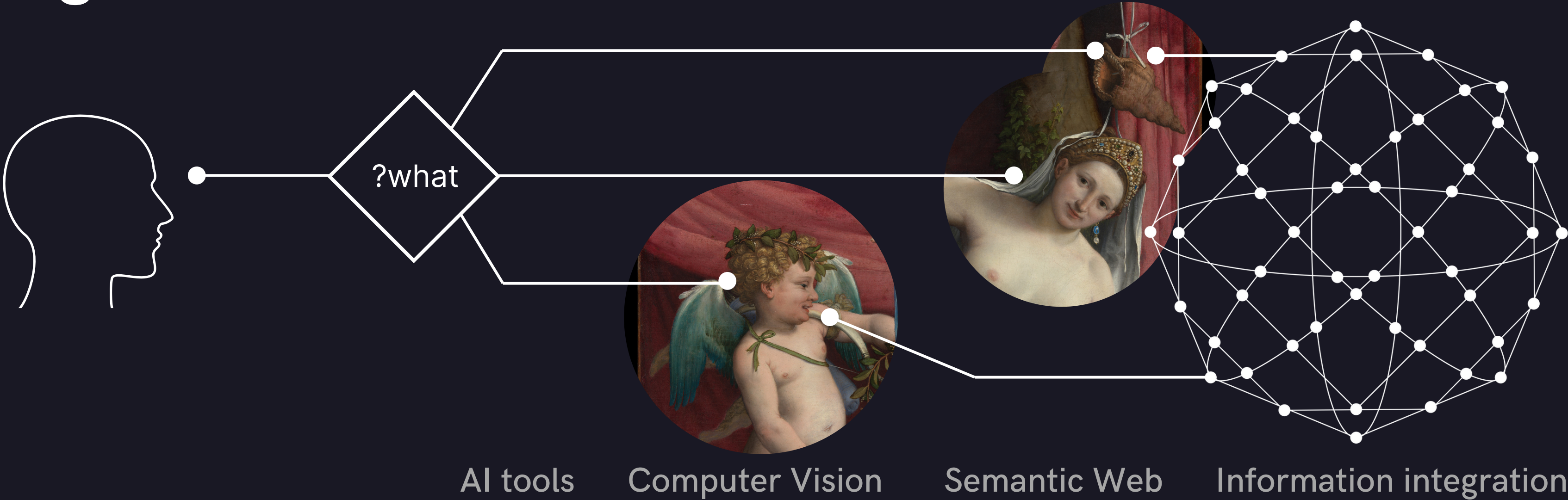


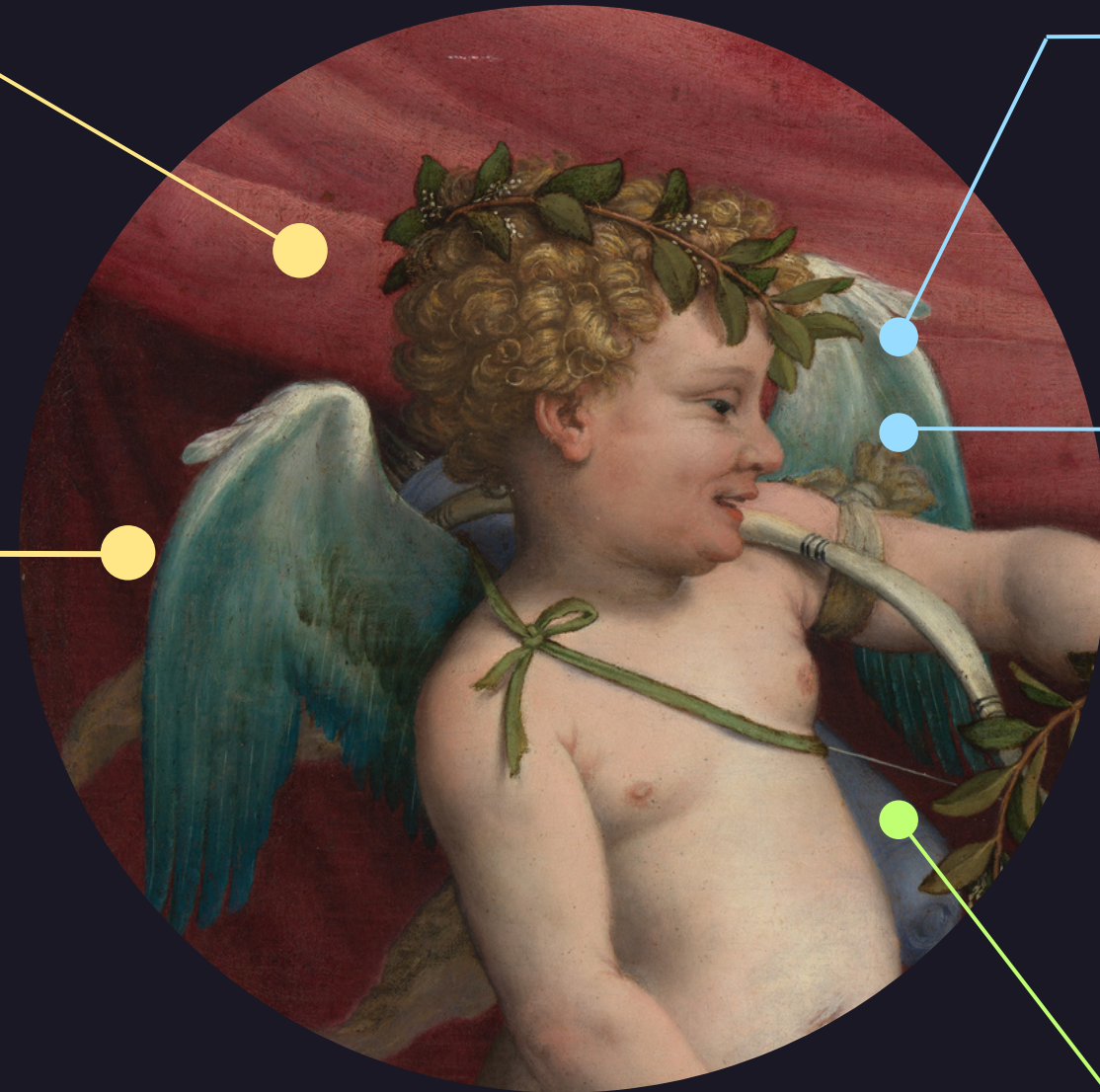
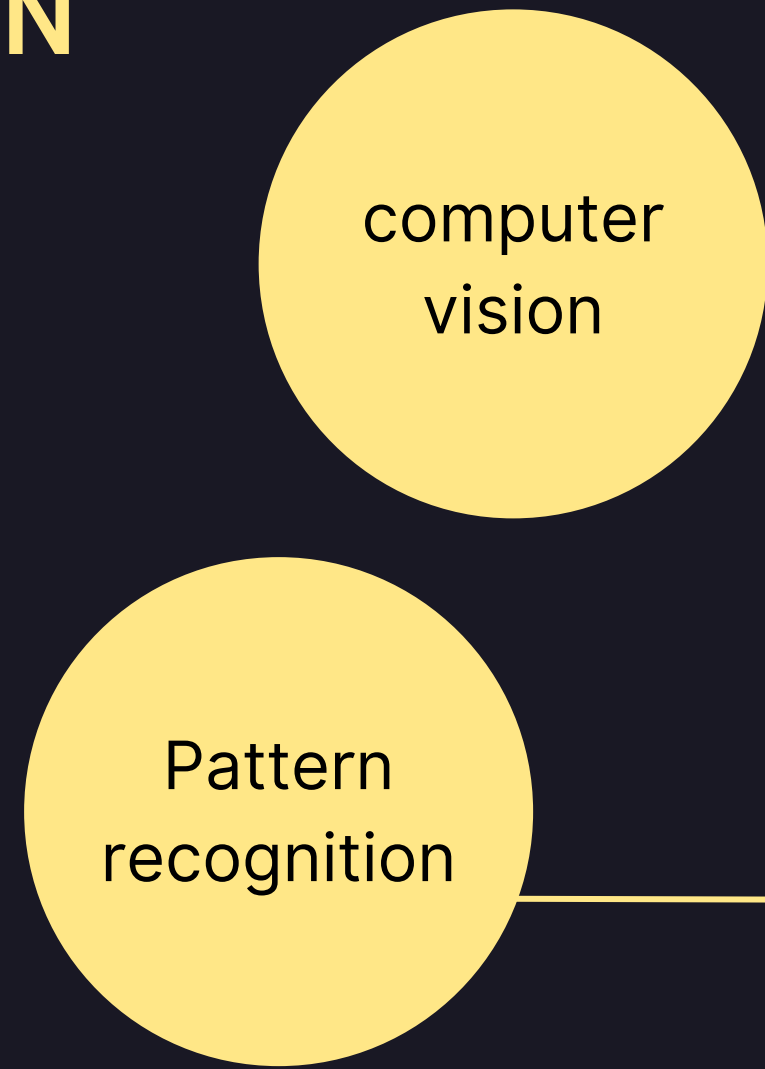
Semantic data retrieval and integration for supporting artworks interpretation through Integrative Narrative Networks



