Linking Historical Evidence to Digital Maps: The MICOLL Map (short paper)

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Abstract

This paper introduces the MICOLL Map, a digital historical map which is currently under construction by the ERC-funded project MICOLL: Migrating Commercial Law and Language: Rethinking Lex Mercatoria (11th-17th Centuries). The eventual aim of the map is to display the changing routes by which goods and information circulated in the late Middle Ages and the early modern period, with an initial focus on Northern Italy, Southern Germany, and Trans-Alpine exchange. The paper will firstly survey existing digital historical mapping tools before explaining how the MICOLL Map aims to go beyond the current state of the art in a number of ways, chiefly through the promotion of source transparency which will enable the map to be used as a source by professional historians. The second half of the paper will outline the current technical solutions in place to achieve this.

Keywords

Digital Routes, Digital Maps, Cultural Heritage, Linking Historical Evidence

1. Introduction

Existing digital historical maps, though in many cases groundbreaking in their own right, have not yet reached a point of sophistication where they are being used as serious tools by historical researchers. Even successful projects - those which manage to extensively and reliably harvest and display historical evidence in a way that inspires confidence in the researcher - are necessarily limited to the purposes of dissemination and public engagement rather than research. Many projects effectively focus on the digitalization of a single source or small group of sources, for instance the *DECIMA* project [1], which uses data from three Florentine censuses of the sixteenth and seventeenth centuries to create an interactive map of renaissance Florence[1]. Others use multiple sources, but as such are something of a rough approximation to historical reality. One of the most notable digital historical maps is *ORBIS* [2], a project based at Stanford University that attempts to display communication and travel routes in the Roman

[1]https://decima-map.net/the-project

Empire in terms of the time and cost of moving from one point of the Empire to another.[2] While this provides a vivid and striking sense of Roman mobility, it is necessarily somewhat impressionistic. While it could conceivably inspire new historical questions, in most cases it is unlikely to provide hard answers. It also remains chronologically vague: the map "broadly reflects conditions around 200 CE" but "also covers a few sites and roads created in late antiquity", an editorial choice that matters little for a casual user but muddies the waters somewhat for a professional researcher. Large, ambitious new projects that are currently in progress will likely take the state of the art further forward in this regard. *EmDigIt* run by Professor Rachel Midura at Virginia Tech University aims to create a "Google Maps for the Early Modern Period" using the printed itineraries published by the managers of nascent postal networks, of which just under 100 survive for the period covering the 16th to the 18th centuries[3]. There remains, however, space for a map can incorporate evidence from across a range of different sources. This is the aim of the MICOLL Map, which is currently in its early stages of design and construction.

2. State of the Art

Historical maps are representations of the geographical space that reflects the political, and cultural framework of a particular area which can vary in size, type, and context, as well as the density and types of information they contain. One of the first problems that researchers face with the management of these maps is how to deal with the digital scan in order to make them accessible to a broader community. Recent works focus on methodologies to overlap the digital scan with the current terrain: for example, in [3], the authors we describe a prototype for studying maps by means of techniques which calculate the areal distortion, its visual design for communicating that distortion, along with a scholarly workflow. Another example is the project described in [4], where authors show a case study of a map of the castle of Pylos in Greece from 1830 showing the infrastructure and outline of the castle. This map is compared to the recent state of the area by using a Geographical Information System (GIS) and the authors show how the georeferenced and digitized map from 1830 provides knowledge of the exact locations where buildings were standing before and after 1830, and where new roads were planned. Historical maps are also valuable data objects that need to be properly managed and shared in the research community. In the work presented by [5], the authors present how to design and implement a historical geographic database that combines history with the current situation of the Shanghai historical geographic area. The main idea is to have different layers of information (the original map, the scan, the overlay with the terrain, the named entities, and so on), to properly represent different objects and thus allow an efficient way to link and query data. Best practices in the Open Science community are suggesting more than ever the use of Linked Open Data (LOD) approaches in line with Findable, Accessible, Interoperable, Reusable (FAIR) principles. In [6], the authors highlight a semantic approach that describes historical maps by integrating data models, standards, and good practices from different domains (geography, cartography, history, museology). These integration is necessary in the framework of the Geospatial Semantic Web which is also discussed in [7]. Historical maps also tell stories, and the storytelling aspect is also

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[2] https://orbis.stanford.edu
[3] https://tinyurl.com/early-modern-digital-itineraries

one important part of this research area. From a cultural perspective, [8] present the problem from a different perspective: it is not simply a question about optimally representing place but it is also about bringing the past in dialogue with the present in ways that invite us to act on that history symbolically, politically, and relationally. This kind of engagement with the histories of the place and their cultural context are also discussed in [9] where the authors show examples of "creative placemaking" which describes the use of arts, cultural and creative thinking to enhance the interest of a place by using digital technologies and narrative, such as through public art walks and mobile games. They also show how it has been applied in creative contexts and to develop digital narrative experiences targeted to the public's interaction with heritage places.

