Data-Driven Maps of Art History

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ABSTRACT

Many approaches to explain conceptions of developments in the arts to both peers and a more general audience included diagrams representing networks of related entities such as genealogies of important historical actors or styles. While such visualizations were traditionally created by hand, the recent emergence of extensive digital repositories of art history information enable new means of presentation. This work seeks to explore the potential of openly available data sources to create bottom-up, data driven versions of such network maps of art history. It highlights commonalities and differences between views derived from institutional and crowd-sourced data repositories and compares them with identified historical examples. The results suggest that the available data can be used to create largescale views on specific developments in art history, potentially serving as aid for navigating vast online collections of digitized artworks but also as means of reflection on the origin of the data sources themselves.

KEYWORDS

Art Styles, Biographies, Core-Periphery, Data Analytics, DBpedia, Genealogy, Network Visualization, ULAN, Wikidata, Wikipedia

INTRODUCTION

Especially after the inception of art history as an academic discipline in the late 18th century, diagrams have been used as visual devices to convey views on related developments. They were included in publications and textbooks and served as communicational means to support scholarly positions and as educational tools providing bird's eye views on large-scale historical developments. Famous examples such as the "Diagram of Stylistic Evolution from 1890 until 1935" from (Barr, 1986/1937) sought to present visual aggregations of multitudes of individual processes as macroscopic, law-like views on artistic evolution. As discussed in (Schmidt-Burkhardt, 2005), such charts were often praised for their educational value but also challenged for lacking objectivity due to omissions or special foci introduced by their authors.

In recent years, the increasing availability of both digitized and born-digital art history resources went in parallel with the emergence of new paradigms of data-driven analysis which can be subsumed under the umbrella term "data analytics". The emerging field of digital art history increasingly uses algorithmic methods to analyze the accumulating body of historical material, while recent trends in museology propose digital means of presenting art collections to an increasingly tech-savvy audience,

seeking to contextualize exhibits using multimedia guides and interactive installations for local and dedicated online presentations for remote visitors. Information visualization plays an important role in both scenarios, supporting researchers in the interpretation of large data collections and the communication of their findings, but also providing virtual visitors with navigational guides for finding their way through vast online art collections.

The original aim of this work was to explore the potential of historical social network data, represented through interlinked artist biographies, for providing bird's eye overviews on art historical developments beyond the relatively limited scope of existing, often manually created maps of art history. This was driven by the expectation that large-enough amounts of recorded ties between artists and/or other important persons from the art world would aggregate into large-scale networks spanning multiple centuries whose visualization could support the contextualization of artworks in virtual presentations. The analysis of existing biographical data sources, however, revealed that they were not free of cultural/institutional biases which appeared in form of differing compositions of nationalities and/or roles of covered persons. This provided an additional and relevant research perspective which directly linked to existing discussions about modes of inclusion and exclusion in the formation of the canon of art history, global aspects of which were often subsumed under the notion of the core and the periphery of the art world (Joyeux-Prunel, 2014).

The aims of the work presented in this article were therefore (1) to demonstrate the possibility of creating data-driven maps of art history and (2) to show their use for revealing specific biases present in different data collections. This paper unifies the authors' previous related work (Goldfarb, Arends, Froschauer, & Merkl, 2013) (Goldfarb, Arends, Froschauer, Weingartner, & Merkl, 2014) under a common data processing framework and discusses large-scale network visualizations of art history biographies generated with content from the Getty Union Artist Names and Wikipedia, comparing them with each other and with existing scholarly examples. Different filtering approaches are used to highlight data specific aspects, including means to unravel chronological structure embedded in highly interlinked sets of historical entities and to reveal hidden interactions between subgroups of them. The results show that data-driven maps of art history successfully extend their manually created scholarly counterparts by putting them in larger historical context and at the same time serve as tool to reflect upon the nature of the used data sources themselves.

DATA SOURCES AND TOOLS

The Getty Union List of Artist Names (ULAN) is an established data source curated by domain experts as controlled vocabulary for person names relevant for art history. As described in (Baca & Gill, 2015), it has recently been made available as Linked Data, reflecting the current trend for cultural institutions to open their databases for public access and re-use. Besides containing records for about 200,000 persons and institutions, the former with basic information such as nationality, role, birth and death dates, etc., the ULAN also provides associative links between a subset of its records, representing identified professional, familial and other relationship types. Due to its institutional background, the presence of persons in the ULAN can be considered as evidence for their importance for the domain of art history.

As one of the premier examples for freely accessible, crowd-curated content on the Internet, Wikipedia in turn unites a wide range of contributions from both domain experts and laypersons, mainly relying on mutual reviews for ensuring the quality of provided content. Being an encyclopedia, its articles are usually dedicated to distinct entities such as persons, places or concepts and are mutually connected via hyperlinks. This allows to treat interlinked biographies on Wikipedia like a social network and to compare it with more explicit network structures such as found in the ULAN. Several projects and initiatives make Wikipedia data accessible for quantitative use: Preprocessed and yearly updated page-link datasets extracted from various Wikipedia language versions are provided by DBpedia, an approach to extract structured information from Wiki pages (Auer et al., 2007). The

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