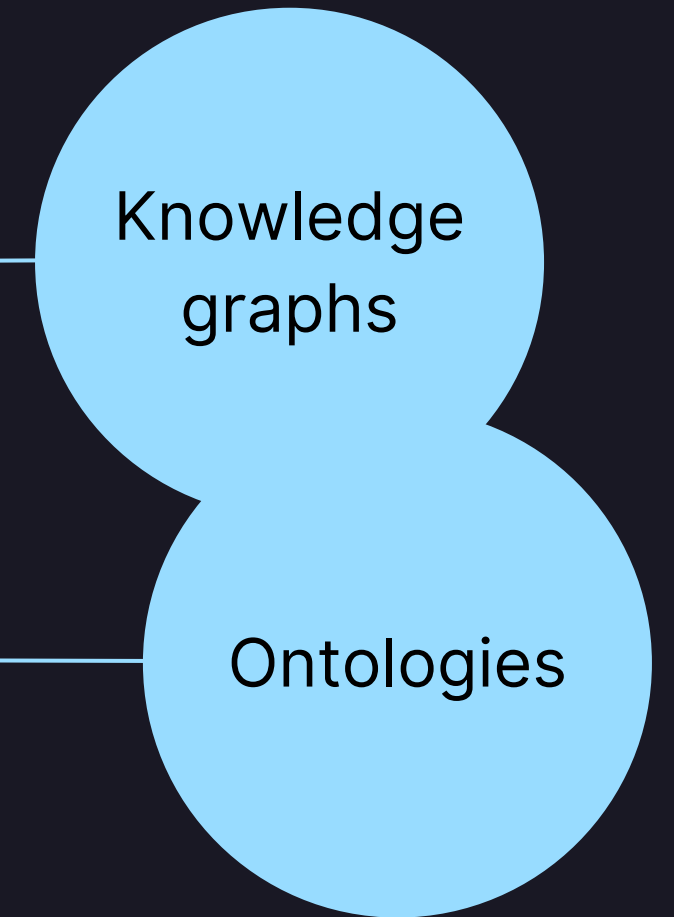
Sofia Baroncini, University of Bologna
Luc Steels, Venice International University, Italy, and Barcelona Supercomputing Centre
Remi van Tijp, Sony Computer Science Laboratories Paris



