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Itinéraires culturels et représentations numériques

Socio-spatial visualisations of cultural routes

Exploring collective memory on Instagram

Visualisations socio-spatiales des itinéraires culturels : explorer la mémoire collective sur l'Instagram

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p. 305-330

Résumés

English Français

Cultural routes, defined as routes of historical importance that geographically represent the shared and living cultural heritage of different countries, have recently gained attention both as tourist destinations and as social repositories of collective local memories. In this paper we argue that the recent development of digital humanities can open interesting new perspectives for the empirical exploration of these routes as cultural objects. Indeed, the availability of new digital traces generated by human activities and social media combined with tools that facilitate the exploration of such traces allow researchers to create new types of fieldwork online. In this paper, we present a case study focused on the Via Francigena cultural route. We added a geographical component to a graph analysis tool called histogram, making it possible to explore and analyse a corpus of more than 8,000 Instagram pictures. We investigate the potential of the prototype to uncover socio-spatial relations related to the itinerary and to hypothesise about the collective memories that the route conveys in this corpus.

Les itinéraires culturels, définis comme des voies d'importance historique qui représentent géographiquement un patrimoine culturel vivant et partagé entre plusieurs pays, des figures ou des

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technologies (tweets, posts on Facebook, photos on Instagram, comments on TripAdvisor, etc.), together with the availability of digital tools to analyse digital traces, allow researchers to undertake new types of digital humanities. This paper presents a case study² focused on the cultural route of the Camino de Santiago stretching from Canterbury to Rome across the UK, France and Italy. It is a good example of the renewed interest in cultural routes. In 2015, about 50,000 walkers, five times more than in 2013. Motivated by the interesting combination of culture, spirituality, nature and taste that the route offers.

- 4 The goal of this research was to test the interest of creating a digital (geo)humanities tool helpful not only to study the topology of texts and images but also the spatial dimensions of a multi-faceted object such as a cultural route. Adapting histogram, a digital humanities tool, originally designed for multimedia search for historic collections, we created a geographic component to explore a corpus of more than 8,000 Instagram pictures related to the itinerary containing posts from a four-year period (2011-2015). Visualising these data using the new prototype of (geo)histograph supported us in undertaking a first exploratory analysis of the social-spatial relations associated with the itinerary, facilitating the generation of hypotheses about the collective memories that it conveys whilst also providing a more detailed insight into the strengths and weakness associated with such a corpus of doing digital fieldwork. Thus, as a first step, in this paper we present this preliminary exploratory analysis carried out by this tool aimed at verifying the usefulness of (geo)histograph prototype and of the related workflow for social scientists interested in studying collective memories related to geographical objects.

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State of the art

Cultural routes and their studies

- 5 Increasing numbers of travellers are attracted by routes such as the Camino de Santiago de Compostela, the Silk Road, the Inca Trail and the Via Francigena rather than a traditional, stationary holiday at the seaside. This type of experience not only affects the lives of the individual travellers, but more importantly, the mobility of people generates a synergy between the places encountered over the course of the trip³. There are two main features that are shared by such routes walked for pleasure : (i) they generate movements of people across national boundaries, thus facilitating the sharing of values and intercultural dialogue ; and (ii) such shared values are strictly related to the tangible and intangible cultural heritage that is present along the route (Martorell Carreño, 2003). During their journeys, travellers visit new places and observe new landscapes, as well as encountering new people and dialoguing with local residents. As a consequence, such routes become tools for sharing 'values as a common heritage that goes beyond national borders' (ICOMOS 2008). Cultural routes are not only the institutional artefact of a heritagisation policy, but they are foremost the result of an on-going social construction engaging tourists and inhabitants. Many different people, mainly walkers and local residents, participate in the everyday (re)definition of the symbolic heritage represented by these itineraries, and everyone participates by bringing their own personal interpretation of their cultural, social and spiritual background (Berti, 2012).
- 6 The recent success of cultural routes has prompted several international bodies to define a legal framework to manage and protect them. The main actors in this field are the International Committee on Cultural Routes (CIIC) and the European Institute of Cultural Routes. The CIIC, a scientific committee of ICOMOS created in 1998, protects cultural routes through the International Charter on Cultural Routes (2008). It aims to protect and

study cultural routes, especially ‘in connection with the protection, maintenance and conservation of their monuments, groups of buildings, landscapes and sites, as they are connected through cultural routes’. The action of the CIIC is fairly limited since this committee cannot carry out direct action, instead delegating to national authorities.

