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ON-STAGE 3D: LINK-BASED INVESTIGATION INTO SPATIAL ICONOGRAPHIC HERITAGE



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Context and applications

- **Context:**
 - Growing availability of digital/digitized heritage collections,
 - In **silos** organization with a lack of structure,
 - Increasing **desire to promote** iconographic heritage.
- **Applications:**
 - **Immersive** exploration of collections,
 - **Structured and spatialized** visualization of different collections,
 - **Semi-automatic structuring** of collections,
 - **Enrichment and alignment of metadata** associated to images.

Proposed platform

- **Front-end part** of a global semi-automatic pipeline dedicated to the **structuring and valorization of spatial iconographic heritage** ([1]),
- **Visualization and interaction** part through the **web 3D platform ON-STAGE 3D**,
- **Multiple collections** of images in the same 3D space, organized as **graphs** of links and potentially **spatialized**,
- **Several scales of analysis through space and time:** the city (Paris), a monument (Notre-Dame de Paris) with a zoom on its chapels,
- **Browsing through collections** from link to link, discovering areas, details or patterns and evolutions through time as well as **investigating like historians or heritage architects**.

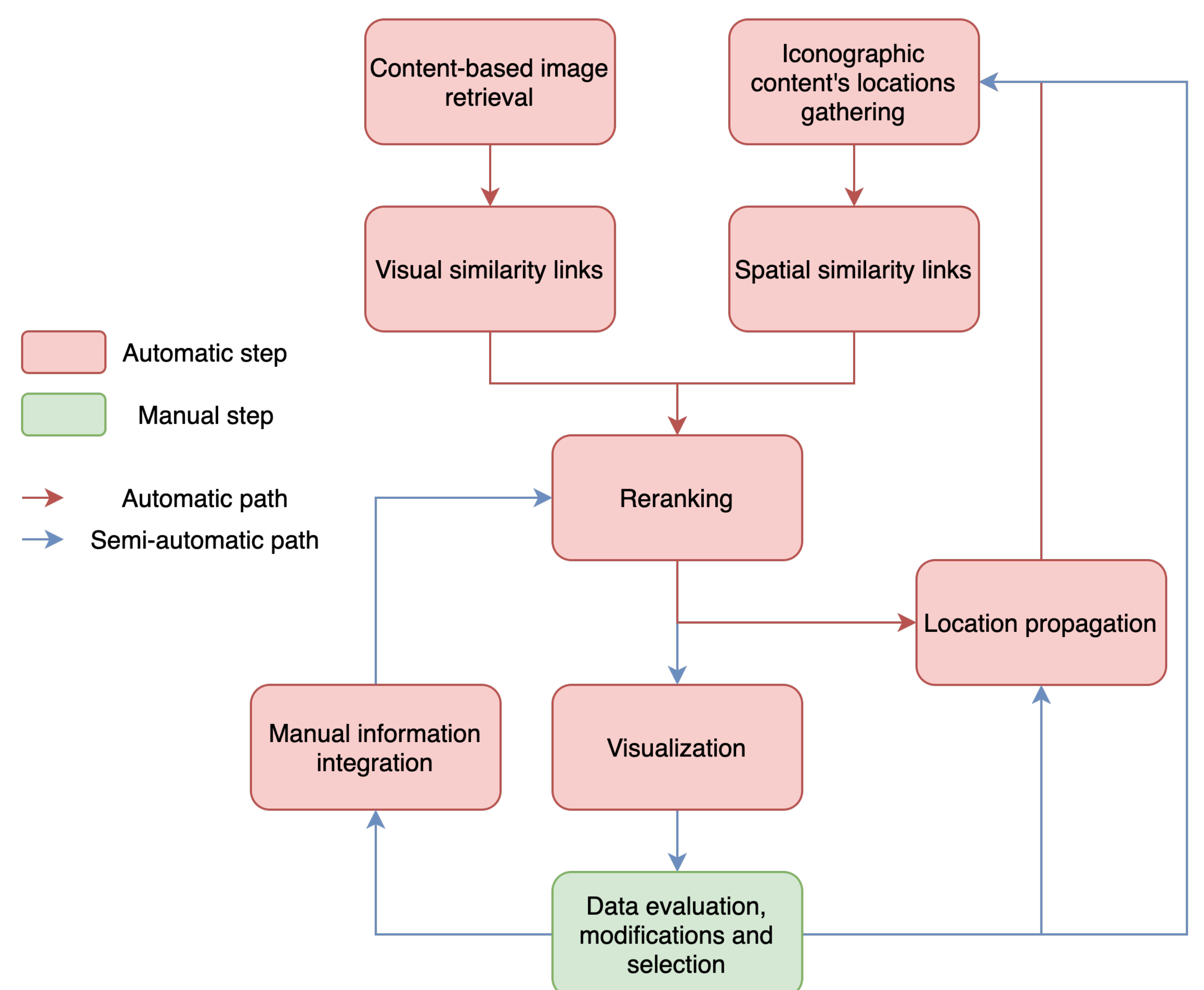
Multiple diverse datasets

- **City of Paris:**
 - More than **10,000** images,
 - Spanning from **1916 to 2015**,
 - **8 different collection** providers,
 - 31 classes depicting **monuments, buildings**, etc.,
 - Some **approximate locations**.
- **Notre-Dame of Paris cathedral:**
 - More than **20,000** images, **exterior and interior**,
 - **After the fire and after the restoration**,
 - **Systematic acquisition** during the restoration,
 - **Precisely located** images.

