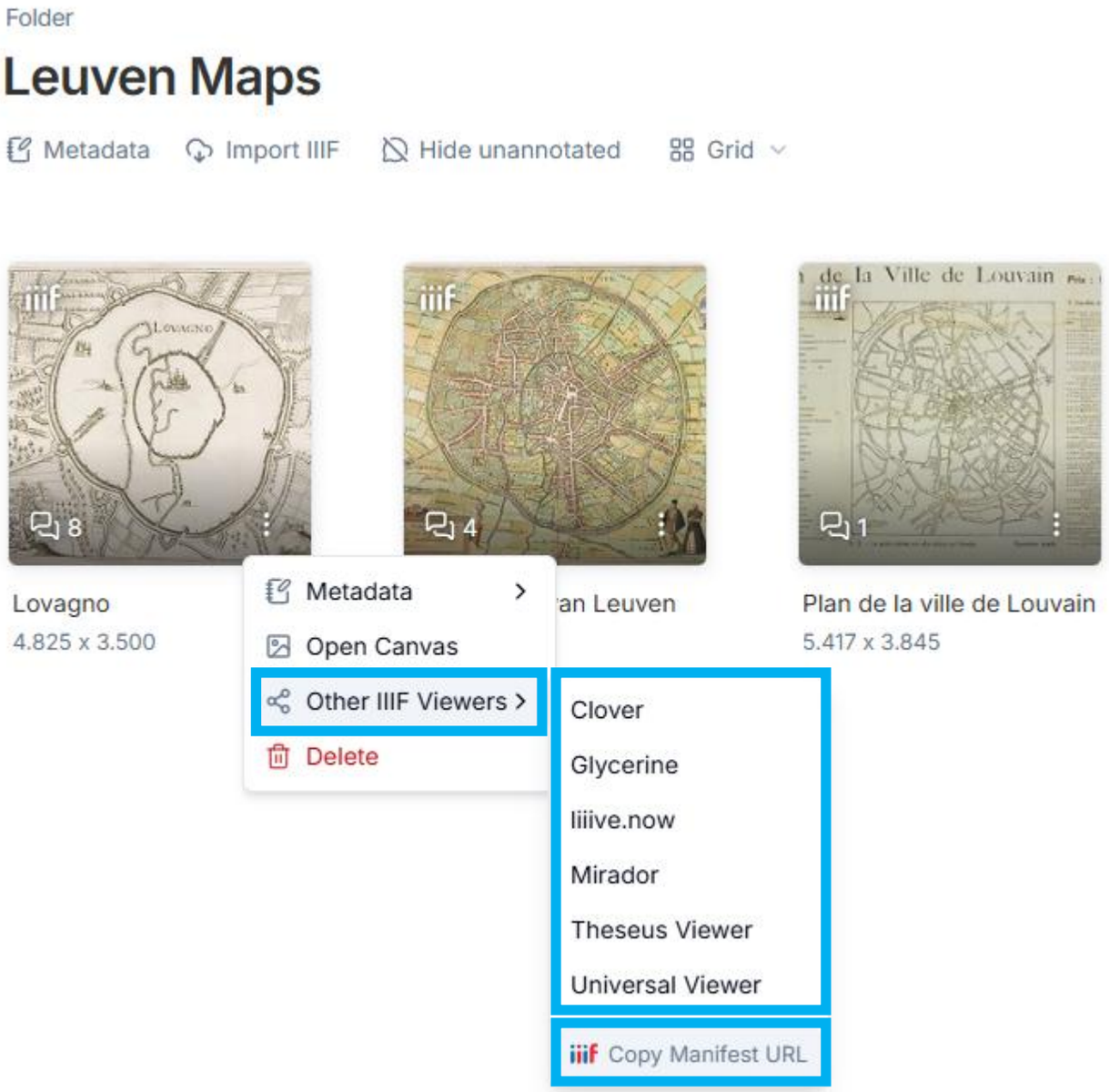


Importing IIIF URLs



Tip

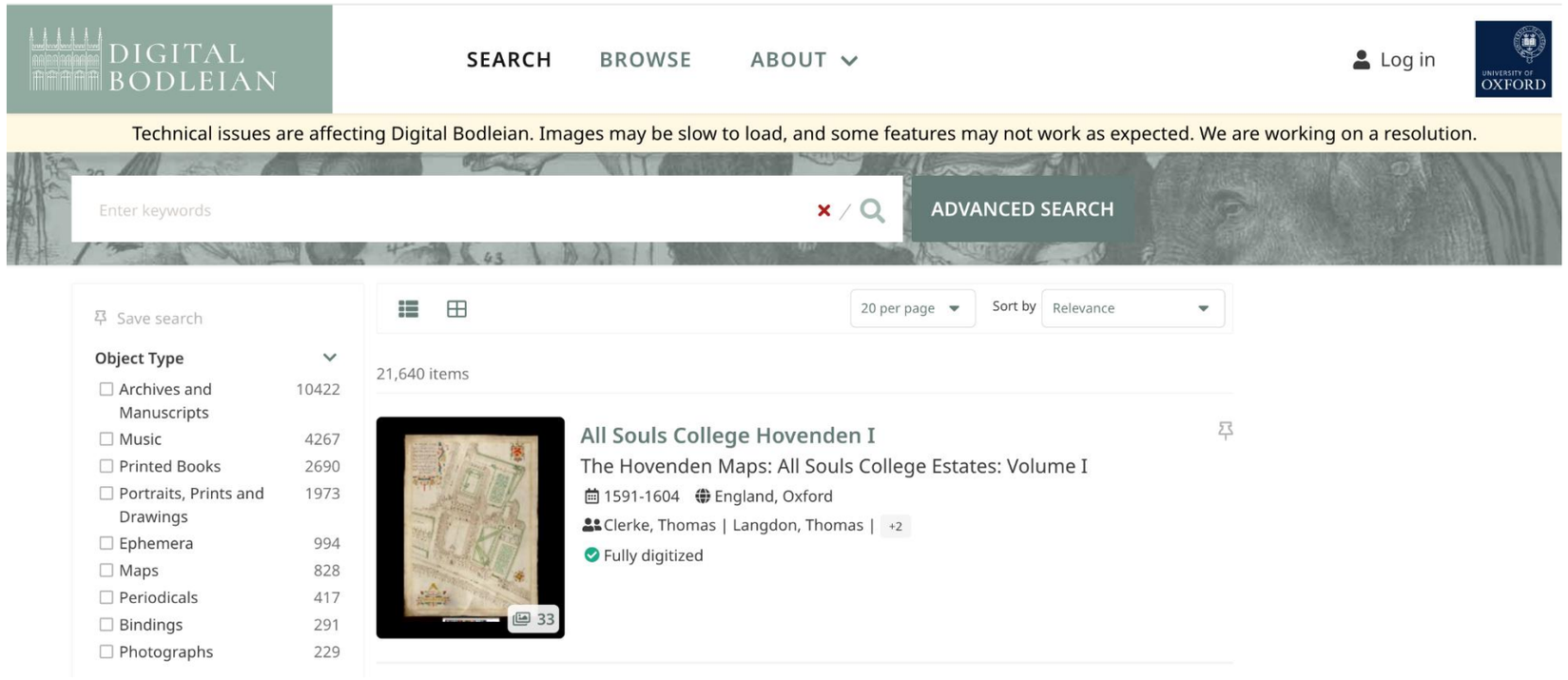
You can also open an imported IIIF manifest in other viewers or copy its manifest URL to validate it and compare its rendering across platforms



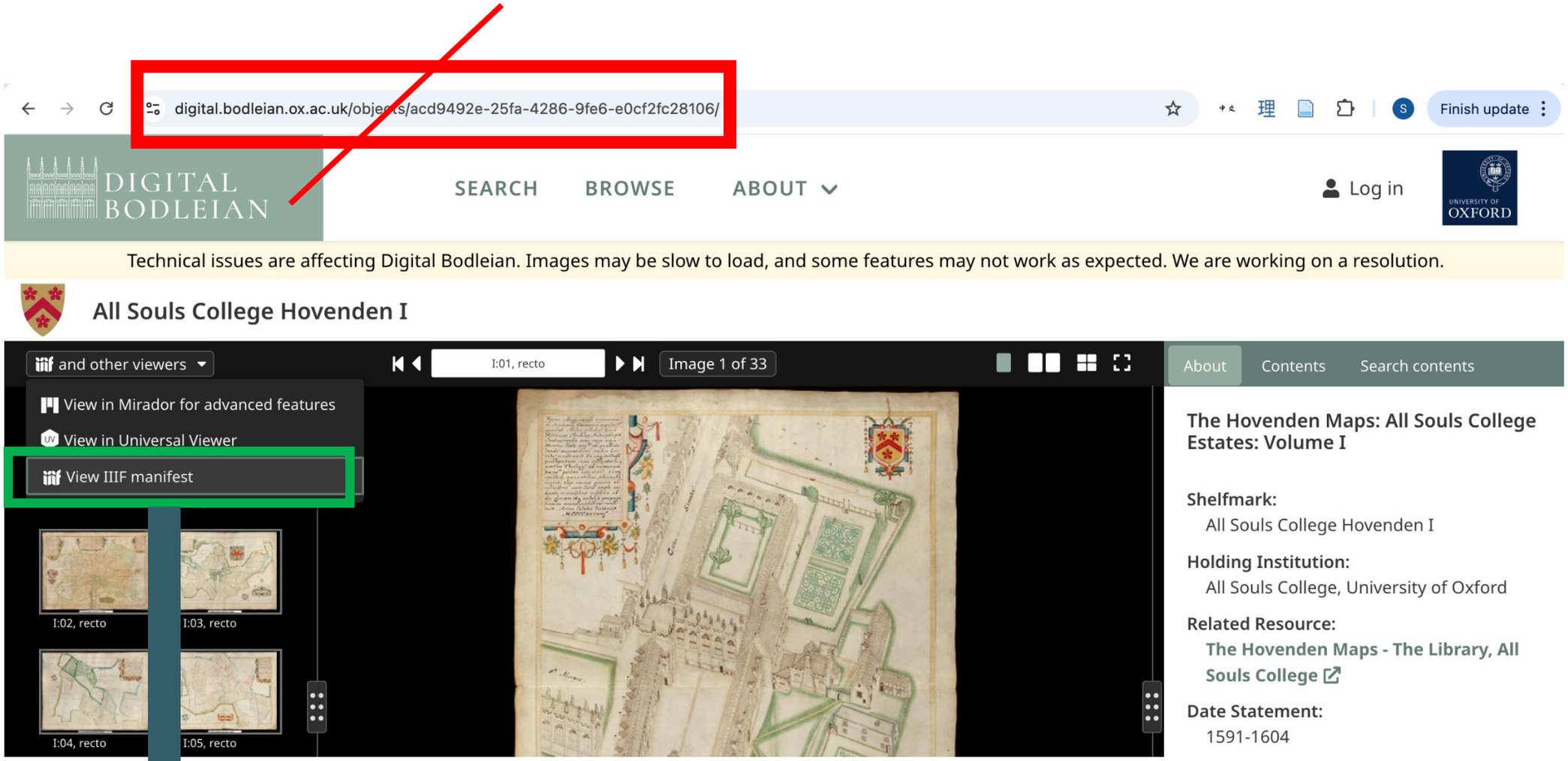
Practice 1: Importing IIIF URLs

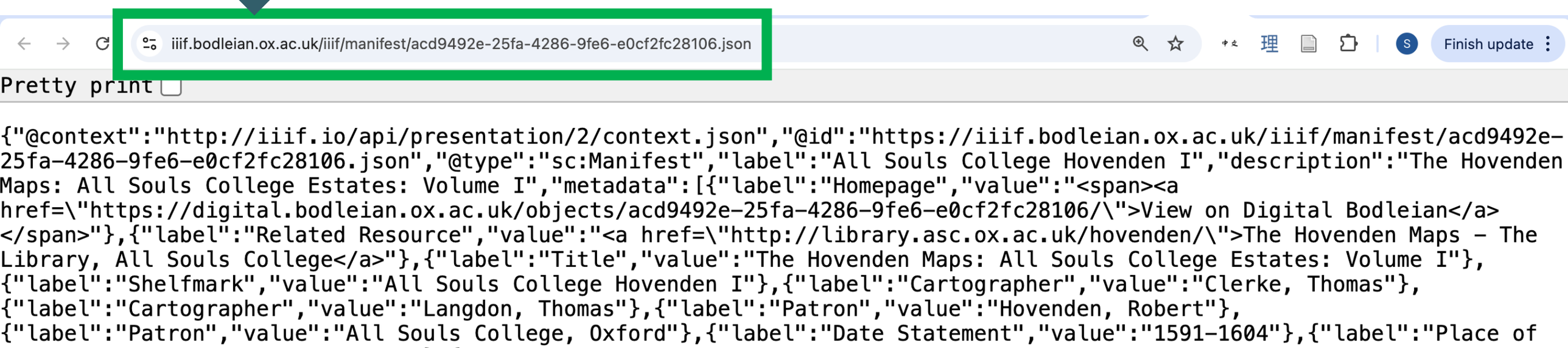
- If you already have a IIIF URL you would like to work with, please copy and paste it into the chat so we can see what you plan to use (and troubleshoot if needed)

- If you do not yet have a IIIF URL, please visit **the digital collections of the Bodleian Libraries**, locate one or more IIIF resources, and import them into IMMARKUS
https://digital.bodleian.ox.ac.uk/search/



- Find and Paste a IIIF URL: ending with /manifest or /manifest.json

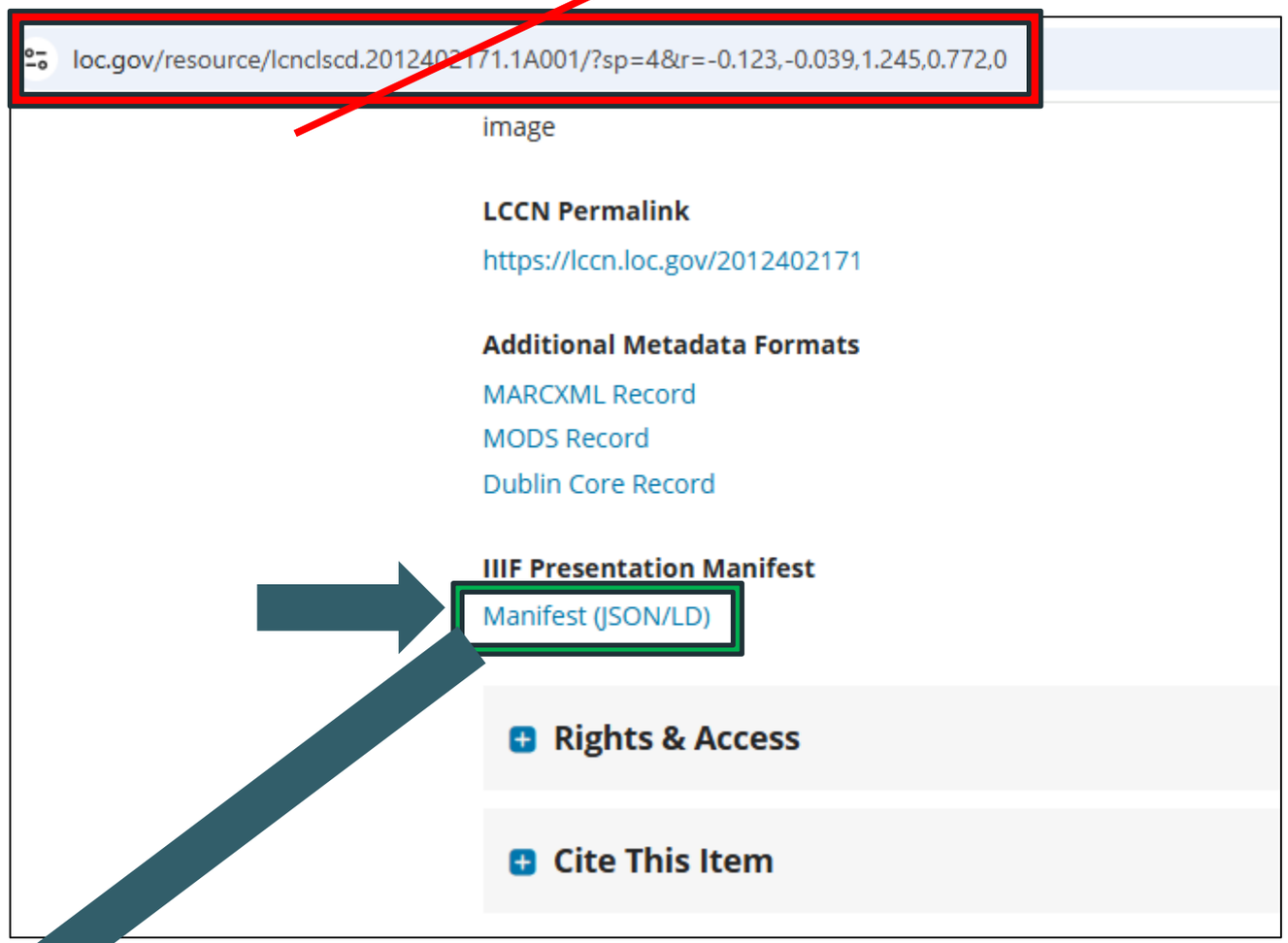


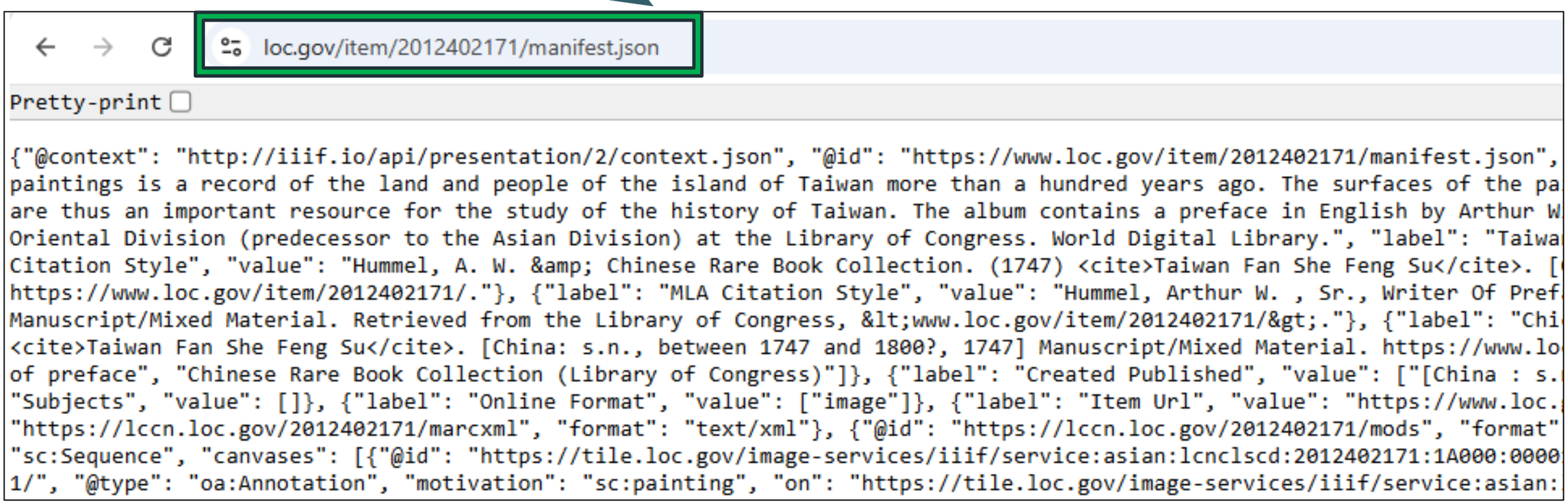


{"@context":"http://iiif.io/api/presentation/2/context.json","@id":"https://iiif.bodleian.ox.ac.uk/iiif/manifest/acd9492e-25fa-4286-9fe6-e0cf2fc28106.json","@type":"sc:Manifest","label":"All Souls College Hovenden I","description":"The Hovenden Maps: All Souls College Estates: Volume I","metadata":[{"label":"Homepage","value":"View on Digital Bodleian"},{"label":"Related Resource","value":"The Hovenden Maps - The Library, All Souls College"},{"label":"Title","value":"The Hovenden Maps: All Souls College Estates: Volume I"},{"label":"Shelfmark","value":"All Souls College Hovenden I"},{"label":"Cartographer","value":"Clerke, Thomas"},{"label":"Cartographer","value":"Langdon, Thomas"},{"label":"Patron","value":"Hovenden, Robert"},{"label":"Patron","value":"All Souls College, Oxford"},{"label":"Date Statement","value":"1591-1604"},{"label":"Place of Origin","value":"England, Oxford"},{"label":"Description","value":"Estate maps of All Souls College, commissioned by

Library of Congress

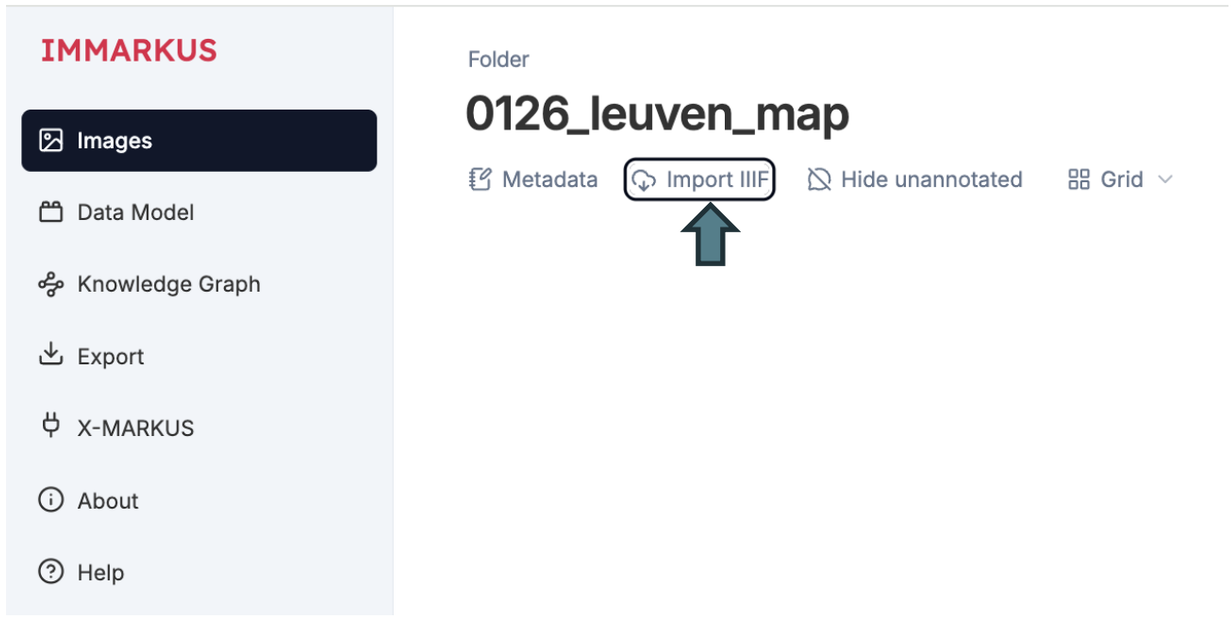
- IIIF manifests usually have in their URL structure: /manifest or /manifest.json
- Go to IMMARKUS Wiki for more tips

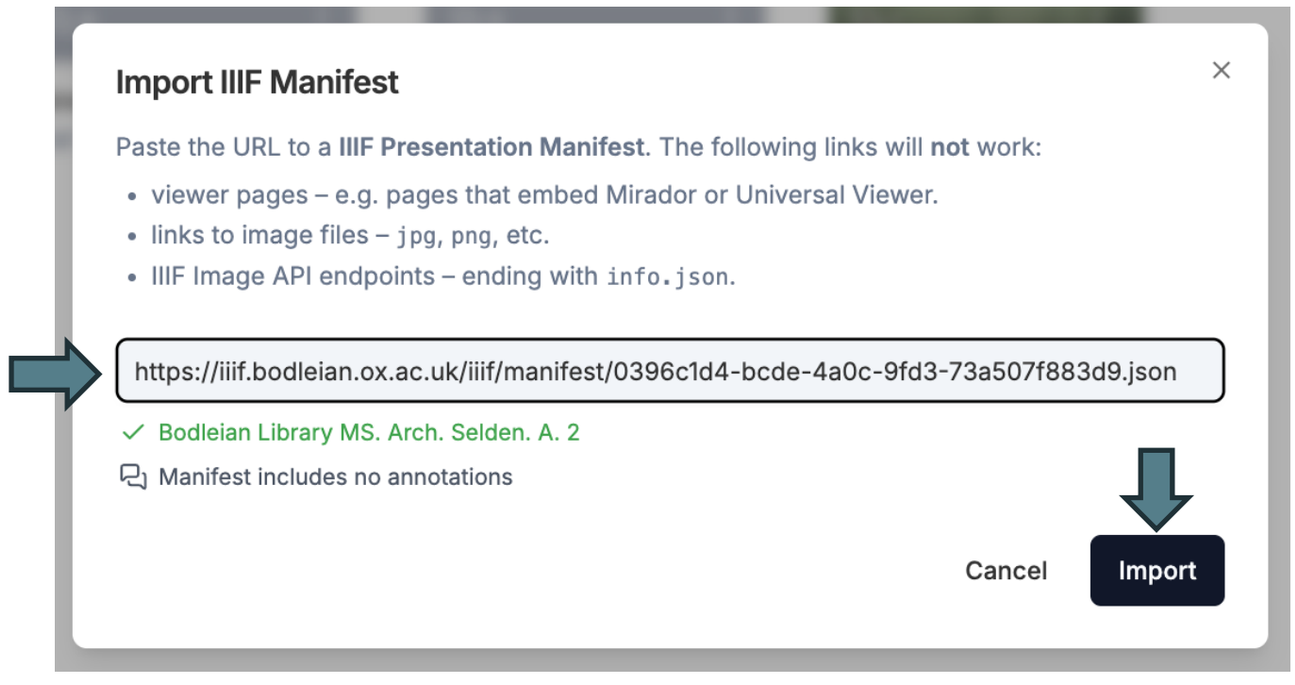




Importing IIIF URLs

1. Click **Import IIIF**
2. Paste the URL into the dialogue box
3. Click **Import**





2. Annotating Images

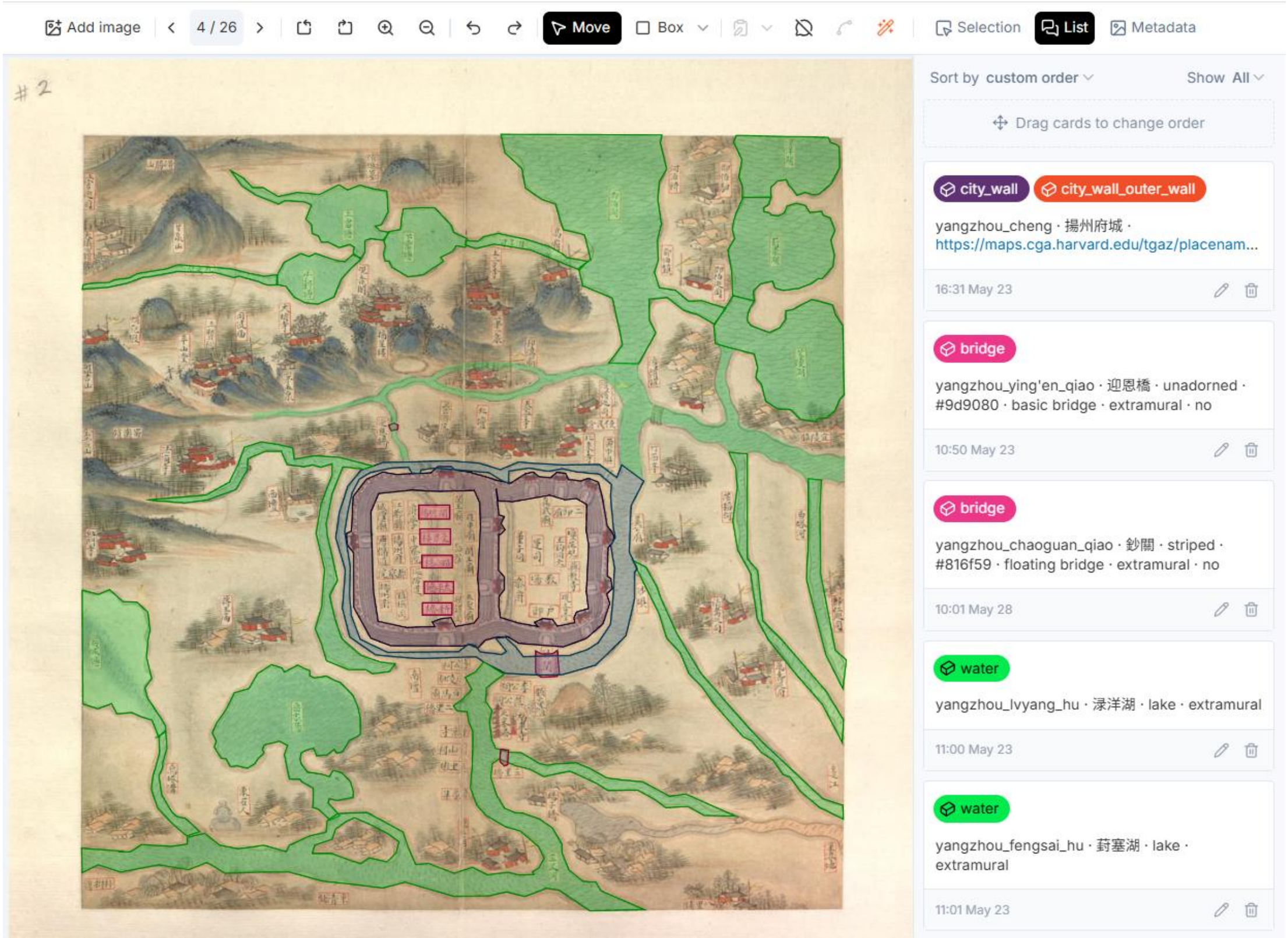
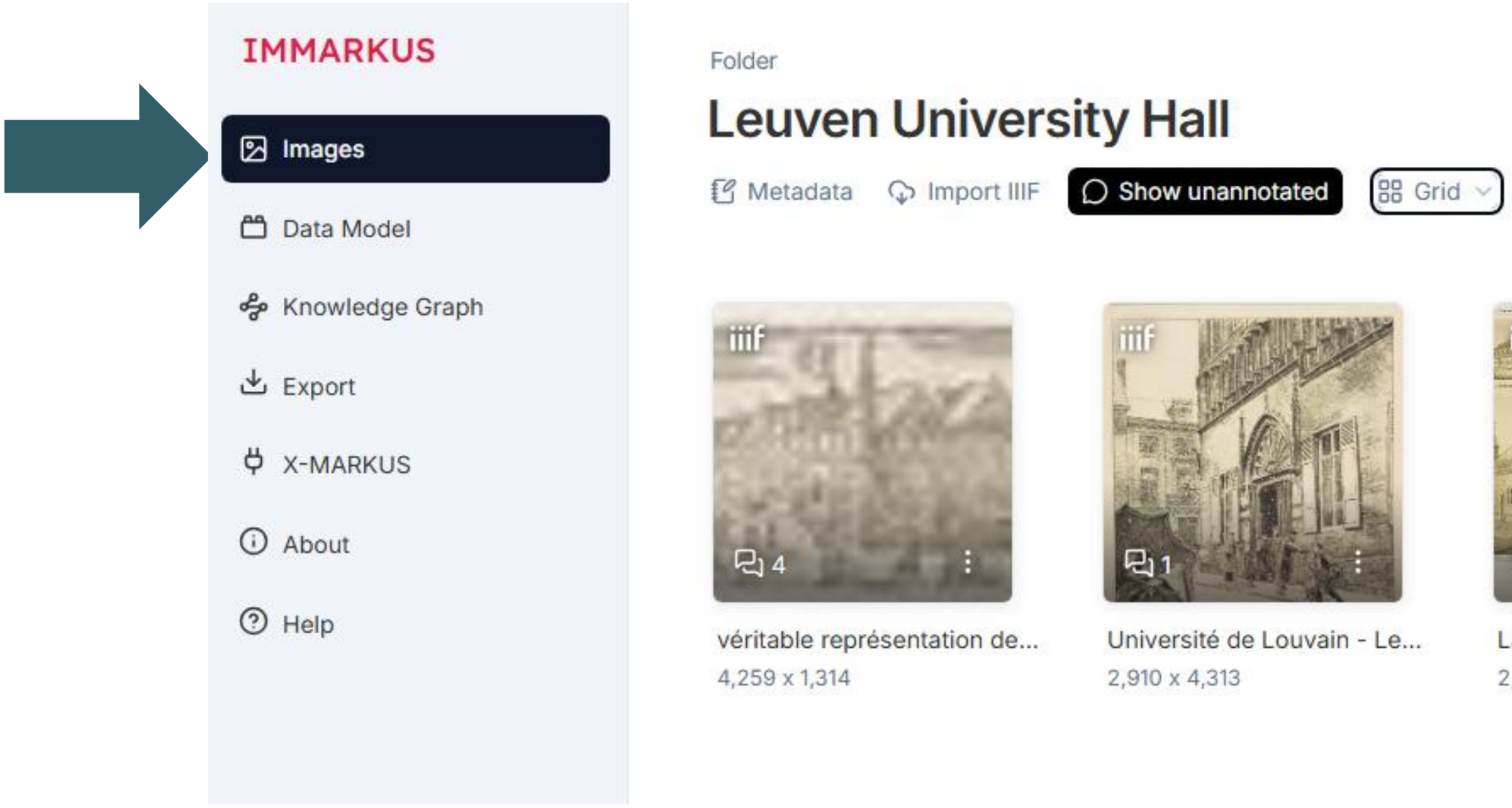
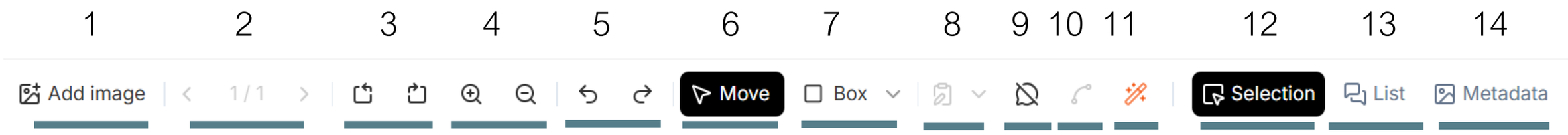


