Viewsari: New Perspectives on Historical Network Analysis in Giorgio Vasari's The Lives Using Knowledge Graphs

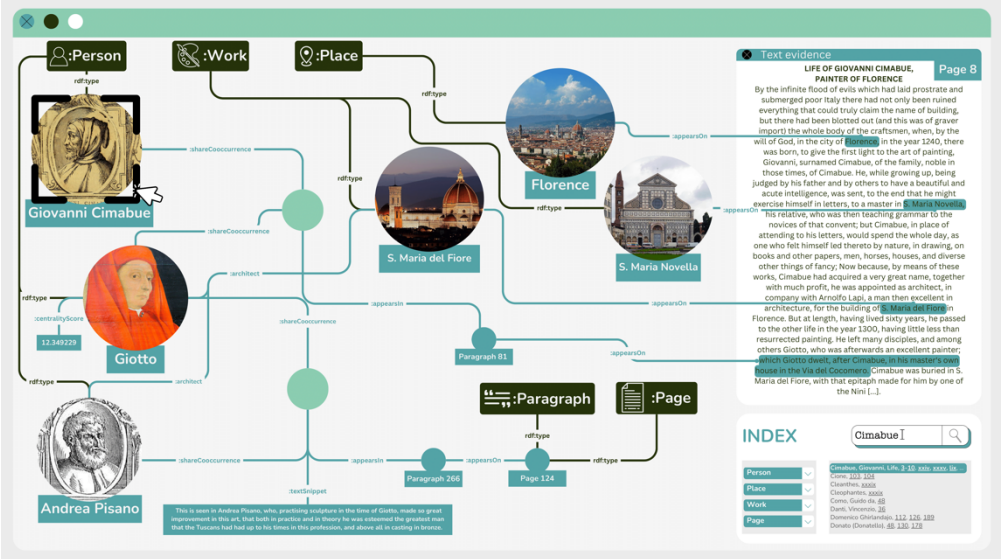
Sarah Rebecca Ondraszek [1], Harald Sack [1][2], Etienne Posthumus [1]
1: FIZ Karlsruhe - Leibniz Institute for Information Infrastructure
2: Institut für Angewandte Informatik und Formale Beschreibungsverfahren (Karlsruhe)

Ondraszek Sarah Rebecca, Sack Harald and Posthumus Etienne. 2024. "Viewsari: New Perspectives on Historical Network Analysis in Giorgio Vasari's The Lives Using Knowledge Graphs", *Historical Network Research 2024*, Lausanne, DOI: 10.5281/zenodo.12606713

Art historians who want to explore the complex relationships of Michelangelo and other Renaissance artists can use network analysis. These relationships can be used to reconstruct an interdependence between collaborations and shared artworks, social practices, or artistic movements.

However, hermeneutics and context sensitivity are critical to interpreting the results (Novak et al. 2014; Van Vugt 2017, 35–36). Knowledge graph (KG) technologies offer new perspectives for historical network research. Transcending the limitations of binary relationships, they combine and integrate heterogeneous data, define relationships, and enrich the network with numerous contextual insights (Dörpinghaus et al. 2022). They also address the need for structured modeling of multilayered social networks and their publication as linked (open) data (Bornhofen and Düring 2020; Grandjean 2019).

This project builds directly upon these considerations and introduces a methodological proof-of-concept in the form of an interdisciplinary KG. It is based on a social network automatically generated by Santini et al. (2022) from an English translation of Giorgio Vasari's The Lives of the Most Eminent Painters, Sculptors, and Architects (Vasari 2008) using named entity recognition, coreference resolution, and statistical association from the co-occurrence of names in paragraphs. They also extracted further named entities, such as places, artworks, motifs, historical events, etc., which this project reuses for additional contextualization.



Originally written in Italian, The Lives was published in 1550 and expanded in 1568. The text provides biographical descriptions of Renaissance artists, including detailed descriptions of their lives, patronships or collaborations, works, and artistic styles. Remaining a valuable resource for scholars and anyone interested in the period, Vasari's texts have significantly shaped the modern understanding of Renaissance art and artists. Art historical research has established the text in its multitudinous variants and commented on its

content (Burioni 2017; Pon 2014). This sheer number of editions and translations of Vasari's work speaks volumes about the importance of the text and the necessity to construct a KG as a structural presentation of the content, which systematically prepares the biographies for questions such as historical network research, the disclosure of dependencies, and visual exploration, but also comparative studies between Vasari's work and narratives about Renaissance art through other historical resources or the reappraisal in existing research work.

The KG functions as a renewed gateway to Renaissance art through Vasari's perspective, transforming The Lives into a flexible and scalable graph of interconnected resources. Complemented by an interactive web-based visualization and a SPARQL endpoint, it supports researchers in exploratory searches for artists and related concepts by fostering serendipitous findings (Waitelonis and Sack 2012, 2). An ontology functions as a baseline data model, covering three conceptual dimensions of the domain: work-level metadata, instantiations of this work, and textual/content details (Bornhofen and Düring 2020; Daquino and Tomasi 2015; Grandjean 2019; Haslhofer, Isaac, and Simon 2018). This ensures efficient encoding of contextual information. Extracted data and their relations can be connected to provenance information, facilitating context-dependent interpretation through provided evidence (Novak et al. 2014, 244; Kuczera 2022, 15). Viewsari enables network analyses of data in the KG within the web application through a social network layer that reconstructs direct relations between nodes and edges. This way, scores such as the Eigenvector centrality or the weight of connecting edges can be calculated directly from the RDF data (Birkholz, Julie M. and Meroño-Peñuela, Albert 2020).

In the process of modeling our ontology, we face questions of effective alignment: at this point, we consider the reuse of existing ontologies like the Historical Context Ontology (HiCO) (Tomasi et al. 2015) to merge descriptive metadata about Vasari's work with content (co-occurrences, text snippets, named entities). This step contributes to interoperability and adheres to the FAIR principles (Wilkinson et al. 2016). Equally relevant are questions concerning multimodality, format options, and data schemas for integrating facsimiles and their corresponding textual transcriptions.

Linked data is crucial for enrichment and contextualization. The connection to other resources enables gathering distributed knowledge, e.g. authority data via Wikidata (Vrandečić, Pintscher, and Krötzsch 2023) or NFDI4Culture (Sack et al. 2023), facilitating retrieval and discovery through information systems and opening the network to external applications.

With Viewsari, connections between artists, artworks, motifs, and historical events that may be hidden from traditional textual analysis will come to light, allowing deeper insights into the construction of, for example, artistic movements or the evolution of social practices. Researchers can analyze the co-occurrences of Michelangelo in a traditional social network and perform conceptual queries with contextual information. Viewsari – as an integrated tool of ontology, KG, and web application – opens up new ways of accessing and discovering the many perspectives of the text and allows new dimensions of understanding.

References

Birkholz, Julie M. and Meroño-Peñuela, Albert. 2020. "Decomplexifying the Network Pipeline : A Tool for RDF/Wikidata to Network Analysis." DIGITAL HUMANITIES BENELUX JOURNAL 2: 53–68. https://doi.org/10.17613/80sx-m116.

Bornhofen, Stefan, and Marten Düring. 2020. "Exploring Dynamic Multilayer Graphs for Digital Humanities." Applied Network Science 5 (1). https://doi.org/10.1007/s41109-020-00295-x.

Burioni, Matteo. 2017. "Giorgio Vasaris Vite." In Handbuch Rhetorik Der Bildenden Künste. De Gruyter. https://doi.org/10.1515/9783110331493-015.

Daquino, Marilena, and Francesca Tomasi. 2015. "Historical Context Ontology (HiCO): A Conceptual Model for Describing Context Information of Cultural Heritage Objects." In Metadata and Semantics Research, 424–36. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-24129-6_37.

Dörpinghaus, Jens, Sonja Klante, Martin Christian, Christof Meigen, and Carsten Düing. 2022. "From Social Networks to Knowledge Graphs: A Plea for Interdisciplinary Approaches." Social Sciences & Humanities Open 6 (1). https://doi.org/10.1016/j.ssaho.2022.100337.

Grandjean, Martin. 2019. "A Conceptual Framework for Multilayer Historical Networks." In Sharing the Experience: Workflows for the Digital Humanities. Sharing the Experience: Workflows for the Digital Humanities. Neuchâtel, Switzerland: DARIAH-CAMPUS. https://shs.hal.science/halshs-02531735.

Haslhofer, Bernhard, Antoine Isaac, and Rainer Simon. 2018. "Knowledge Graphs in the Libraries and Digital Humanities Domain." In Encyclopedia of Big Data Technologies, 1–8. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-63962-8_291-1.

Kuczera, Andreas. 2022. "TEI Beyond XML – Digital Scholarly Editions as Provenance Knowledge Graphs." In Graph Technologies in the Humanities - Proceedings 2020. Vienna. https://ceur-ws.org/Vol-3110/paper6.pdf.

Novak, Jasminko, Isabel Micheel, Mark Melenhorst, Lars Wieneke, Marten Düring, Javier Garcia Morón, Chiara Pasini, Marco Tagliasacchi, and Piero Fraternali. 2014. "HistoGraph – A Visualization Tool for Collaborative Analysis of Networks from Historical Social Multimedia Collections." In 2014 18th International Conference on Information Visualisation, 241–50. https://doi.org/10.1109/IV.2014.47.

Pon, Lisa. 2014. "Rewriting Vasari." In The Ashgate Research Companion to Giorgio Vasari. Ashgate.

Sack, Harald, Torsten Schrade, Oleksandra Bruns, Etienne Posthumus, Tabea Tietz, Ebrahim Norouzi, Jörg Waitelonis, et al. 2023. "Knowledge Graph Based RDM Solutions: NFDI4Culture - NFDI-MatWerk - NFDI4DataScience." Proceedings of the Conference on Research Data Infrastructure 1 (September). https://doi.org/10.52825/cordi.v1i.371.

Santini, Cristian, Mary Ann Tan, Oleksandra Bruns, Tabea Tietz, Etienne Posthumus, and Harald Sack. 2022. "Knowledge Extraction for Art History: The Case of Vasari's The Lives of The Artists (1568)."

Van Vugt, Ingeborg. 2017. "Using Multi-Layered Networks to Disclose Books in the Republic of Letters." Journal of Historical Network Research, October, 25–51. https://doi.org/10.25517/JHNR.V1I1.7.

Vasari, Giorgio. 2008. Lives of the Most Eminent Painters, Sculptors and Architects. Translated by Gaston du C. De Vere. 10 vols. Project Gutenberg. https://onlinebooks.library.upenn.edu/webbin/gutbook/lookup?num=25326.

Vrandečić, Denny, Lydia Pintscher, and Markus Krötzsch. 2023. "Wikidata: The Making Of." In Companion Proceedings of the ACM Web Conference 2023, 615–24. WWW '23 Companion. New York, NY, USA: Association for Computing Machinery. https://doi.org/10.1145/3543873.3585579.

Waitelonis, Jörg, and Harald Sack. 2012. "Towards Exploratory Video Search Using Linked Data." Multimedia Tools and Applications 59 (2): 645-672. https://doi.org/10.1007/s11042-011-0733-1.

Wilkinson, Mark D., Michel Dumontier, IJsbrand Jan Aalbersberg, Gabrielle Appleton, Myles Axton, Arie Baak, Niklas Blomberg, et al. 2016. "The FAIR Guiding Principles for Scientific Data Management and Stewardship." Scientific Data 3 (1). https://doi.org/10.1038/sdata.2016.18.