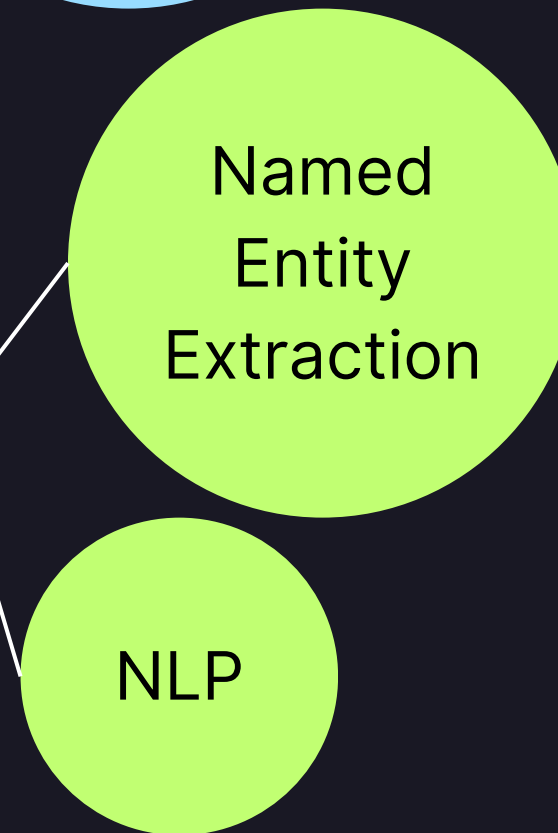
VISION



SEMANTIC WEB



TEXT

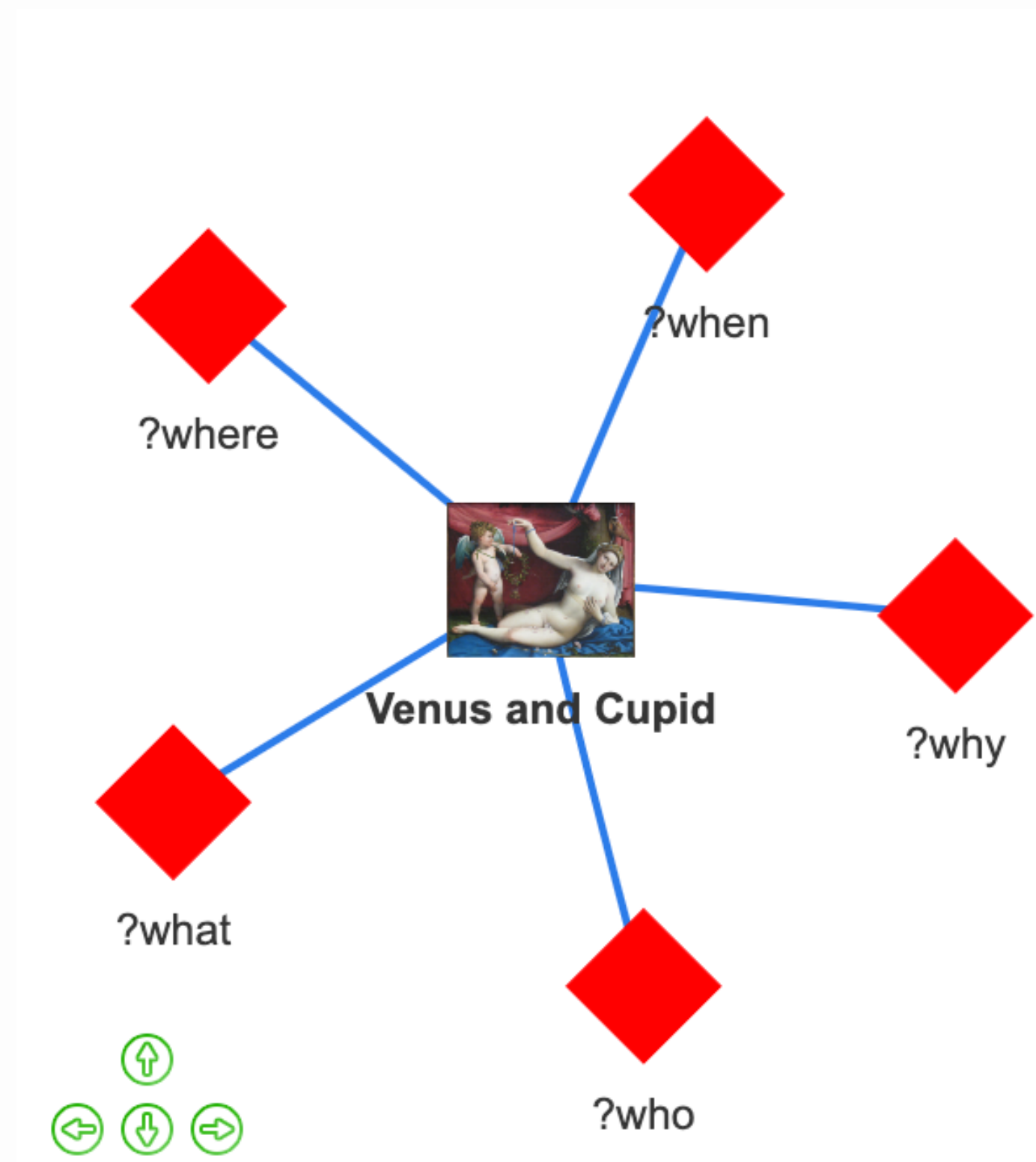


CURRENT AI TOOLS

How to exploit their full potential for art understanding?

