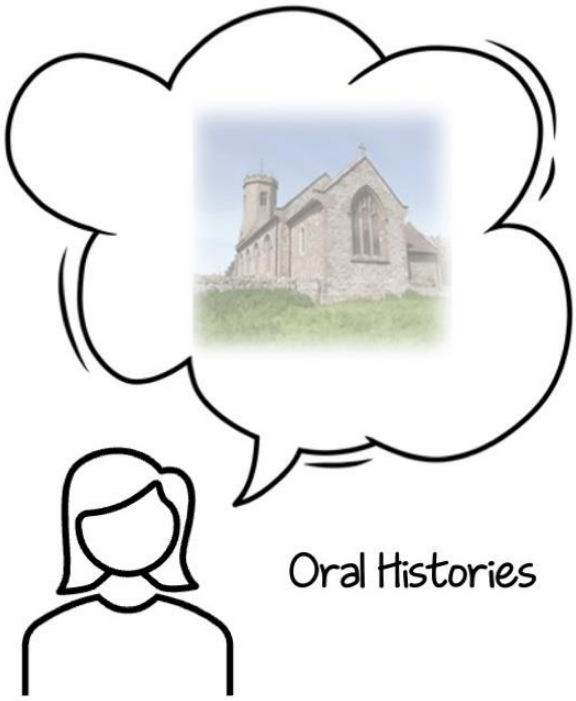
June 2024

MANUAL FOR GENERATING IMAGES OF LOST HERITAGE BUILDINGS

Preserving the Past using the tools of the Future

THIS MANUAL PROVIDES A STEP-BY-STEP GUIDE FOR HERITAGE BUILDING PROFESSIONALS TO GENERATE IMAGES OF LOST HERITAGE BUILDINGS USING THE ECHO-BASED HERITAGE DIGITAL TWIN FRAMEWORK.

1. STEP 1- DATA COLLECTION - GATHERING INFORMATION



Start by interviewing previous occupants or individuals familiar with the lost heritage building. Use the following questions to gather detailed descriptions:

1. *General Information*

- How many storeys did the building have?
- What was the type of the building (e.g., residential, commercial)?
- What was the architectural style or age of the building?
- What materials and colours were used in the building's construction?

2. *Architectural Elements*

- What specific architectural elements did the building have (e.g., bay windows, decorative cornices)?
- What materials were used for the architectural elements?

3. *Historical Information*

- Who was the architect of the building?
- What restoration details are available for the building?
- Were there any signs of deterioration in the building?

4. *Current and Future Use*

- What was the building's current use or occupancy before it was lost?
- What were the future plans for the building? If it's a partially lost heritage building, what are the future plans of the building?

5. *Context and Environment*

- Where was the building located?
- What was the environmental context or surrounding area of the building?

Example: Below are the oral history questions and 'hypothetical answers' for the Church of St Michael, Alberbury with Cardeston.

1. *General Information*

- How many storeys did the building have?
  - The church had one storey.
- What was the type of the building (e.g., residential, commercial)?
  - It was a religious building, specifically a church.
- What was the architectural style or age of the building?
  - The architectural style was a mix of 12th-century origins with significant rebuilds in 1749 and 1844. It features elements of Gothic architecture.
- What materials and colours were used in the building's construction?
  - The church was constructed with uncoursed Alberbury breccia with sandstone ashlar dressings. The roofs were mostly covered by plain clay tiles, and the tower roof was covered with slate.

2. *Architectural Elements*

- What specific architectural elements did the building have (e.g., bay windows, decorative cornices)?
  - The church had a nave and chancel built in 1749, a semi-detached west tower added in 1844, Gothic windows, and a decorative weathervane.
- What materials were used for the architectural elements?
  - The nave and chancel were made of uncoursed Alberbury breccia with sandstone ashlar dressings. The Gothic windows were framed in sandstone, and the weathervane was metal.

3. *Historical Information*

- Who was the architect of the building?
  - The original C12 church's rebuild in 1749 and the addition of the west tower in 1844 do not have recorded architects, but the restoration in 1905 was by AE Lloyd Oswell.
- What restoration details are available for the building?
  - The church underwent significant restoration in 1905 by AE Lloyd Oswell. Restoration included repairing the slate roof of the tower, renewing the parapet gutter, overhauling the decorative weathervane, and improving access to the tower parapet gutter.
- Were there any signs of deterioration in the building?
  - Yes, the slate covering on the tower roof had failed and needed to be re-laid. The parapet gutter required complete renewal, and the decorative weathervane needed overhauling.