3. The MICOLL Project

The MICOLL Map is part of a broader European research project involving historians, jurists, linguists, and specialists in the digital humanities[4]. The Migrating Commercial Law and Language (MICOLL) project aims to use the tools of historical linguistics to reconstruct the migration of technical legal terms across Europe [10]. The overall aim of the project is to cast light on the reality behind the "lex mercatoria", the customary commercial law that medieval merchants across Europe and the Mediterranean supposedly shared but which is most likely an invented tradition or myth emerging after the end of the medieval period. In a nutshell, the project asks whether medieval merchants "spoke the same language" when it came to commercial law. Words that migrated from the languages of the Italian peninsula were particularly important in this respect and came to be widely used, thanks to the precocious success of commercial cities like Florence, Genoa, and Venice. The project thus concentrates primarily on the transfer of commercial terms between Germany and Northern Italy since it was a key area for European mobility thanks to the importance of the Alpine passes, one which network analysis has revealed as a "key area of the European mental map"[11, p. 10].

In order to be of use to historians, the map will have to display this change over time, but will also have to be open about the data that lies behind the lines on the map. These are two features that are currently absent in current digital historical maps. In total, the MICOLL map will exhibit four features that we believe to be completely new in digital historical mapping. Firstly, it will display trade routes on both land and water. Secondly, it will show change over six centuries (as far as historical sources allow). Thirdly, it will be capable of integrating multiple source bases, both primary and secondary. And finally, and most importantly, it will be possessed of an unparalleled level of transparency with regards to those sources, allowing the user to see (and cite) the underlying information lying behind each aspect of the map.

4. The Historical Solution

Historical "maps", at least as we understand them, are unlikely to be much help in reconstructing trade routes before c.1700, the end point of the MICOLL project. Apart from a few very rare

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[4]https://www.micoll-erc.eu

exceptions - the map of public Roman roads known as the Peutinger Table, for example - journeys were not represented graphically but rather as "itineraries" i.e., lists of places passed through along one's journey. Extensive maps approaching a high level of geographical accuracy were available by the mid-seventeenth century (e.g., the maps produced by Johannes Blaeu). Such maps were usually state-sponsored productions, however, and prioritized political features and boundaries rather than roads and ways. Blaeu's maps, for example, contain almost no roads. Any smooth contiguous lines drawn on any modern representations of roads in this period are necessary to a certain degree of speculation on the part of the creator.

In the first instance, and thanks to a close working relationship with *EmDigIt*, the MICOLL Map will therefore make use of the printed postal itineraries relevant for the Southern German, Northern Italian, and Trans-Alpine area. However, it will necessarily have to incorporate a much wider source base than this, not only to cover other chronological periods (printed itineraries did not exist prior to the late 15th century) but also to represent waterways. The system has therefore been designed to be capable of "citing" all kinds of historical evidence, both primary and secondary. In this way, the MICOLL Map represents a tool for visually displaying the vast but scattered work done on this topic that exists in the secondary literature. Information in sources is most likely to be given in the following form: "in the year X, the route from City A to City B passed through these locations". Routes can thus be linked to a number of historical sources, each of which is linked to a date. The system will eventually be able to use this data to display a route across its known lifespan. Routes themselves are to be made up of a series of waypoints, which can be given certain attributes and incorporated into more than one route. Each attribute will likewise be linked to a source and date.

5. The Technical Solution

The web application providing access to the MICOLL digital map is publicly available for consultation at https://micoll-erc-maps.dei.unipd.it. Unregistered users can access all the information available in the platform including currently: (i) the complete list of the waypoints stored in the database; (ii) the list of the routes and (iii) the list of the evidence sources supporting a given route type or waypoint type and their related authors. However, to edit the information users are required to be registered and since we aim to collect and report only verified historical information, users, for the present, cannot register by themselves but is only possible upon request. A navigation menu is present on top of the screen, providing links to navigate among the different resources (i.e., waypoints, routes, sources and their authors). For example, on clicking the link *List the waypoints* a search form is provided enabling users to look for a specific waypoint by means of natural language queries. The retrieved results containing the candidate waypoints that match the user-provided query are organized in tabular form so that users can sort and filter the candidates according to multiple filters (e.g., latitude, longitude, country). Figure 1 shows the information concerning the waypoint considered (i.e., Brixen) reported in a structured form, that is, waypoint/geoname id, latitude, longitude, country, alternative names, a description, the list of the different types associated to that waypoint and a flag indicating whether the waypoint was a Roman settlement or not. In addition, a map shows the waypoint
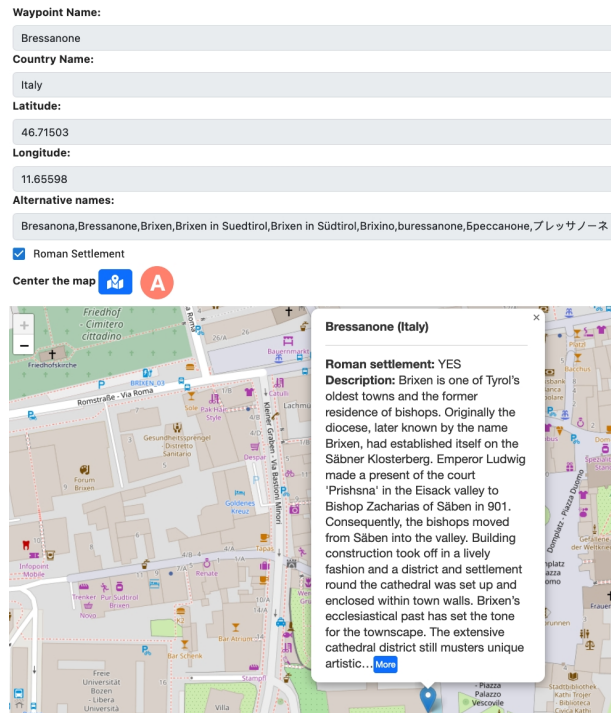
**Figure 1:** Information details for the waypoint *Brixen (Bressanone)* in the read-only consultation mode.

