

Constellations of Correspondence: a Linked Data Service and Portal for Studying Large and Small Networks of Epistolary Exchange in the Grand Duchy of Finland

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Abstract

This paper presents the vision of aggregating, harmonizing, and publishing letter catalogue metadata (information e.g. of senders, receivers and datings of letters) from cultural heritage (CH) institutions in Finland as a single reconciled Linked Open Data (LOD) service and a semantic portal providing data analytical tools for researchers. The research is conducted as part of the consortium research project *Constellations of Correspondence* (CoCo). The target of the project is to study – for the first time – scattered, heterogeneous epistolary metadata regarding the period of the Grand Duchy of Finland (1809–1917) as one, integrated dataset and make it interoperable and available. This will enable scholars to ask ambitious research questions in the field of computer science and to conduct empirical, bottom-up case studies e.g. on epistolary culture, communicative networks, and heritagization processes. This paper discusses one of the first datasets acquired by the project, the letter collection of the Board of the Finnish Art Society (1846–1901), provided by the Finnish National Gallery, which contains details of c. 1150 letters sent or received by c. 400 actors.

Keywords

Epistolary culture, letter metadata, Linked Open Data, semantic portal, data analysis, visualization

1. Introduction

Letters – words written on paper, enclosed in an envelope and transported to the recipient – were everywhere in 19th-century world. This ancient means of communication had become

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a more efficient form of inter-personal and "inter-institutional" contact and permeated all layers of modernizing societies as literacy spread and transportation speeded up [1]. Such permeability means that letters are among the most important historical research materials. However, enquiries based on quantitative analysis are absent both from the studies that use letters as sources and from the enquiries to epistolary cultures or letter-writing as a social practice [2, 3]. The strong paradigm of close reading has rendered quantitative questions largely irrelevant. At the same time, as in the Finnish case, the Cultural Heritage (CH) institutions (archives, museums, libraries) can rarely provide any reliable information as to the number of letters in their collections, which has also effectively prevented quantitative enquiries.

Constellations of Correspondence: Relational Study of Large and Small Networks of Epistolary Exchange in the Grand Duchy of Finland (CoCo) consortium project's¹ main goal is to unite epistolary metadata of siloed collections and provide access to the harmonized, linked, and enriched dataset. A central output of the project will be an open data publication of aggregated letter catalogue metadata that has been previously unavailable as a data resource. This will offer a new entry point to 19th-century society and epistolary culture, and it will enable both quantitative and qualitative analyses. Moreover, the project develops and utilizes social network analysis, data visualization, and knowledge discovery methods to respond to the empirical research questions and to discover interesting patterns and phenomena in the data. The analysis tools are packaged and provided for public and scholarly use as a LOD service, SPARQL endpoint, and semantic portal.

The project is currently surveying and collecting data from letter metadata collections scattered in different CH institutions in Finland. The collected datasets will be transformed into a harmonizing data model accompanied by automatic and manually curated disambiguation processes for the reconciliation of the identities of pivotal entities (people, places). The recognized people are linked to established LOD registers and enriched with their metadata, such as occupation and gender. An ontology of historical occupations [4] is used to link to information about social stratification provided via the HISCO standard [5]. For datasets with full-text contents of letters, we investigate options for enriching the metadata by utilizing natural language processing methods, such as named entity recognition. Possibilities of hand-written text recognition of digitized letters will be explored.

In the following sections, we present background on studying epistolary metadata collections, outline the currently available metadata collections we plan to use in the project, discuss initial ideas on the harmonized letter data model, data ingestion/aggregation workflow, and data publication, provide an initial demonstrator on a single letter metadata collection, and conclude with a general discussion.