4. *Current and Future Use*

- What was the building's current use or occupancy before it was lost?
  - The church was still in use for religious services and community events.

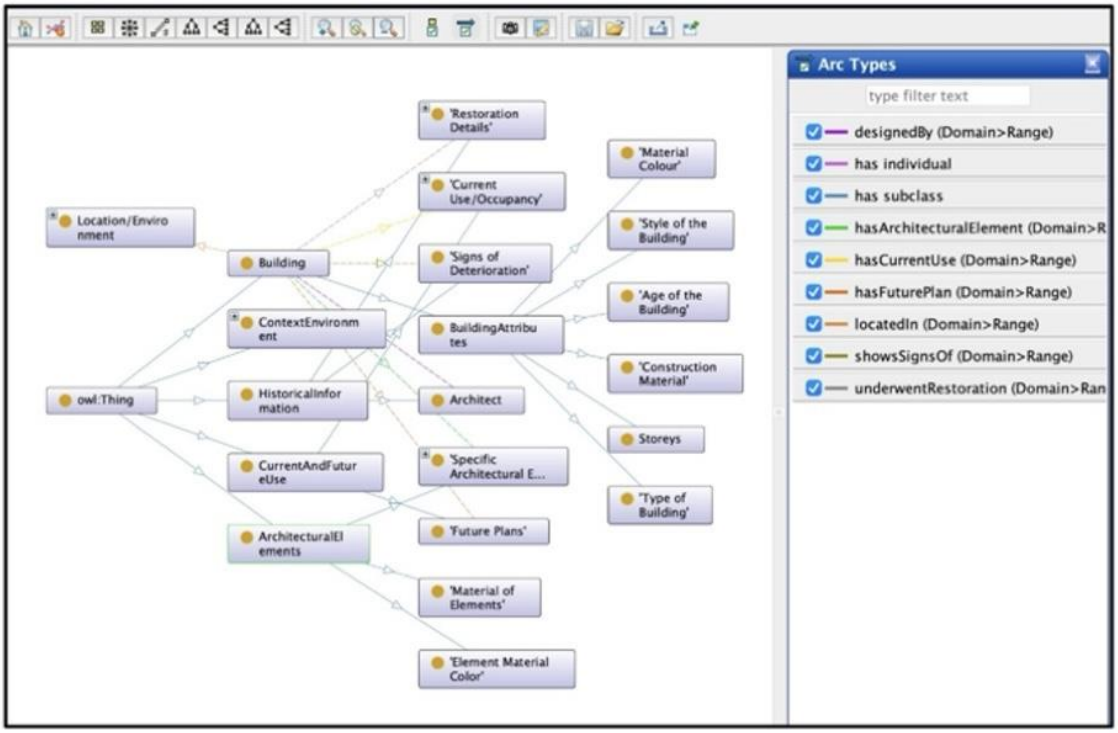
- What were the future plans for the building? If it's a partially lost heritage building, what are the future plans of the building?
    - Fundraising was in progress to address the needed repairs, including re-laying the slate roof, renewing the parapet gutter, overhauling the weathervane, and improving access to the tower parapet gutter.

5. *Context and Environment*

- Where was the building located?
    - The church was located in Alberbury with Cardeston, Shropshire (UA), England.
- What was the environmental context or surrounding area of the building?
    - The church was set in a vibrant green landscape, surrounded by rural countryside, contributing to its serene and historical atmosphere.

Note: The hypothetical answers provided here are expressed in architectural terminology. However, it's important to recognise that when interviewing previous occupants without an architectural background, their responses may not be phrased in such specialised language. That's why it is important to extract specific words and phrases to create instances in the ontology, transforming spoken language into precise architectural terminologies in the next step.

2. STEP 2: INPUT DATA INTO THE ONTOLOGY USING PROTÉGÉ

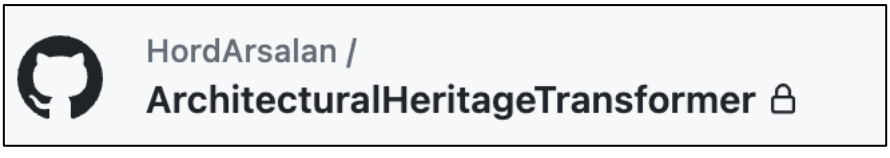


Architectural Heritage Transformer

Protégé software will be used in this step, download it from:
https://protege.stanford.edu/

1. Open Protégé and Load the Ontology the AHT ontology file (`AHT.rdf`).

AHT ontology can be downloaded from:
https://github.com/HordArsalan/ArchitecturalHeritageTransformer/tree/main



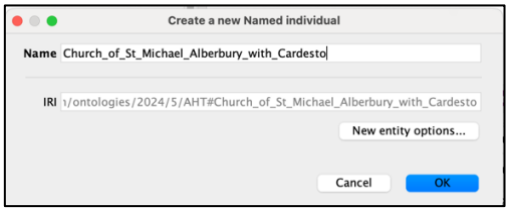
2. Add New Instances

- Navigate to the "Entities" tab.