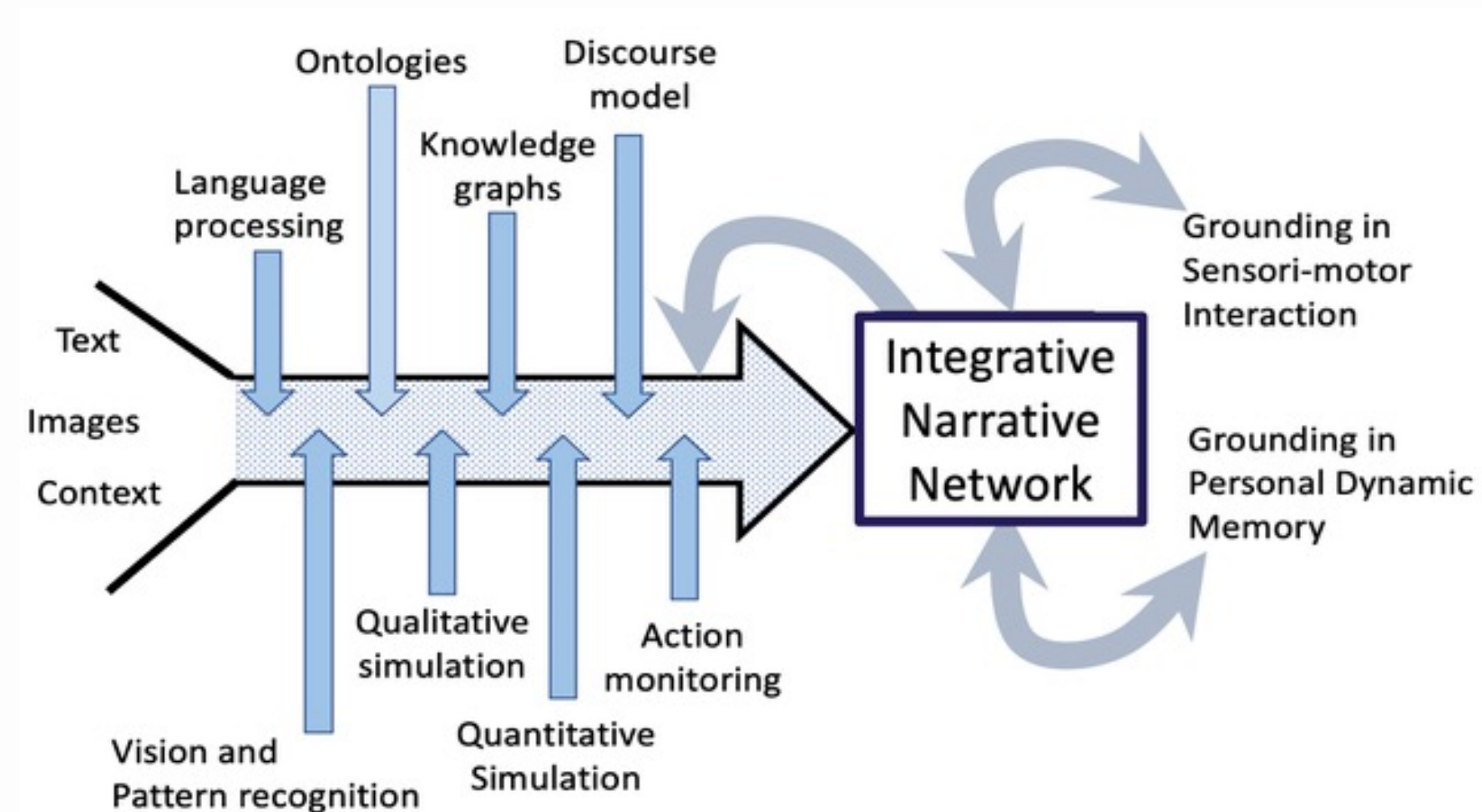
NARRATIVE UNDERSTANDING

- Narrative:
 - facts (fabula)
 - questions
 - answers
- From the viewpoint of the **viewer**, it is a network of questions and answers
- From the viewpoint of the **author**, the artist gives material to answer the possible viewer's questions (i.e., what is painted)



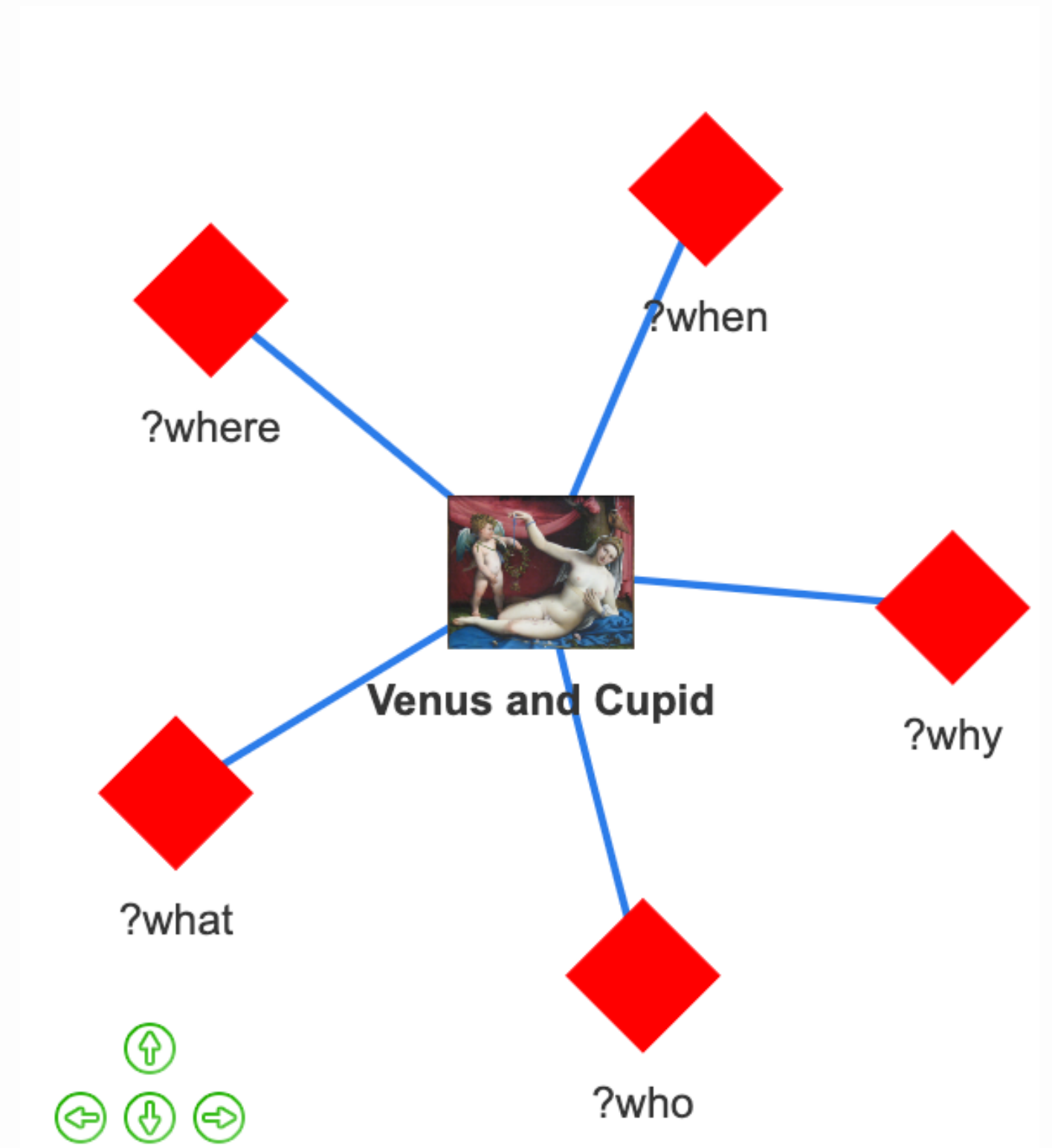
INTEGRATIVE NARRATIVE NETWORK (INN)