7 Cultural routes have acquired particular importance since the 1950s. Cultural routes were created by the Council of Europe in 1954, based on the principles expressed in the European Cultural Convention⁴ (1954) into specific action. The Convention defines for the first time the concept of a ‘*common cultural heritage of Europe*’ and establishes for European countries the obligation to safeguard such heritage. A first programme devoted to the certification of ‘*cultural routes of the Council of Europe*’ was officially created in 1987 through the Camino de Santiago Declaration⁵. According to this programme, European cultural routes are intended as tools to promote and preserve Europeans’ shared, diverse cultural identities. In the following years, the programme was enlarged to include other trails. Since 1998, it has been managed by an executive agency of the Council of Europe based in Luxembourg, the European Institute of Cultural Routes. In 2010, the Committee of Ministers of the Council of Europe established an Enlarged Partial Agreement (EPA) to enable closer cooperation between states particularly interested in the development of cultural routes. The EPA reinforces the function of cultural routes as tools for international cooperation. Indeed, according to the EPA, European Cultural Routes are defined as: “*a cultural, educational heritage and tourism co-operation project aiming at the development and promotion of an itinerary or a series of itineraries based on a historic route, a cultural concept, figure or phenomenon with a transnational importance and significance for the understanding and respect of common European values*” (art. 1, Council of Europe, 2013). As a technical agency, the European Institute of Culture Routes is highly active and carries out extensive action at an international level. In 2018, 33 itineraries were awarded this European label (including the Via Francigena, the Viking Route, the Via Regia and The Routes of the Olive Tree) and several others are currently applying for similar certification (e.g. Longobard Ways across Europe and the Chocolate Way).

8 Cultural routes are of transnational importance because of their relationship with the understanding and respect of common European values. Routes are therefore of interest to researchers since they embody complex social values and represent places with significant cultural heritage and collective meaning for both the people who journey on the route and the inhabitants of the places where the routes passes⁶. Yet the complexity of the object makes it equally difficult to theoretically grasp this concept (Timothy & Boyd, 2015). So far, studies on cultural routes have been generally restricted to disciplines. Some focus on the religious aspects, notably related to pilgrimage (Frey, 1998 ; Reader, 2007) ; others examine the specific cultural and natural heritage of individual cultural routes, analysed from the viewpoint of art history, history or geography (Coleman & Eade, 2004 ; Foltz, 1999 ; Stopani, 1998). More recently, scholars in economics and tourism studies have shown an interest in cultural routes through an analysis of their potential and actual impact on tourism (Majdoub, 2010 ; Council of Europe, 2011 ; Puczko & Ratz 2013). It is for these reasons that we have decided to test the interest of a more interdisciplinary approach, combining geography with digital humanities, and, accordingly, to verify the feasibility of building a tool that can help the researchers in applying such an approach.

9 In particular, empirical studies on the perceptions and motivations of pilgrims are very rare. Whilst the heritage of many of the routes in Europe such as the Via Francigena and the Camino de Santiago is strongly connected with the Christian religion, recent studies reveal wide-ranging reasons for people choosing to follow all or part of the route. For example, a survey about the Via Francigena in the Tuscany Region found that only 28 % of walkers were motivated by religious reasons, while others mentioned reasons related to culture, tourism, wellness and the environment and its landscape (D’Agliano, 2015). Similarly, the participant observation and interviews carried out by Carbone et al (2016)

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on 400km of the Camino de Santiago show that “the authenticity is the first value that pilgrims expect from the overall experience of pilgrimage. The main motivations (religious, spiritual, but also cultural and physical fitness)” (p. 163).

Digital humanities and cultural heritage

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10 Since the widespread adoption of the smartphone, the routine use of ubiquitous portable technologies such as social networks (Facebook, Instagram or Twitter) or mapping applications (Google Maps) has become the cultural and social norm for certain groups in society. Indeed, the data shared via these platforms is a rich source for academic research. For example, a search on Google Scholar for location-based analysis and Twitter articles since 2010 returns more than 400,000 results covering a breadth of topics including event detection for human and natural catastrophes such as mass shootings or earthquakes, civil unrest, sentiment analysis, language use, crowd behaviour, mobility patterns and health trends, to name but a few. More recently, Instagram has emerged as an interesting source of geotagged information. For our research we decided to focus on this less explored platform, since the combination of text, images, people, hashtags and locations fitted more closely with the goals of our analysis.