Image Gallery



Overview



1. Add an image
2. Browse images in the same subfolder
3. Rotate image 90° left or right
4. Zoom in or out
5. Undo or redo
6. Move (pan) across the image
7. Draw a shape (select box, polygon, ellipse, or path)
8. Copy an image snippet to the clipboard
9. Hide all annotations
10. Use smart tools to select irregular shapes or transcribe text
11. Add a relation between two entities
12. View details of the currently selected annotation
13. List all annotations
14. Add or edit individual image metadata

Drawing Annotations

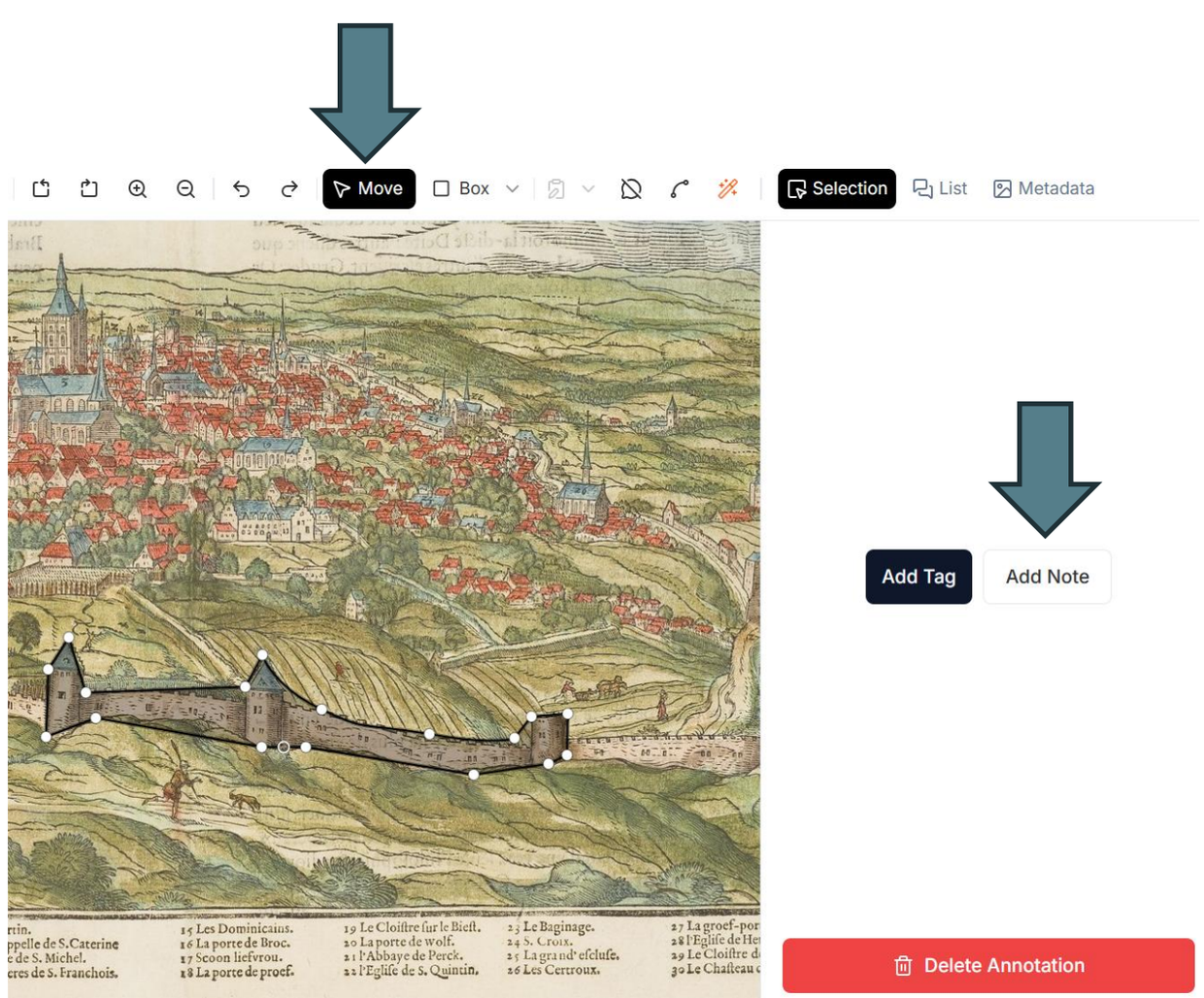
1. Click the draw button (blue arrow) and select a shape (**box, polygon, ellipse, or path**)

2. Click once (without holding the mouse button) to start drawing

3. For polygons: <u>each click adds a point</u>

4. **Double click** to close the shape

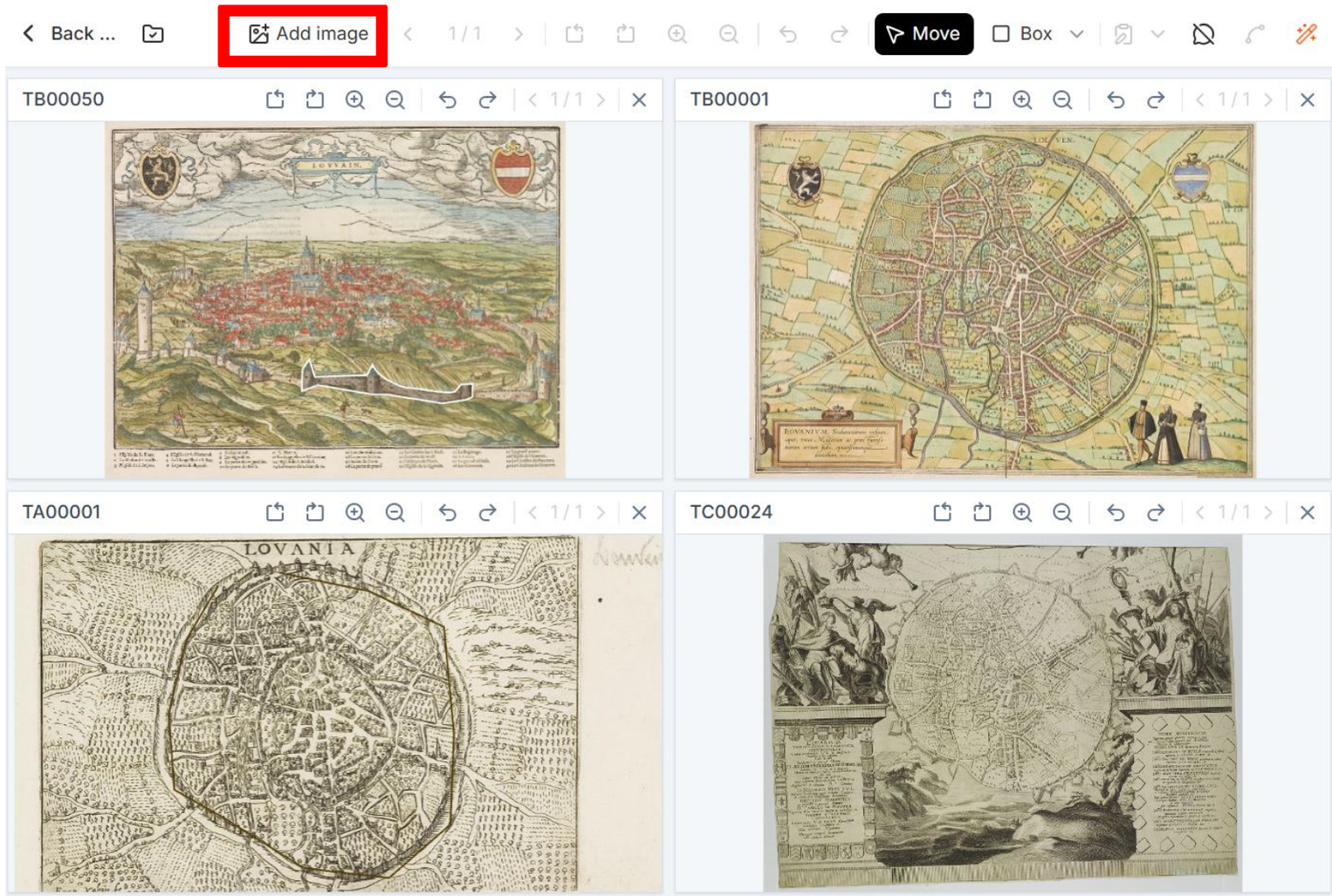
5. Add Tag or Note



Annotating Multiple Images Simultaneously

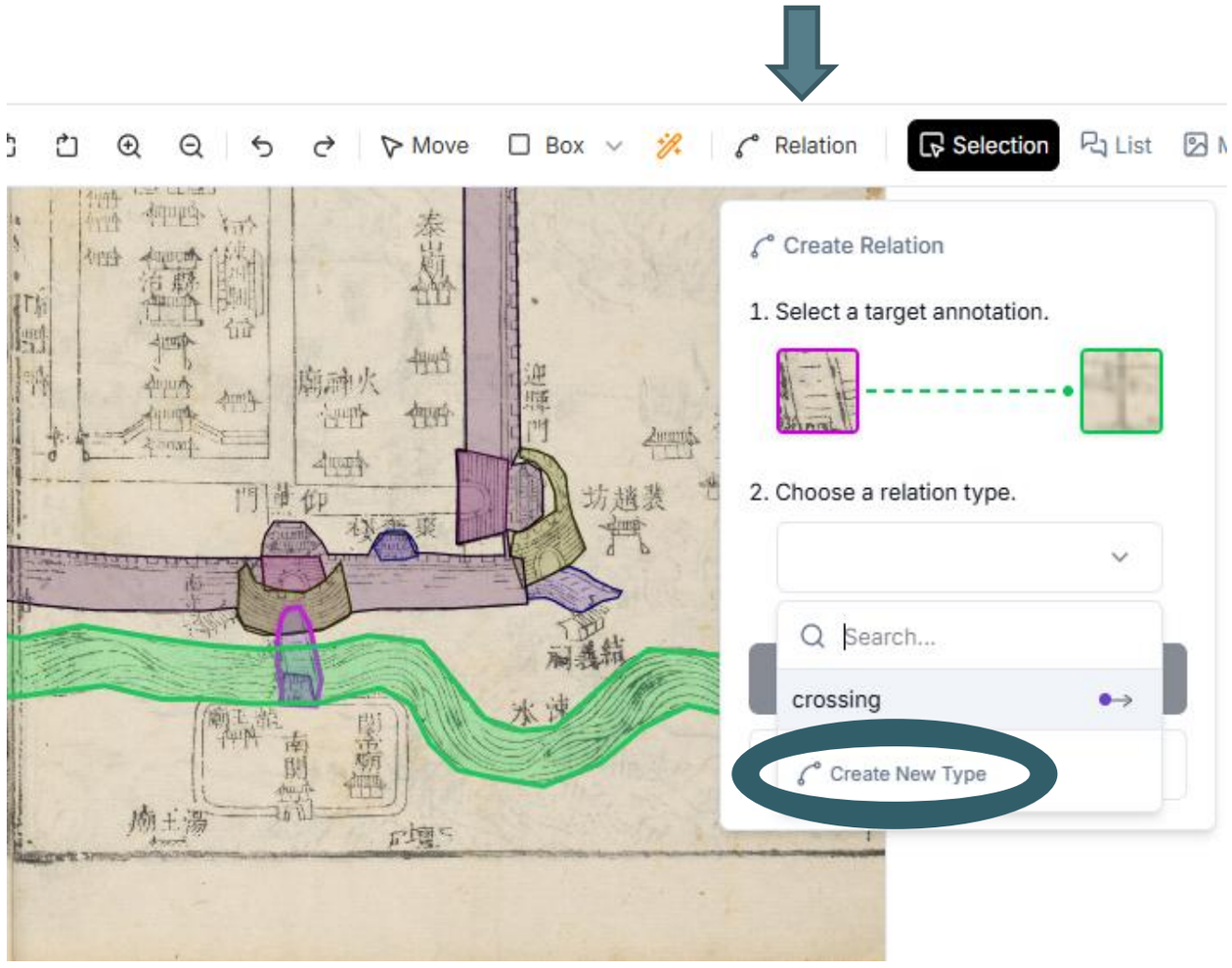
1. Click **Add Image** and select the images you want to annotate together

2. You can drag and drop windows to adjust the layout



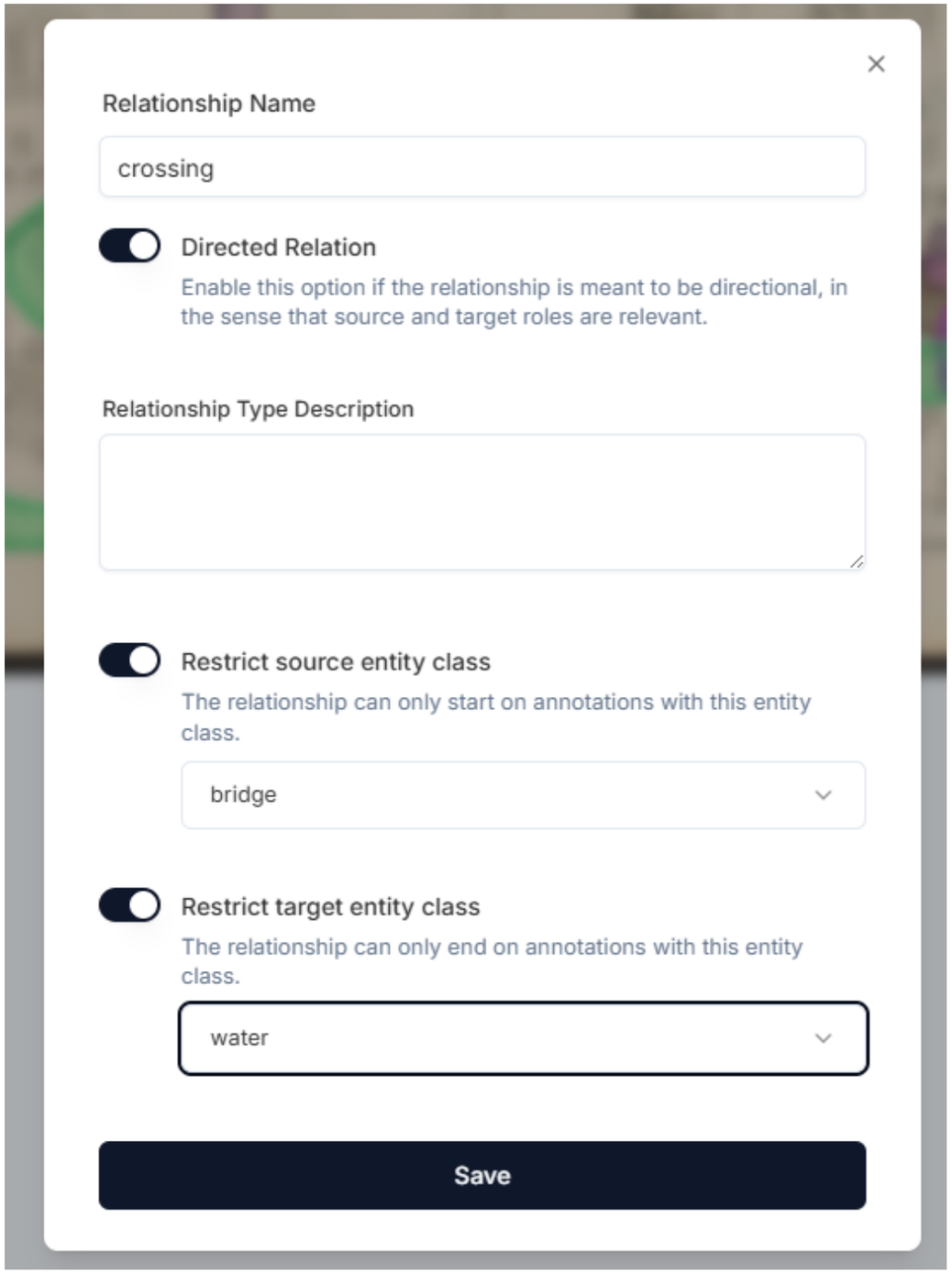
Defining Relationships between Image Regions

1. Select the source entity
2. Click **Relation** in the menu bar
3. Select the target entity
4. **Create New Type** or choose an existing relation type

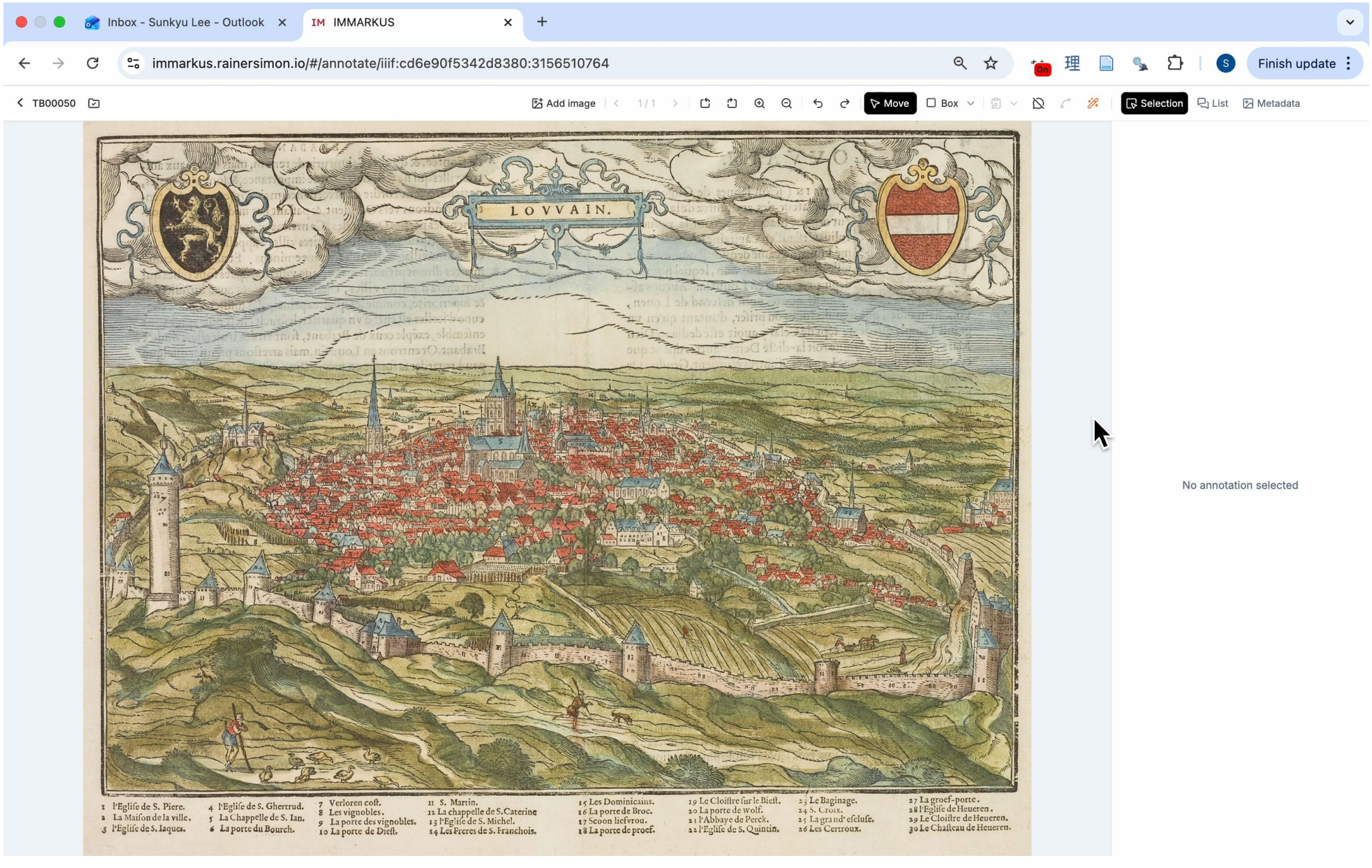


Defining Relationships

1. Enter the **Relationship Name**
2. (Optional) Indicate direction
3. (Optional) Set restrictions for source and/or target entity classes
4. Click **Save**

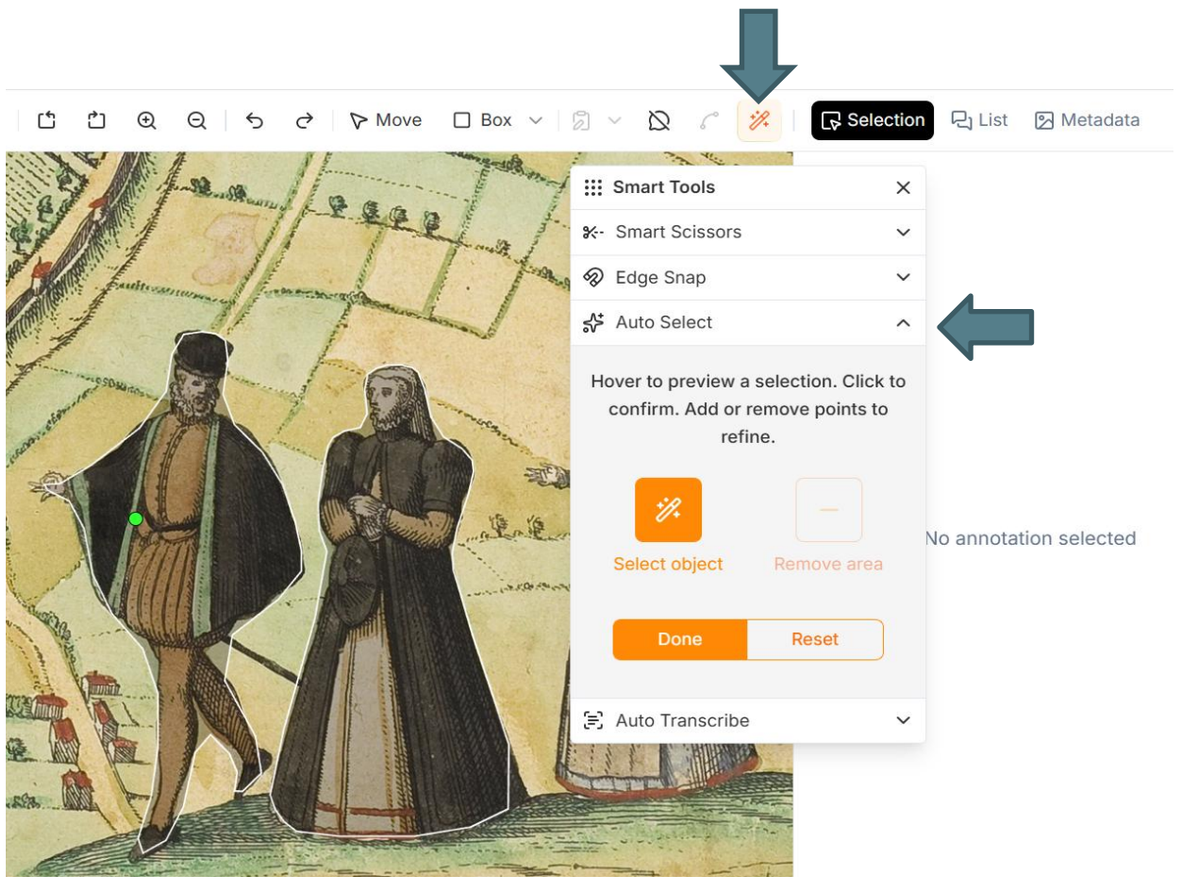


Smart Selection Tools: Auto Select

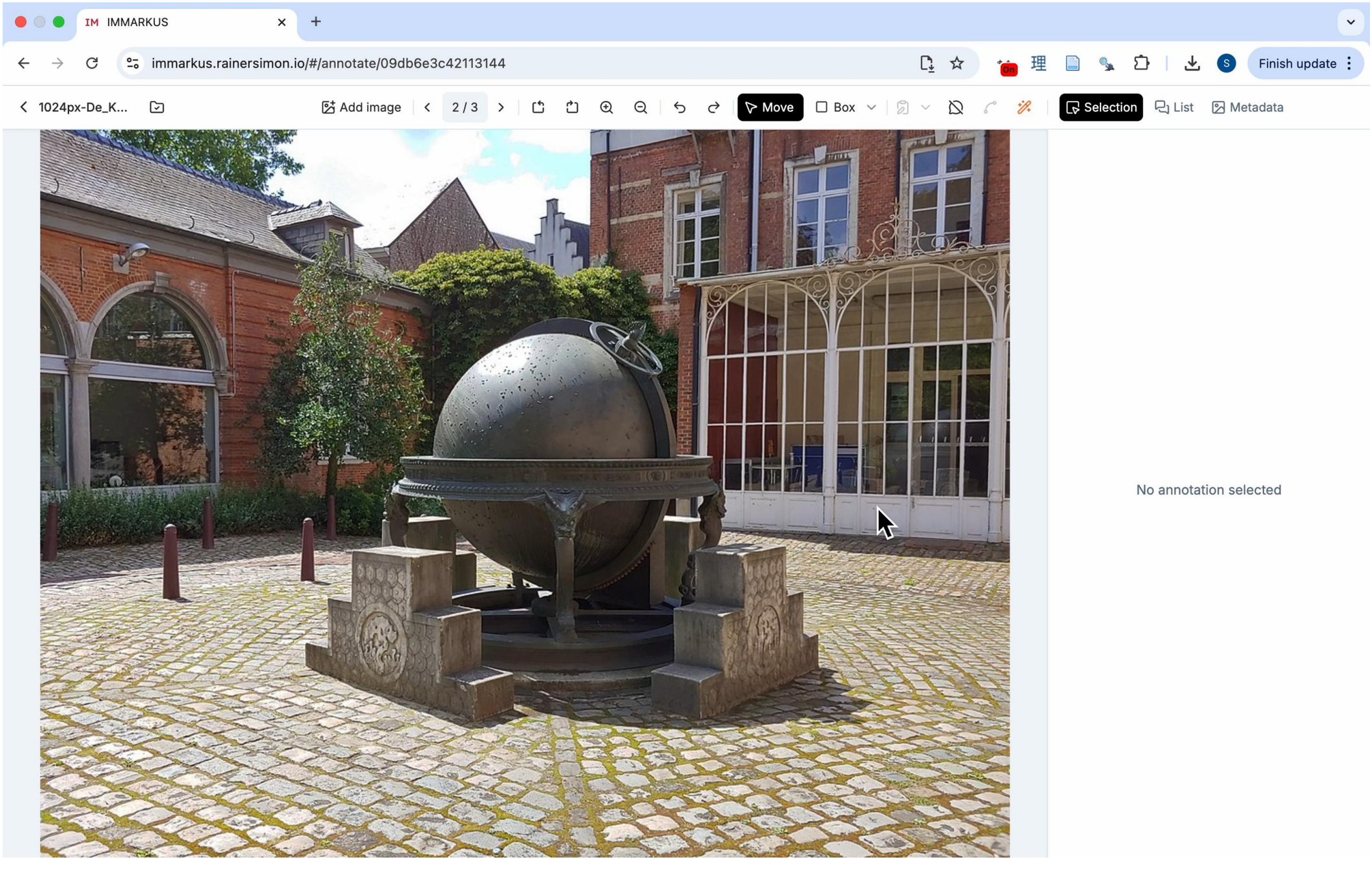


Smart Selection Tools

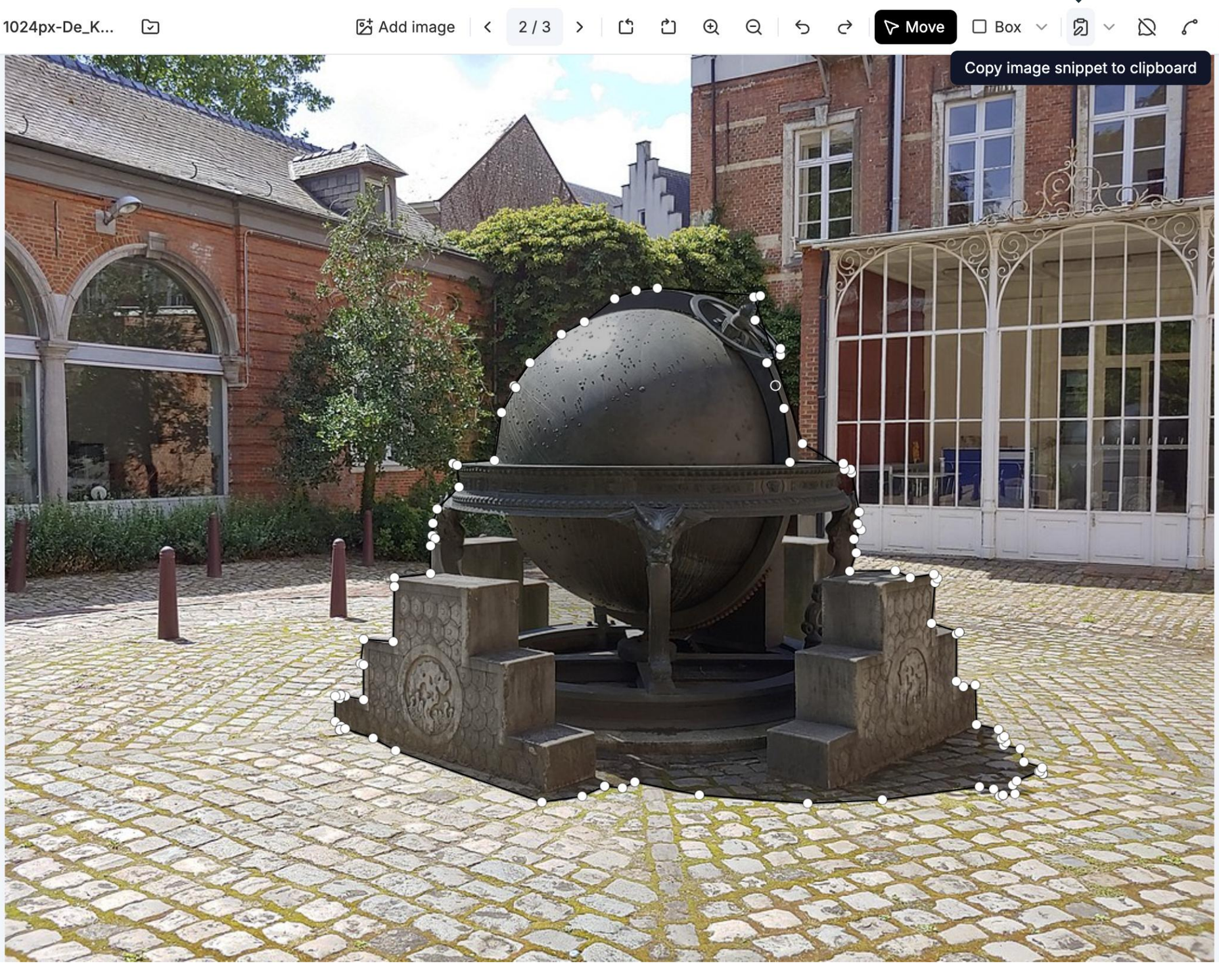
1. Click the 🪄 magic wand icon
2. Click **Auto Select** and **Select object**
3. <u>Wait</u> for the detection model to load
4. Hover to preview the detected object (highlighted area)
5. Click the highlighted area to confirm selection
6. To refine:
   - click nearby points to add areas (green dots)
   - click **Remove area** and then click areas (red dots) to exclude them
7. Click **Done** to generate a polygon
8. Click the ✕ close icon to exit the tool