- **Narrative Network:** groups all questions and answers
- **Knowledge sources:** vision, language, semantic web, human input, etc.
- **Integrative:** collects questions and answers coming from the knowledge sources in a spiraling process



THE DYNAMICS OF UNDERSTANDING

- **Distributed control**
 - **bottom-up processes** (e.g., what is depicted, what triggers the viewer's attention)
 - **top-down processes:** frame-driven. A frame is a bundle of questions (e.g., *who is the painter? What is depicted?*)
- **Closure** is reached when the key questions are answered





SEMANTIC INFORMATION

Lorenzo Lotto, *Venus and Cupid*, c. 1530

LORENZO LOTTO, VENUS AND CUPID, C. 1530

How can AI tools help us to better understand the artwork?
Semantic web information retrieval and integration



Search for an Artwork

Add Node

Add Edge

Cluster Selected Nodes

By Wikidata ID number:

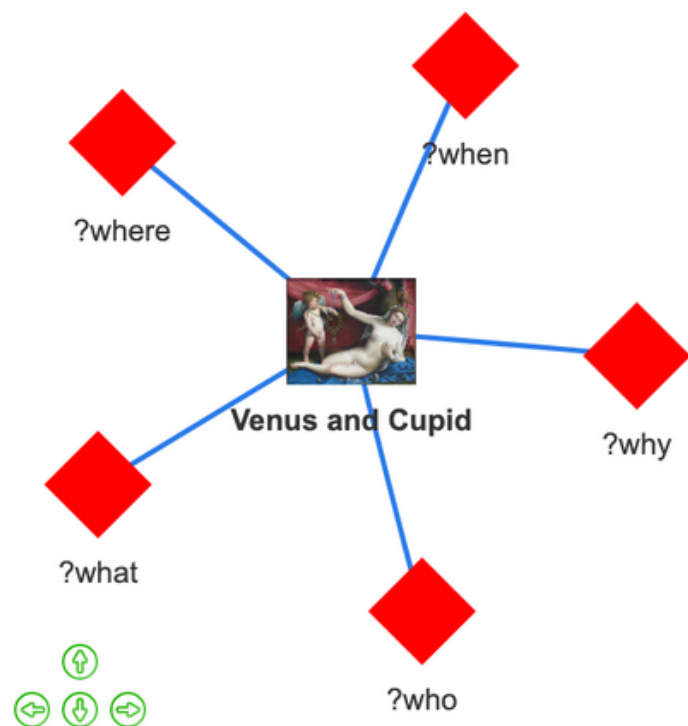
Wikidata ID Number (e.g. Q4009580)

Or by Creator and Title:

Creator (e.g. Lorenzo Lotto)

Title (e.g. Venus and Cupid)