position on a OpenStreetMap[5] layer. Users can navigate the map interactively or center it back to the waypoint position, by clicking on the button (A). Another function provided is the possibility of creating routes from a set of waypoints. Specifically, the users are asked to provide several information including the name of the route, a description, any route types (e.g, *Trade route*) and the supporting evidence. Users can search for the waypoints of interest and add/sort them to create the route of interest, as shown in Figure 2. Each waypoint name is clickable and is linked to an entry in the GeoNames[6] database.

6. Approaches and Perspectives

The database is populated with waypoints defined in an open dataset provided by GeoNames at https://tinyurl.com/geonames-all-cities. The dataset contains all cities around the world with a population greater than five hundred people. Thus, users do not have to enter the geographical data concerning the major cities in order to use them as waypoints. This allows historians to concentrate on the inputting of the historical data without having to look up widely available information such as coordinates. Nevertheless, users can still create custom waypoints by providing the required information such as the geospatial coordinates, which is useful in case of historical places that no longer exist or that have changed position over time. Since this is

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[5]https://www.openstreetmap.org
[6]https://www.geonames.org
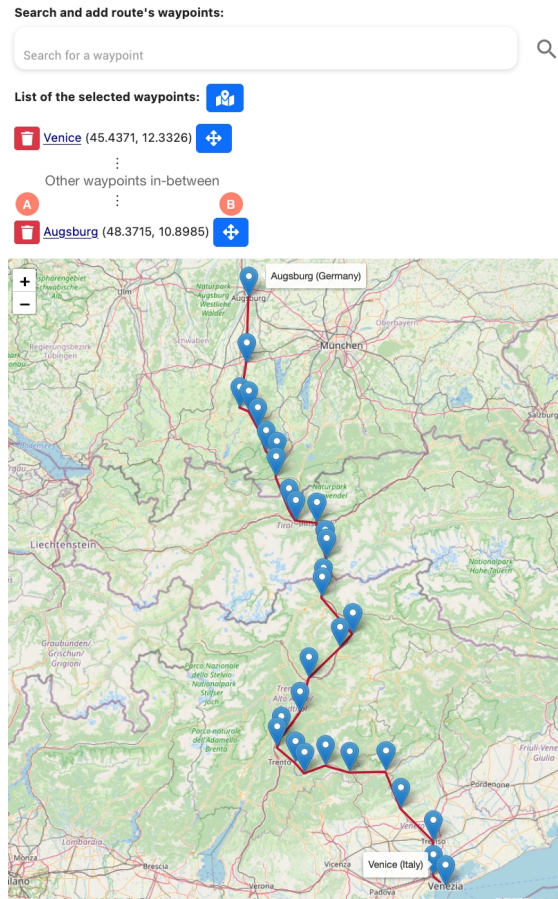
Figure 2: Interface for creating a new route. The route depicted connects Venice to Augsburg according to path described in the evidence publication "Prodromus Germaniae" authored by Gerhard von Goltz in 1612. Users can edit a route by deleting some waypoints (button A) or changing their order in the path (button B) using drag-and-drop facilities.

an on-going project, we plan to improve it with several additional features including: (i) the possibility of visualizing multiple layers in the digital map at the same time, that is, not only the base OpenStreetMap layer but also other stacked layers (e.g., digitized historical maps such as that of Johannes Blaue); (ii) automatic import/export features in several geospatial formats such as GeoJSON, Well-Known Text (WKT), and Keyhole Markup Language (KML); (iii) search facilities enabling users to search for routes connecting two given waypoints of interest. The final aim is to create a publicly available system that targets expert users and allows them to consult and edit historical routes in a collaborative setting. Furthermore, we will publicly release the whole source code on Github[7] so that it can be reused in different contexts with proper customization (e.g., change the set of waypoints/routes types), thus possibly fostering further developments in the integration of historical information into digital maps.

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[7]https://github.com/MICOLL-ERC/micoll-erc-map-pub

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Author contribution statement

S.G. devised the MICOLL project and the main conceptual framework. G.M.D.N., J.D., and F.G. co-designed the MICOLL Map. F.G. developed and implemented the MICOLL Map. G.M.D.N., J.D., F.G and S.G. co-authored the manuscript and revised it. J.D. contribution focuses on the first half of the paper concerning the historical solution, whereas F.G. focuses on the second half concerning the technical solution.

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