Smart Selection Tools: Smart Scissors



Copying Image Snippets

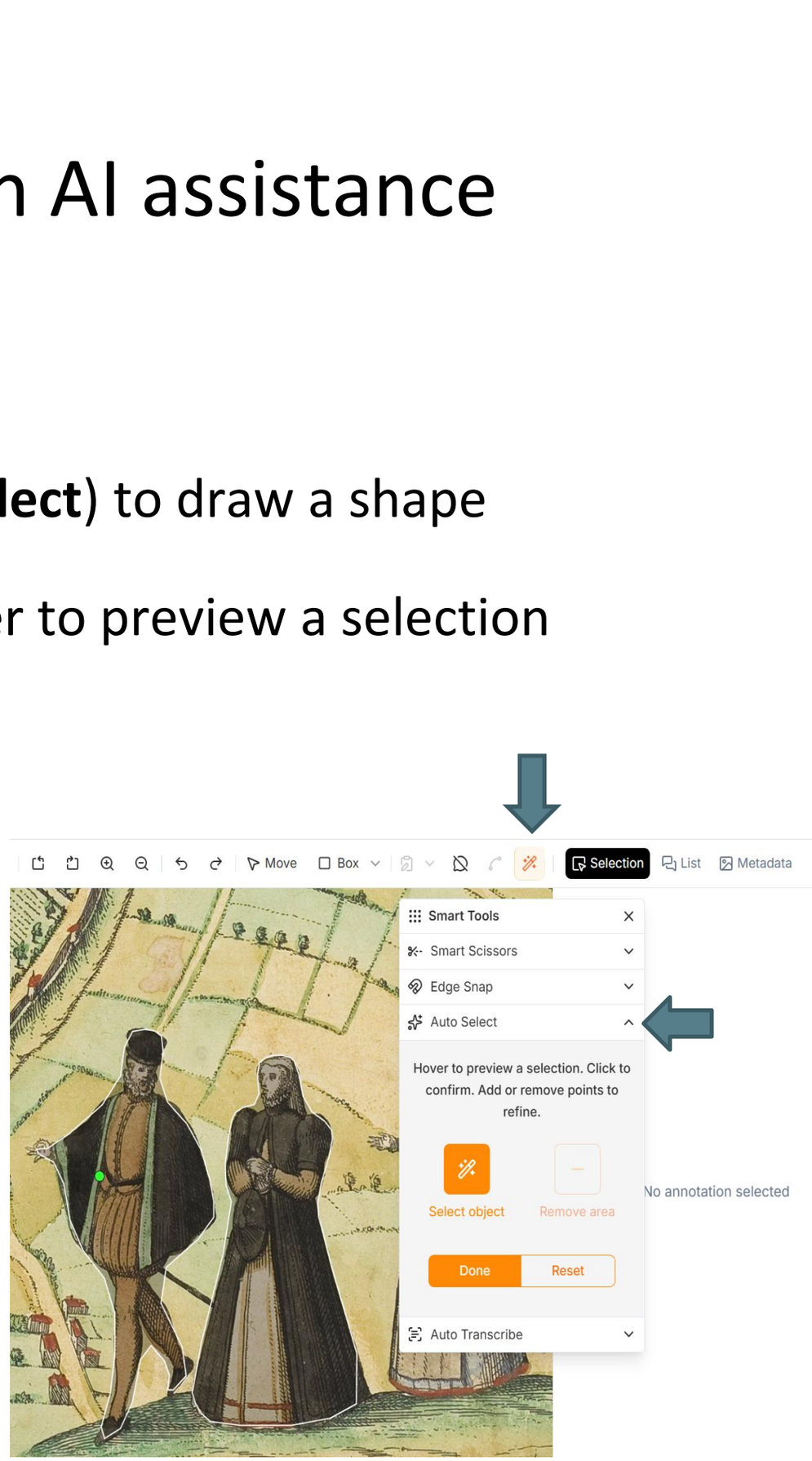


Practice 2. Annotating Images with AI assistance

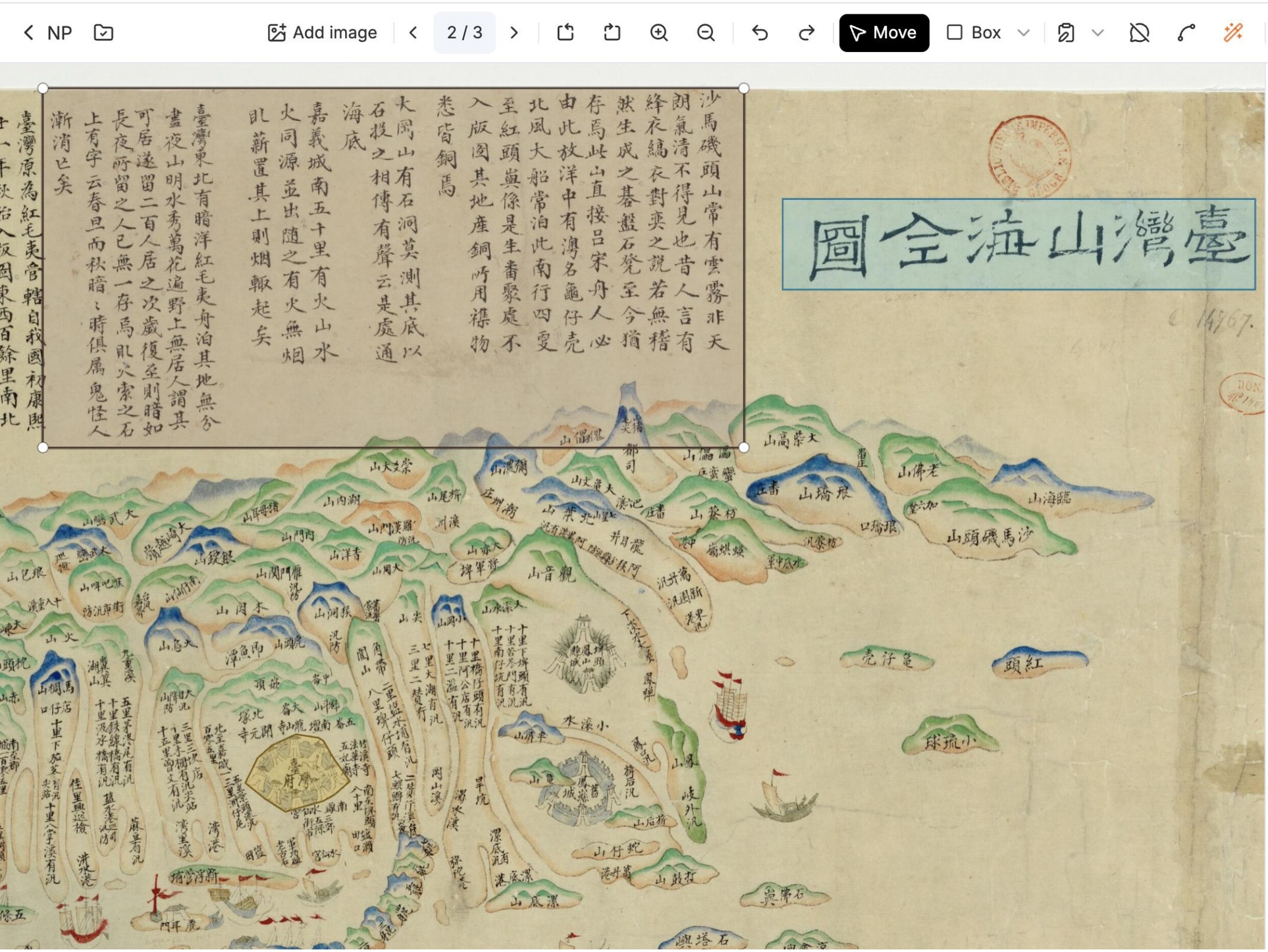
Use the **magic wand** to annotate images

1. Try using smart tools (**smart scissors** or **auto select**) to draw a shape
   - Wait for the detection model to load and hover to preview a selection
   - Click on the highlighted area to confirm
   - Click **Done**
2. **Add tags** or **notes** to the shape you drew
3. Click **List** to view all annotations

➢ Stuck? Try again after refreshing the page!



Transcribing (& Translating) Text from Images

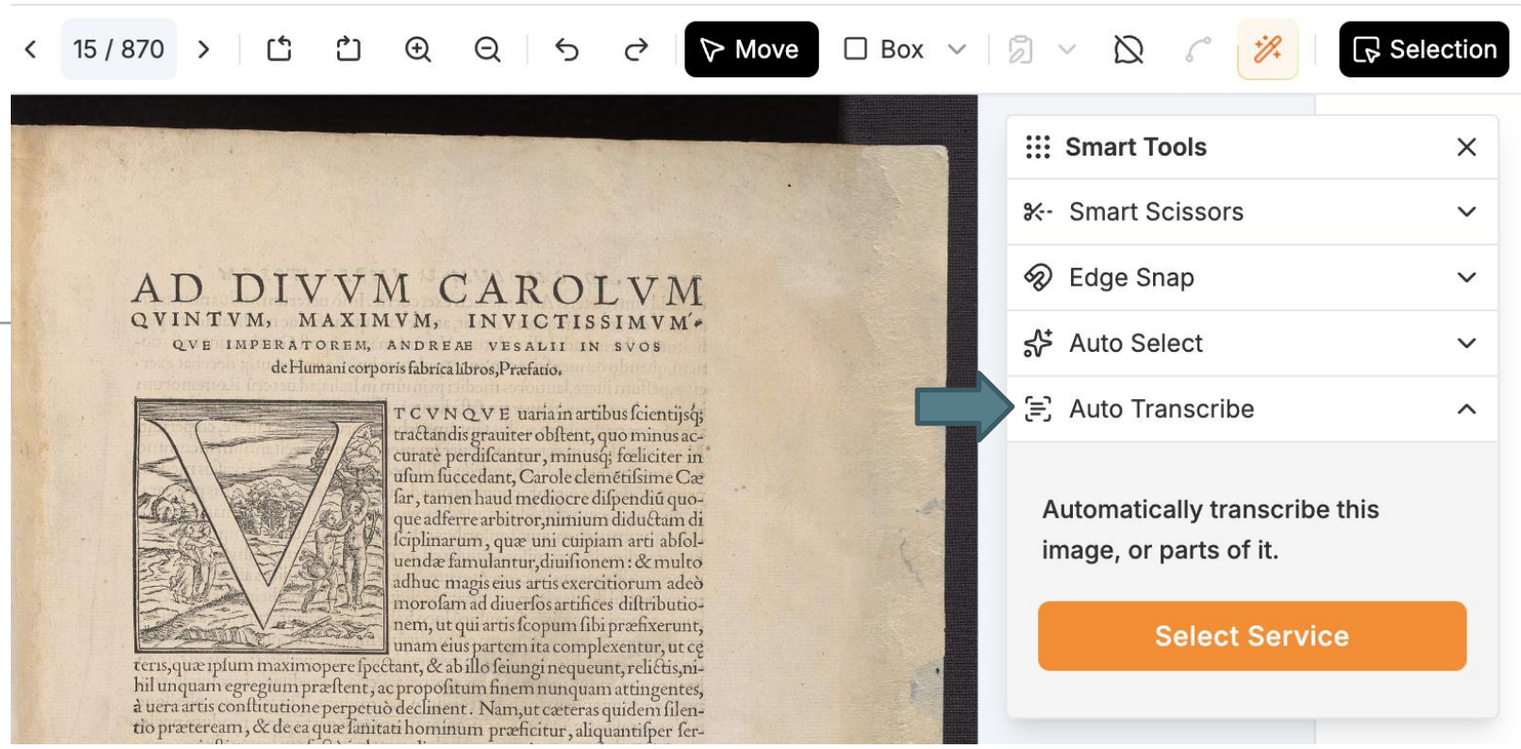


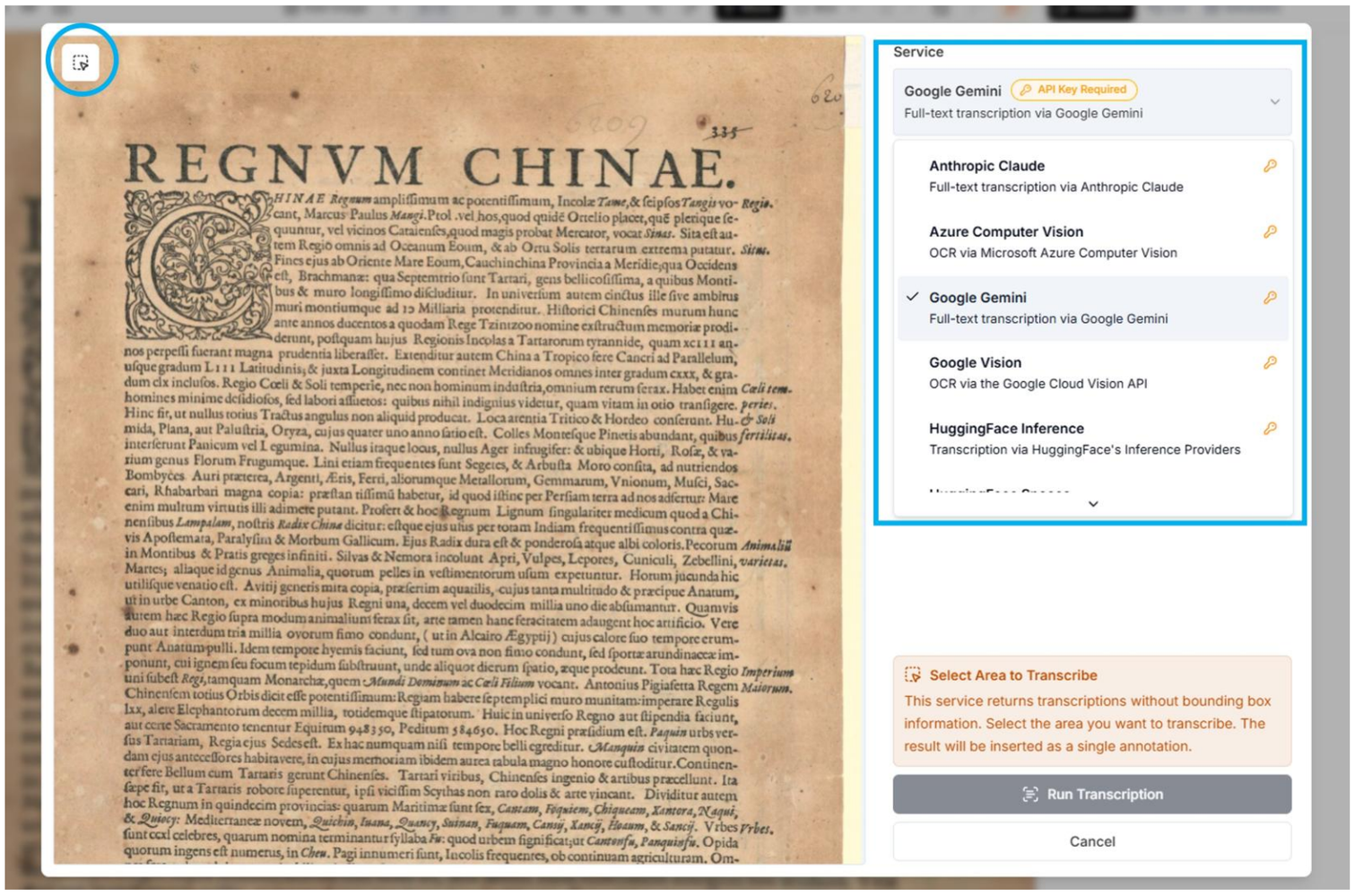
Auto-Transcribe

1. Click **Auto Transcribe**
2. Click **Select Service**
3. Select a transcription service

! Some services require an API key (see IMMARKUS Wiki for instructions) !

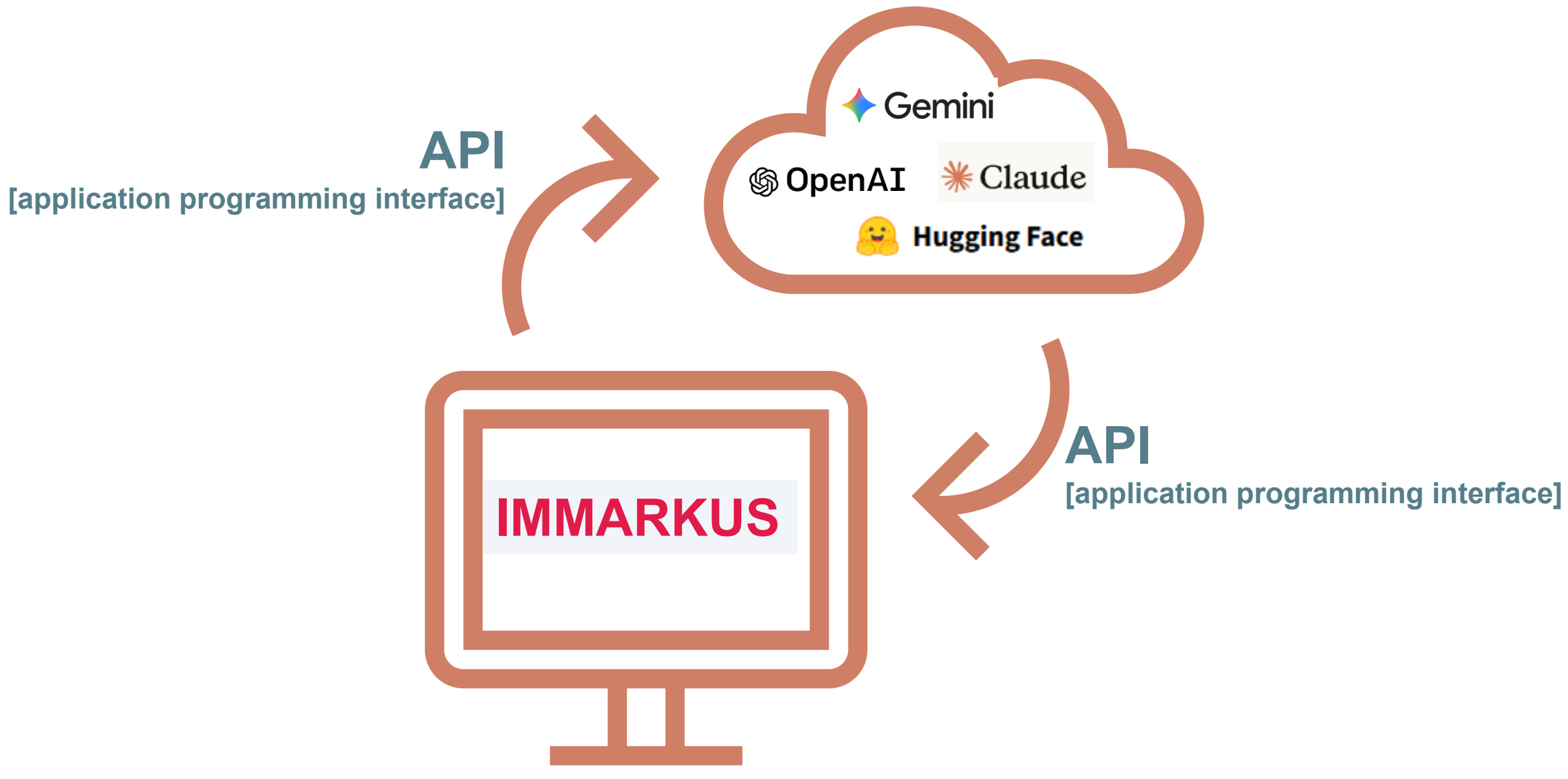
4. Click **Run Transcription**





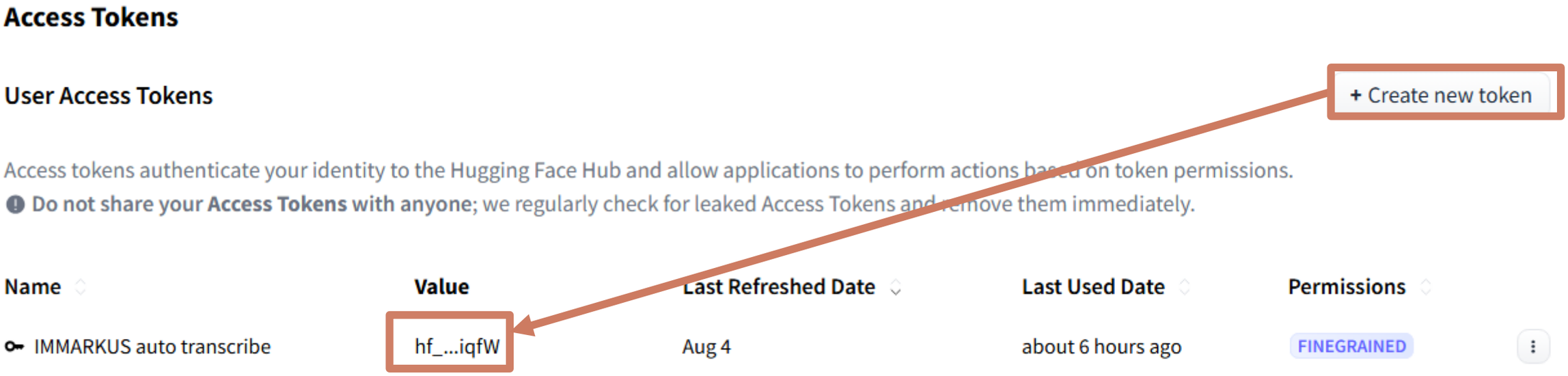
What is an API key?

API: a mechanism for computers or services to communicate with each other



What is an API key?

API **key**: a unique "digital key" provided by an AI service that unlocks its features and allows your app (e.g., IMMARKUS) to access them

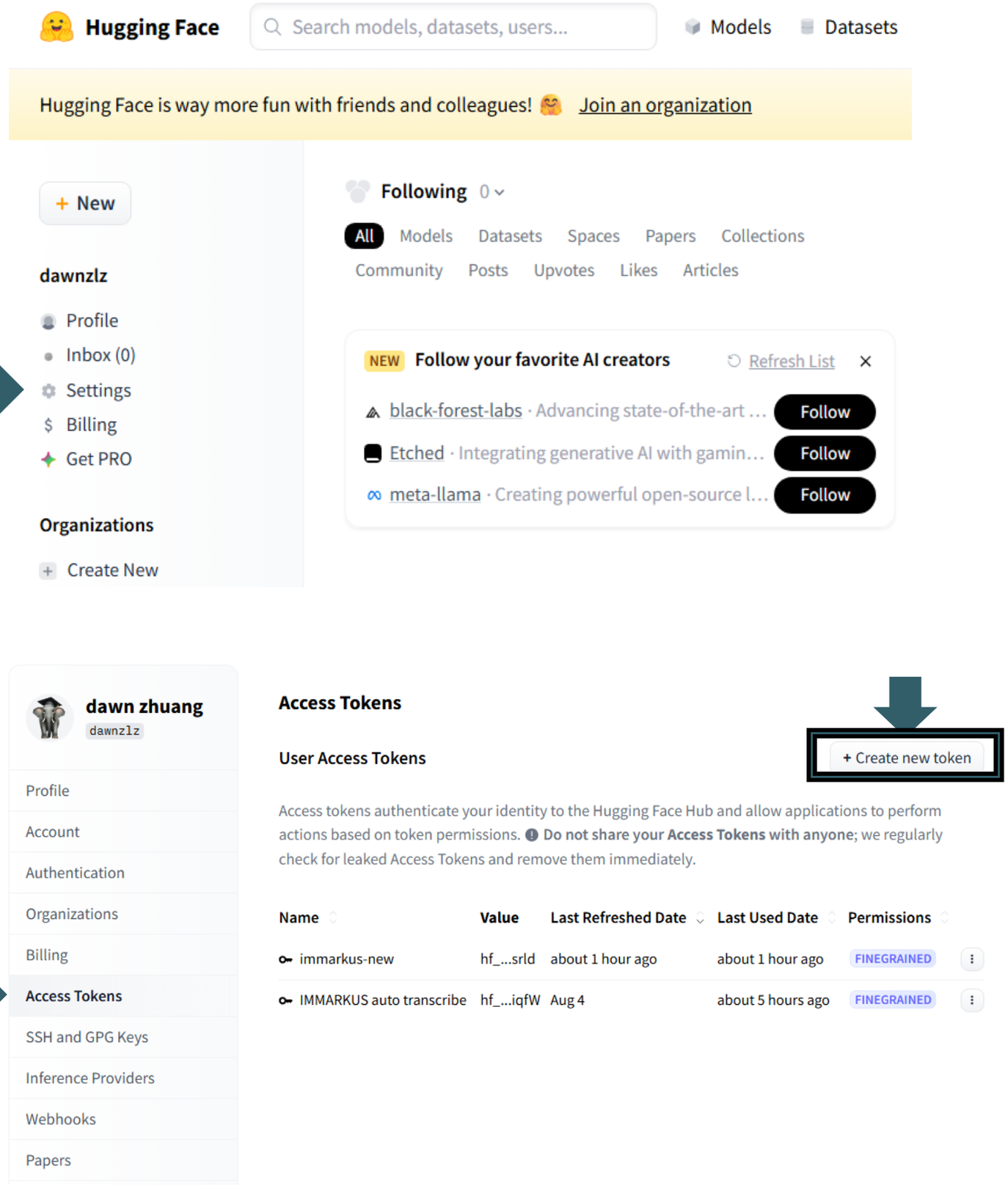


Hugging Face

open-source AI platform and community that currently offers an easy, low-cost way to run transcription models using your own API key

How to Get an API key

1. Click the link: https://huggingface.co/
2. Sign up a or log in your **Hugging Face account**
3. Click **Settings**
4. Click **Access Tokens**
5. Click **Create new token**



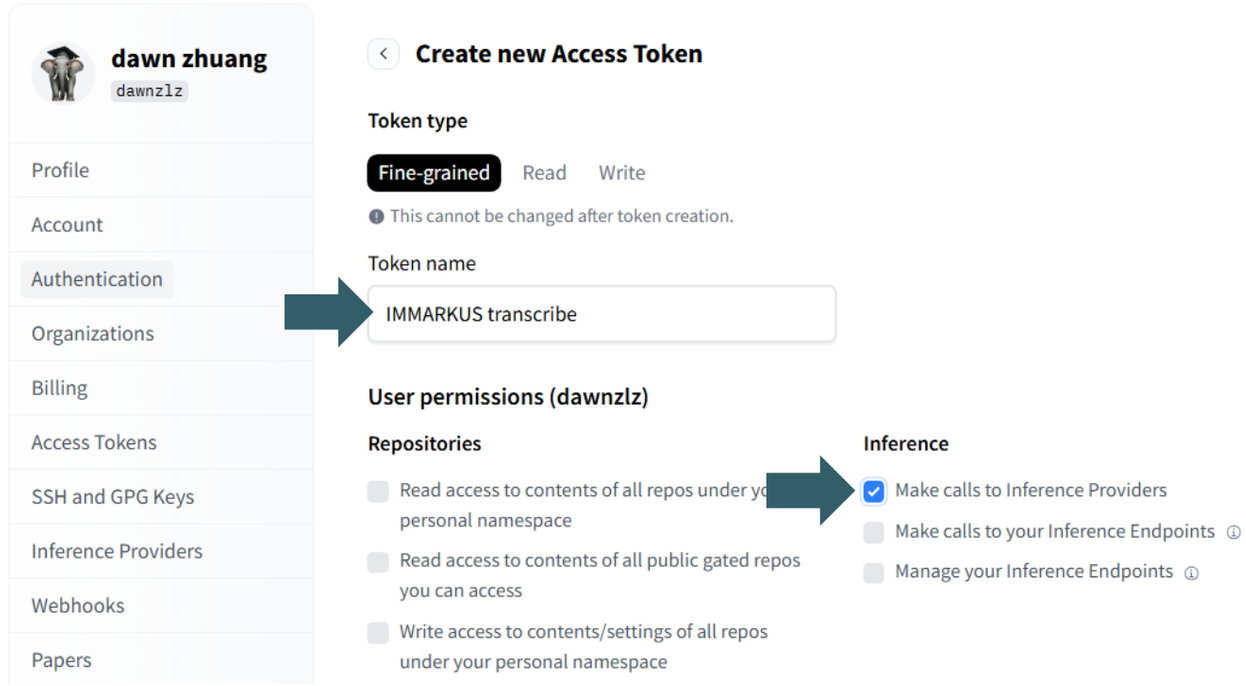
How to Get an API key

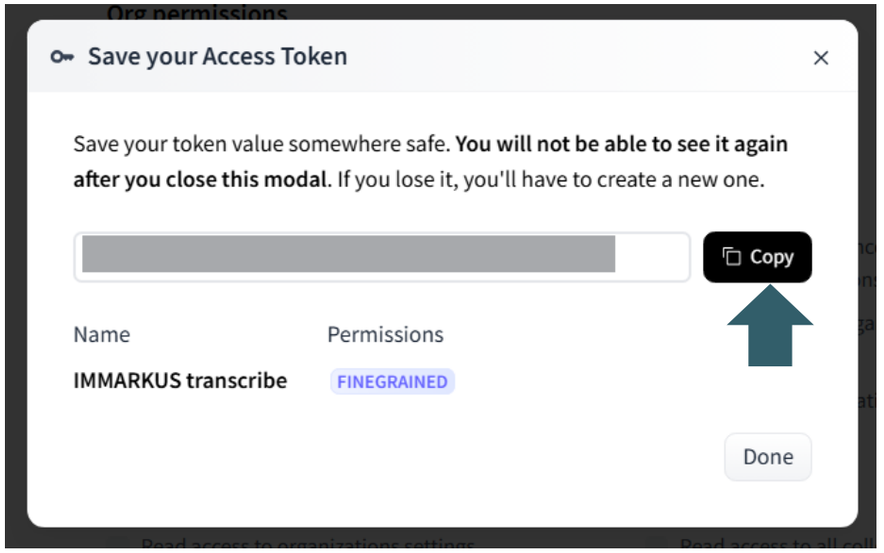
6. Name your token

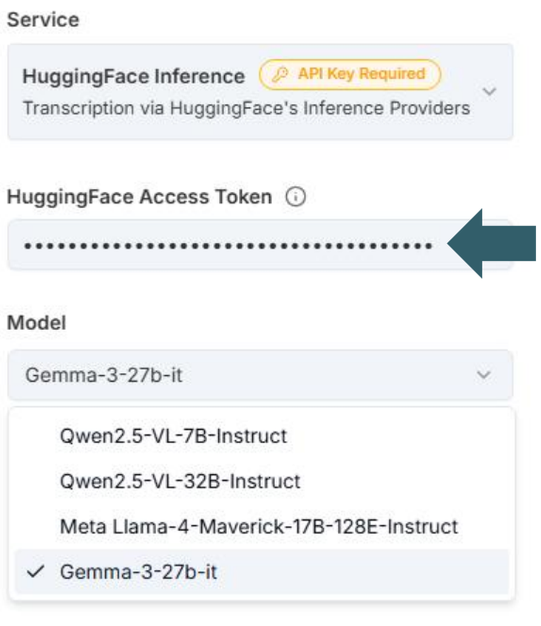
7. Check **Make calls to Inference Providers** under **Inference**