11 Instagram is a mobile photo-sharing app available since 2010. It has become one of the leading social media apps. In 2017, the user base of Instagram contributed more than 95 million photographs every day, and it had around 500 million active users per month. Academic research has already demonstrated the value of using this data for studying spatial objects. For example, relevant literature discusses the analysis of Instagram posts to explore visual rhythms of colours and intensity at urban scale (Hochman and Manovich, 2013), narrative constructions of museum experiences (Weilenmann, Hillman, and Jungselius, 2013), city dynamics and urban social behaviour (Silva et al. 2013) and location-based identity (Schwartz and Haleboua, 2014). Considering such a state of the art, it becomes a challenge to investigate how and indeed if this type of data can be useful for examining the collective memory of users publishing posts and photos related to cultural routes.

12 The daily use of these location-based services and social networks through social media apps has the potential to be a valuable social-cultural asset for understanding the new and emerging styles of virtual interactions, collaborations and place-based meaning. They can reveal certain spatial and social behaviours of their users (Batty et al. 2013) as well as embedding location and temporality as part of their metadata. These data are sometimes referred to as volunteered geographic information (VGI)⁷ if a location or place is also mentioned or geotagged, a term first coined by Goodchild in 2007 (Goodchild, 2007). Such social media data create qualitative spatial knowledge (Elwood, 2009) associated with places that contrasts with traditional geographical information collected in the main by different government agencies. The result, as Goodchild (2010) describes, is a global patchwork of geographical information which has considerable potential to help us explore social-spatial interplays. Hence, why these data might be a valuable input into our understanding of cultural routes. With such pervasive technologies we have become walking sensors, capturing data and sharing information as well our personal thoughts as we encounter places and people and partake in different and diverse experiences.

13 Through these location-enabled mobile devices and apps, we are collectively able to contribute to a technology-mediated memory. These contributions foster different perspectives of our shared understanding of collective memory through pictures, comments, likes and sharing of posts. They are forming a new corpus and are part of a shared digital history (Elwood and Mitchell, 2015). Although, these data are stored in databases of commercial companies they are often accessible via APIs. When these digital traces are entwined with geographical information in the form of geocoded tags or specific

references to places, these histories become or contribute to the notion of DigiPlaces (Zook and Graham, 2007). They constitute spatially embedded history. We are therefore witnessing an abundance of (2012) that can contribute to new conceptualisations of what indeed future historical resources. As such, these sources with a detailed understanding of their strengths and weaknesses many interplaying dimensions that form their content. traditional linear narratives that describe an experience but are rather 'collections of infinitely retrievable fragments, situated within categories and organized according to predetermined associations' (Anderson, 2011, p. 122).