Examples



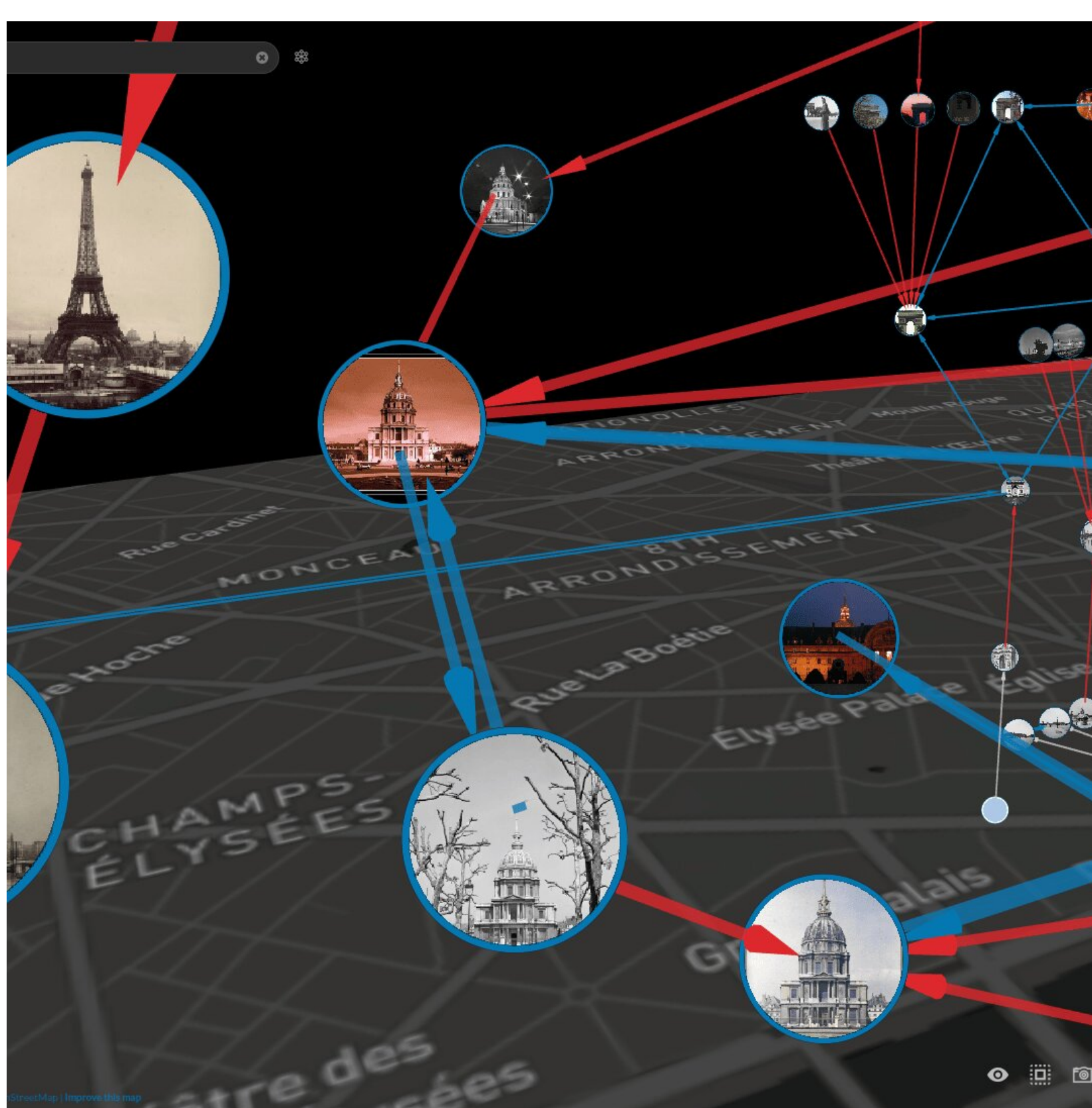
A semi-automatic structuring process



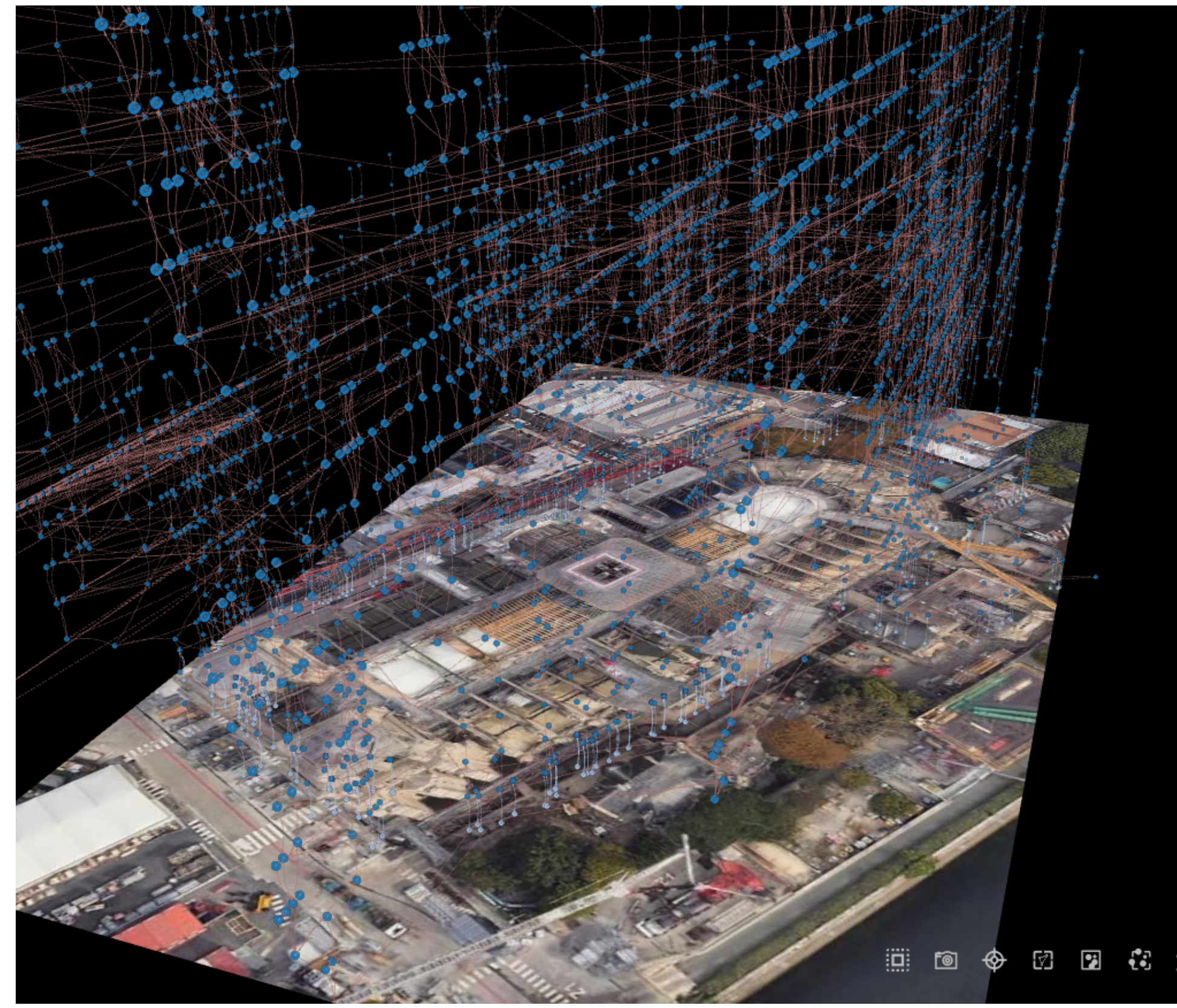
Technical elements

- Web platform built on top of **GraphXR** [2] with a **Neo4j** database,
- **Visual similarity** links created by image retrieval,
- **Spatial similarity** links based on proximity,
- **Visual clues** to identify key areas of the graph,
- **Semi-automatic** process to **propagate manual changes** and **improve the structuring globally**.