8. Click **Create token**

9. Copy the token (API key) and paste it to the IMMARKUS interface under service **HuggingFace Inference**

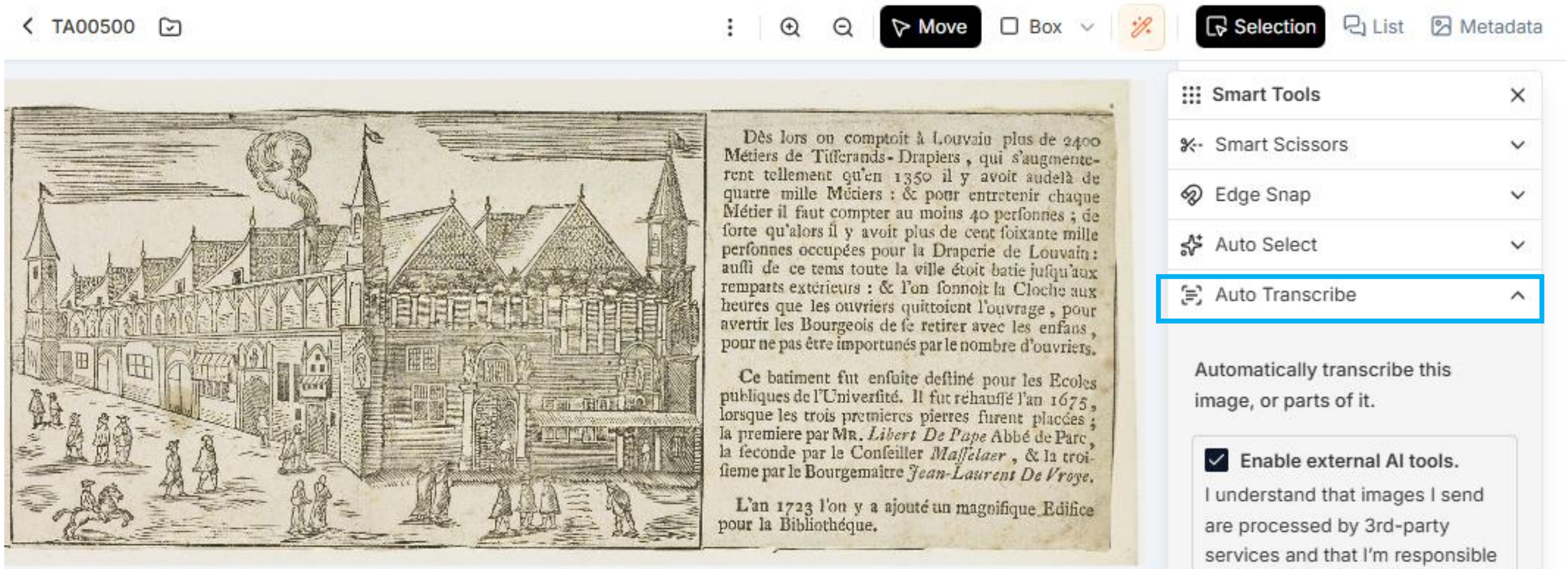






Transcribing Text from Images

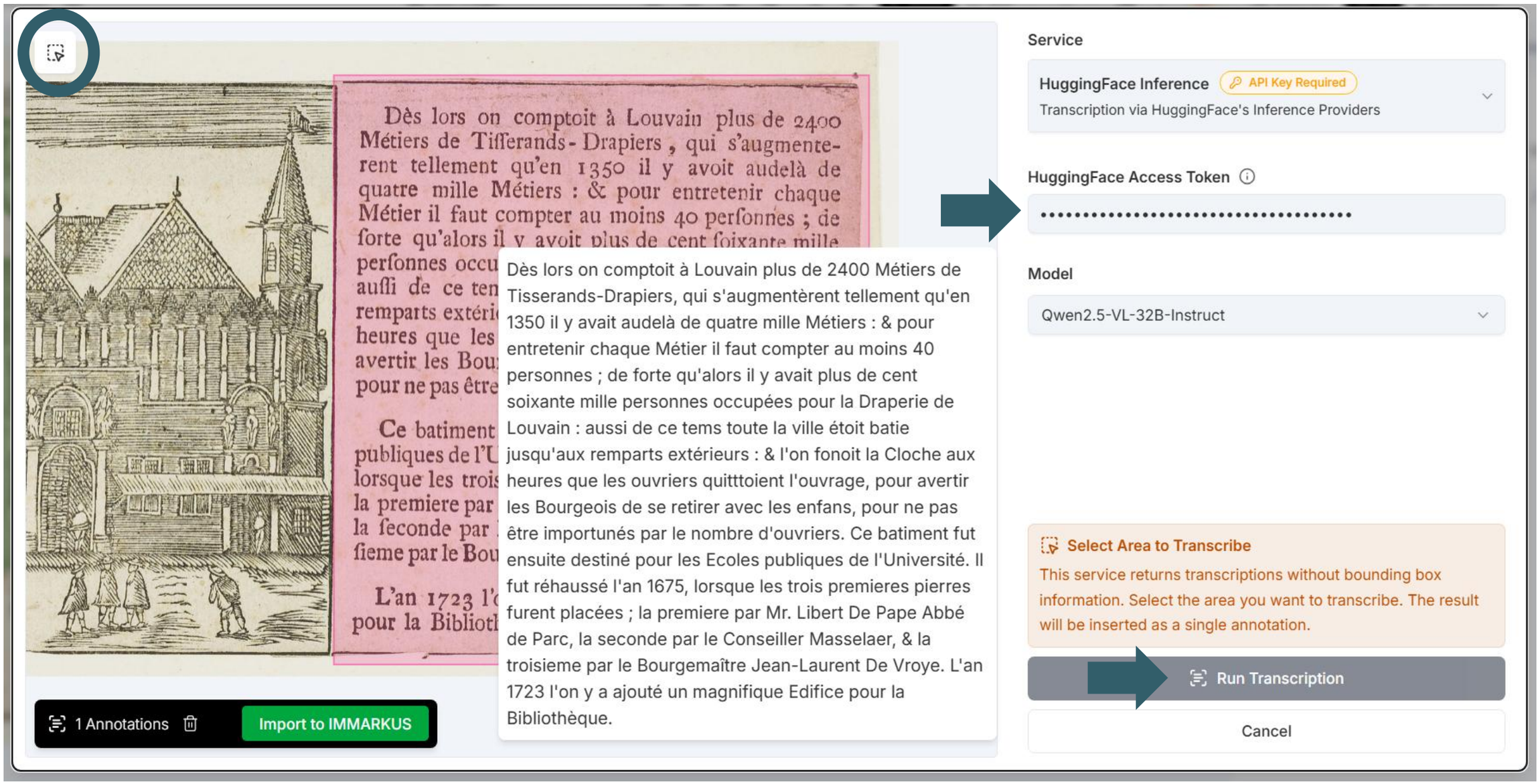
1. Open the Auto Transcribe feature and select a service



Transcribing Text from Images

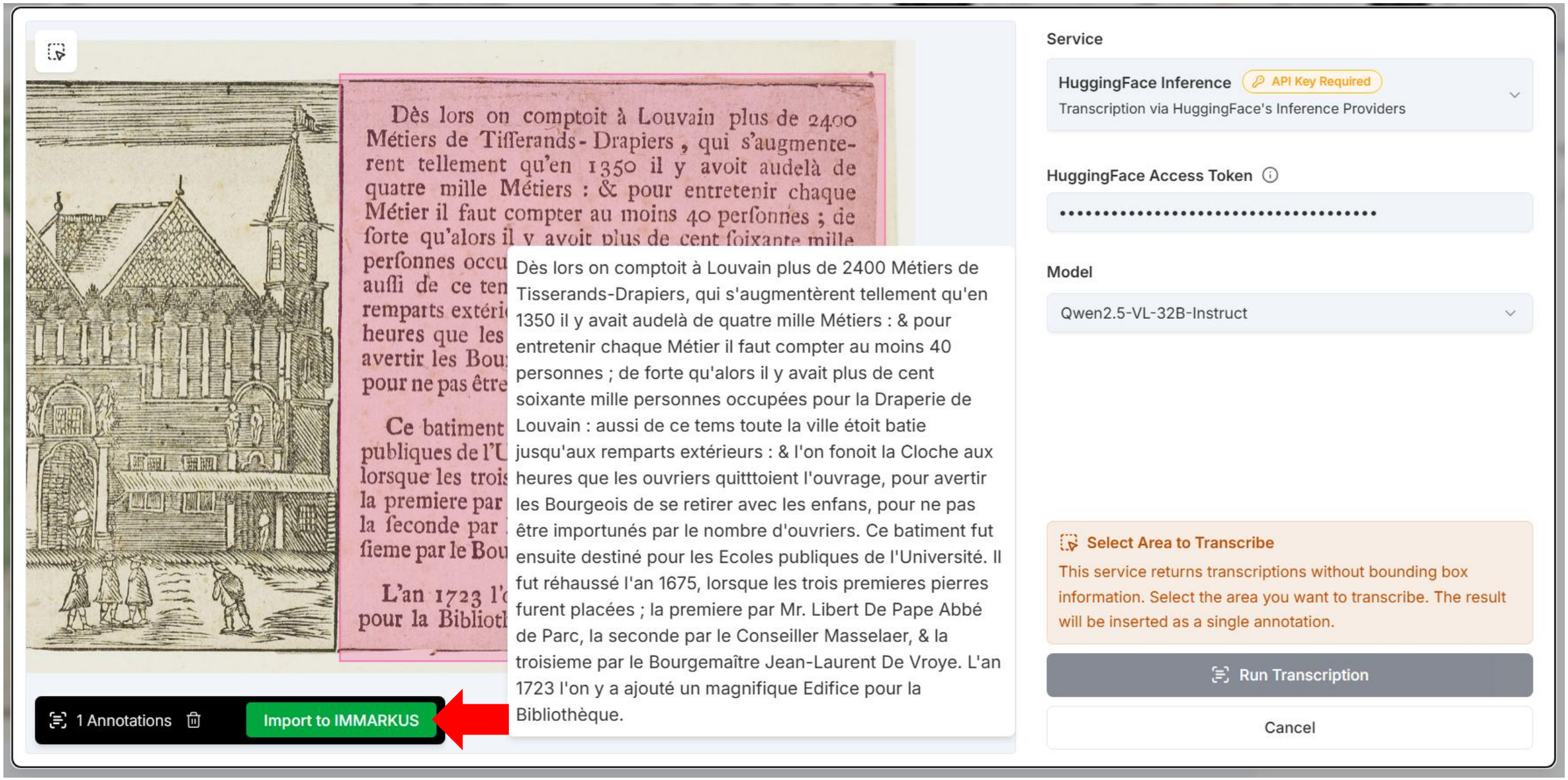
2. Set up your API key and select an area to transcribe

3. Click **Run Transcription**.



Transcribing Text from Images

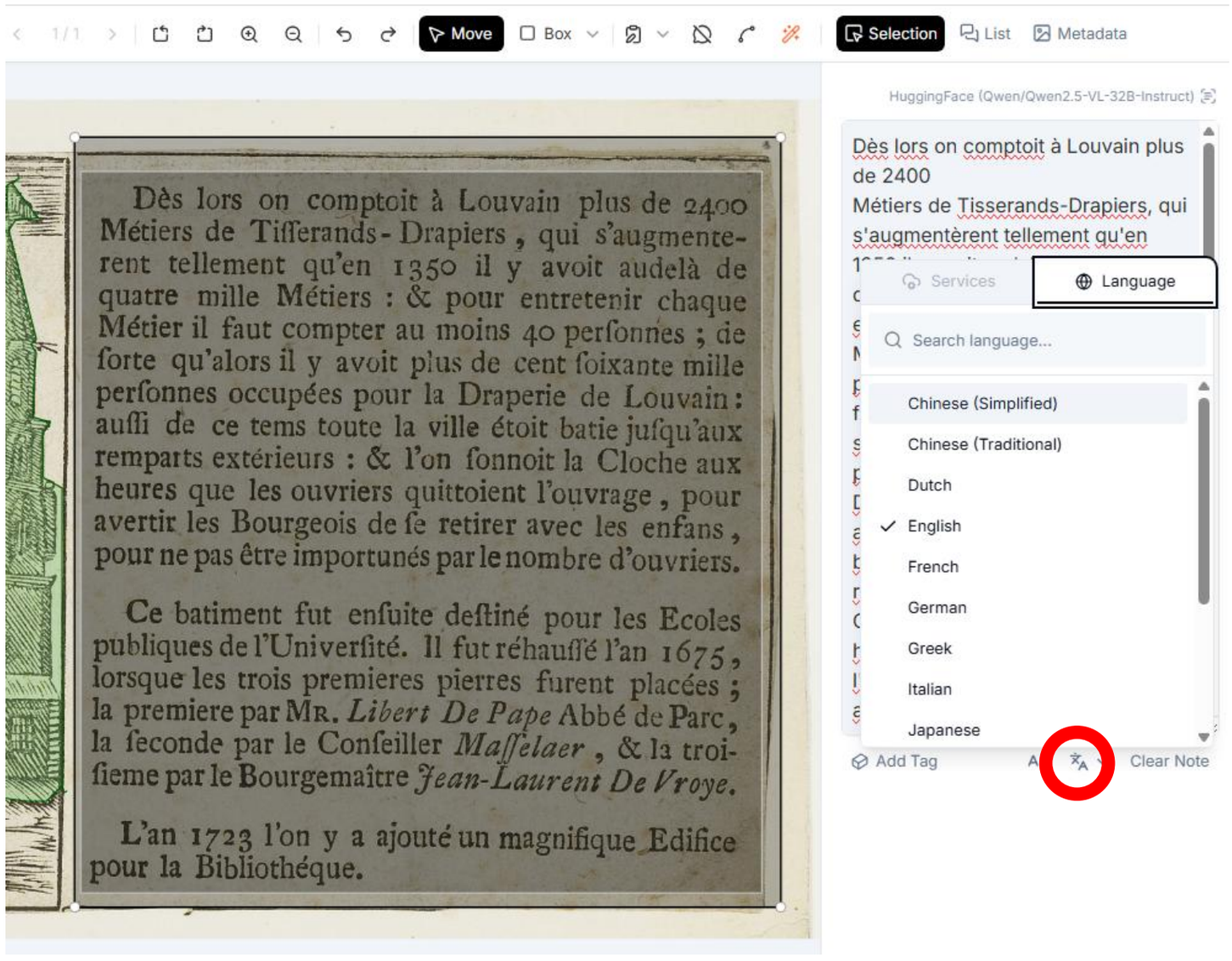
4. Hover over the selected area to view the transcription, and import it into IMMARKUS to store, edit, or translate it



Transcribing Text from Images

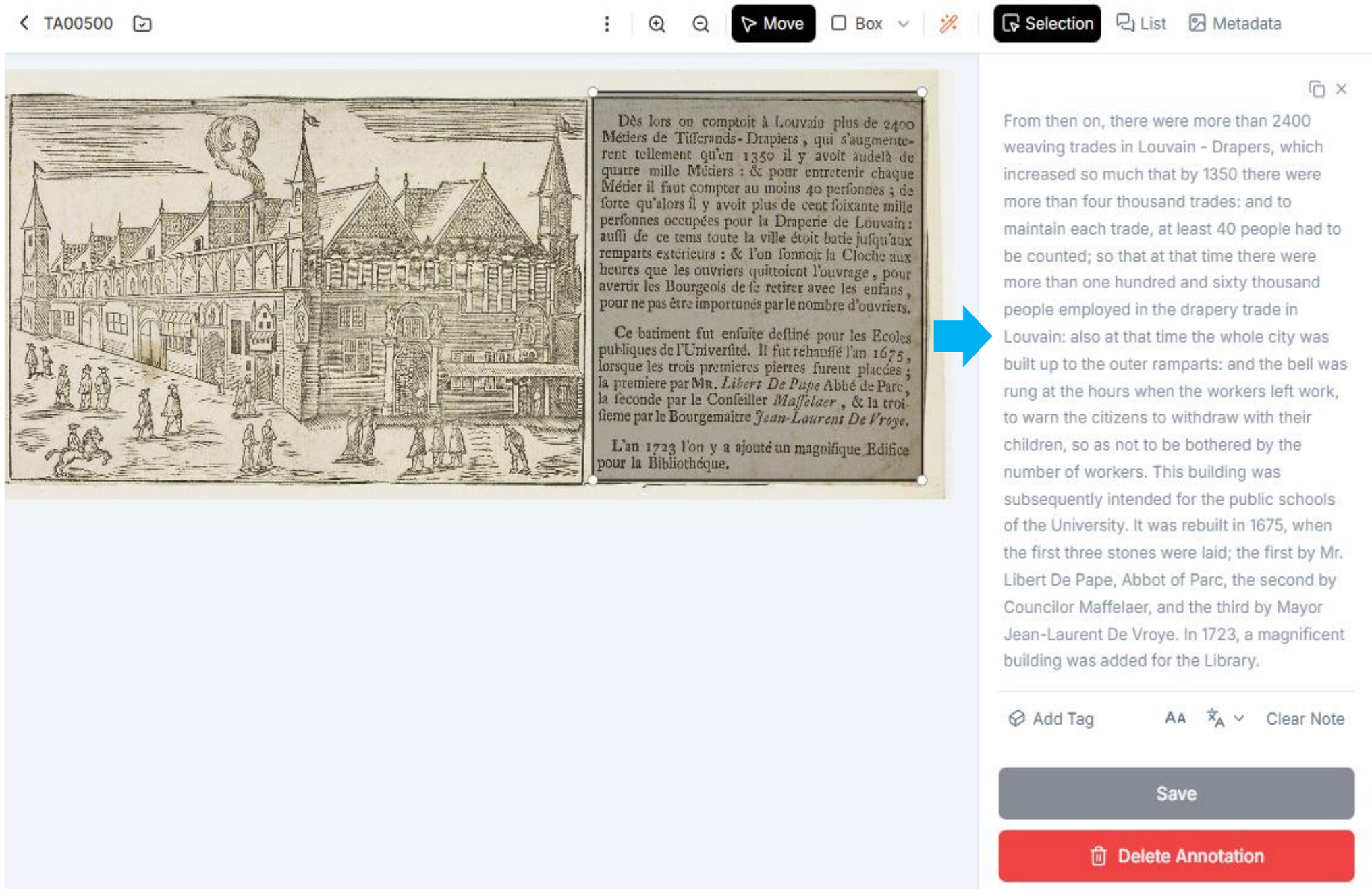
5. After importing, click **Show Translation (red circle)**

6. Select the translation service model and the target language



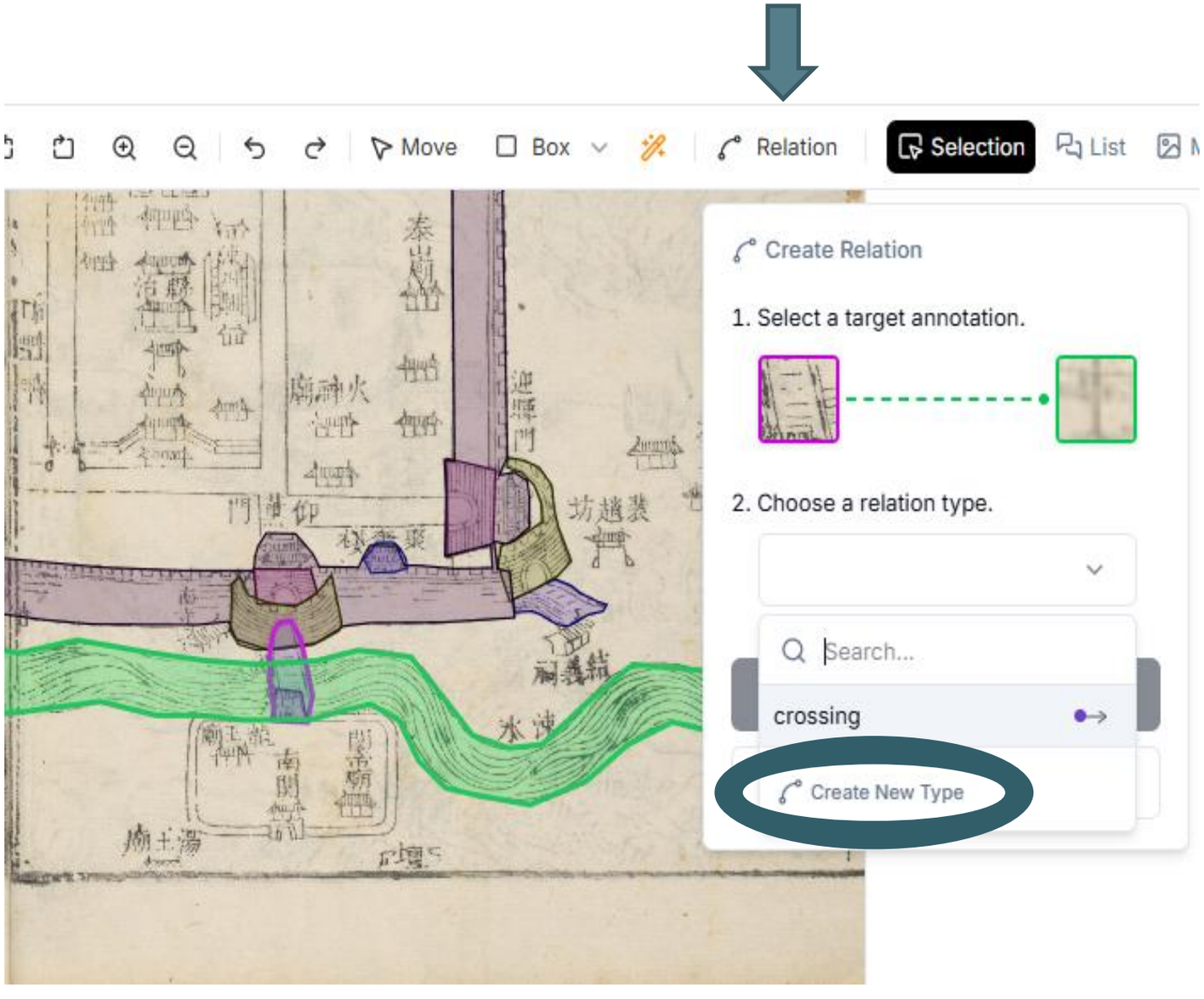
Transcribing Text from Images

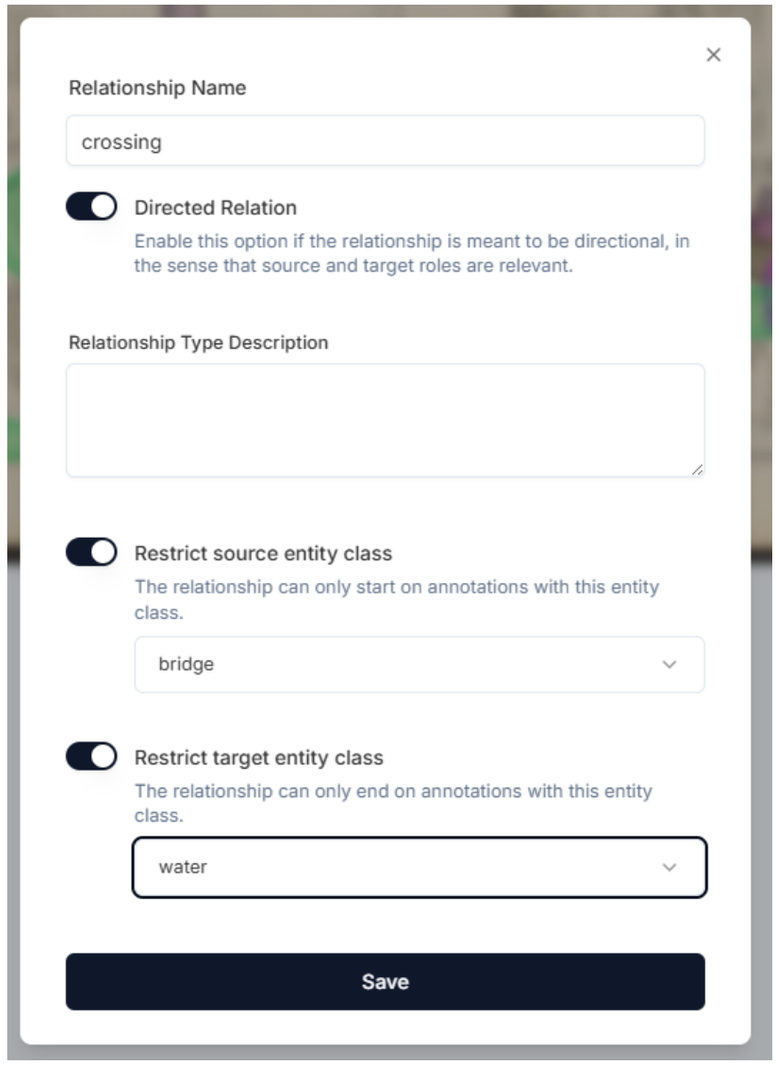
7. View the translated version of the transcription



Break (20 minutes)

- **Questions or comments?** Please raise your hand or write in the chat

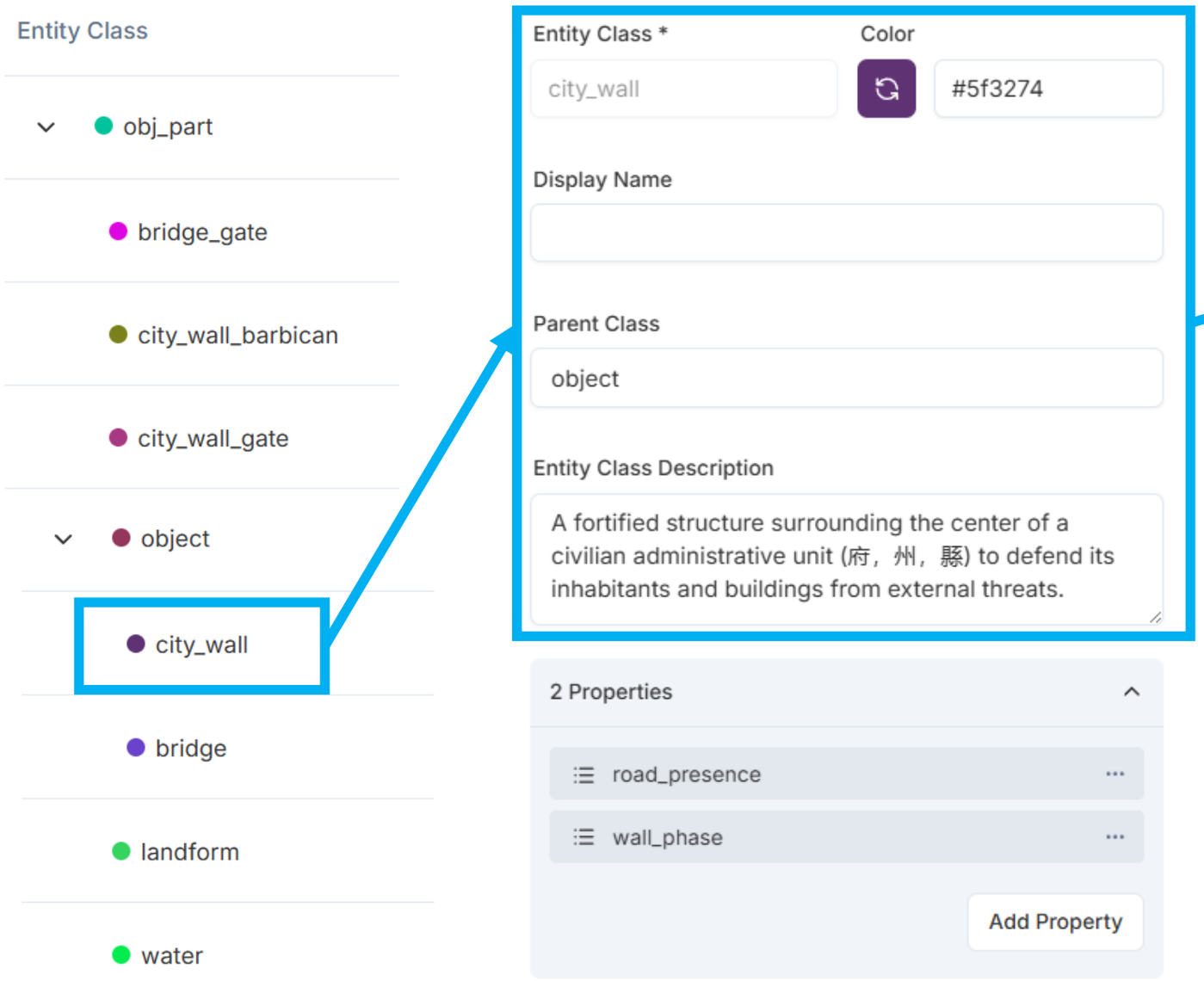


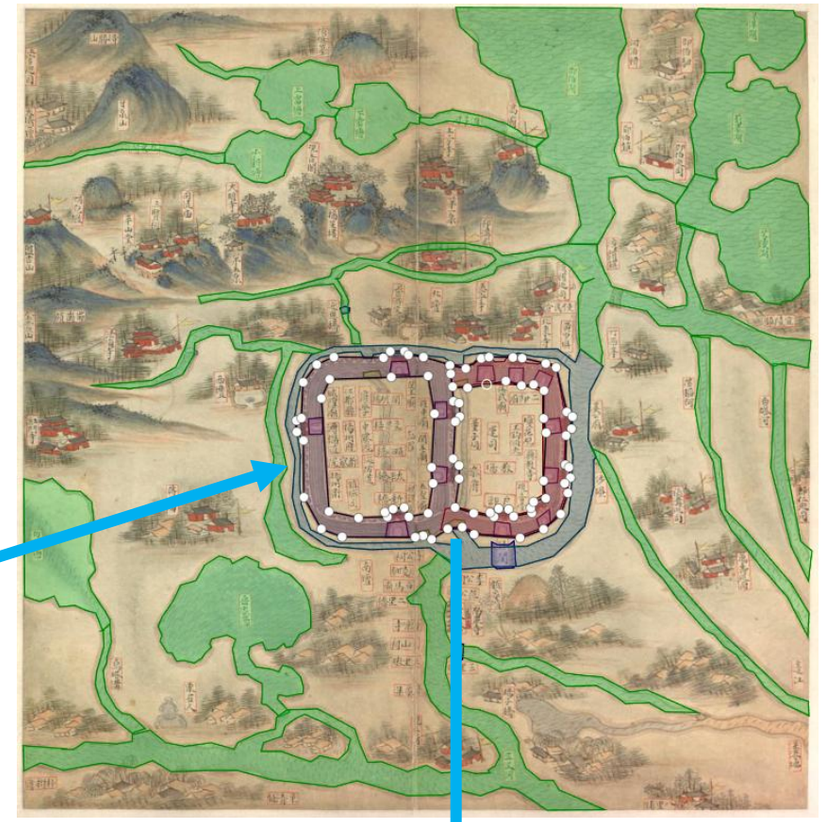


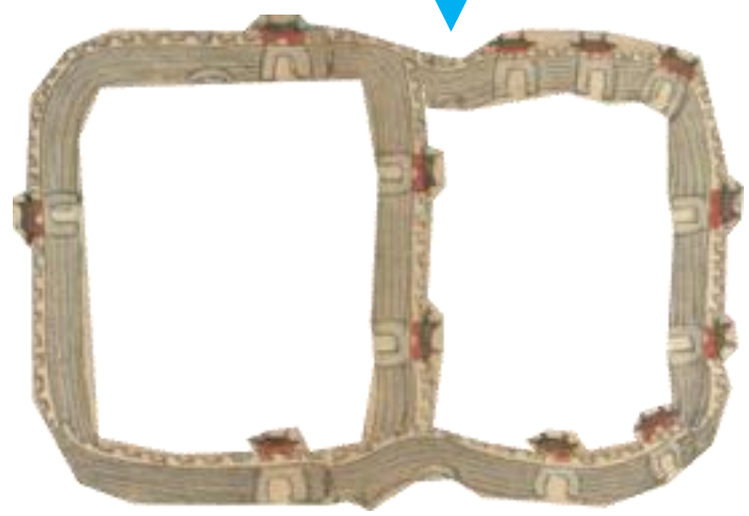
3. What Is a Data Model?

