Unveiling the Dispersal of Historical Books from Religious Orders

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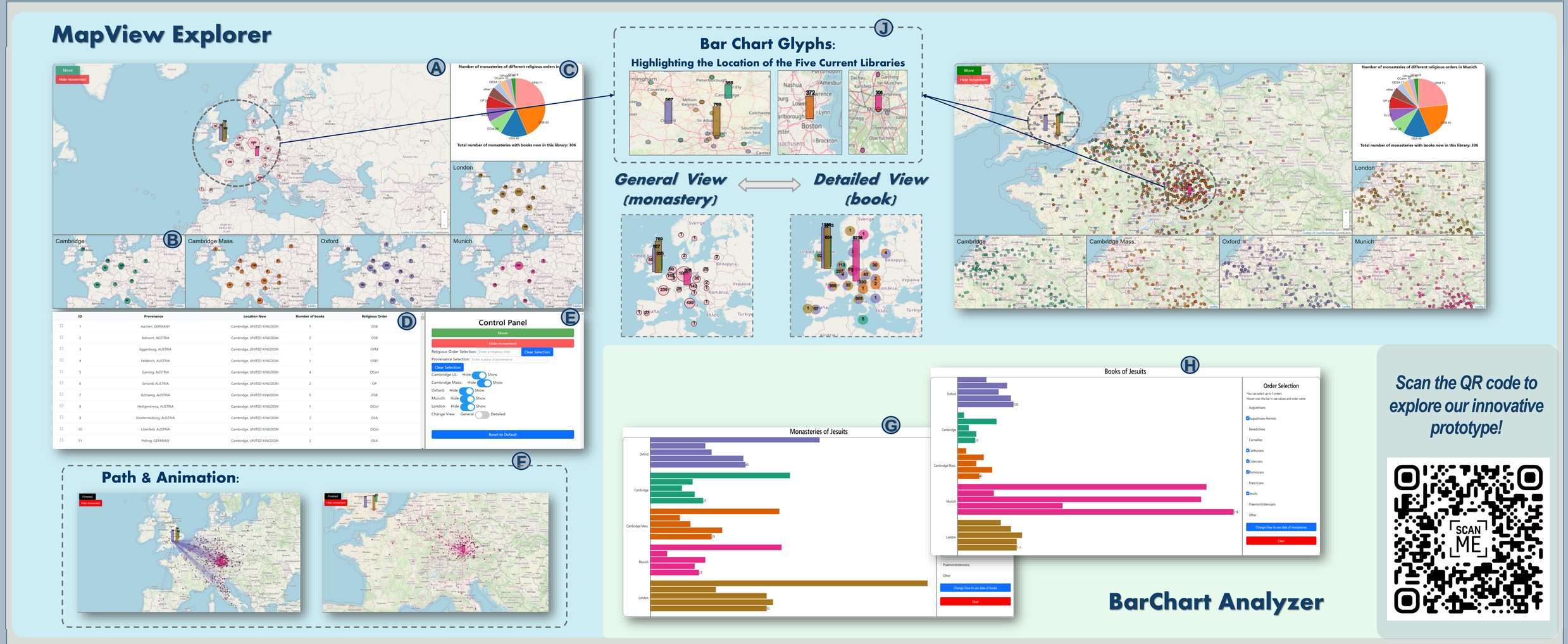

Figure 1: Two interfaces are designed to visualize the dispersal of books using map-based layouts augmented with descriptive statistics.

Introduction

The secularization of religious houses in Europe, driven by significant political events such as the reigns of Henry VIII, Joseph II, and Napoleon, as well as the Spanish desamortización (Spanish land and property expropriation) and the formation of the Italian State, led to the dispersal and partial destruction of vast quantities of early printed books. These events have shaped the landscape of libraries across Europe, with many books from secularized institutions forming the core of national and municipal libraries, while others found their way into the international antiquarian book market and became part of other countries' early printed heritage collections. To address historical interest in mapping the dispersal of thousands of books, a collaborative project between a historian and visualization researchers resulted in the creation of an interactive visualization tool (Figure 1) to quantify and analyze the extent of this phenomenon. We uncover hidden patterns and connections between the original and current holding institutions by extracting information on the provenance of books from monastic institutions in major European collections.

Domain Background

From the sixteenth century onward, vast quantities of early printed books have been displaced and partially destroyed because of the secularization of the religious houses of Europe. It is hard to find a library in Europe today that has not been affected by these political events. Historians have always tried to quantify the extent of the phenomenon and have managed to extract useful information from the provenance data of historical books, as they frequently change ownership throughout their lives, disseminating knowledge, ideas, and information [1]. Since 2009, the collaborative database Material Evidence in Incunabula (MEI) [2] has collected data on the former ownership and usage of 15th-century books, enabling the tracking of their circulation in Europe and the USA.