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Aims and methods

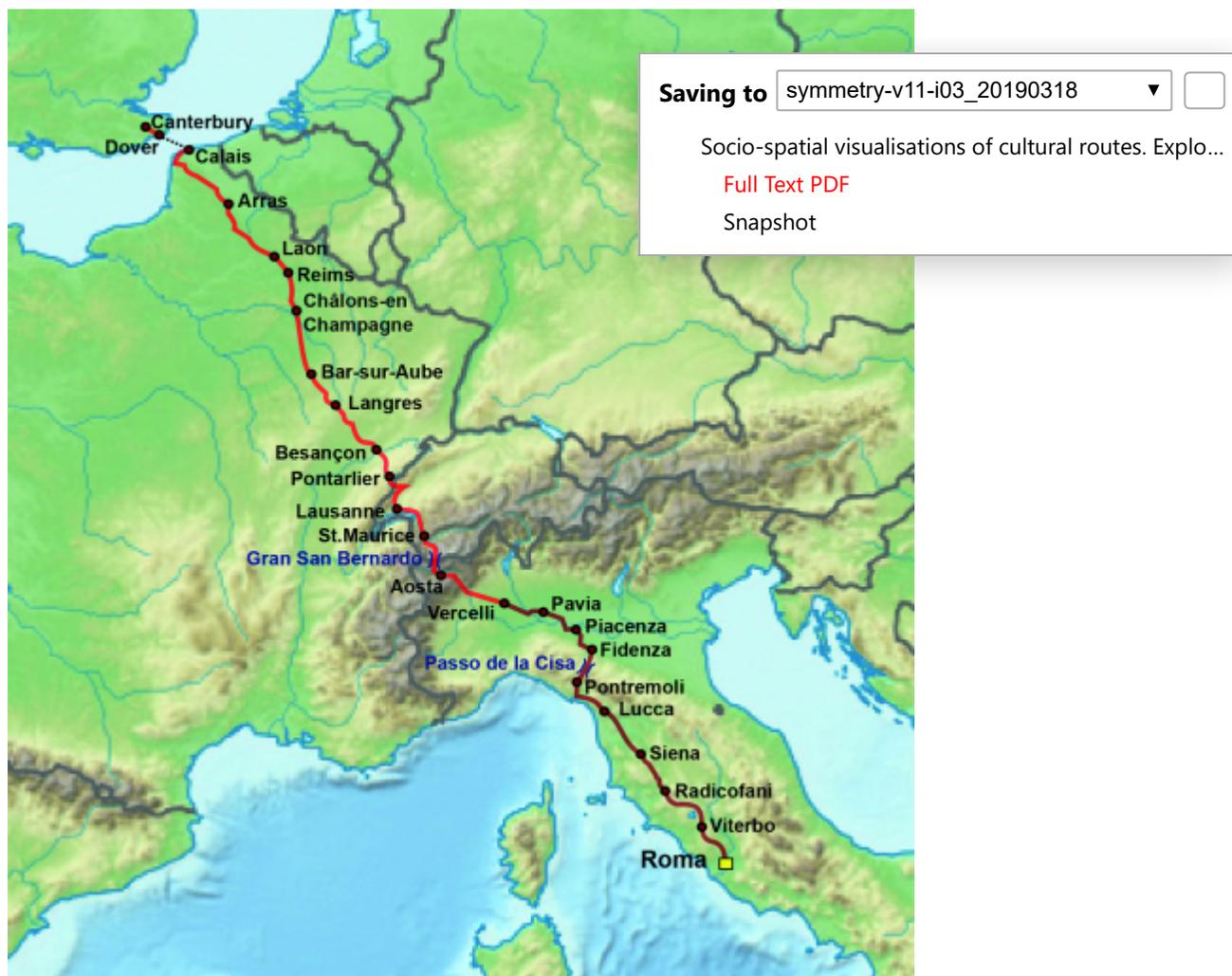
14 This research proposes a querying method and visualisation workflow which will inform the development of a prototype tool based on the topology and topography of a corpus of Instagram posts. Firstly, using the workflow we will explore the potential of the prototype tool to unravel the social complexity of "mediated" memory related to cultural routes, as seen through the eyes of Instagram users. Secondly, we will study if and how our workflow and subsequent prototype can contribute more generally to a better understanding of how such social media resources can be evaluated and understood through the use of linked visualisations comprising social graphs and dynamic maps and offer an exploratory lens to further the exploration of collective memory of online user communities. Thirdly, we will study if and how this workflow can enhance our understanding of the cultural meaning and practices of these routes and their collective rememberings as mediated through technology.

15 To achieve these research aims we describe a preliminary interdisciplinary study, to combine tools and techniques from both humanities and geography. This prototype use case considers how an existing tool developed in the humanities (histograph.eu) could be adapted and extended to facilitate social and spatial enquiries that could enhance our ability to explore technology-mediated collective memories. Finally, we discuss how our enhanced ability to search and query disparate datasets through (geo)histograph can provide both a distant and close reading of social media data as historical resources associated with cultural routes. Considering all that, it should be clear that this paper doesn't aim to provide an in-depth analysis of the Via Francigena that would call also for an ethnographic fieldwork and the integration of other contemporary and historical source material. This itinerary will serve mainly as a case study for test the effectiveness of the tool for a social scientist performing a preliminary exploration.

Via Francigena case study and data

16 This first case study considers the Via Francigena, an 1,800km-long cultural route from Canterbury to Rome that has been recognised by the Council of Europe in 2004. It was selected for several reasons : (i) the geographical object could be clearly identified because the stops of this cultural route are officially defined by the NGO that manages the route at an international level (the European Association of the Vie Francigene)⁸ ; (ii) since 2016 this NGO started an aggressive digital communication campaign by inviting pilgrims to post comments and photos on social media using specific hashtags ; (iii) the trail was well known by the research team⁹.

Figure 1 : Official trail of the Via Francigena



Source : Paulusburg [CC BY-SA 4.0 (<http://creativecommons.org/licenses/by-sa/4.0/>)], via Wikimedia Commons.

17 We focused our efforts on the Instagram data. In early 2016 thanks to the official API of Instagram¹⁰, we took an extract of all Instagram pictures that were returned when searching for multilingual variations (Italian French and English) of the term “francigena” or “francigene” (e.g. #viafrancigena or #viefrancigene). All posts consistently contained a photo, a date and a time stamp and some were geotagged at the time of posting. In total there were 8,834 pictures published between September 2011 and the end of December 2015 by 2230 users¹¹. The dataset also contained the caption title together with the corresponding hashtags, the geolocation of the images where available (longitude/latitude in WGS84 format)¹², people mentioned (with their IDs) as well as the ID of the person posting, comments, and the number of likes and shares.

18 Our methodology is designed to explore two main questions :

- i. Can we extract from social media data which can be transformed into information which offers potential insights or understandings or do we simply reaffirm knowledge that has previously been acquired through more traditional methods, historical sources and data ?
- ii. What meaning(s), using this method if any, can be ascribed to cultural routes through a deeper understanding of the photographs and their associated texts ?

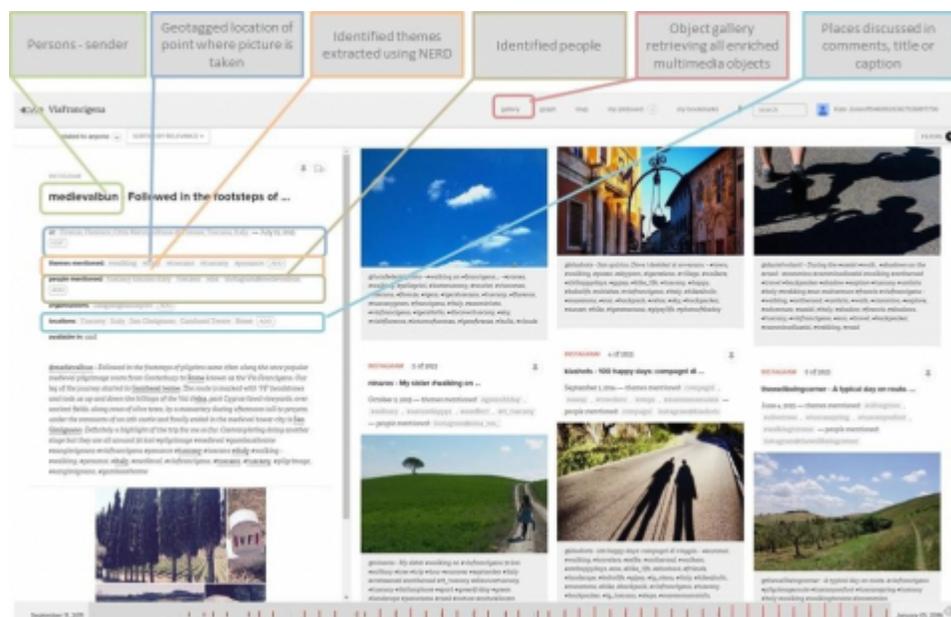
19 Taking into account the wideness of these questions, this paper aims to present the interest of building a digital (geo)humanities tool that can help the research to answer to these interrogations

Description of the histogram tool

20 We used the tool histogram¹³, which is an open source data exploration. Originally developed for use in the histogram tool (Novak et al. 2014), it was redesigned in 2015-16 for the Via Francigena in Luxembourg (formerly the CVCE). The tool was originally designed to explore diverse cultural heritage resources that were part of a corpus containing historical documents (eg meeting minutes, reports), photographs and oral history interviews. These resource data are used to construct co-occurrence graphs of people, places and organisations based on the resource titles and captions. The resource data are then stored in a Neo4J graph database, which calculates and stores the relations between the identified people, places and organisation entities. For humanities researchers the tool provides a topological approach to discovering, analysing and exploring relations through co-occurrence (Wieneke et al, 2013) ie who is connected to who. It facilitates this process by with an interface that enables search and discovery in either a gallery view or a social network graph view.

21 In figure 2, we see an example of the histogram interface displaying the resources associated with the cultural routes Instagram corpus. The gallery makes it possible to observe the complete set of resources, giving the users an at-a-glance overview of the image objects, their associated metadata and the encoded entities, including the themes discussed and people (as defined by user IDs) mentioned in the original Instagram post. The gallery can be searched or sorted in various different ways (alphabetically, temporally, relevance). It is also possible to annotate manually each individual entity and add new ones. The top five themes in the dataset are organised according to a specificity measure (TF-IDF) that reflects the importance of the theme with respect to the entire collection of posts. It acts as a useful measure to establish importance (Düring, Wieneke and Croce, 2015). The views are linked so any filtering and querying completed in the gallery view will be dynamically updated in the graph view ; this enables a seamless exploration of the relationships between the different entity types.

Figure 2 : Example of histogram's gallery view, showing the corpus of Instagram resources for the Via Francigena¹⁴



22 In the next paragraphs, we will study if the affordances provided by the tool are a simple and effective method of displaying a corpus of multimedia resources and querying datasets, tasks that if completed with a relational database would prove computationally expensive (Düring, Wieneke and Croce, 2015). Our hypothesis is that the use of co-occurrence graphs enables the researcher to search, retrieve and explore topological

networks, showing both close (near) and distant (far) relationships between entities (place, theme and people) and historical resources. Instagram pictures, the topological features of the histogram exploration of who is connected to each other through identify commonalities between themes and improve connectivity to space. Finally, combining the temporal the ability to investigate the connections through space (the researcher should be better-placed to explore collective memory of the cultural routes.

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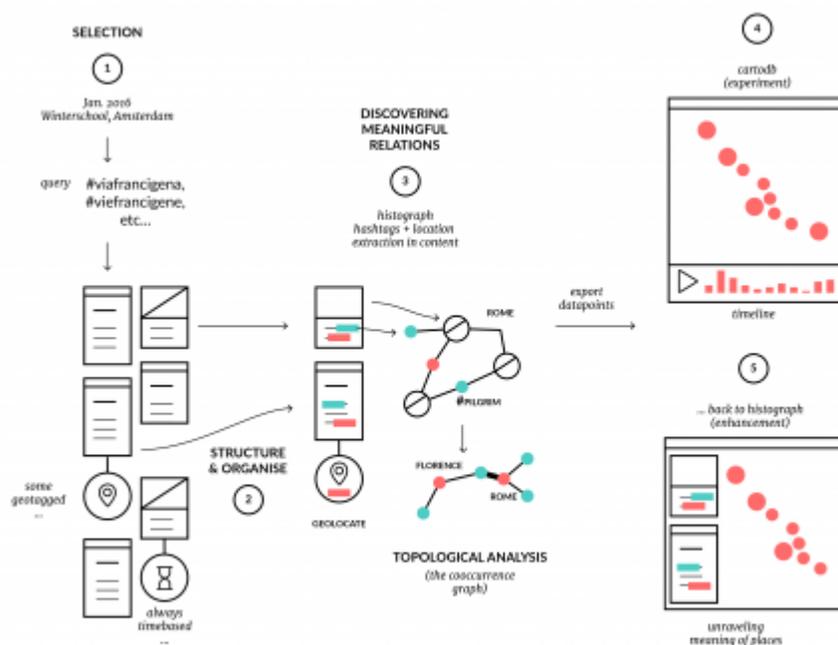
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Exploratory workflow

- 23 Working with the Instagram resources and the histogram tool required the development of a new workflow comprising five steps : (1) data selection, (2) data enrichment, (3) topological analysis and exploration, (4) topographic analysis, (5) topographic and topological exploration with a prototype of a geographical extension to histogram¹⁵. These steps are described in figure 3 and discussed in detail below.