2. What can epistolary metadata tell us?

The project's focus on letter metadata will open new perspectives for 19th-century studies and improve our understanding of the epistolary collections as cultural heritage. The metadata aggregated during the project will enable us to ask unprecedented "big questions" (How much correspondence as a whole and in chosen decades?). We can also safely assume that the

¹<https://coco.rahtiapp.fi>

letters acquired and cherished as cultural heritage represent figures and individuals who were considered e.g. politically and culturally important, and that educated, upper-class men from established families are over-represented in the collections, and therefore in the CoCo project's epistolary dataset as well. At the same time, we hope that the data may surprise us. We are particularly interested if the quantitative analyses of the collections as a whole – combined as a harmonized dataset – could offer a more nuanced picture of the communication networks of the 19th-century society and reveal unexpected patterns or links between and beyond the “usual suspects” of actors. Moreover, the possible social and gendered aspects of epistolary communication are of great interest (Are there “gendered” networks?).

An equally important aspect is the study of the collections and the heritagization process related to their composition. The collections – and also their metadata – mirror what was considered worth saving as heritage for the emerging nation and fit with the idea of the newborn Finnish national identity. As one result, we will acquire a more profound understanding regarding the “data profiles” of different CH institutions (How do the explicit collection policies relate to the actual data they have accumulated?; Do the collections have specific temporal and gender profiles?). Such collection-related research is also a central part of the validation of the subsequent data models and visualizations and will form a backbone of source or “data criticism” when the data is being used as a point of departure for humanistic enquiries.

The more specific research questions of this paper are connected to the letter collection of the Finnish Art Society (*Suomen Taideyhdistys*, STY), a predecessor of the present Finnish National Gallery and founded in 1846. Its role in the formation of the Finnish art world with all its institutions was crucial and it soon became the key actor in the 19th-century cultural field. The letters in this set were (and still are) attachments to the minutes of the Art Society, its board and other organs. In other words, they mainly contain issues that were discussed in the meetings. The set includes both letters sent by the Art Society and its representatives (copies) and letters sent to it. The minutes with the attachments and the letters are published online².

Regarding the Finnish Art Society we will ask: What kind of transnational networks did the Society have? Can the data point to decades or years of accelerated frequency in the correspondence? What caused such intensification of epistolary communication? In other words, can we use letter metadata to study alterations in the activities of different organizations or individuals?

3. Data

Datasets. In the first phase of metadata acquisition the project has collaborated with a selection of key CH institutions, including the Finnish National Gallery, Finnish Literature Society (SKS), Swedish Literature Society in Finland (SLS), National Archives, and National Library. Moreover, metadata about the correspondence of the “national philosopher”, professor, and senator J. V. Snellman has been acquired from the Edita Publishing House. These institutions together hold central collections related to persons and institutions influential in the fields of art and literature, learning, science, and politics. The collections of SKS and SLS also include documents compiled by lower-class, uneducated people. In the course of 2022 and 2023, the project will expand

²<http://www.lahteilla.fi/styp/>

its datasets to include other sectors of society (e.g. business and economics). The data comes in heterogeneous formats with different data granularities (from well-curated, individualized metadata to extensive correspondences between two persons merged into one metadata record). Most institutions have archival databases or systems, from where it is possible to acquire data in structured formats and as data dumps, but some only or partly maintain the epistolary metadata in MS Word format (see Table 1). In many cases, the project will be responsible for filtering out 19th-century metadata from a larger set of epistolary data.

Cultural heritage institutions and datasets			
Institution	Collection	Total collection size	Structured metadata
National Gallery	The Art Society	1147 letters	100% / csv
SLS	Albert Edelfelt	1310 letters	100% / csv
Edita/Seco	J.V. Snellman	1514 letters	100% / csv
SKS	Elias Lönnrot	6247 letters	100% / csv
National Gallery	Letter collections	c. 9900 letters	100% / csv
SLS	Letter collections	235 700 letters	100% / csv
SKS	Letter collections	c. 2000 archives	Database/MS Word
National Archives, Helsinki	Letter collections	420 archives / 200 000 files	Database/MS Word
National Library	c. 90 collections	?	MS Word

Table 1

Available source datasets as of February 2022.

Data model. As part of the project, a harmonizing data model for epistolary metadata collections will be developed. Compatibility with existing standards will be ensured, e.g., relevant CIDOC CRM classes and properties (e.g. *crm:E5_Event*, *crm:E21_Person*, *crm:E53_Place*, *CRM:E52_Time-Span*) will be used. Central classes of the data model will include Letter, Place (e.g. place of writing), Actor (e.g. sender, receiver), and Organization (e.g. host of collection), accompanied with classes representing information related to the archival processes of letters, e.g. Collection and Archival series. The core metadata of a letter includes sender, recipient, place of writing/sending, place of receiving, time of sending, and data source.

Data ingestion/aggregation workflow. In the envisioned workflow for data processing, firstly, each piece of source data is converted into a simple, uniform RDF. In this simple RDF format, all data fields in the source material are only converted into literal string-type values. The simple RDF format will be the same for all source data, independent of their original format, e.g., spreadsheet, Word document, or an extract from an existing database. Secondly, the produced simple RDF conversions are further harmonized into the applied CoCo data model. During this process the literal values are converted to resources according to the data model schema, e.g., actor names are split into family and given names, gender is statistically inferred from the given names, and timespan resources are generated based on the literal expressions of time. Next, actor and place resources are linked to external databases, e.g. Wikidata, GeoNames, BiographySampo [6], and AcademySampo [7]. Available information about an actor, such as given and family names, floruit, and possible geographical locations, is used for reconciliation. Actor resources are enriched with biographical information, such as the times and places of birth and death, name variations, vocations, known locations, inter-personal relations, URLs in

third-party ontologies, and images. Place resources are enriched with label variations, position in place hierarchy, images, and geographical coordinates. Finally, the full CoCo dataset is assembled by reconciling all individual datasets constructed from different sources. Reconciling will be done both computationally as well as manually by domain experts. Furthermore, the data will be enriched by, e.g., calculating network statistics and constructing resources of correspondence between two actors.

Data publication and service. The letter metadata gathered in the project will be published in an open Linked Data service LDF.fi with a permissive license, according to the Linked Data publishing principles and other best practices of W3C [8], including the provision of a public SPARQL endpoint³, and FAIR principles⁴. The data service allows for building custom data analyses in Digital Humanities research using, e.g., YASGUI⁵ [9] and Python scripting in Jupyter notebooks. The dataset will be accompanied with descriptive metadata enhancing its findability and possibilities for re-use. In addition, the data will be published as data dump, e.g. in Zenodo. By publishing the accumulated data as an open resource, new possibilities for distant and close reading of epistolary metadata of the Grand Duchy of Finland will be provided.

4. Semantic portal demonstrator

To perform preliminary studies on the data, one of the source datasets was converted into RDF using the LetterSampo framework [10]. The chosen dataset, *Finnish Art Society, Letters 1846–1901* data provided by the *Finnish National Gallery*, contains details of c. 1150 letters sent or received by ca. 400 actors. The actor data consists of both cultural organizations as well as of Finnish people with cultural significance, many of them having pages in, e.g., Finnish Wikipedia, AcademySampo, or BiographySampo. To enrich the chosen test data, person records were linked to Wikidata where c. 140 records were matched. The linkage was done by matching the person names and comparing the years or birth and death to the known years of activity in the correspondences. The data was enriched by importing details of e.g., birth, death, occupation, and person images.

The semantic portal demonstrator is based on the Sampo model [11] and is implemented using the Sampo-UI programming framework [12]. In the user interface, the faceted search for actor data allows the user to filter the results e.g. by a person's name, gender, or times of birth or death. As a result the user will acquire the possible image, full name, times of birth and death, and number of letters sent or received by that particular actor.

Two timelines of letters are depicted in Fig. 1. The upper one shows the 10 actors with the largest numbers of sent (green dot) and received (blue dot) letters. The actor with the largest number of letters both sent and received (Board of STY, *STY:n johtokunta*) appears at the top of the timeline. In comparison, the other actors have flourished for clearly limited times. The lower timeline in Fig. 1 illustrates the yearly amounts of letters in the test data set where it can be noticed that most of the letters are dated between 1875–1900. In Fig. 2, the places of sending the letters are visualized on a map.

³<https://www.w3.org/TR/sparql11-query/>

⁴<https://www.go-fair.org/fair-principles/>

⁵<https://yasgui.triply.cc>

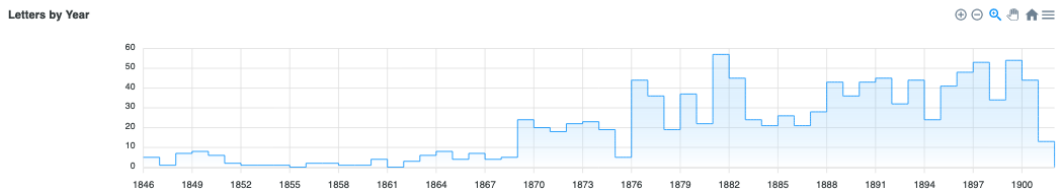
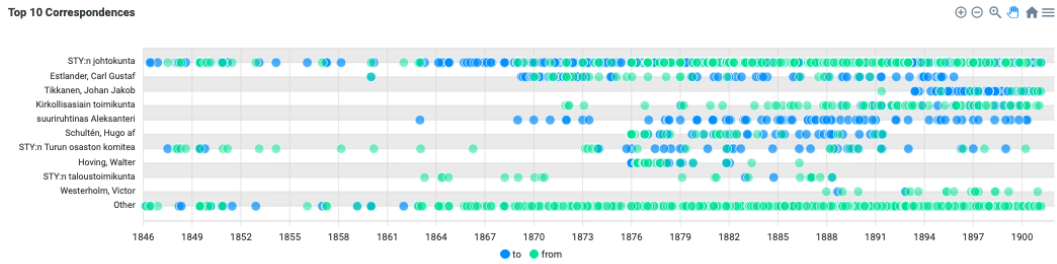


Figure 1: The upper chart depicts the most active actors and the lower chart the yearly amounts of letters.

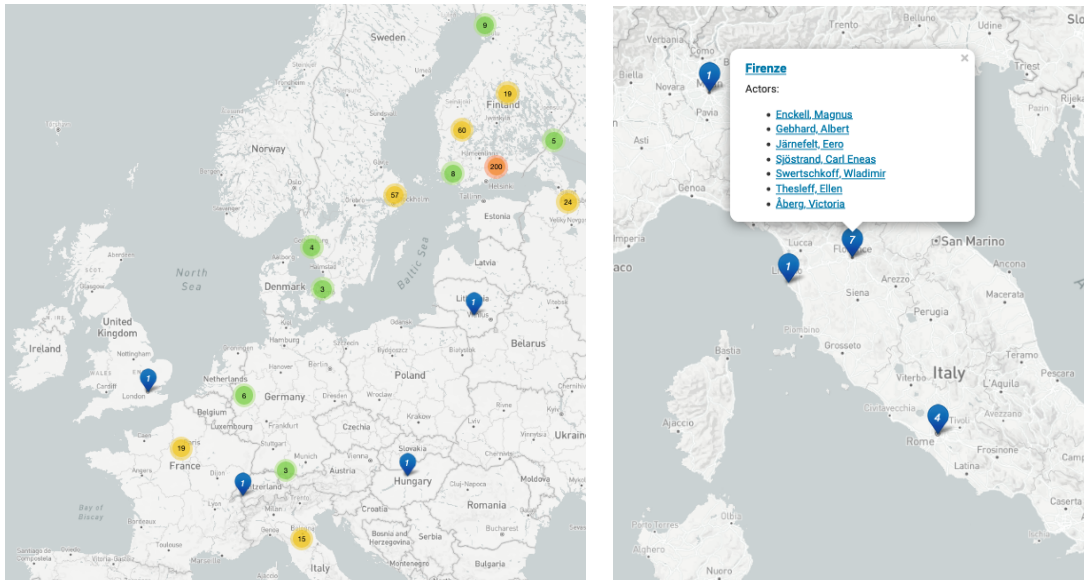


Figure 2: The places of sending the letters marked on the map of Europe (on the left) and Italy (on the right).

5. Discussion

Domain knowledge representation, Semantic Web technologies, and shared ontologies, such as CIDOC CRM, provide a sustainable and collaborative cyberinfrastructure for pursuing humanist research [13]. The CoCo project builds upon the experiences accumulated during the Reassembling the Republic of Letters (RRL) [14], 1500–1800 (2014–2018) COST action

and works in close collaboration with the LetterSampo initiative⁶ [15, 10] that is building a framework for representing, publishing, and using epistolary data as LOD on the Semantic Web for Digital Humanities research. Our work is informed by other correspondence metadata projects, such as CKCC⁷ [16, 17], correspSearch [18, 19], SKILLNET⁸, the Early Modern Letters Online (EMLO)⁹, and Norwegian Correspondences [20]. Compared with RRL, CoCo is focused on data that are both temporarily and geographically more restricted but, due to this, much more comprehensive regarding social layers of 19th-century epistolary culture. Although the project deals with Finnish data, the data model, reconciliation and enrichment workflow, and analysis tools developed will be applicable to other datasets as well, as one of the goals of the project is to produce a generic framework for producing LOD data publication based on heterogeneous epistolary metadata collections.

Regarding the Finnish Art Society dataset presented in this paper, a researcher interested in the correspondence connected to the Society or its board can get a quick overview as to the main actors (senders) and the amounts of letters by simply studying the letter catalogue in Excel format. However, even the quite limited and specialized data currently available can show the activities of the Finnish Art Society from a new perspective and point to some of the fundamental source critical questions vis-à-vis the use of such data.

A large amount of prior knowledge is always at work when scholars interpret models. Also the list of 10 most active senders/receivers of letters mentioned above is not surprising. Persons such as Carl Gustaf Estlander or Johan Jacob Tikkanen are amongst the known leading figures of the Art Society, and the Turku (Åbo) branch of the Society (STY:n Turun osaston komitea) a natural institutional correspondent. Perhaps the most interesting and important facet regarding the visualization of actors in this restricted dataset is that it brings the gendered nature of the Society's activities to the fore. Public organizations were run by men – and so was the Art Society, although for example its Drawing School was from the start open for both genders.

The epistolary metadata of the collection discussed here is very detailed, which means that altogether 823 entries contain information about the sending place. Put on a map, we can immediately see that the Society and its representatives corresponded with senders/recipients e.g. in France and Italy. A closer examination shows that most of them were Finnish artists staying in Paris and in different Italian cities, the two favored and known destinations for 19th-century Finnish artists' visits abroad. One of the institutional correspondents was the Hungarian Art Society with whom the Finnish Art Society e.g. discussed a possible regular exchange of Finnish and Hungarian lithographs. At the time, Finno-Hungarian connections were cherished particularly in Finland, since the Finns were set apart from Indo-European speakers as an ethnic group, and Finno-Ugrism became the favored ethno-linguistic alternative.

The number of the letters in the dataset increases throughout the century as the activities of the Society become more varied and frequent. The visualizations point to certain distinct peaks in the correspondence dated to e.g. 1849, 1869 and 1876. Should we concentrate on these years, if we study the 19th-century activities of the Art Society? On the other hand, is there a reason

⁶<https://seco.cs.aalto.fi/projects/rrl/>

⁷CKCC is an acronym for "Circulation of Knowledge: A Web-based Humanities' Collaboratory on Correspondences and Learned Practices in the 17th century Dutch Republic".

⁸<https://skillnet.nl>

⁹<http://emlo.bodleian.ox.ac.uk>

for a sharp reduction in the correspondence in 1875 or do we just observe casual fluctuation? Just to give one example: the peak in 1869 can be due to the revision of the statutes in 1868, which brought about an important change as the gathering of a permanent art collection was officially included amongst the responsibilities of the Society. It is a plausible hypothesis that such changes can cause accelerated epistolary activity.

At the same time, we should bear in mind the bounds of chance regarding the surviving of the data and, also, the archival practices of the Art Society and the later keeper of the collection, the National Gallery. It might well be that what we see in the data are the actions of a particular dutiful or perfunctory secretary. This may serve as a good reminder, that data-driven questions related to epistolary culture and enquiries as to the value-laden heritagization processes active in the formation and maintenance of the collections are more than two parallel research strands; they are deeply intertwined and should be taken into account on each level of the acquisition, processing and interpretation of epistolary metadata.

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