- Under "Classes," find the `Building` class.

- Right-click on `Building` and select "Create Instance/individual."

- Name the instance/individual (Name of the Heritage Building) (e.g.,`Church_of_St_Michael_Alberbury_with_Cardeston`).



3. Fill in **Data Properties**

- Select the new instance.

- In the "Description" tab, add **data properties** as appropriate:

  - `hasNumberOfStoreys`: Number of storeys.

  - `hasBuildingType`: Type of building.

  - `hasStyle`: Architectural style.

  - `hasConstructionYear`: Year of construction.

  - `hasConstructionMaterial`: Construction materials.

  - `hasMaterialColour`: Material colour.

  - `locatedIn`: Location/environment.

  - `designedBy`: Architect.

  - `hasCurrentUse`: Current use/occupancy.

  - `hasFuturePlan`: Future plans.

Note: If it is not specified, value = not specified

4. Add **Object Properties**

- Add related architectural elements:

- `hasArchitecturalElement`: Link to instances of architectural elements (e.g., `Chancel`, `Nave`).

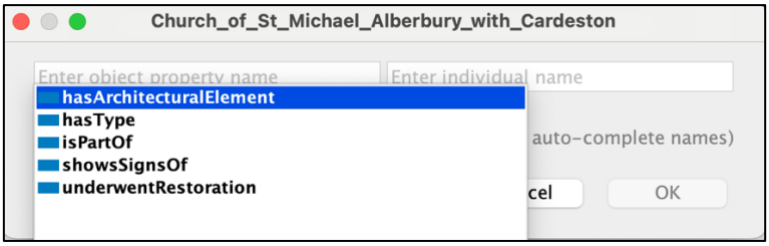
- Add restoration details:

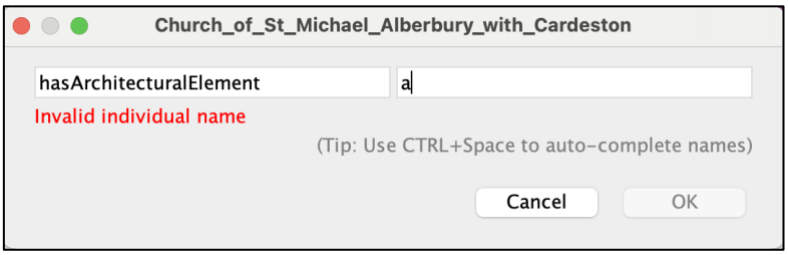
- `underwentRestoration`: Link to restoration instances.

- Add signs of deterioration:

- `showsSignsOf`: Link to deterioration instances.

Note: If the descriptions from the previous occupants include an architectural element, restoration details or signs of deterioration that are not specified in the ontology, they must be manually added as a new instance (individual) otherwise the **Object Properties** will show an error message.

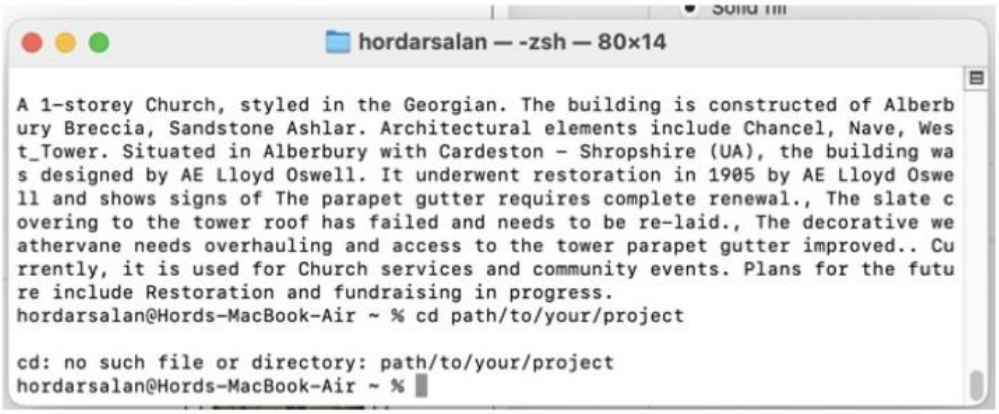




5. Save the Ontology

- Go to "File" > "Save" to save the updated ontology.