Figure 3 : Exploratory workflow for exploration of the Via Francigena social media corpus



- 24 The Instagram dataset (posts including #francigena or #francigene) was collected in January 2016 (figure 3, step 1). The starting point for the analysis was to make sense of the themes and cultural representations that are significant to walkers of the Via Francigena. To do this, we first broke down each post into a resource compiled of the following entity data : person, date, themes, location, places and the multimedia object (photograph). Prior to importing the data into histogram, four processes were used to clean and structure the data :

- i. Reverse geocoding of geotagged images. Reverse geocoding used Google Maps API to return a corresponding place for the geo-coordinates of the image, i.e. turning the abstract coordinates of location into a named place (city, town, village, etc.). As an example, an image geotagged with the coordinate pair (-0.1277583, 51.5073509) can be reverse geocoded to become the named place of London. This process transforms abstract coordinates into a useable and human readable

geographical place name that can be used to build the co-occurrence graph and will aid searching.

- ii. Transforming user IDs to people. An internal script was written to transform Instagram user IDs to people. This script was applied to both the sender's Instagram user ID, and the user IDs of people that were mentioned within the caption text. This was stored in a database entity known as people.
- iii. Transforming hashtags into themes. The Named entities tag service was used to extract a list of themes derived from the specific Instagram #tag field such as #nature, #walking or # pilgrim. Named entities were enriched with Dbpedia links with basic information, like name, short description thanks to the identifier attached to the named entity.
- iv. Temporal organisation. Finally, contributions were organised according to their time stamps (see step 2, figure 3).

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25 Following the data structuring and cleaning process, the resources were then ready to be imported into the histogram tool, integrating the places where the pictures were taken, the people, time periods and themes to build an initial social graph of the Via Francigena (figure 3, step 3).

26 We then turned to enriching the dataset to make sense of the textual information included in the post. Multilingual Named Entity Recognition and Disambiguation (NERD) was undertaken on the textual attributes identifying entities using the natural language processing tool Text Razor API¹⁶. Text Razor was used due to its multilingual capabilities (Italian, French and English) which were not available with the online API for Yago¹⁷. In this way we could begin to identify: (i) *people* mentioned in the post (in addition to simply extracting user IDs) to see if people using the route referenced historical persons in their posts, which would be relevant to the cultural route. For example, the identification of saints and the co-occurrence with churches could potentially be interesting since the data could identify culturally representative spiritual locations on the route; (ii) *places* mentioned in the post (not to be confused with the place where the picture was taken), were transformed into geocoded entities using the Google Maps Geocoding API¹⁸. The average of data enrichment treatment was around 20 second per post¹⁹.

27 In next paragraphs, we test this workflow on the analysis of Via Francigena, first by focusing on topological explorations, then on topographical ones and finally trying to crossing the two visualization techniques.

Analysis

Preliminary topological explorations

28 Following the data selection and enrichment processes the data were imported into the histogram tool. As said, the tool builds a social graph to populate the graph view of the toolset. It does this by identifying the co-occurrence relationships between the different entities. The next step (figure 3, step 3) in the workflow was to prototype the types of topological analysis and visualisation that it would be possible to create with a cultural route dataset. Note that the term “analysis” here does not refer to definitive results ; this was not the aim of the prototype workflow. Once the social graph had been built, our goal was to explore the co-occurrence networks to evaluate, through an inductive methodology, the usefulness of this type of visualisation for future full-scale implementation.

29 The social graph provides a topological visualisation of the networks of people, places and themes. Using the social graph view, it is possible to navigate the corpus as a co-occurrence network of different types of entities : people, places and themes

corresponding to hashtags. The network of people, in our case is constructed from the information related to (1) the original Instagram user (2) the user who reposted the image (3) people who are mentioned in posts (3) other people quoted in posts. The network graph of the enrichment process carried out in step 2 of the analysis is filtered according to a specific person, place or theme and the resulting network graph provides a topological visualisation of the co-occurrence of people to people, people to places, people to themes, place to place, etc.