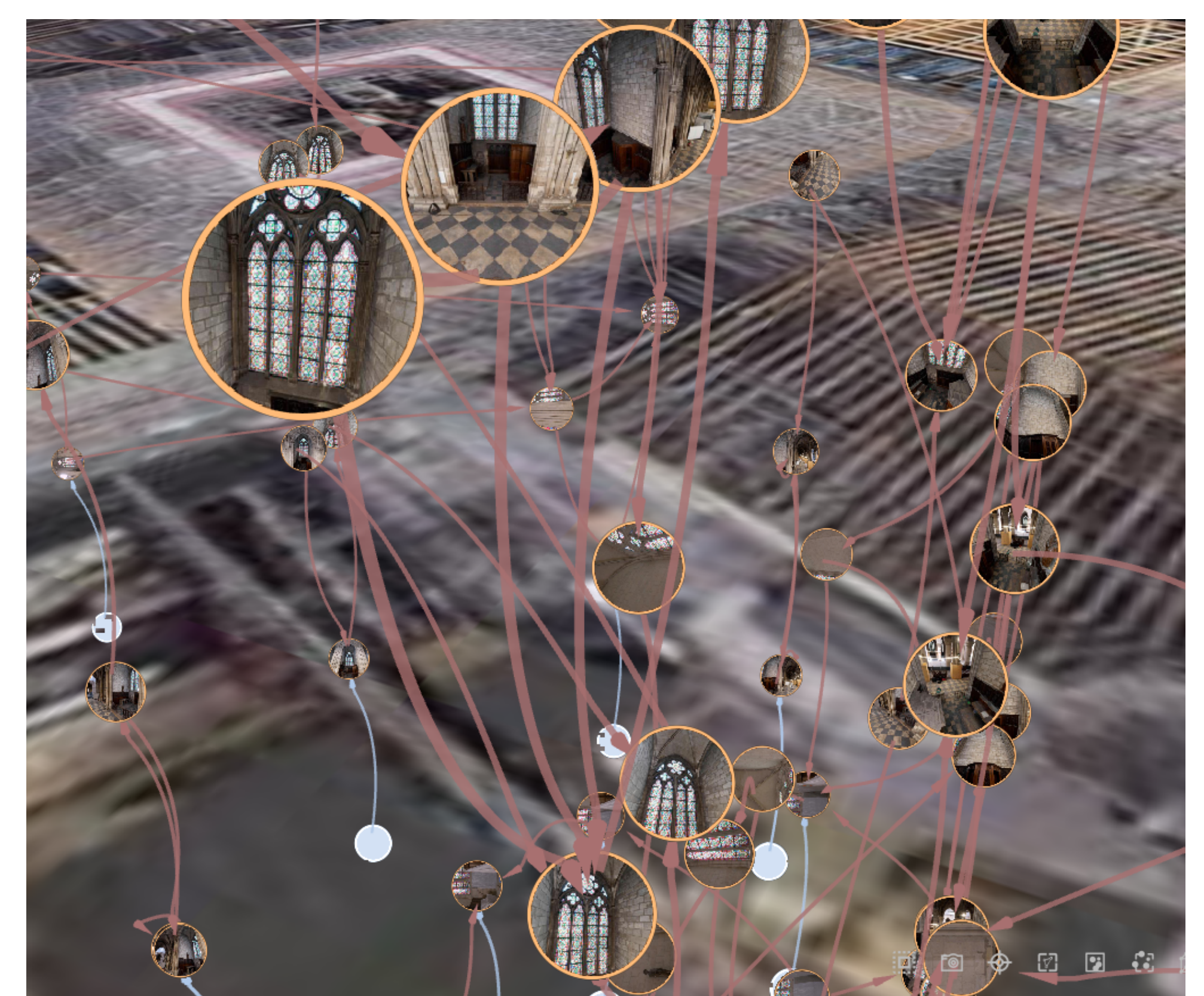
City scale



Cathedral scale



Interior chapel scale



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- [1] Emile Blettery and Valérie Gouet-Brunet. "Heritage Iconographic Content Structuring: from Automatic Linking to Visual Validation". In: *Journal on Computing and Cultural Heritage* (May 2024), pp. 1–40. DOI: 10.1145/3666007.
- [2] Kineviz. *GraphXR visualization platform*. 2024. URL: <https://graphxr.kineviz.com/>.