submit



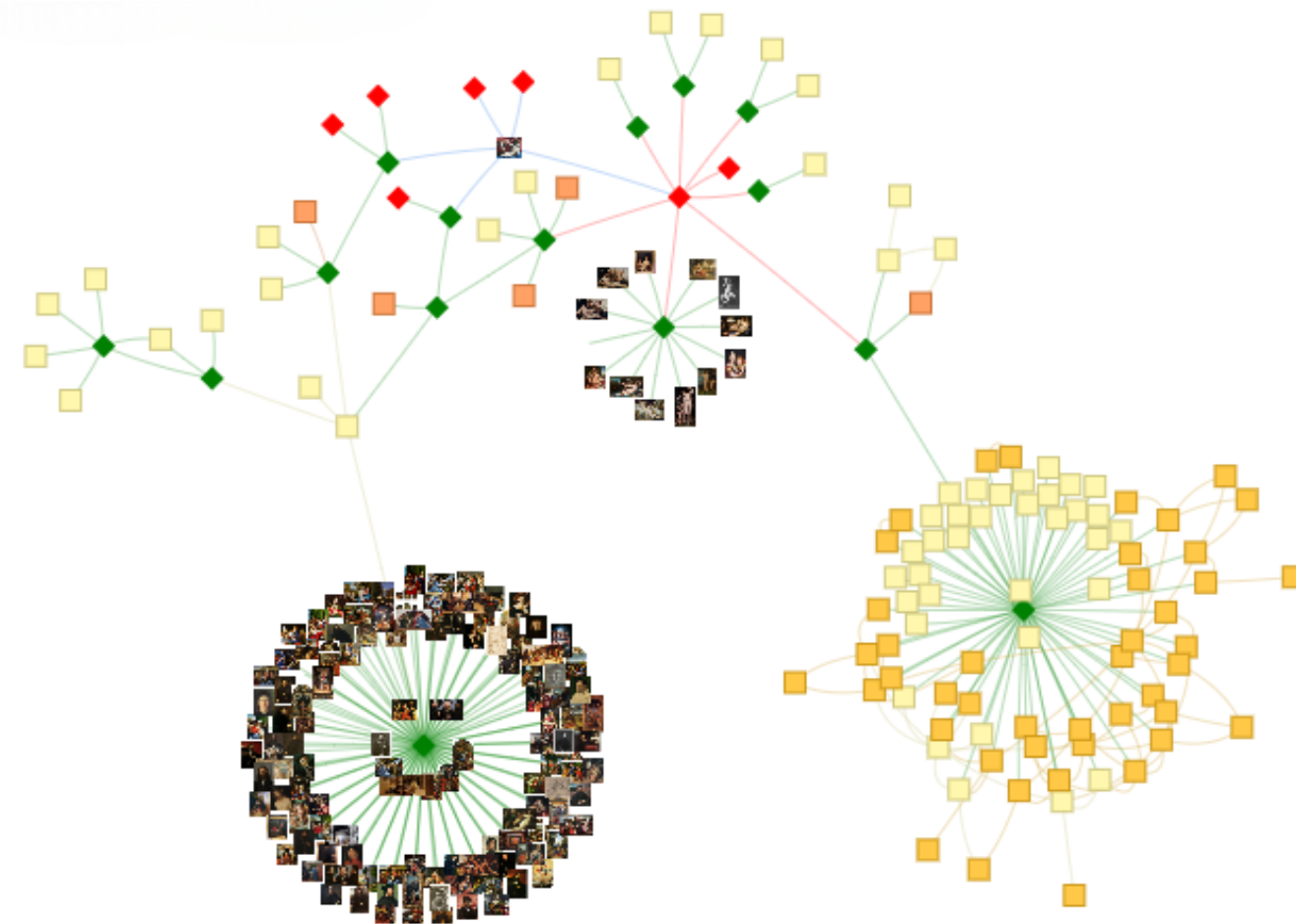
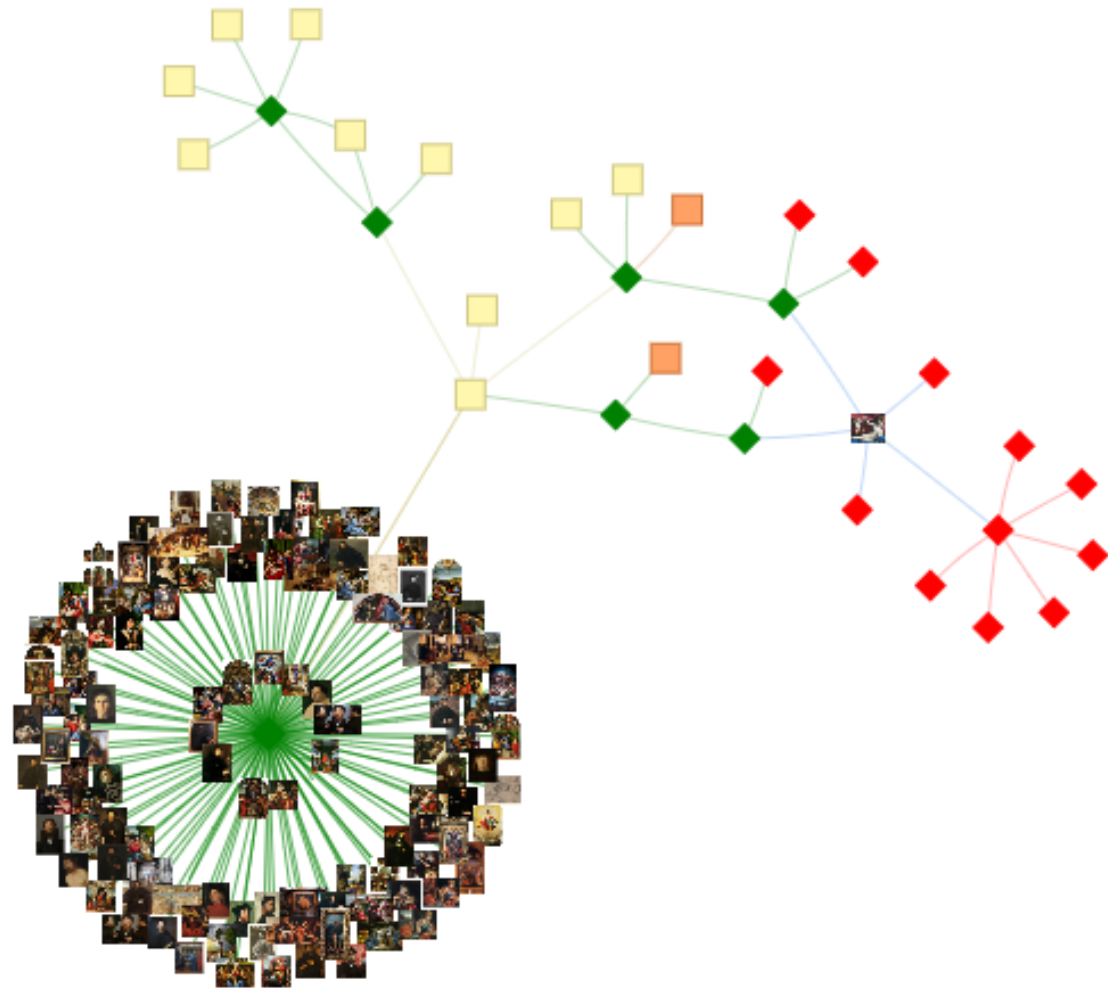