For this project, the domain experts selected a dataset of 2,369 books that from the MEI database, emphasizing the impact of secularization of religious houses on historical book distribution.

Data

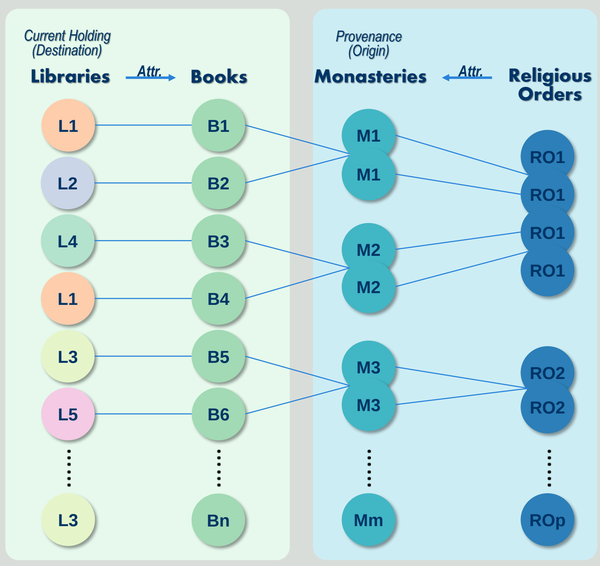

Figure 2: Two-level hierarchy of books and monasteries.

Figure 2 illustrates the data structure with a two-level hierarchy, comprising books and monasteries. Each book instance is accompanied by an origin-destination location pair, and each monastery is associated with its corresponding religious order. The Origin-Destination (OD) features within the data [4], along with hierarchical visualization and decomposition techniques [5], have attracted the interest of visualization researchers. A wealth of existing literature on geospatial data visualization serves as a strong foundation for our work [7]. The research conducted by Franke and Koch [6] shares a close connection with the theme of our work, but primarily emphasizes the distribution on the map over time, rather than the relationship between provenance and current holding institutions.

Requirements & Tasks

To achieve the objective of ***mapping the dispersal of books from religious orders***, we identified the following requirements based on the discussions with the domain expert:

- **R1** *Display the locations of monasteries and libraries.*
- **R2** *Illustrate the current book locations and movement paths.*
- **R3** *Support for multi-faceted data exploration.*

Based on the requirements, we devised specific analysis tasks:

- **T1** *Emphasize the provenance-destination pairing.*
- **T2** *Facilitate comparisons among books or monasteries.*
- **T3** *Visually differentiate the data by current holding institutions.*
- **T4** *Enable extensive dataset exploration & manipulation via table*
- **T5** *Visualize the descriptive statistics of the data.*

Prototype

The prototype features two interfaces, as shown in Figure 1, to address domain requirements. Multi-view design is applied as the decomposition technique to efficiently handle the two-level hierarchical data structure, allowing users to seamlessly switch between books or monasteries for comparison, exploration, explanation, or identification (***R3, T2***). A consistent color scheme is employed, encoding data with five distinct colors for different libraries to facilitate intuitive comparison and differentiation of book origins and distributions.

The **MapView Explorer** features map-based visualizations (Figure 1 *A, B, F*) designed to showcase the location of holding institutions and the dispersal of books (***R1, R2, T1***). At the monastery level, bubble (proportional circle) maps depict the location and the number of books held in each monastery. When zooming in to the book level, each scatter point on the map represents an individual book. The bar chart glyphs (*J*) on the map differentiate the five current libraries from other circle markers, indicating the number of books each library currently houses. For comprehensive data comparison, the use of small multiples [3] enables the design of five synchronized mini-maps, each highlighting data specific to an individual library (***T3***). Supplementing the map-based views are connected panels (*C, D, E*), offering diverse perspectives, flexible options, and interactive data manipulation through a control panel, table, and interactive pie chart (***T4***).

The **BarChart Analyzer** delivers an interactive bar chart visualization, concentrating on presenting and comparing statistics from the perspective of religious orders. It allows users to select up to five orders to compare the number of books (*H*) or monasteries (*G*) affiliated with the five libraries (***R3, T5***).

Future Direction

As this project advances, refining the prototype and scrutinizing scalability and performance becomes paramount. Emphasis will shift towards systematic evaluations of the tool's usability and effectiveness, alongside integrating advanced visualization methods for hierarchical OD data representation. It is noteworthy that the prototype has already demonstrated its practicality in a teaching session, highlighting visual analytics' potential in boosting historical research and teaching.

Acknowledgements

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