A data model defines:

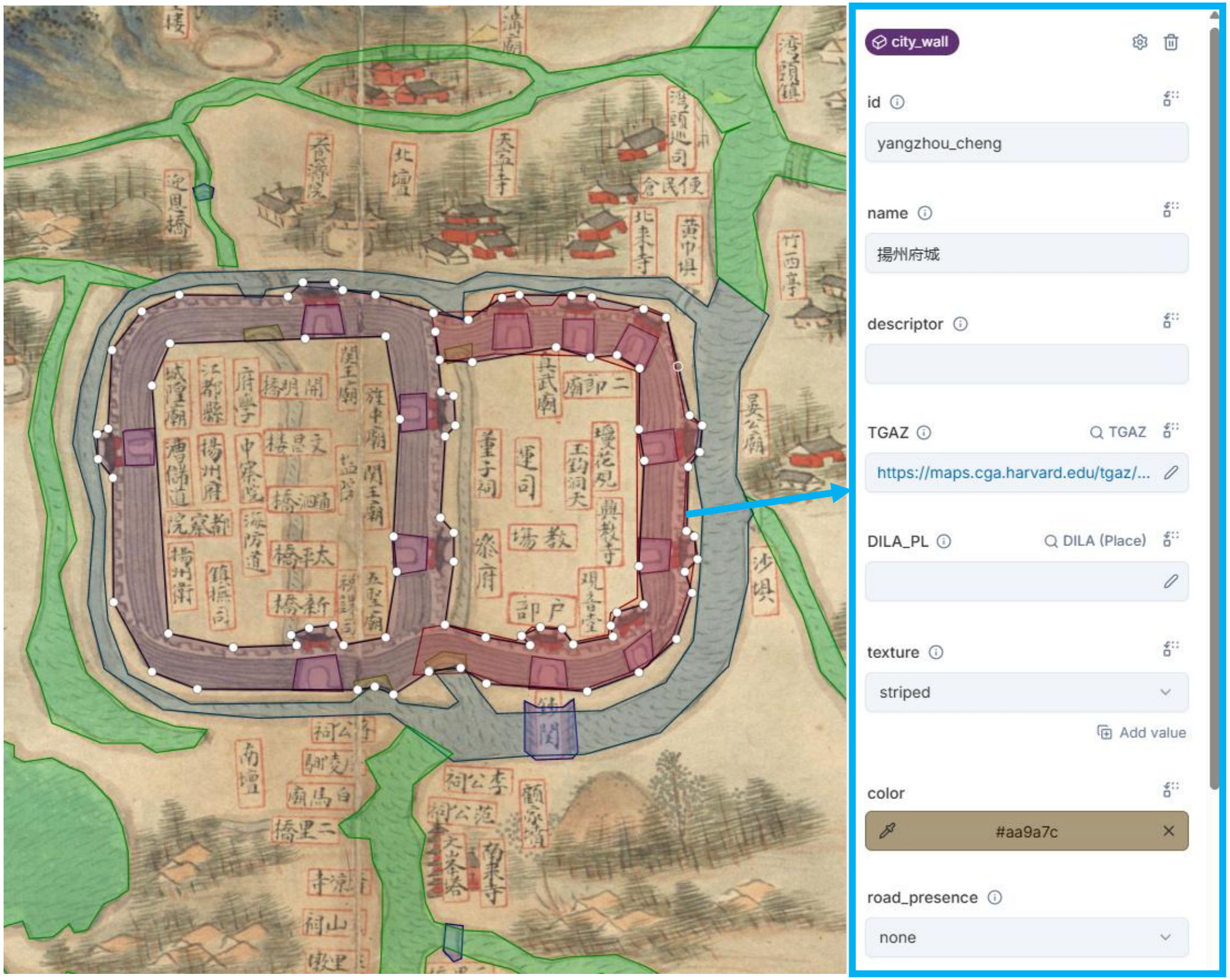
- What **things** you record (**Entity**)



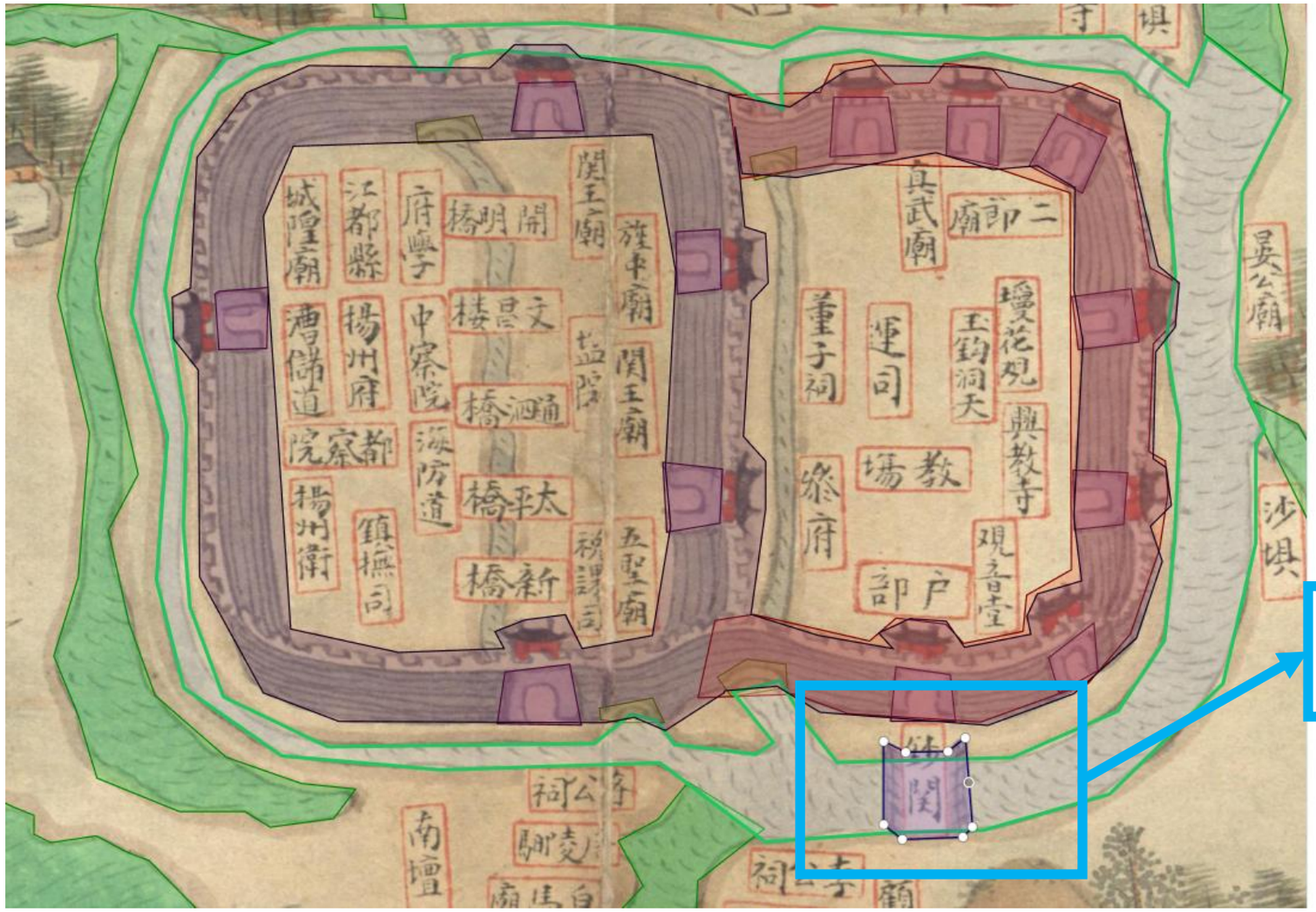




- What **details** each entity has (**Property**)



- How they **relate** (**Relationship**)



Relationship Name

crossing

Directed Relation

Enable this option if the relationship is meant to be directional, in the sense that source and target roles are relevant.

Relationship Type Description

Used to connect a bridge with the feature it crosses such as a river, moat, or road.

Restrict source entity class

The relationship can only start on annotations with this entity class.

bridge

color

#816f59

bridge_type

floating bridge

relation to wall

extramural

bridge_pillar_quant

bridge_cover

no

Related Annotations

crossing

Add Tag

Add Note

Save

Delete Annotation

A data model defines:

- What **things** you record (**Entity**)
- What **details** each entity has (**Property**)
- How they **relate** (**Relationship**)

Example:

Figure (Mythological or Human)

- ID
- Name
- Garment_type
- Garment_color
- Holding (A **figure** holding an **artifact**)

Infrastructure

- ID
- Name
- Type
- Dimension_height
- Dimension_width
- Crossing (An **infrastructure** crossing **another feature**)

Landform

- ID
- Name
- Type
- Location

Artifact

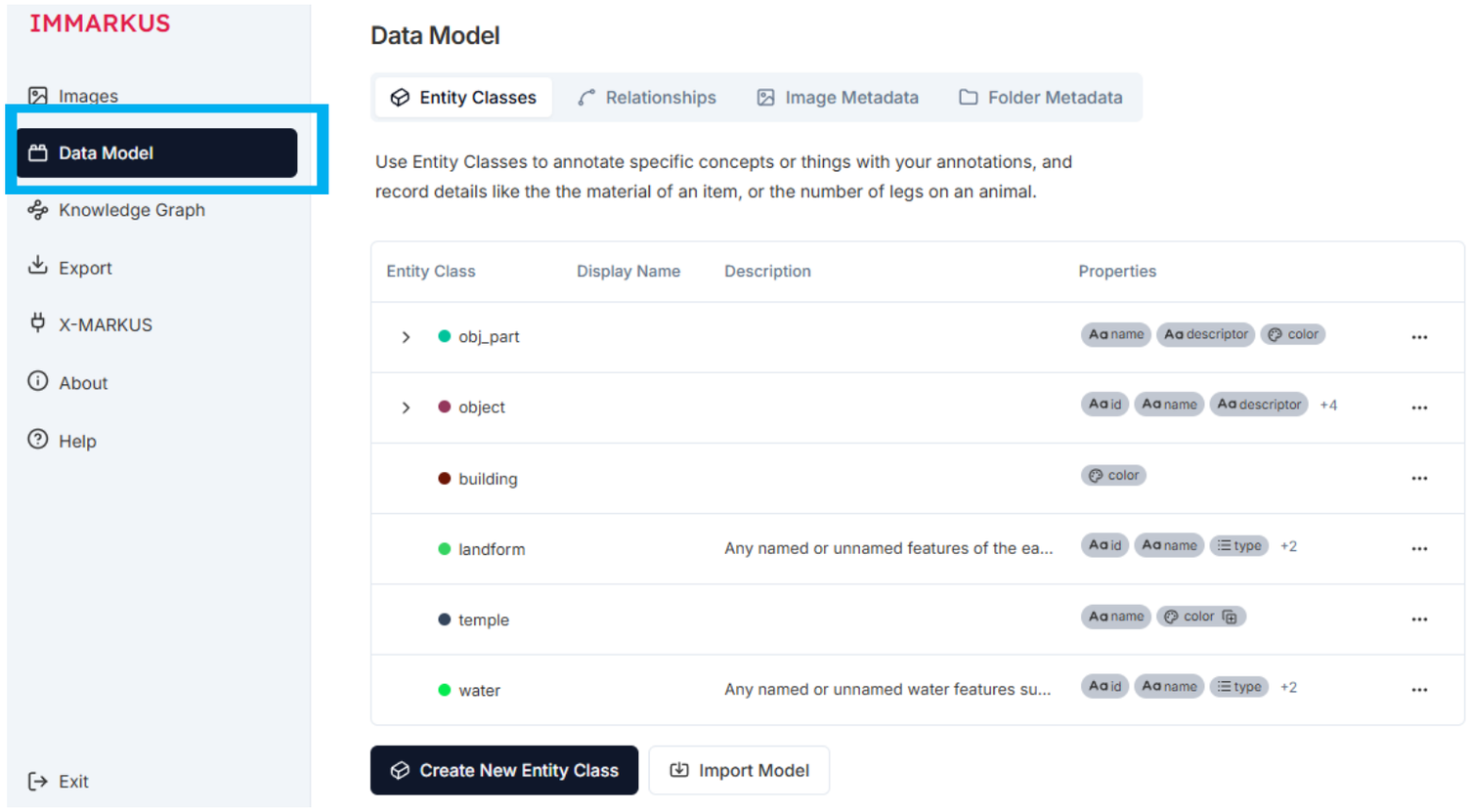
- ID
- Name
- Type
- Material
- Location_current
- Inscription_YN

Why Use a Data Model?

- Ensures consistency across annotations
- Makes annotations searchable and comparable
- Enables complex queries and structured exports

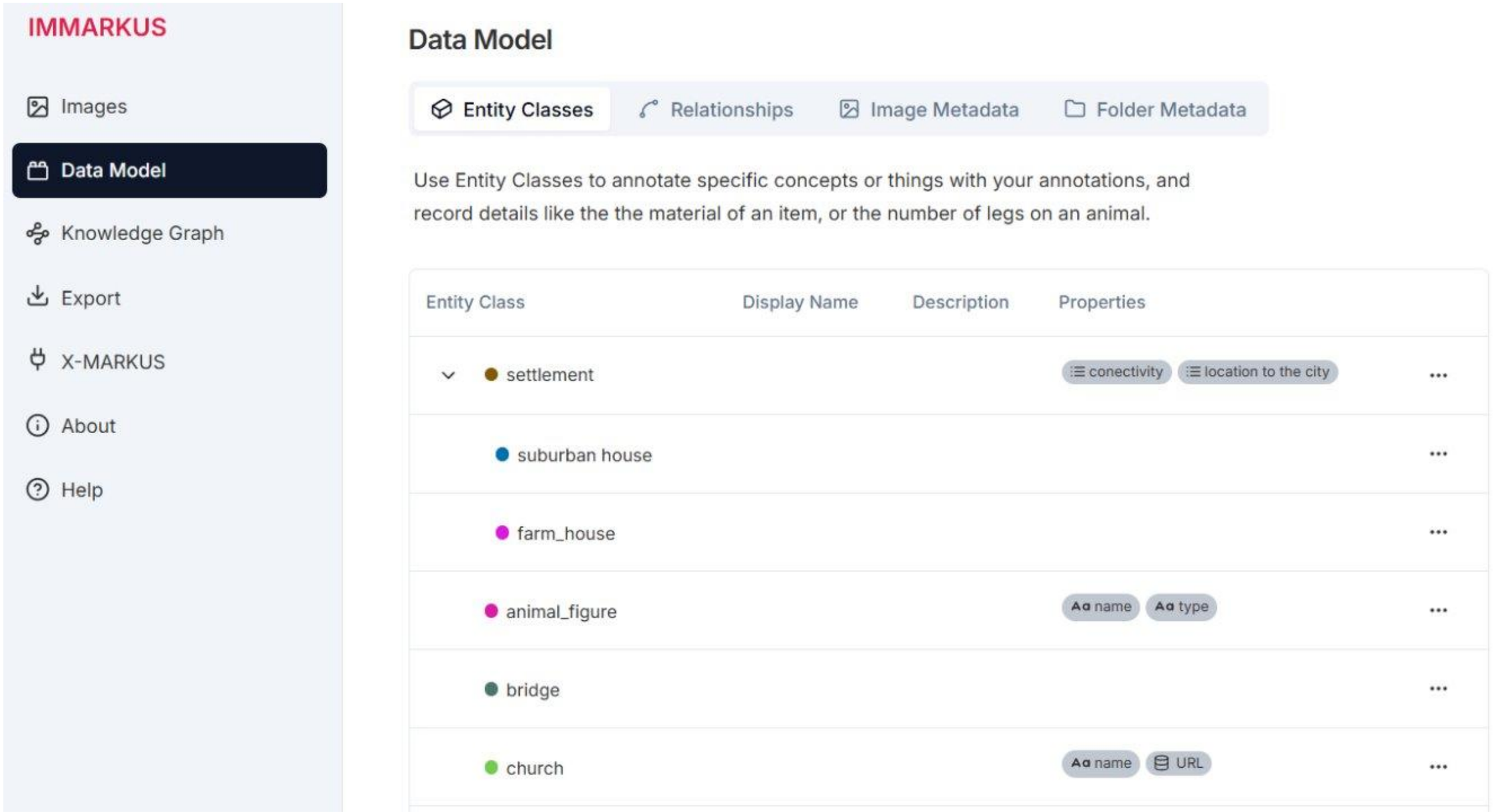
When you annotate, you are already shaping a data model.
To view your current data model:

1. Click on **Data Model** on the left-hand menu bar
2. Navigate what you have created during the annotation practices



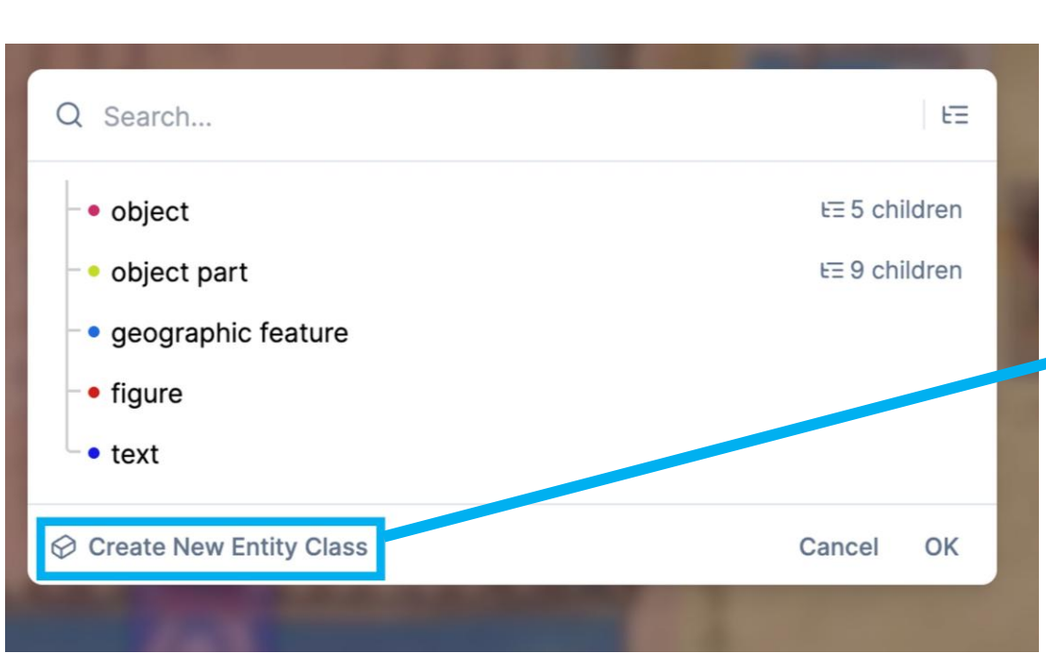
Data Models in IMMARKUS

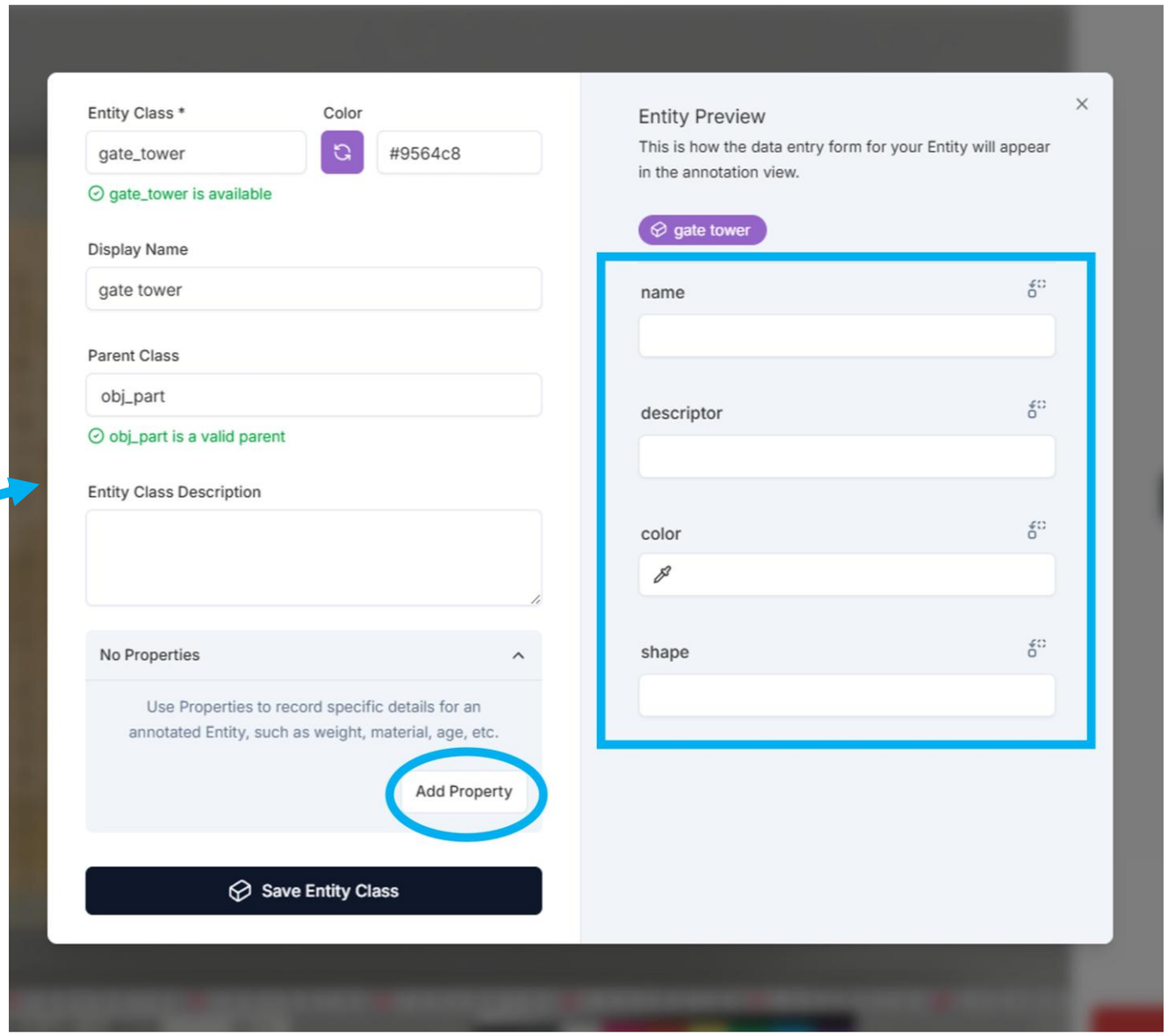
Define schema (entity classes, properties, relationships and metadata) directly in **Data Model Mode**



Data Models in IMMARKUS

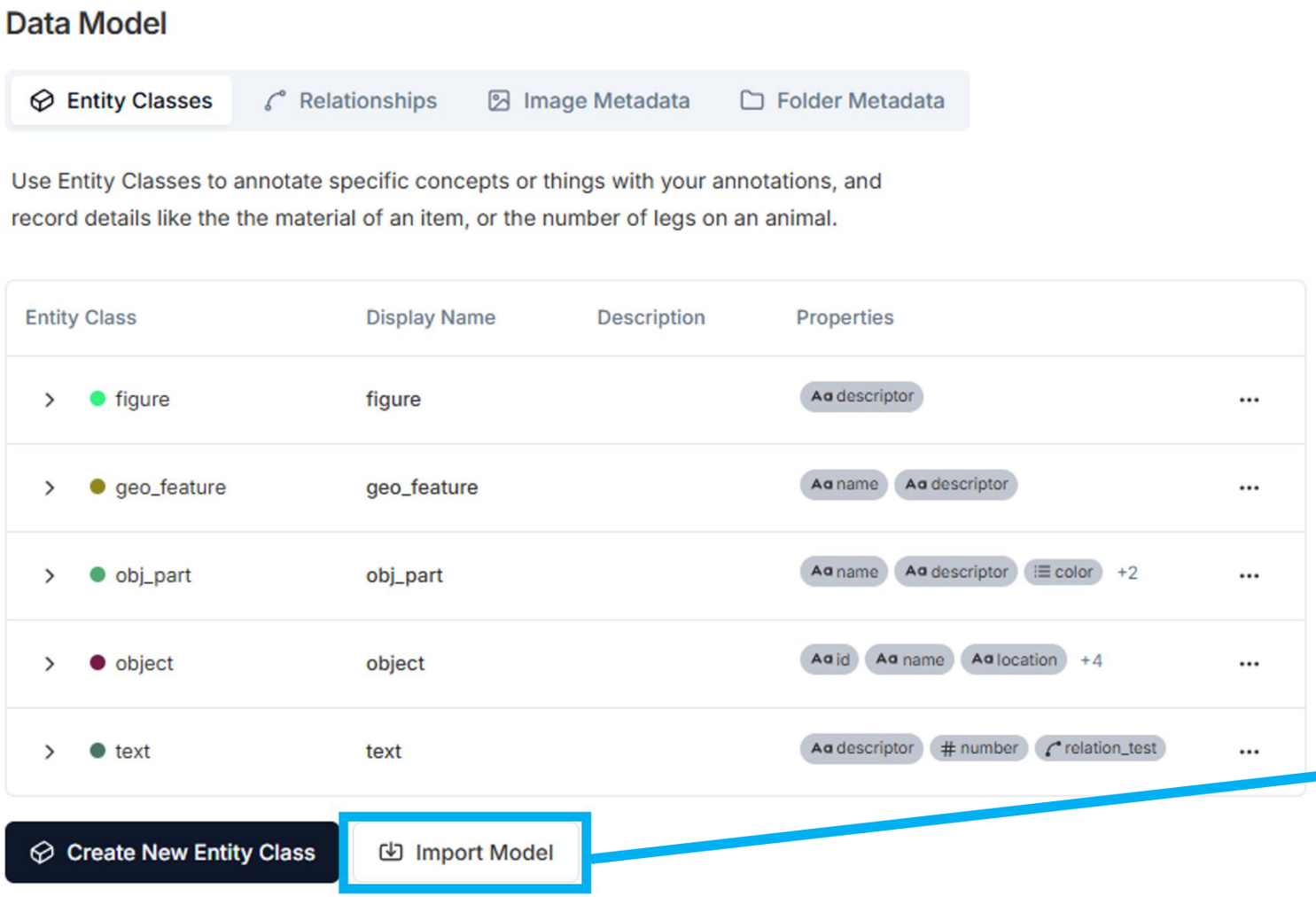
Create or expand schema (new entity classes, properties, and relationships) in **Annotation Mode**

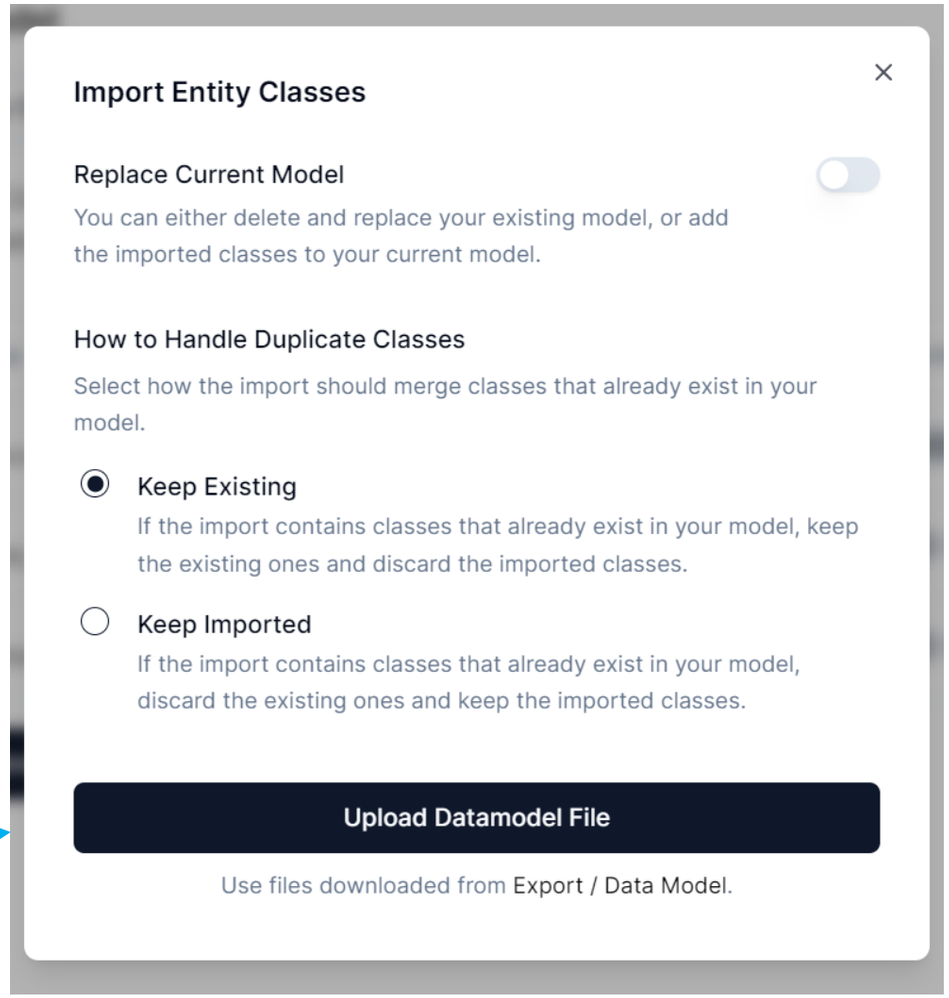




Data Models in IMMARKUS

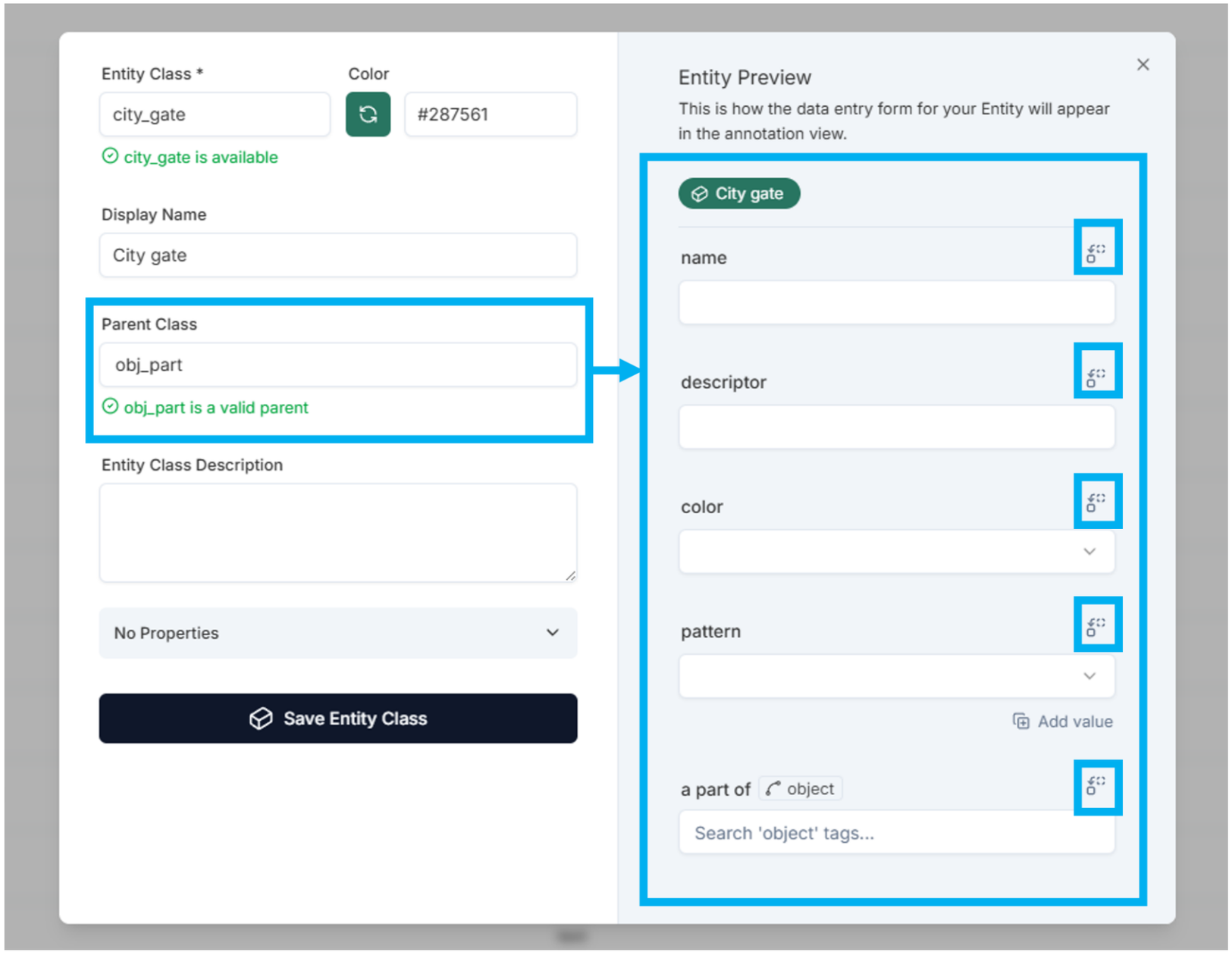
Import / Reuse data model from other projects in **Data Model Mode**





Tips

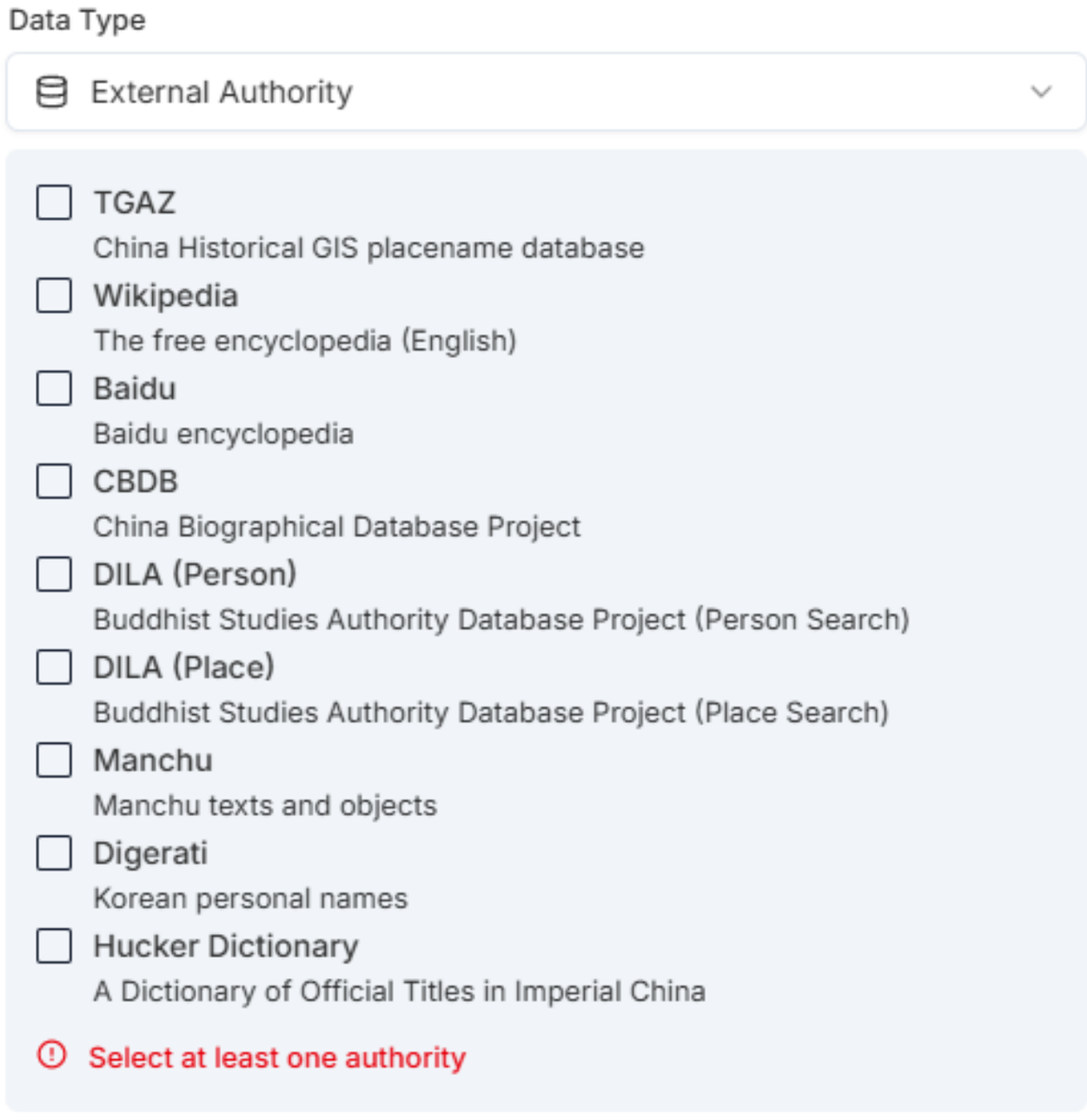
Make use of **parent-child class hierarchies** to avoid duplicating properties for entities that share certain characteristics



Child classes inherit properties from parent classes

Tips

Make use of **external authorities** to connect your entities to other knowledge bases



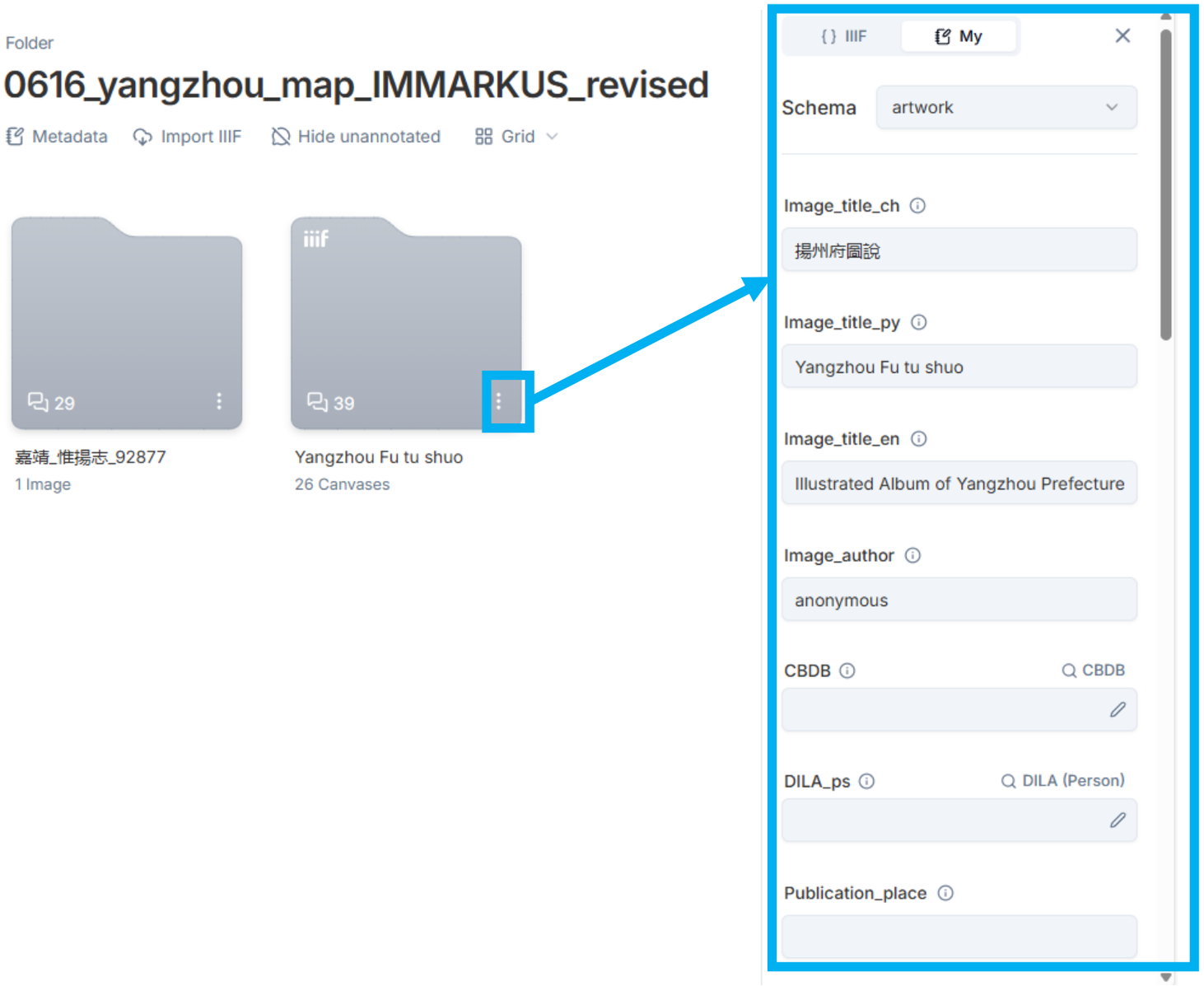
Practice 4. Adding a Child Class to Your Data Model

1. Click **Data Model** on the left-hand menu bar.
2. Click **Create New Entity Class**
3. Type the name of your new entity class
4. Type one of the existing entity class name in the **Parent Class** field

5. Click **Save Entity Class**

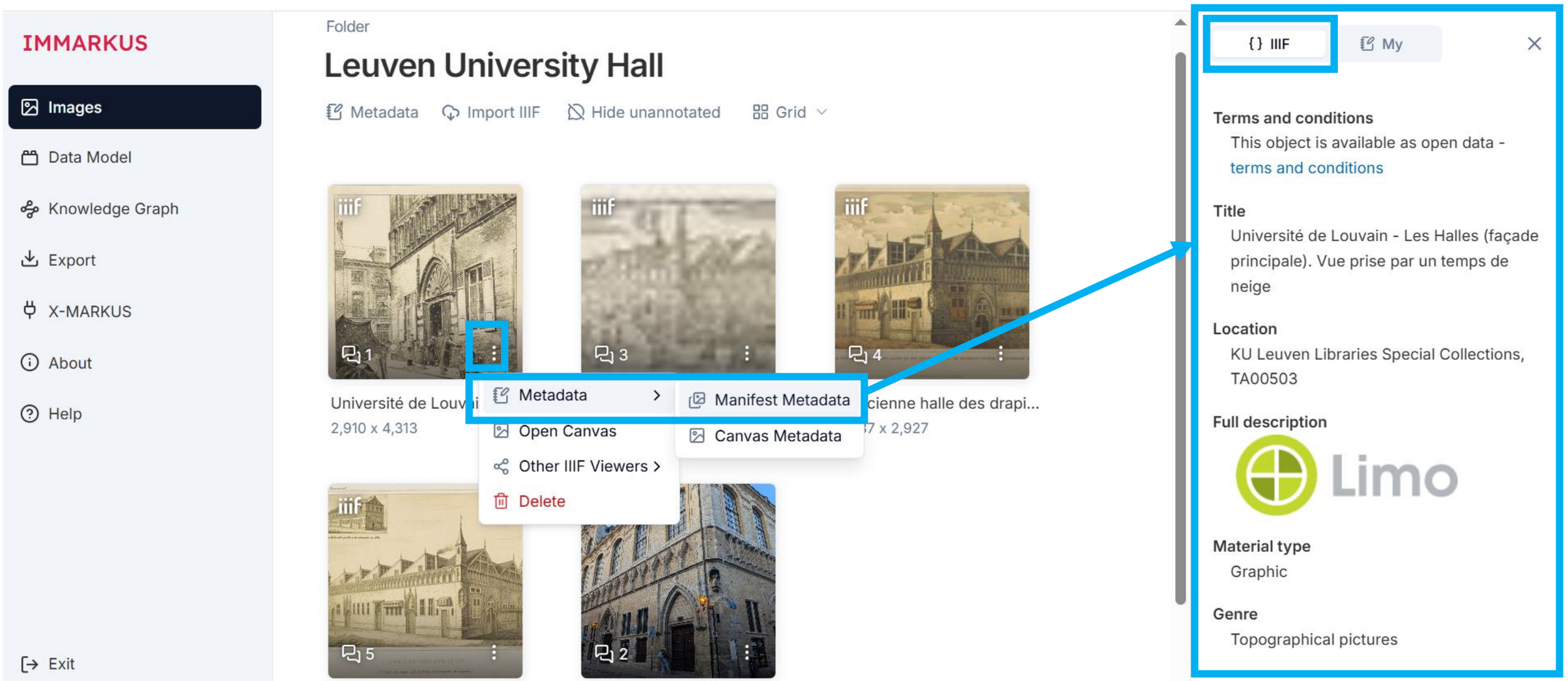
Working with Metadata

- The data about your data: **what** something is, **who** made it, **when** and **where** it comes from
- Supports **citations**, **reuse**, and **data linking**



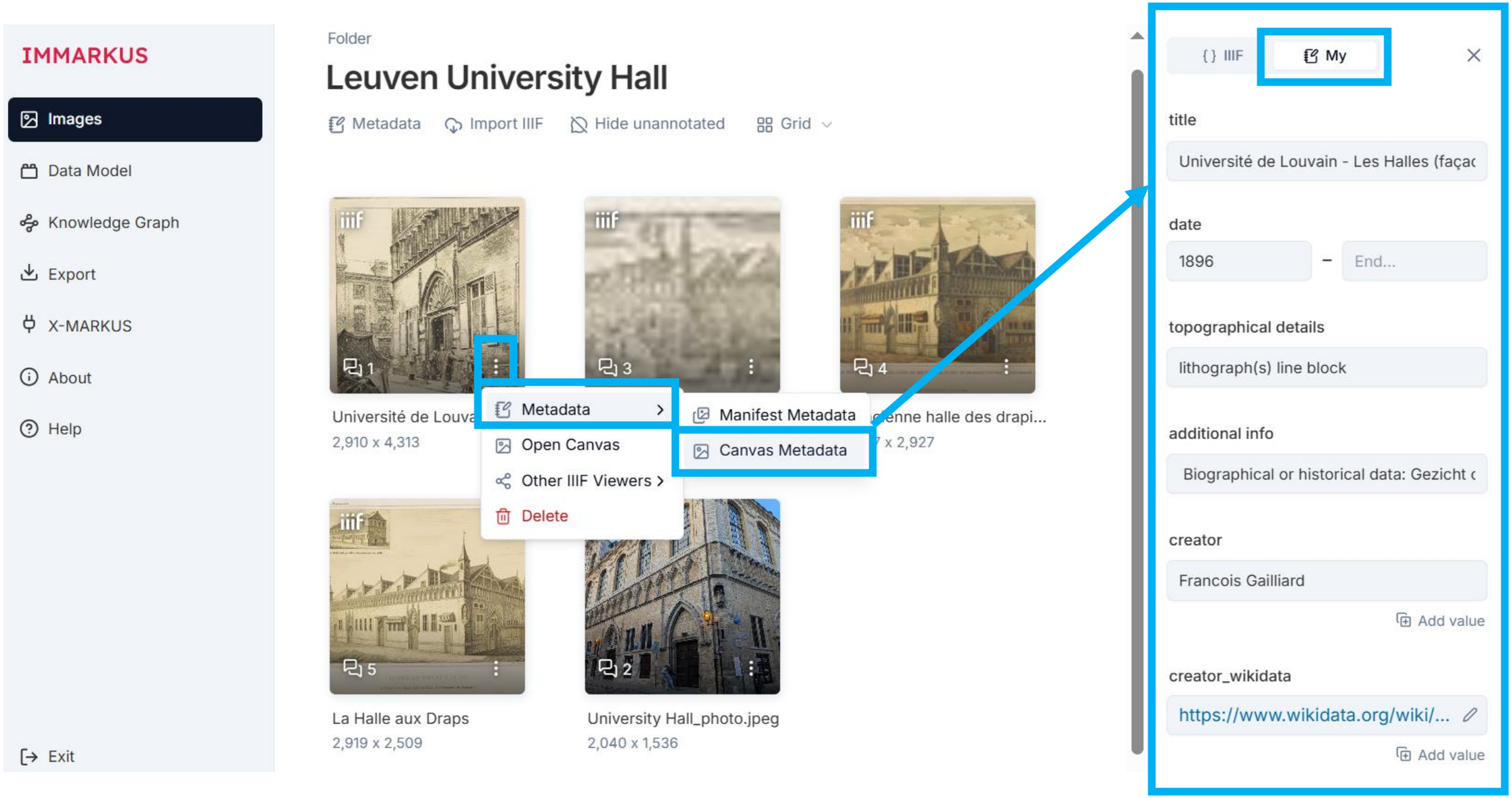
Metadata in IMMARKUS

For IIIF images, the embedded metadata is automatically retrieved and displayed.



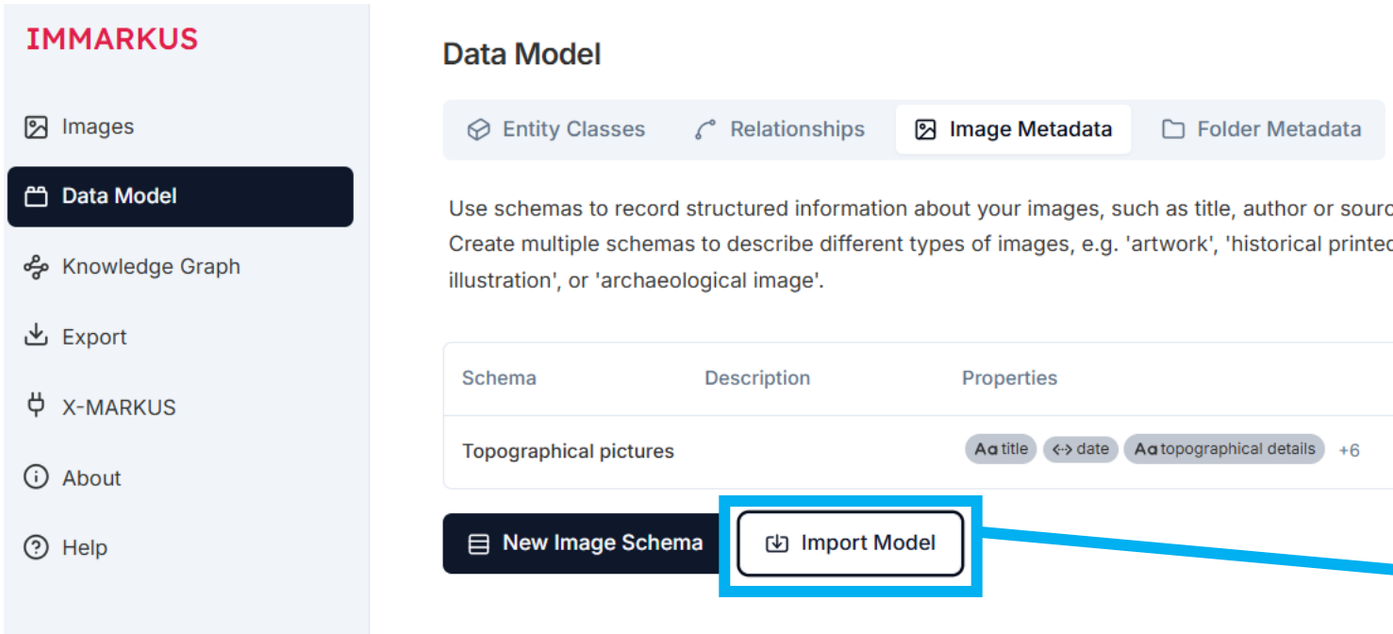
Metadata in IMMARKUS

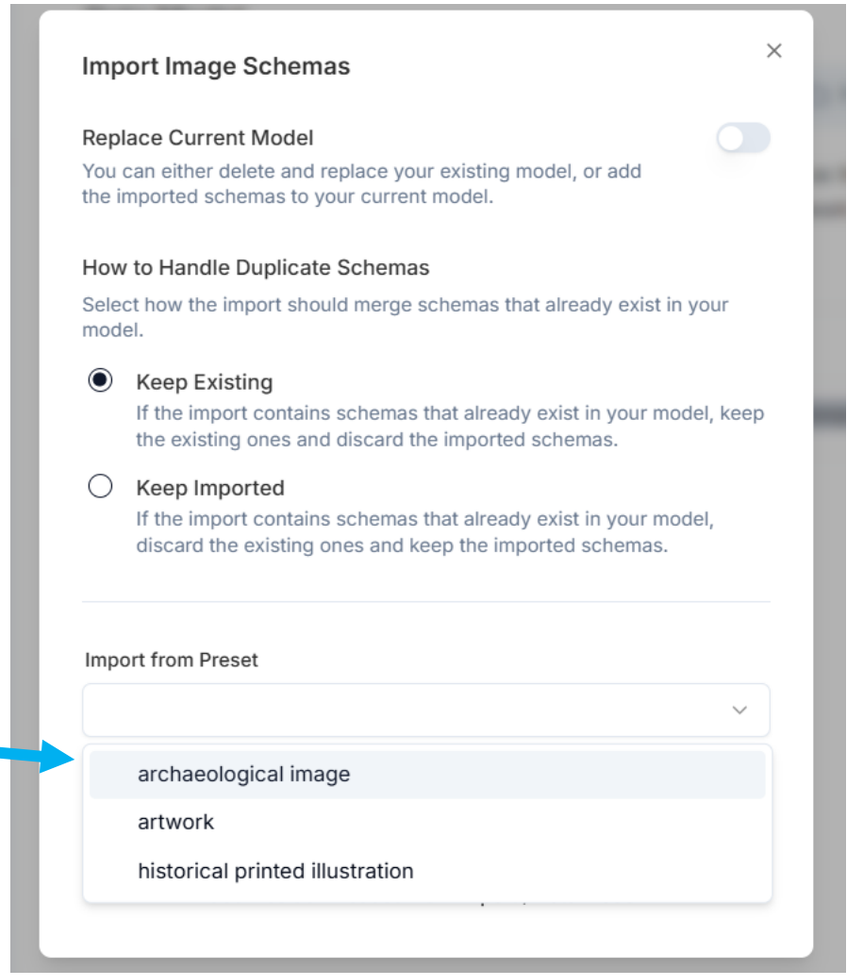
You can also edit and save metadata for IIIF resources using your own schema.



Metadata in IMMARKUS

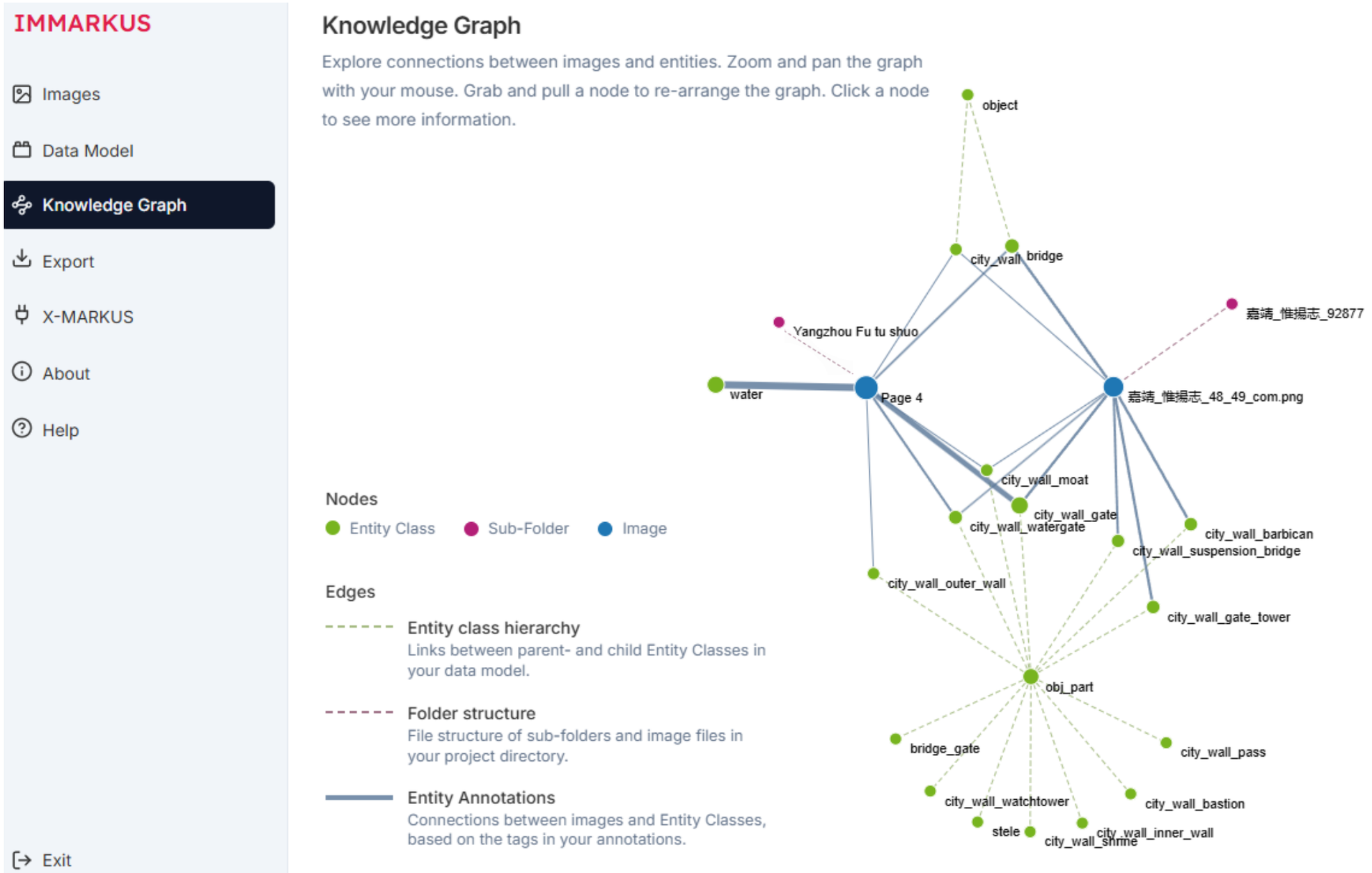
Or you can import preset schemas (e.g. ‘archaeological image’, ‘artwork’, and ‘historical printed illustration’) in **Data Model Mode**.



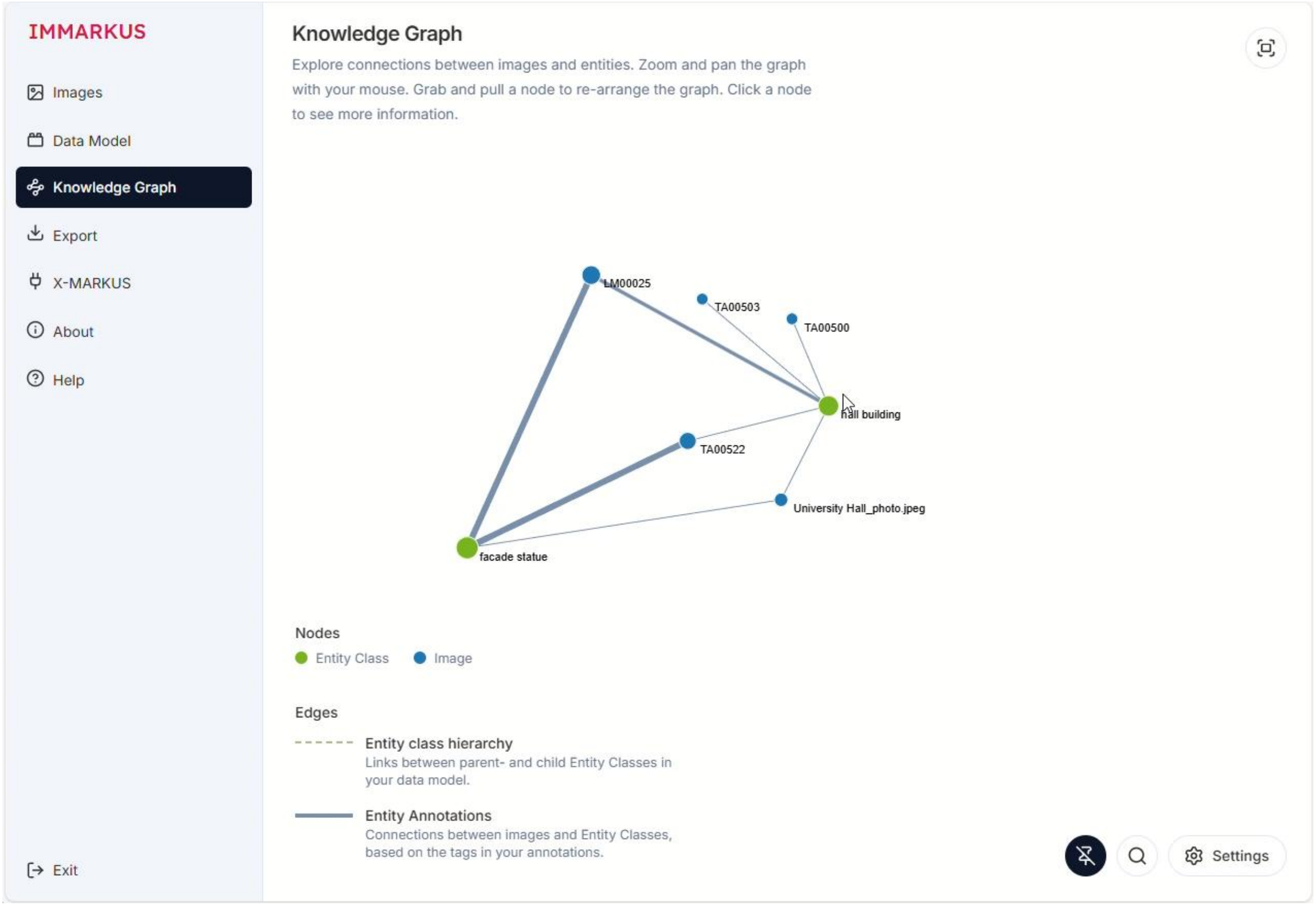


4. Visualising and Querying Annotations

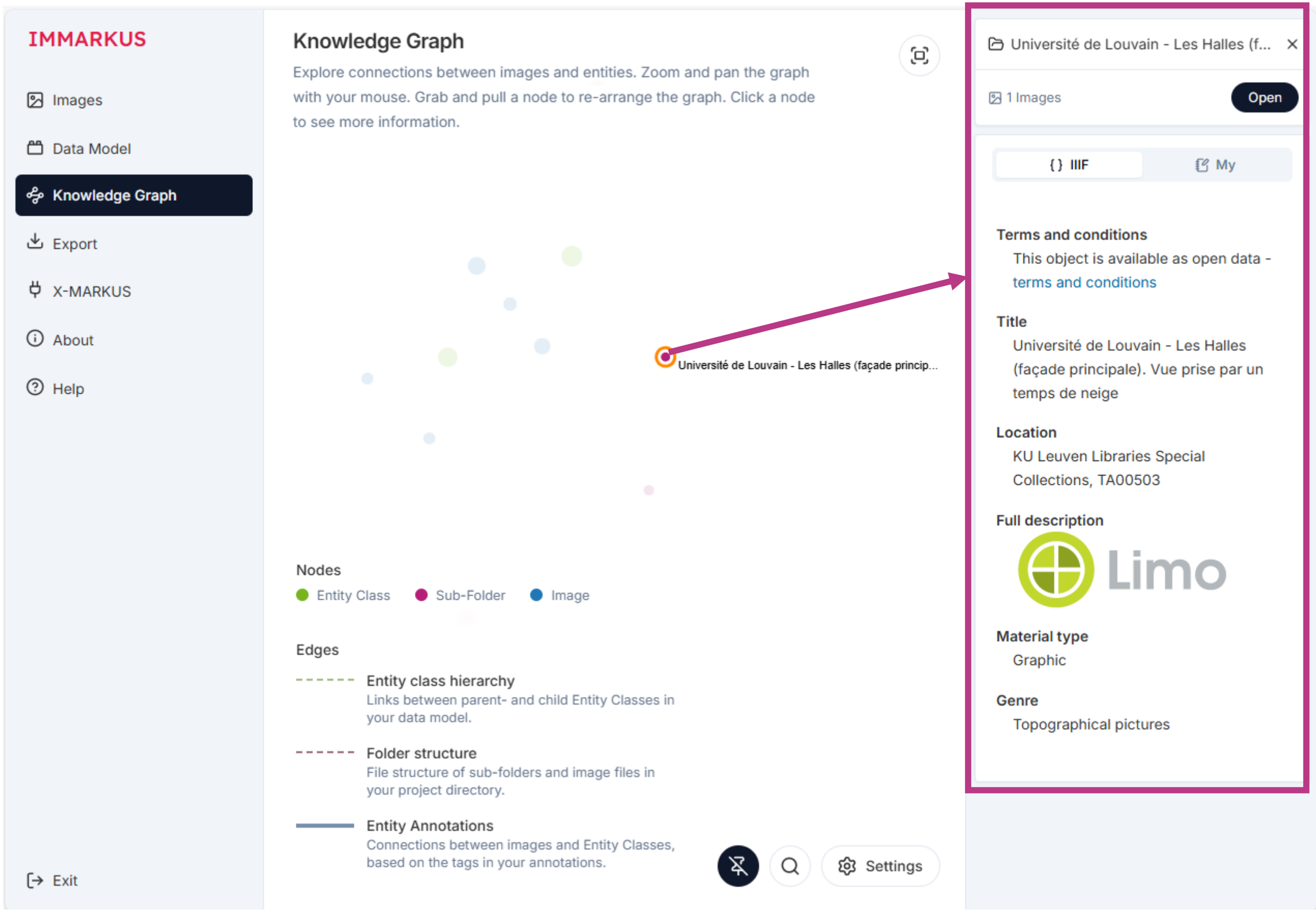
Graph view helps reveal patterns and connections across annotations and their sources.