3. STEP 3: GENERATE THE PROMPT USING PYTHON SCRIPT



Prompt Generation

1. Prepare the Python Script

- Ensure you have Python and the owlready2 library installed.

- Download (generate_prompt.py) from: https://github.com/HordArsalan/ArchitecturalHeritageTransformer/tree/main

- Update the paths in the script to match your file locations.

2. Run the Script

Open a terminal and navigate to the directory containing the script.

Run the script by replacing the file path placeholders with your actual paths:

Copy code

```
python3 /path_to_your_script/generate_prompt.py
```

3. Copy the Generated Prompt

Copy the generated prompt from the terminal output.

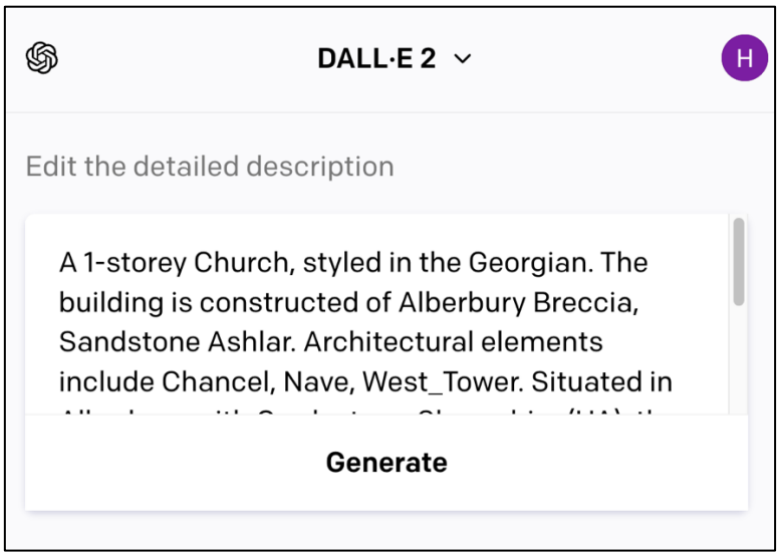
4. STEP 4: GENERATE THE IMAGE USING AN AI TEXT-TO-IMAGE TOOL

1. Select an AI Text-to-Image Tool

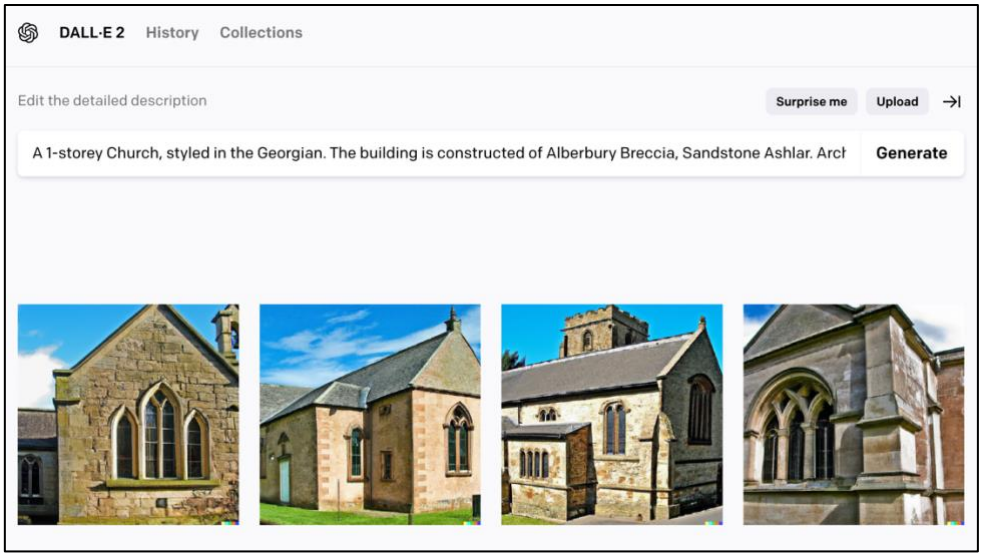
Choose a text-to-image generation tool (e.g., DALL-E, MidJourney, Stable Diffusion).

2. Input the Prompt

Paste the generated prompt into the text input field of the AI tool.



3. Generate the Image



The AI-generated images above are compared to the original image of the heritage building from the Heritage At Risk Register below: