Towards Computational Prosopography: from Semantic Modelling to Historical Networks

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We present *computational prosopography* as a methodological label for a growing body of historical research that combines the traditional aims of prosopography with semantic data modelling and quantitative analysis. Similar practices have emerged across different historiographical contexts (Adriaenssens and Van Steenbergen 2016; Prado 2020; Hammond 2021; Fuller and Wang 2021; Saadany, Mohamed and Sarwar 2023; Jauhiainen and Alstola 2025; Prajda 2025) but they have not been fully consolidated in an explicit theoretical framework. We introduce the term to describe an approach in which digital infrastructures are used to aggregate heterogeneous sources, formalise different types of interaction, extract and finally analyse networks, allowing historians to move iteratively between individual evidence and large-scale patterns.

Following the view that computational methods in history are not neutral external toolkits, but practices embedded in the methodological traditions of the discipline (Piotrowski and Fafinski 2020), and that digital modelling involves processes of selection, abstraction and interpretation (Tomasi 2018), we argue that the transformation of historical data into networks is a further *interpretive act*. Indeed, nodes and edges do not simply "emerge" from the sources, but they result from prior decisions about entities, relations and historical meaning (Lemercier 2015; Ahnert et al. 2020).

We show an example of computational prosopography in our work carried out since 2023 in the Managing Maximilian project which investigates the political, administrative and cultural world around Emperor Maximilian I of Habsburg as a complex system of interacting individuals. The project is highly interdisciplinary, involving several researchers from different Austrian research institutes and universities who are collecting an incredibly huge amount of data integrating heterogeneous sources taking into account interactions, geographical context, temporality and uncertainty. Rather than considering this complexity as an obstacle to be flattened, the project preserved it within its data infrastructure. Building on the factoid model (Pasin and Bradley 2015) and APIS (Schlögl and Lejtovicz 2018), persons are connected to semantically typed statements describing hundreds of interactions as communications, offices and roles, participation in events, family relations, payments, transfers and many other historically attested actions. Data creation itself has progressively become a hybrid process, combining manual curation with automatic AI-assisted extraction, while entity reconciliation addresses variant and incomplete references to the same historical persons across sources. The result is a large and highly complex knowledge graph.

In Managing Maximilian we run some preliminary analysis on a large temporal co-occurrence network of people mentioned in Regesta Imperii XIII: by modelling the corpus through yearly layers we investigated changes in centrality, brokerage and community structure, including Maximilian's gradual emergence in relational structures documented by

those documents in the reign of Frederick III (Tambuscio et al. 2024). This proved the potential of network methods for prosopographical research, but also highlighted the main limitation of co-occurrences: links are not based on a documented historical relation between the actors.

The development of the Managing Maximilian knowledge graph allowed us to move from co-occurrence to semantically defined networks, through a workflow that maps typed statements to several possible graph representations while preserving relation types, contextual information and links to the underlying statements. Depending on the research question, the same data can generate communication, family or event-based networks, preserve multiple edges among the same actors, or combine relations into multilayer representations. The semantic classification encoded in the data model is therefore mapped into possible network projections and the network extraction becomes part of the historical research rather than a hidden processing step.

The generated networks support several forms of computational analysis. Egonetworks allow us to compare relational profiles of individual actors; multilayer representations distinguish different types of interactions that will be explored in the future with graph embedding. In particular, our typed-network analysis shows that some communities are dominated by specific forms of interaction while others exhibit greater semantic diversity, and that structural position can be combined with relational diversity to distinguish, for example, brokers from insiders and specialists from generalists (Tambuscio and Vogeler 2025). Ongoing analyses use betweenness and k-core decomposition to test historiographical hypotheses concerning Maximilian's inner circles (Tambuscio et al. 2026).

These experiments also highlight a fundamental problem of historical research: network position is shaped not only by historical relations but also by source survival, corpus composition and modelling choices. In this framework, computational analysis becomes a form of source criticism. The value of computational prosopography is keeping the transitions from historical sources to network analysis traceable and reproducible, combining the semantic richness required by historical research with the abstraction needed to identify patterns across large datasets. In this sense, computational prosopography does not replace traditional or digital prosopography, but extends it: from the systematic study of persons towards the reproducible transformation analysis of prosopographical data, making explicit how modelling choices shape the relational structures and historical processes that can be computationally investigated.

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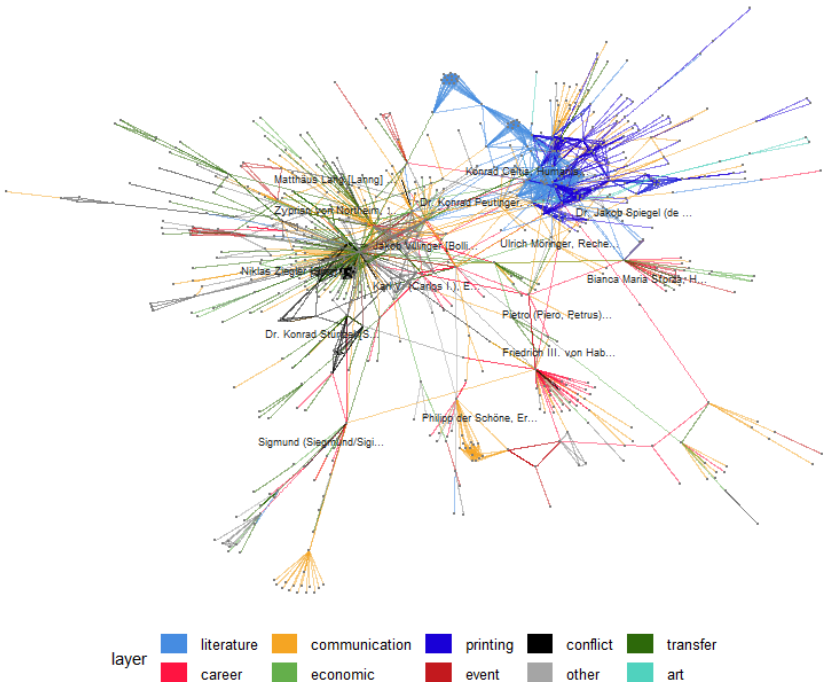


Figure: an example of an action network extracted from the knowledge graph generated in Managing Maximilian.