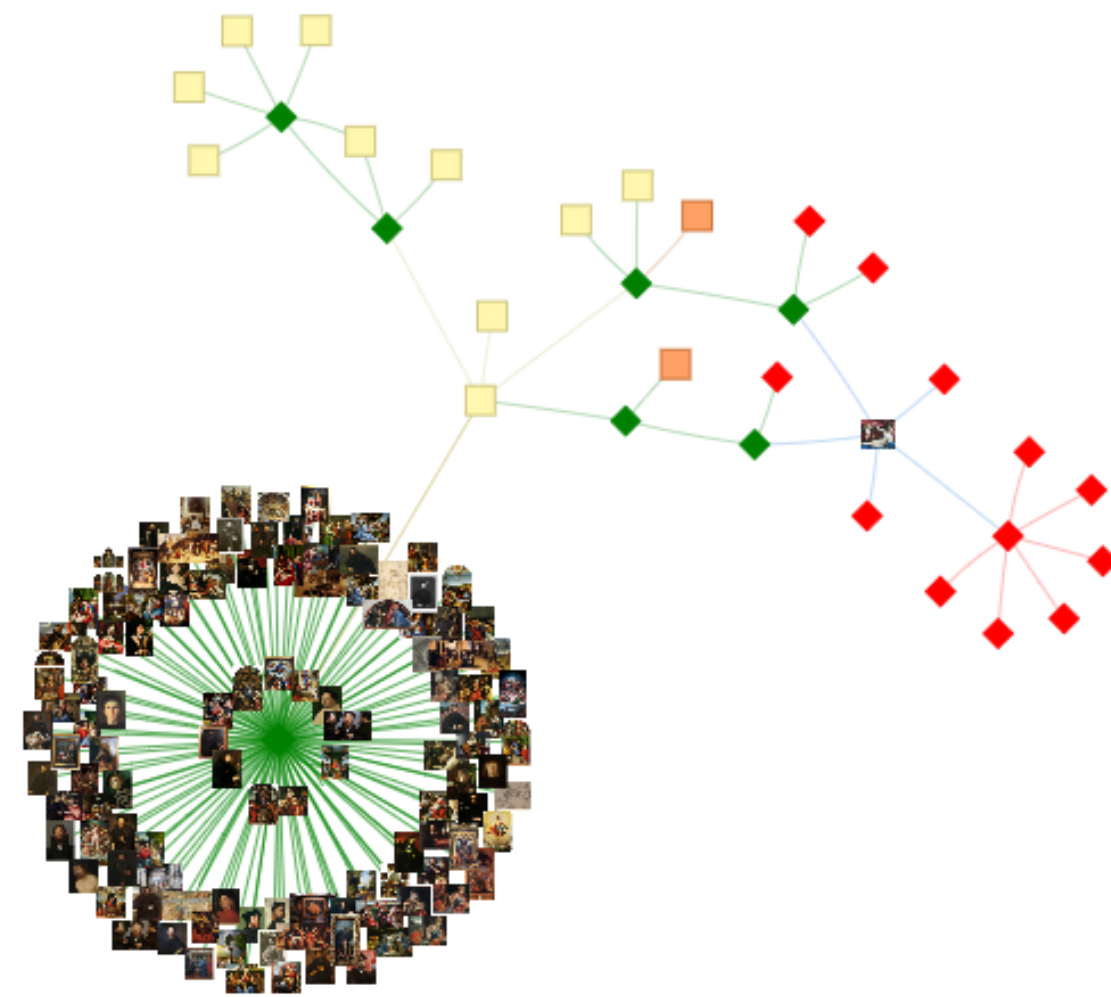
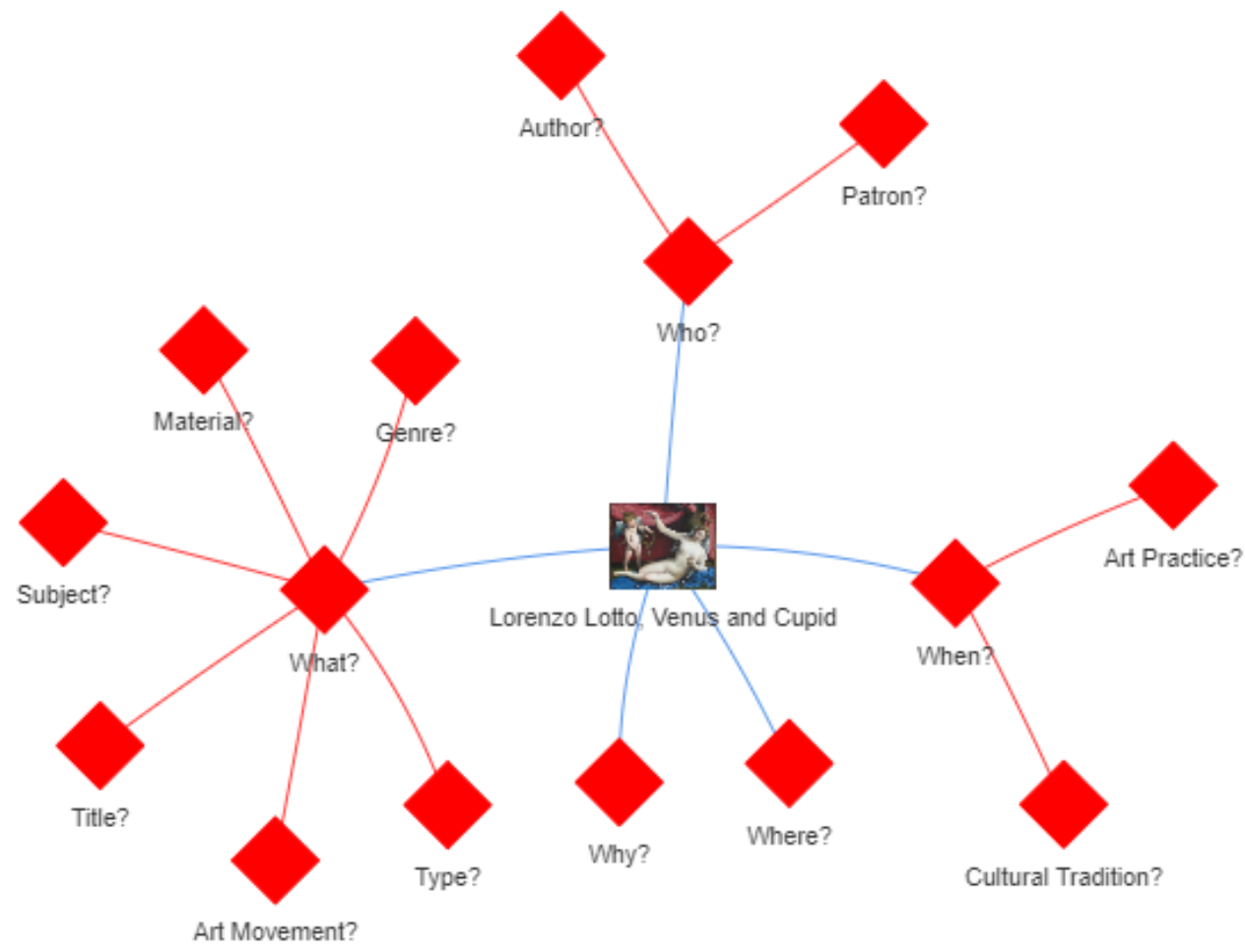
APPROACH