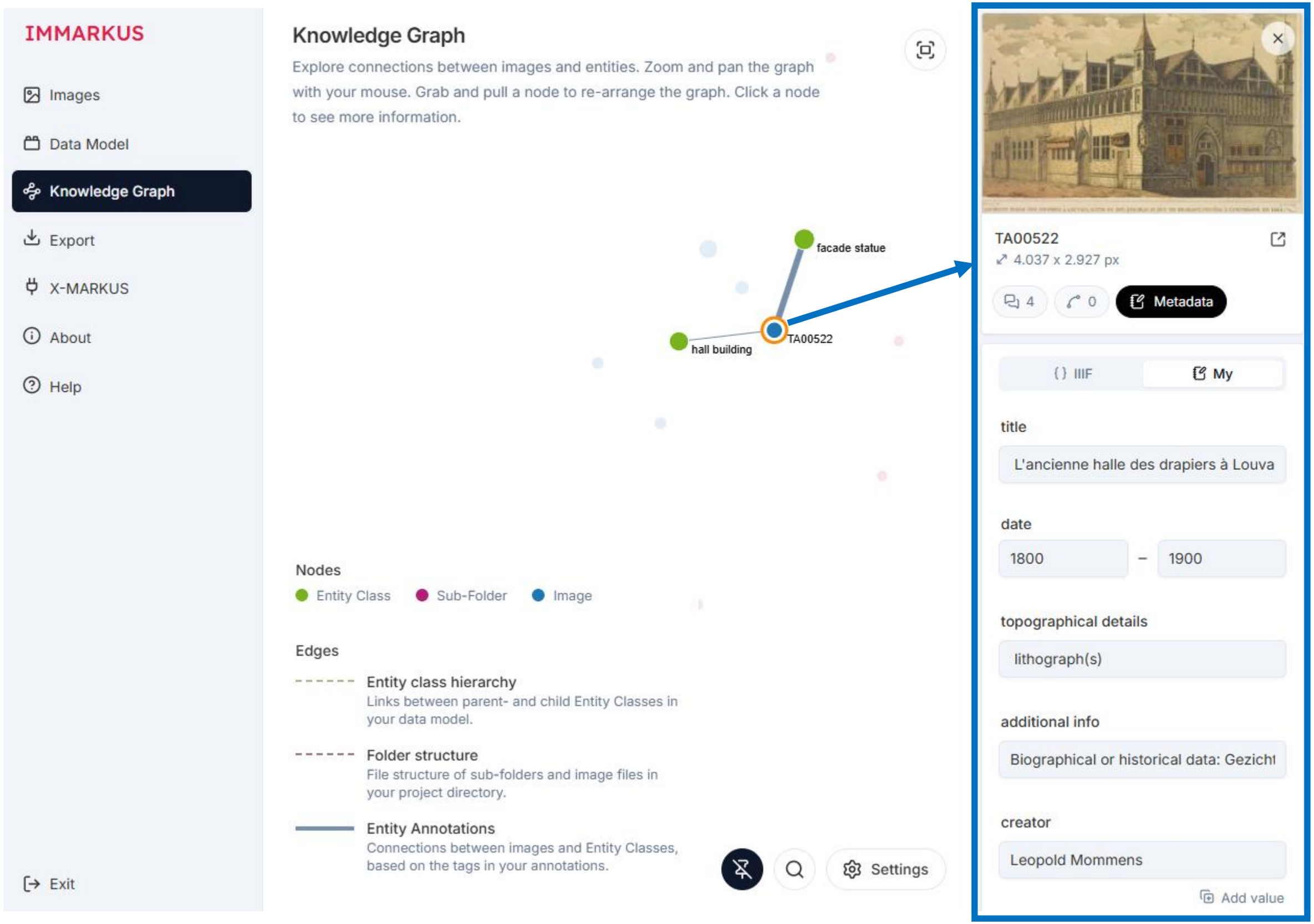
Hovering over and clicking nodes to view the connections and annotations



Clicking sub-folder nodes ● to view the collection details



Clicking image nodes ● to view the image details



Clicking image nodes ● to view the image details or the annotated shapes within it

IMMARKUS

- Images
- Data Model
- Knowledge Graph
- Export
- X-MARKUS
- About
- Help

Exit

Knowledge Graph

Explore connections between images and entities. Zoom and pan the graph with your mouse. Grab and pull a node to re-arrange the graph. Click a node to see more information.

Nodes

Entity Class · Sub-Folder · Image

Edges

- Entity class hierarchy — Links between parent- and child Entity Classes in your data model.
- Folder structure — File structure of sub-folders and image files in your project directory.
- Entity Annotations — Connections between images and Entity Classes, based on the tags in your annotations.

Settings

Clicking entity nodes ● to view its annotated shapes

IMMARKUS

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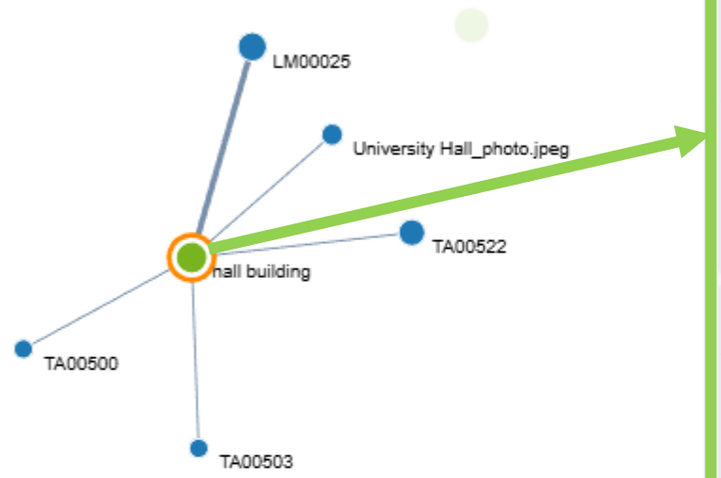
Knowledge Graph

Explore connections between images and entities. Zoom and pan the graph with your mouse. Grab and pull a node to re-arrange the graph. Click a node to see more information.



Nodes

● Entity Class ● Sub-Folder ● Image

Edges

Entity class hierarchy
Links between parent- and child Entity Classes in your data model.

Folder structure
File structure of sub-folders and image files in your project directory.

Entity Annotations
Connections between images and Entity Classes, based on the tags in your annotations.

Settings

hall building

No description

6 Annotations 0

LM00025

La Halle aux Draps · https://www.wikidata.org/wiki/Q1 · 1850 · 1900 · elevation

La halle · https://www.wikidata.org/wiki/Q1 · 1680 · elevation

TA00500

Des Halles · https://www.wikidata.org/wiki/Q1 · 1700 · 1750 · elevation

TA00503

Les Halles · https://www.wikidata.org/wiki/Q1 · 1896 · facade

TA00522

Ancienne Halle des Drapiers · https://www.wikidata.org/wiki/Q1 · 1800 · 1900 · elevation

University Hall_photo.jpeg

University Hall · https://www.wikidata.org/wiki/Q1 · 2025 · facade

Practice 5. Navigating Your Annotations in the Knowledge Graph

---

1. Click **Knowledge Graph** on the left-hand menu bar

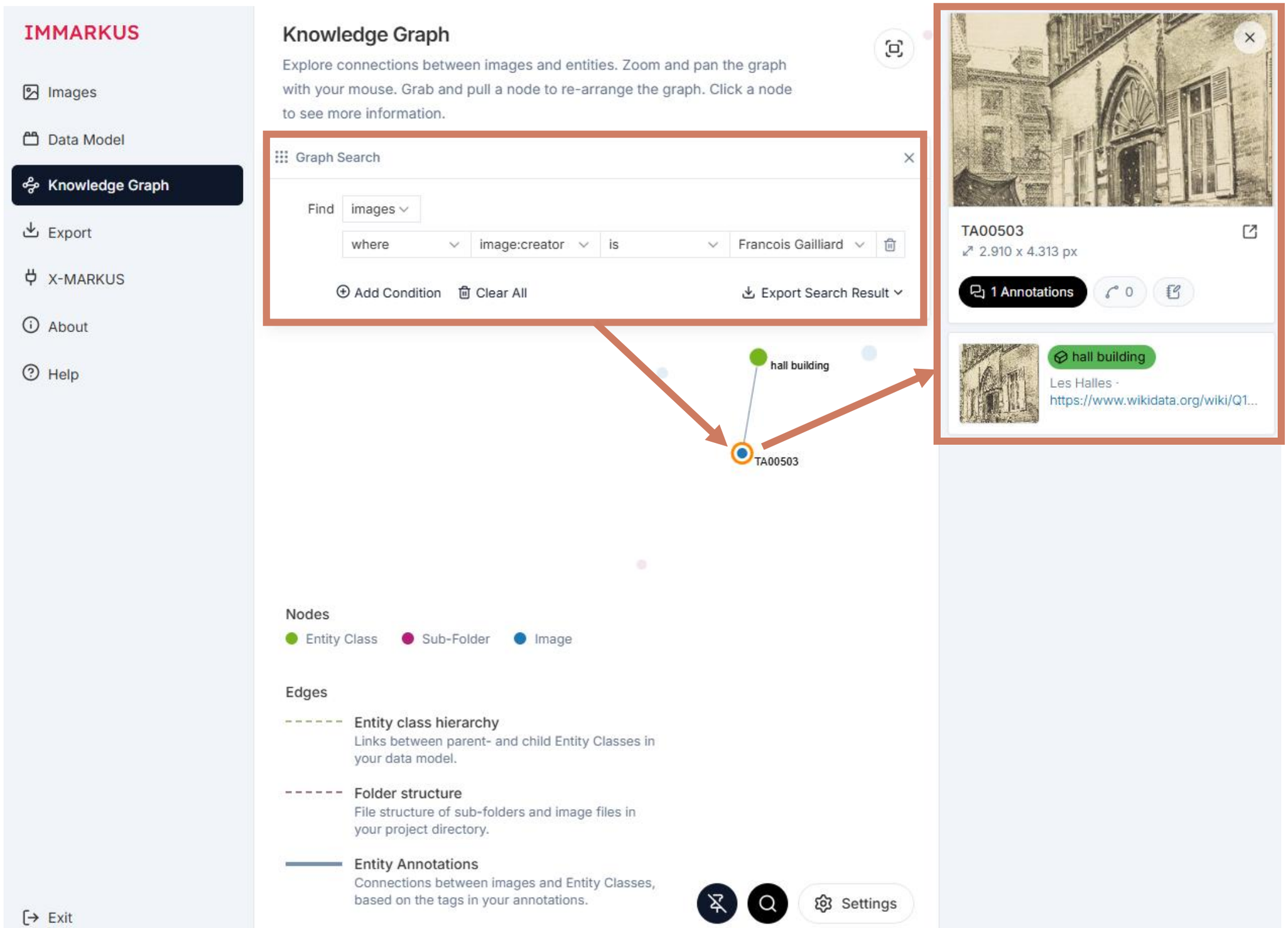
2. Hover over an **Entity Node** 🟢 to see the entity class hierarchy and its connection with the **Image Node** 🔵

3. Click an **Image Node** 🔵 to navigate the annotations associated

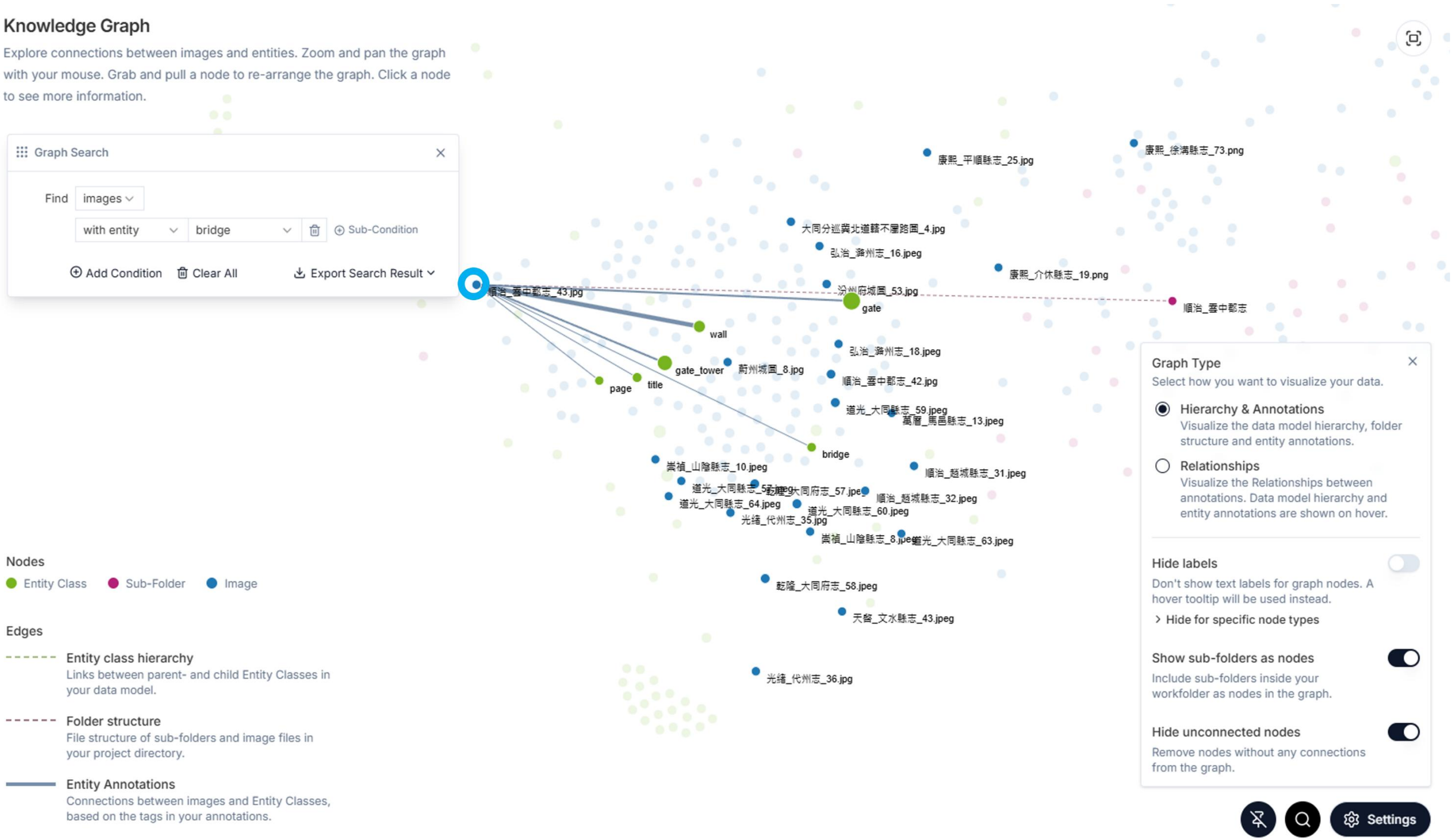
4. Click **Settings**, then toggle on **Show sub-folders as nodes**