- Top-down definition of the questions addressed during an interpretation act from the didactic of art literature (Barrett), grouped as 5W sub-questions
- expression of the questions as SPARQL queries
- Performing the query over an initial selection of KGs
- Integration of the retrieved entities in the INN Network

SEMANTIC WEB INTERFACE

Each node is interactive. Narrative questions launch SPARQL queries to find an answer on the selected Knowledge Graphs

Lorenzo Lotto, Venus and Cupid, c. 1530, MET, New York;
2. Interface for art historians for browsing the web

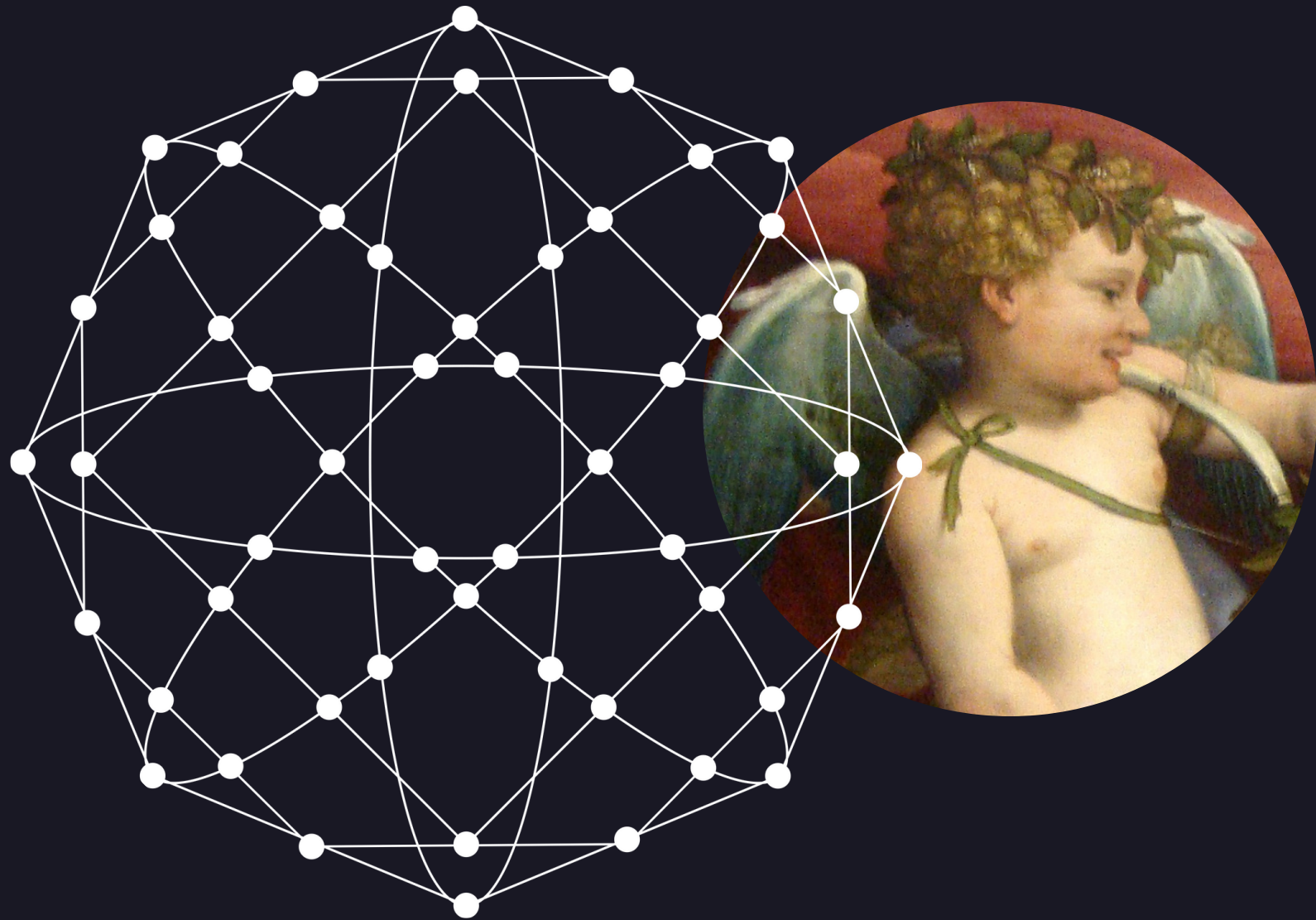


Expansion phases of the INN of the Lotto's paintings as questions are raised and answered

<https://inn-painting-art-interpretation.streamlit.app/>

Conclusions and future work

- Current AI tools can help in information retrieval of artworks
- Integrative Narrative Networks can be a solution for representing and integrating knowledge from different sources.
- A tool for browsing currently available Knowledge Graphs and steering the interpretation process under human control.
- **Future work**
 - more case studies
 - implementation of the understanding process (a tool to automate a single process and to manage the overall process of narrative understanding)



Thank you for your attention

Any questions?

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Remi van Trijp: Remi.Vantrijp@sony.com

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- T. Barrett, *Interpreting art: Reflecting, wondering, and responding*, McGraw-Hill New York, 2003.
- K. Christiansen, *Lorenzo Lotto and the tradition of epithalamic paintings*, *Apollo* 124 (1986) 166–173.
- L. Steels (Ed.), *Foundations for Meaning and Understanding in Human-centric AI*, Venice International University, 2022. <https://doi.org/10.5281/zenodo.6666820>