5. Click a **Sub-Folder Node** 🟣 to view the metadata fetched from IIIF manifests

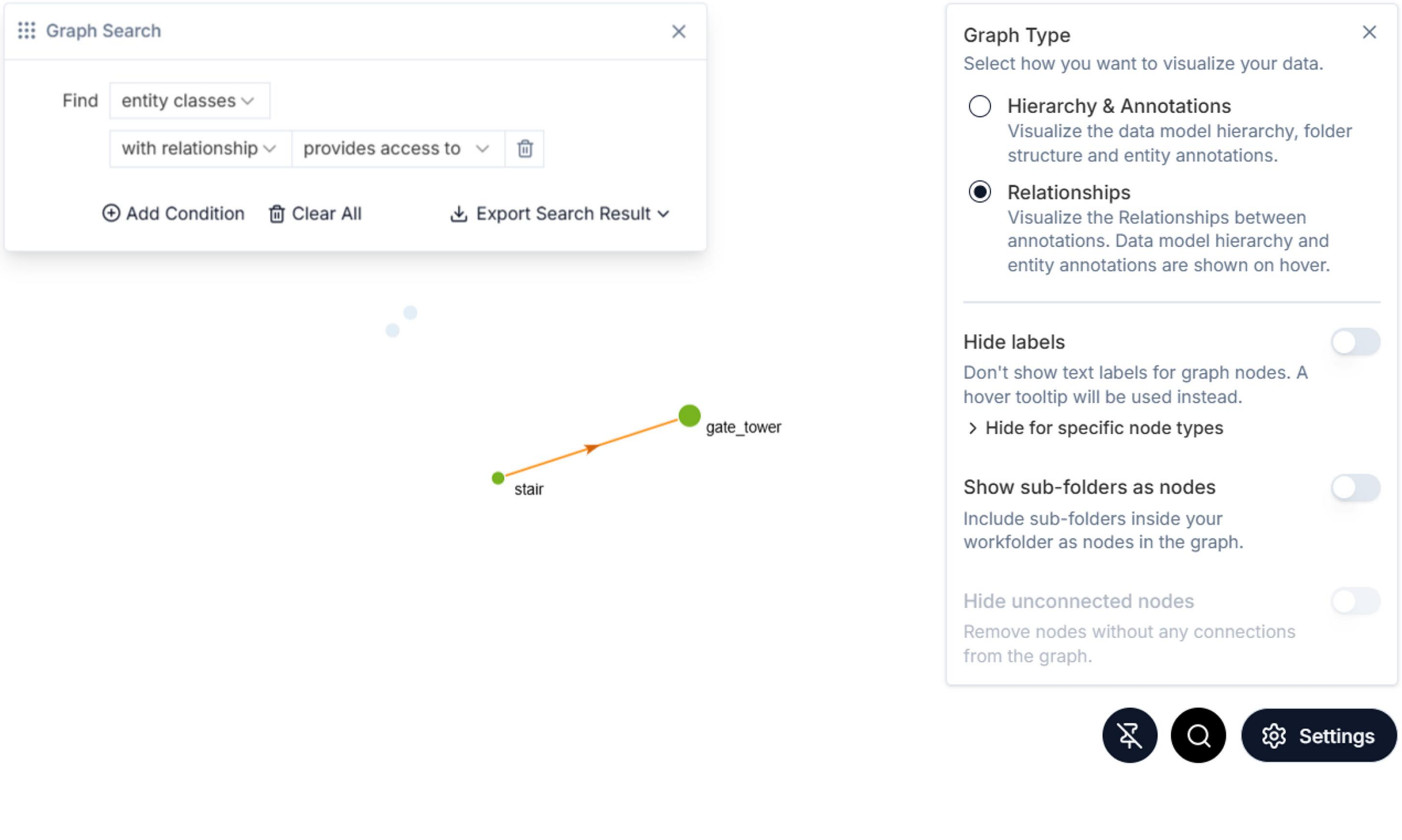
Querying Images and Annotations



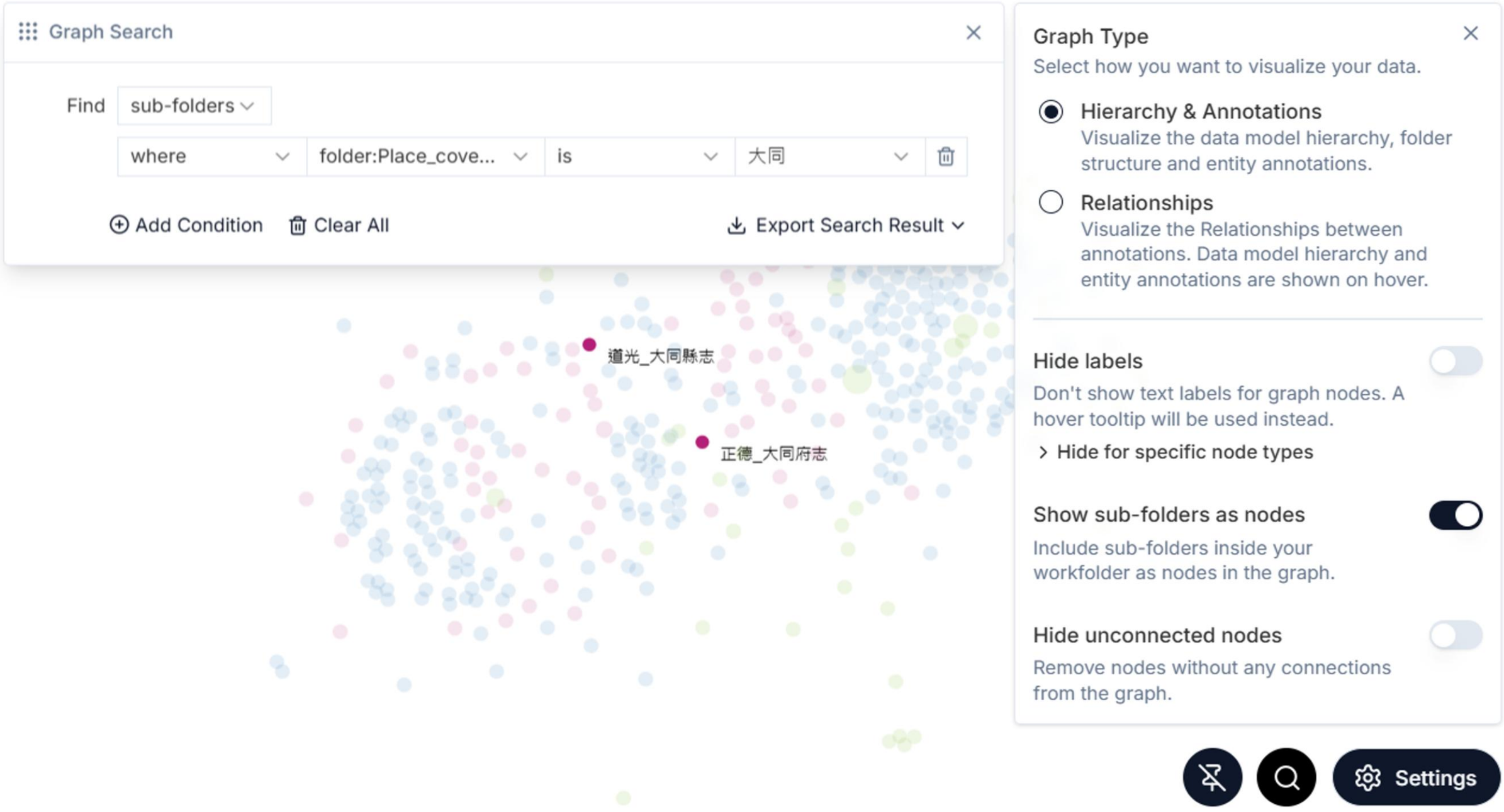
Searching by Entity Class



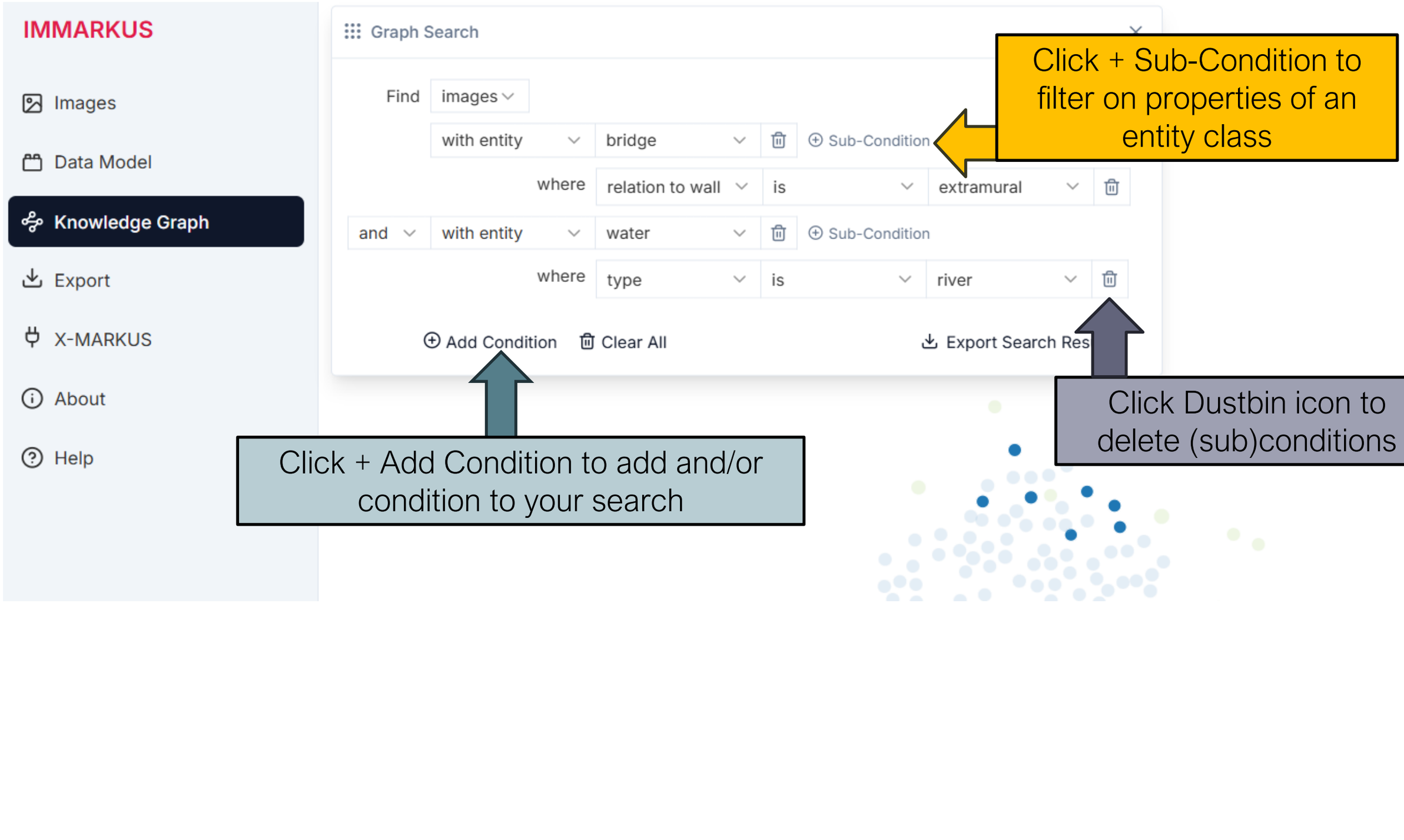
Searching by Relationship



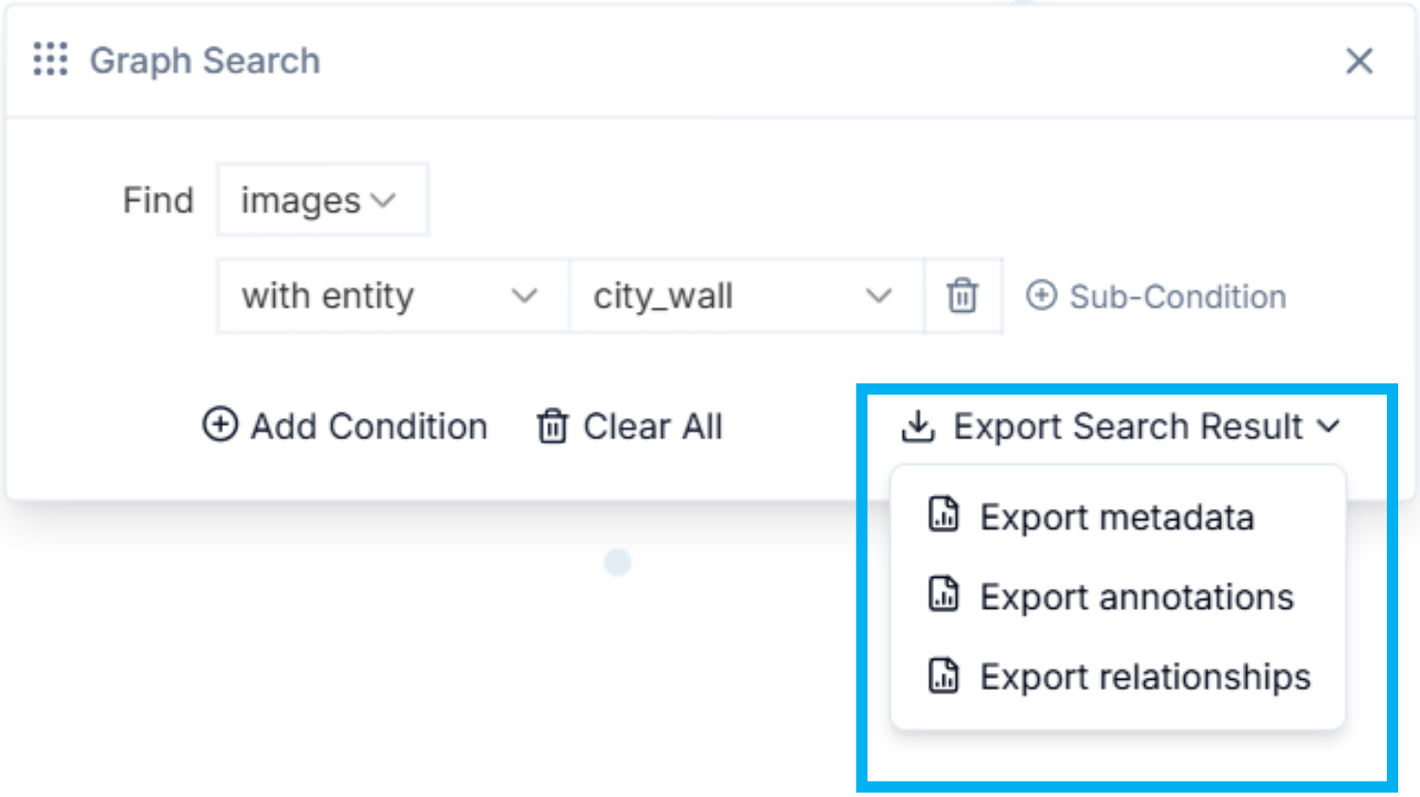
Searching by Metadata



Adding and Managing Conditions

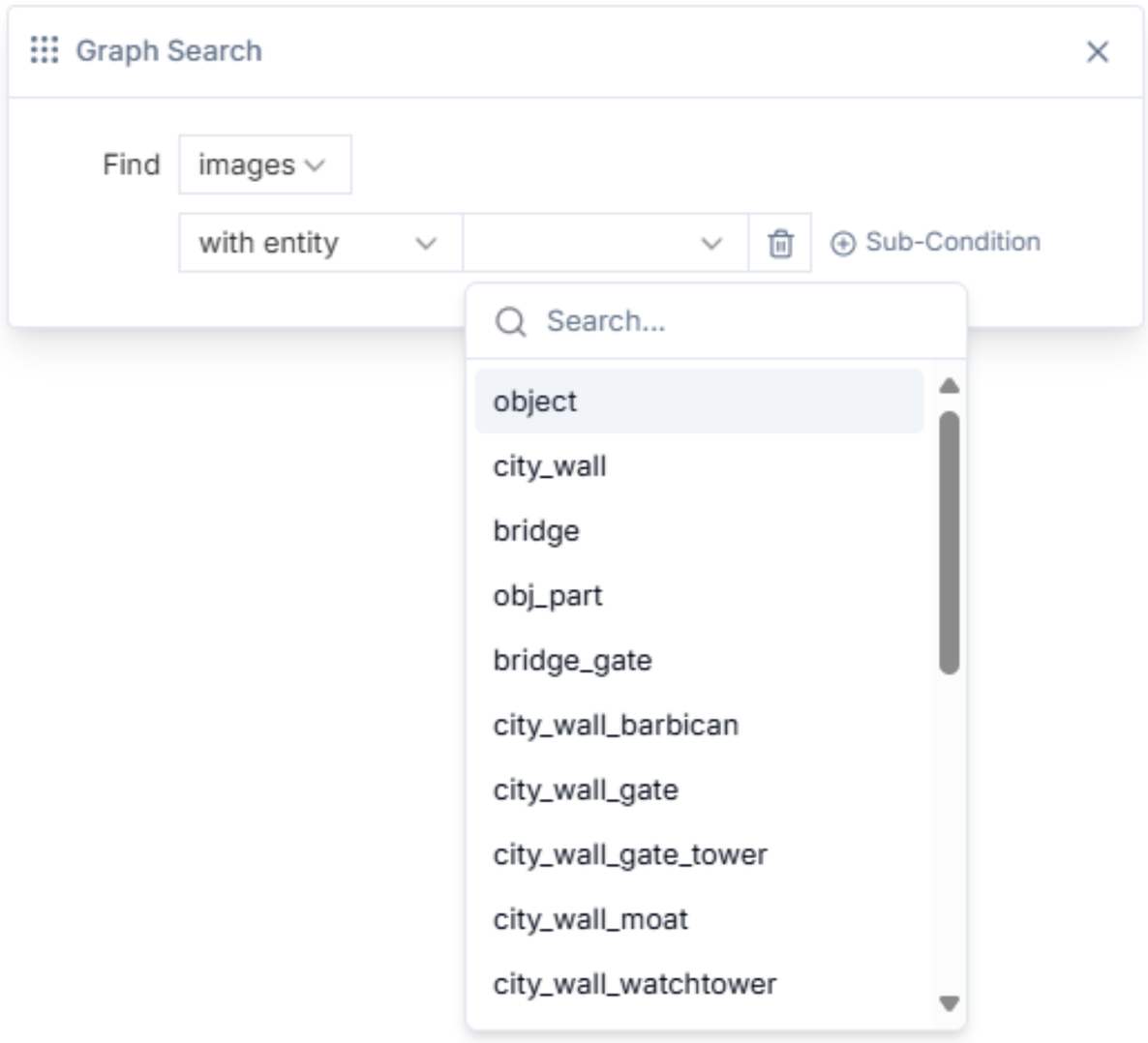


Exporting Graph Search Results

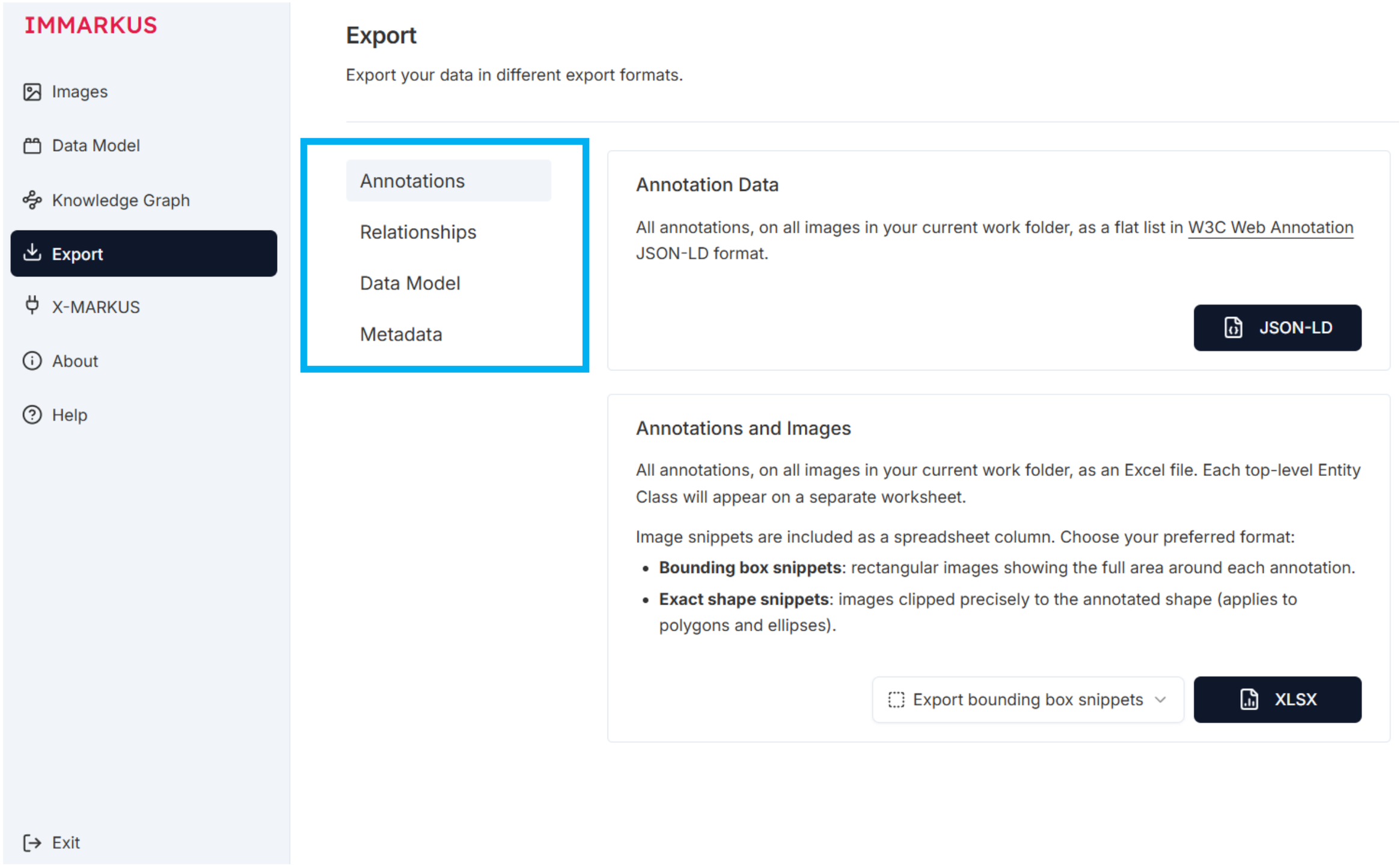


Practice 6. Searching for Images by Entity Tags

1. Click the **Magnifier Icon** 🔍
2. Select **Find images** → **with entity** → **select one [entity]** from the dropdown list
3. The image node that meets the condition will be highlighted in the graph
4. Explore adding a **Sub-Condition** to include more search criteria



5. Exporting Annotations and Models



Exporting Annotations for Further Computation

IMMARKUS

- Images
- Data Model
- Knowledge Graph
- **Export**
- X-MARKUS
- About
- Help

Export

Export your data in different export formats.

- Annotations
- Relationships
- Data Model
- Metadata

Annotation Data

All annotations, on all images in your current work folder, as a flat list in W3C Web Annotation JSON-LD format.

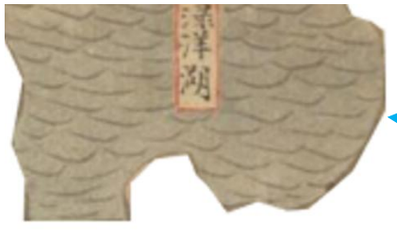
JSON-LD

Annotations and Images

All annotations, on all images in your current work folder, as an Excel file. Each top-level Entity Class will appear on a separate worksheet.

Image snippets are included as a spreadsheet column. Choose your preferred format:

- **Bounding box snippets**: rectangular images showing the full area around each annotation.
- **Exact shape snippets**: images clipped precisely to the annotated shape (applies to polygons and ellipses).



Export bounding box snippets

XLSX

Export bounding box snippets

Export exact shape snippets

Exporting Annotations for Further Computation

Snippet column

Annotated Properties

	A	B	C	D	E	F	G	H	I
1	Snippet	Image Filename	Folder Name	Annotation ID	Created	Entity Class	id	nam	descriptor
2		嘉靖_惟揚志_48_49_(	0616_yangzhou_map_IMMARKUS_revised/嘉靖_惟揚	5b9896cd-9b51-4b04-a3c5-5103f8746a8	2025-05-23T10:42:07.021	city_wall	yangzhou_cheng	揚州城	
3		嘉靖_惟揚志_48_49_(	0616_yangzhou_map_IMMARKUS_revised/嘉靖_惟揚	c2f5e32e-d7ec-40a0-b962-b64bc0cc00c6	2025-05-23T10:27:14.434	bridge	yangzhou_kaiming_qiao	開明橋	
4		嘉靖_惟揚志_48_49_(	0616_yangzhou_map_IMMARKUS_revised/嘉靖_惟揚	7173dbd1-110d-4ae6-8d76-677ce680f0c	2025-05-23T10:27:24.170	bridge	yangzhou_wenjin_qiao	文津橋	
5		嘉靖_惟揚志_48_49_(	0616_yangzhou_map_IMMARKUS_revised/嘉靖_惟揚	fd6f5684-0285-4f63-a6a4-50e0b15f8d69	2025-05-23T10:27:38.385	bridge	yangzhou_tongsi_qiao	通泗橋	
6		嘉靖_惟揚志_48_49_(	0616_yangzhou_map_IMMARKUS_revised/嘉靖_惟揚	f40efc83-17a7-495c-92ae-682ebc173153	2025-05-23T10:27:46.122	bridge	yangzhou_taiping_qiao	太平橋	

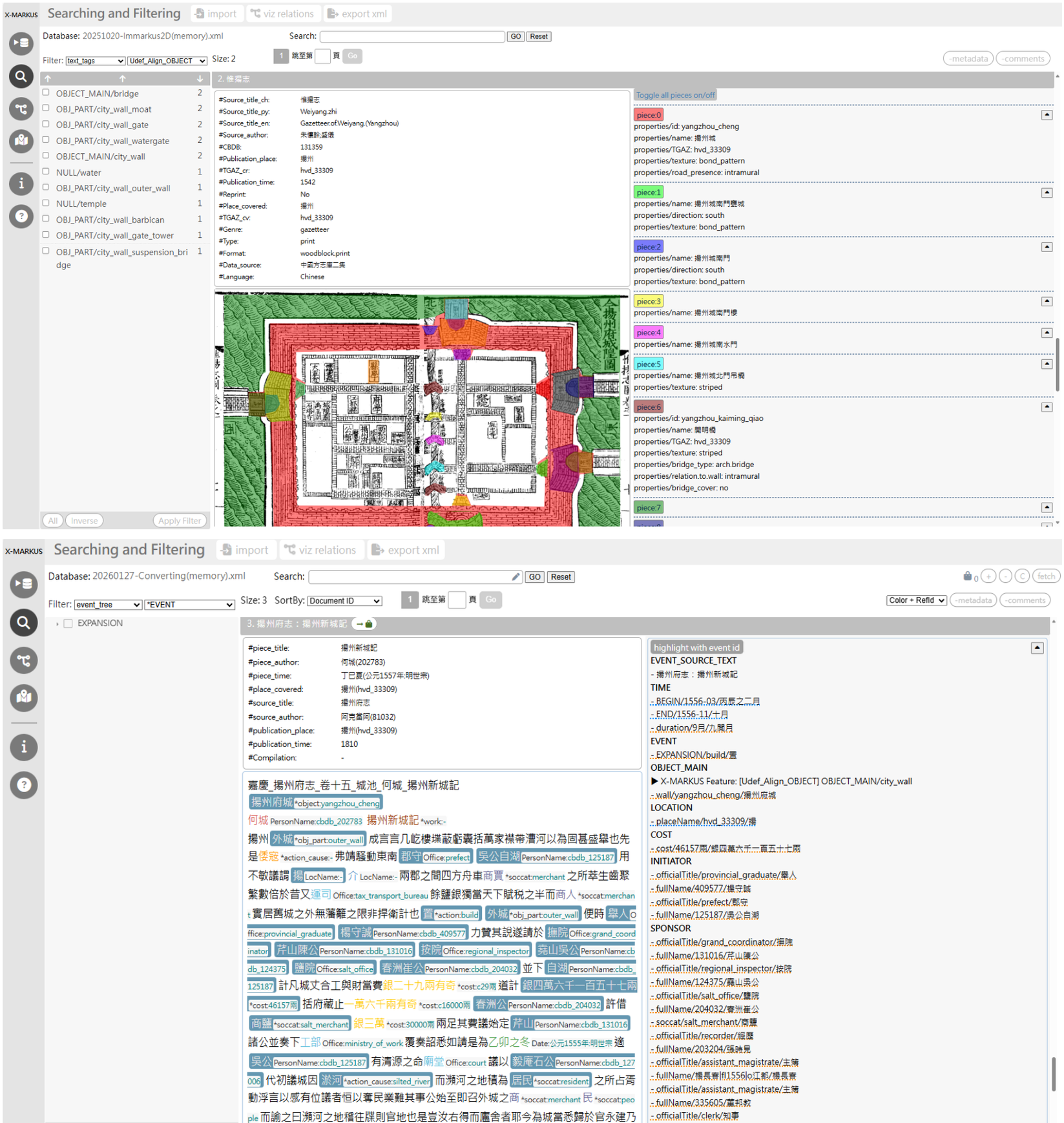
object | obj_part | water | Notes

Entity Classes

Exporting W3C Web Annotation Format

- Annotations have unique IDs
- **`target.source`** references the filename
- Each entity tag stored as one **W3C Annotation Body**
  - Type: **`Dataset`**
  - Purpose: **`classifying`**
  - Source: entity ID in the data model
  - Values stored as serialized key/value pairs
- Comments stored as a **TextualBody**
  - Purpose: **`commenting`**
  - AI annotations retain model information in **`generator`** field

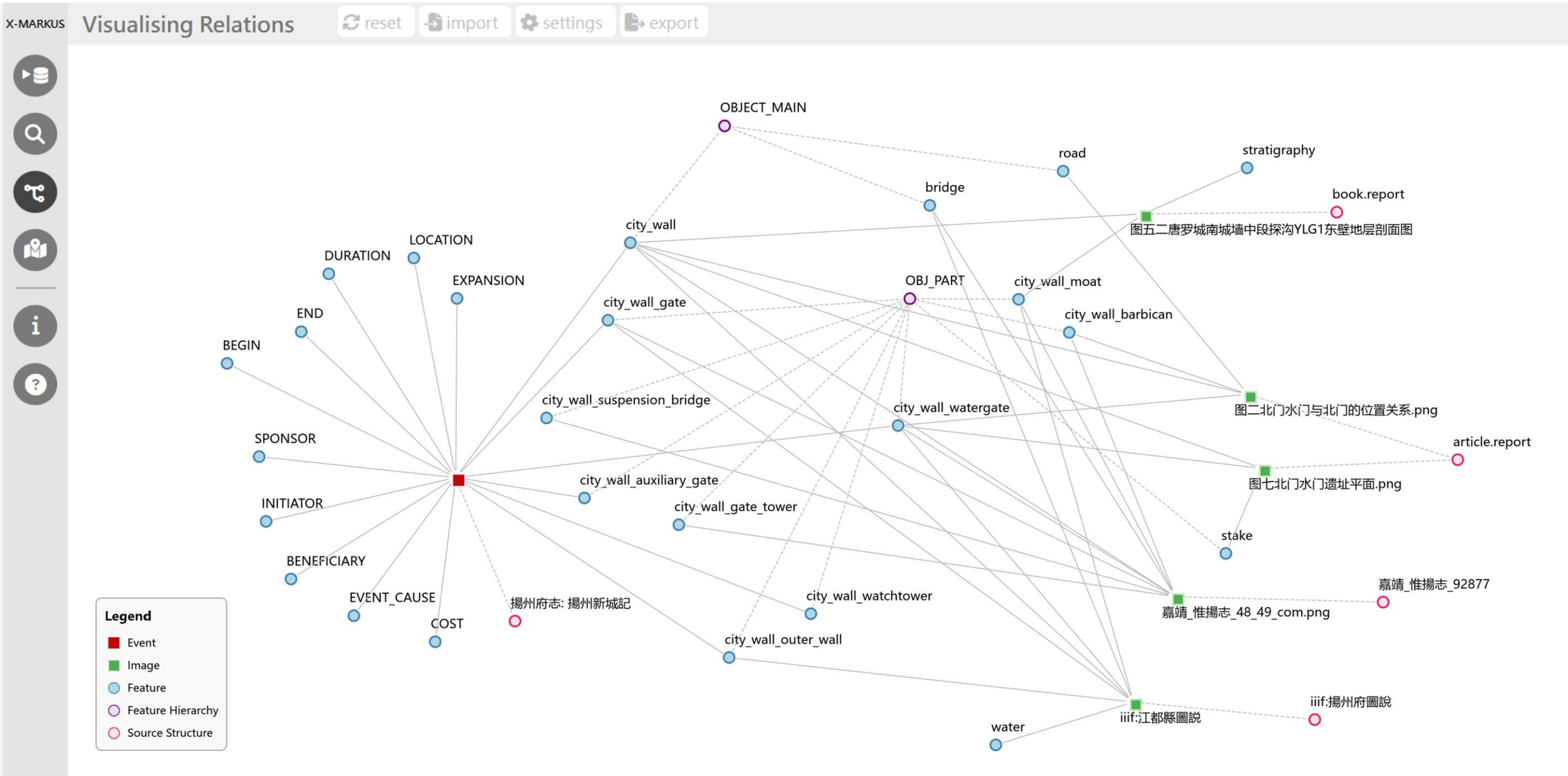
Further Computation Example



IMMARKUS annotations parsed in X-MARKUS
https://xmarkus.xmarkus.org/

Related event annotations parsed in X-MARKUS

Knowledge Graph Showing Entity Connections across Text and Image Corpora

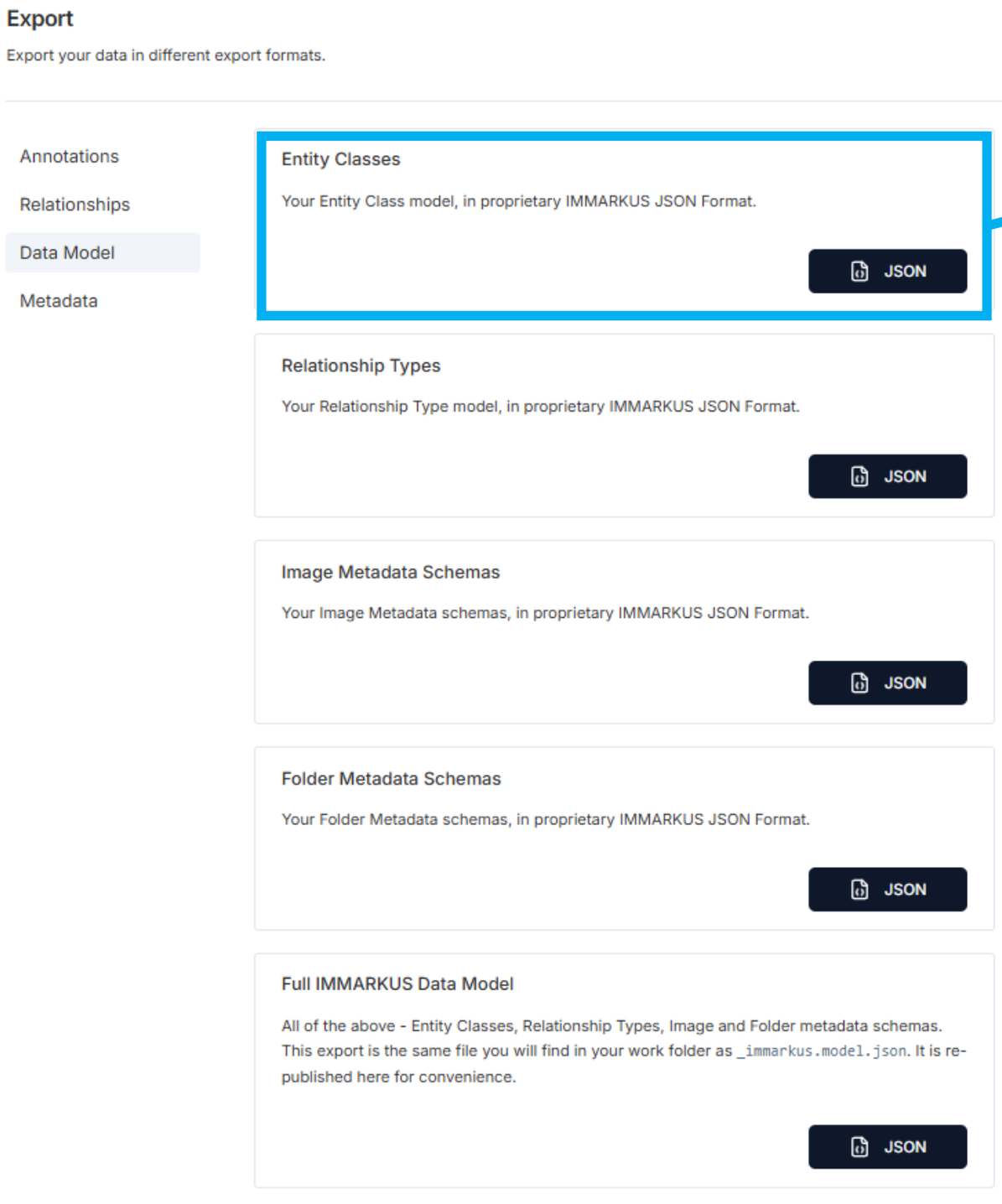


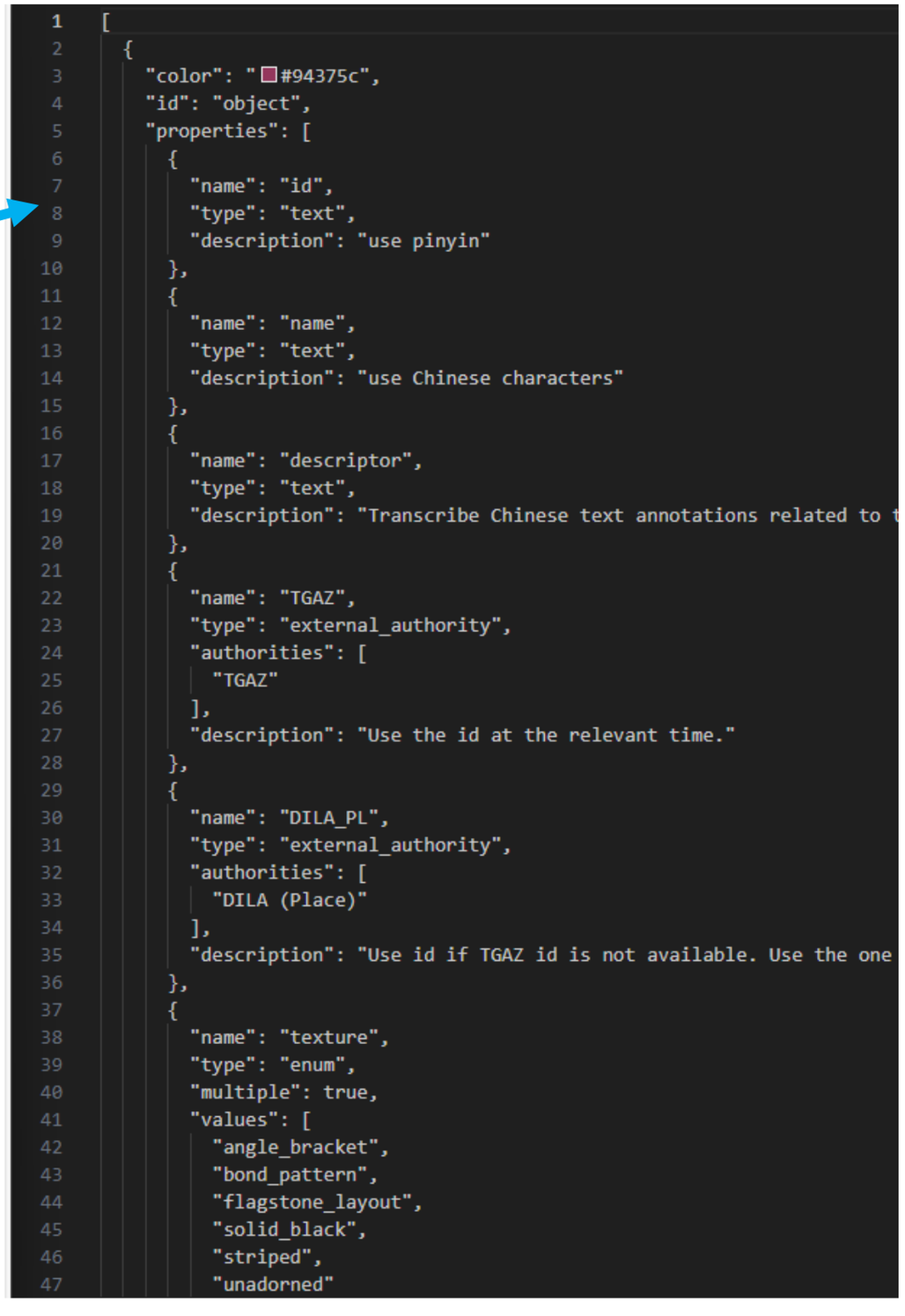
Practice 7. Exporting Your Annotations as an Excel File

---

1. Click **Export** on the left-hand menu bar
2. Select your preferred snippet type, then click **XLSX**
3. Open the downloaded Excel file to view your annotations

Exporting Data Models for Reuse





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[
  {
    "color": "#94375c",
    "id": "object",
    "properties": [
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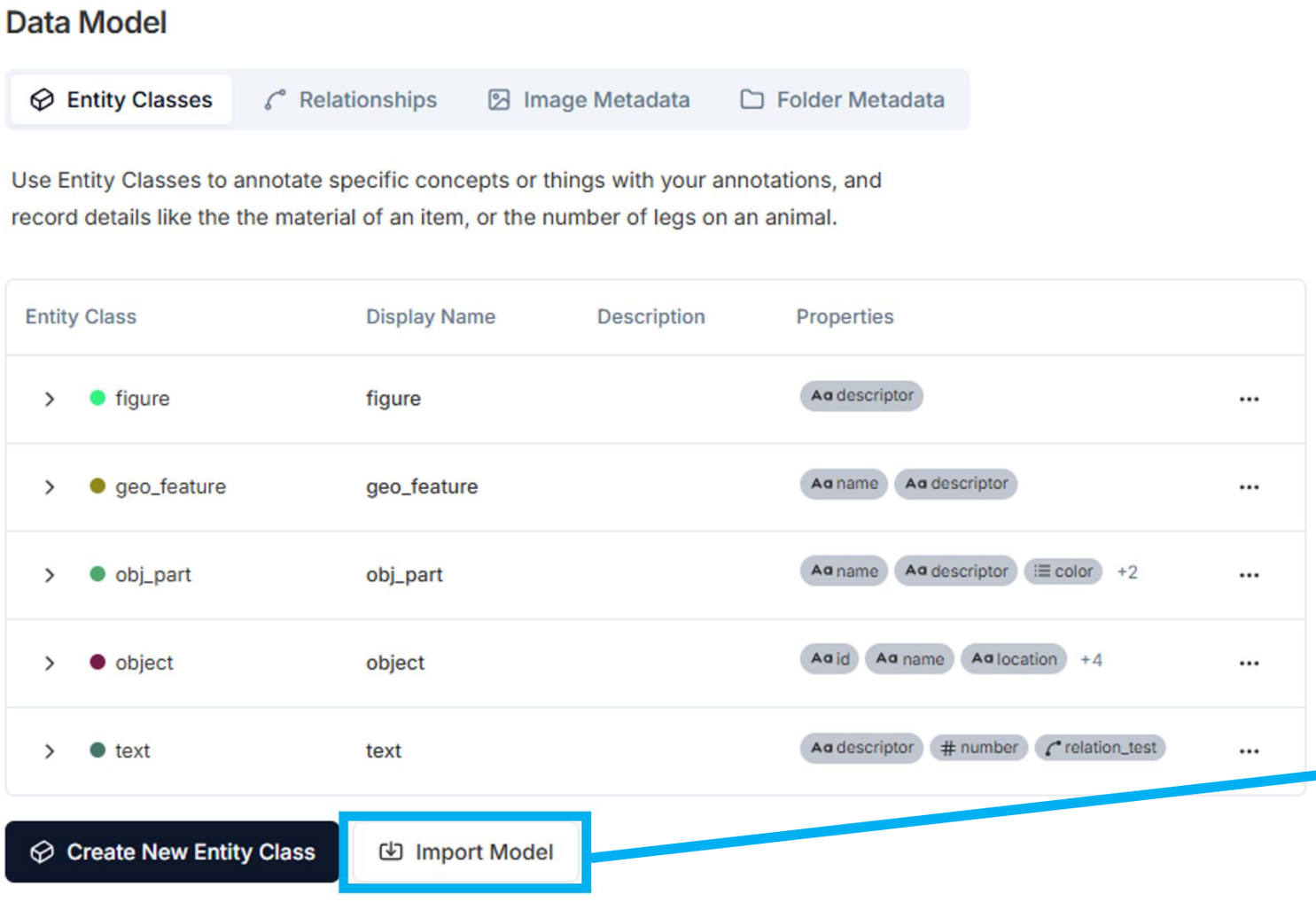
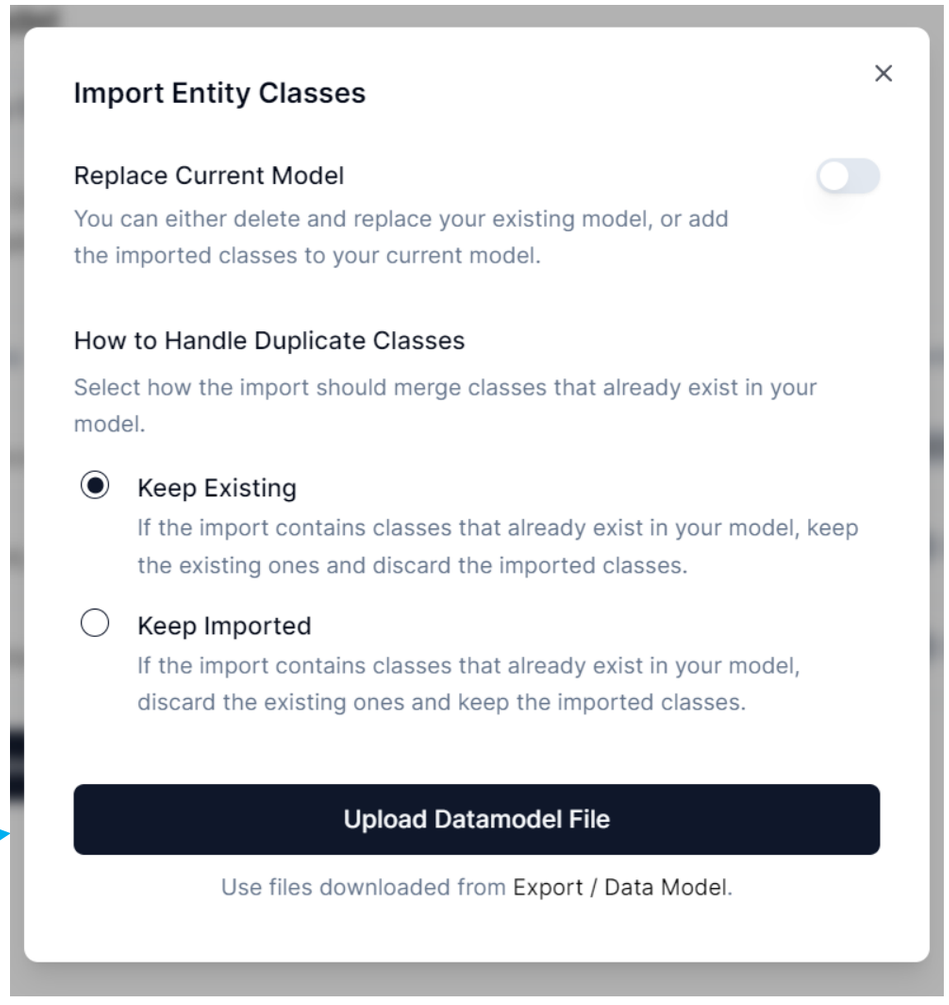
        "name": "id",
        "type": "text",
        "description": "use pinyin"
      },
      {
        "name": "name",
        "type": "text",
        "description": "use Chinese characters"
      },
      {
        "name": "descriptor",
        "type": "text",
        "description": "Transcribe Chinese text annotations related to t
      },
      {
        "name": "TGAZ",
        "type": "external_authority",
        "authorities": [
          "TGAZ"
        ],
        "description": "Use the id at the relevant time."
      },
      {
        "name": "DILA_PL",
        "type": "external_authority",
        "authorities": [
          "DILA (Place)"
        ],
        "description": "Use id if TGAZ id is not available. Use the one
      },
      {
        "name": "texture",
        "type": "enum",
        "multiple": true,
        "values": [
          "angle_bracket",
          "bond_pattern",
          "flagstone_layout",
          "solid_black",
          "striped",
          "unadorned"
```

Exporting Data Models for Reuse





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- Rainer Simon
- Bol, Peter K., Michael Fuller, et al. China Biographical Database Project (CBDB) (2004–). http://isites.harvard.edu/icb/icb.do?keyword=k16229&pageid=icb.page12970
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- Tu Hsieh-Chang, Hsiang Jieh, Lin Nungyao et al. National Taiwan University.

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