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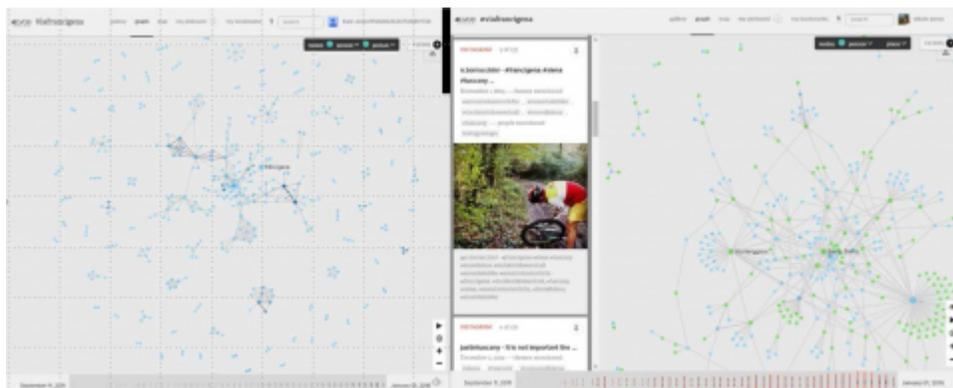
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- 30 We started by exploring the *person-to-person* networks representing the near and far relationships between *people* who are creating and reposting Instagram content on the Via Francigena. This type of network adds insight into the social interactions between people ‘*talking*’ about the Via Francigena. Such visualisations may lead to an understanding of the ‘public’ opinion or even the social bonds, real or virtual (West et al. 2014), which are collectively expressed in relation to the cultural route. So, for example, in figure 4 we observe one large component of the graph highlighting people who are connected to each other through the posts. One hypothesis for such a pattern is that the images contributed somehow resonate with each other. The next stage of any future analysis would be to unravel the reasons for the relationships behind this homophilous network.

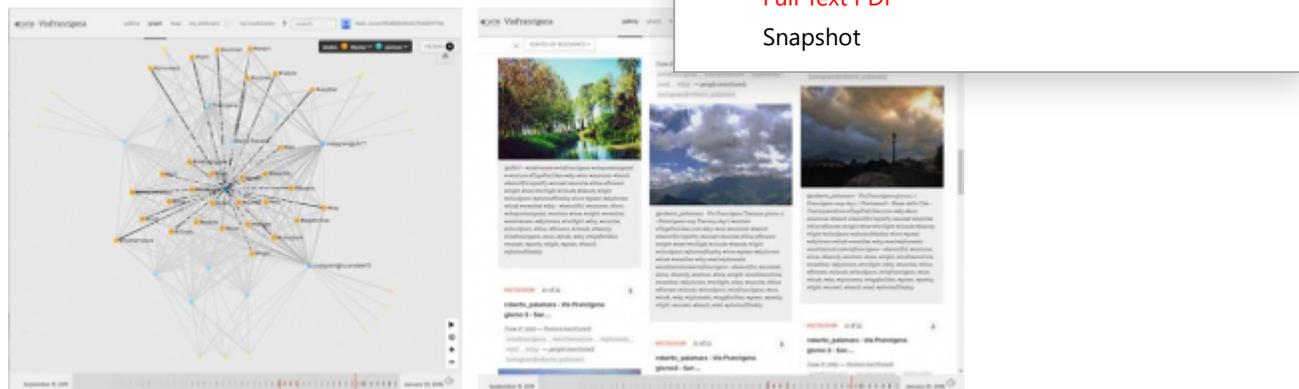
Figure 4 : Example of person-to-person network (left) and of person-to-place network (right)



- 31 Taking this a step further and exploring the interactions between *people and place* (here place refers to the geotagged images at the time of posting), we can explore the topology between the people who interact with the cultural route and the locations that they have in common. We have a lens into the social-spatial network of people and their journey. We can begin to identify if people are connected via a shared place, how the connectivity of these networks is formed and the types of images that are being posted. This approach also highlights if people are socially disconnected (in this context). Such visualisations facilitate the identification of connections between people who are very active posters of pictures in different places and the connections between the places and their journey. For example, this visualisation can be useful to elaborate hypothesis about people travelling together or potential communities of walkers sharing the same interest. Yet such hypotheses could be verified only combining the topological exploration with more traditional methods (ex. surveys or interviews).
- 32 The graph of *person to theme* (figure 5) can be used to explore the relationships between people and what they are talking about, exposing the relationships between people and the types of themes they post/repost about the cultural route. This may indicate a sense of collectiveness associated with similar impressions. For example, we can easily see that the people related to religious themes are less numerous than ones related to nature. Moreover, we can uncover people who are central proponents for particular themes in the network. The network of themes to persons can be filtered, for example, to show themes connected to positive sentiments such as beautiful, love, happy, pretty and beauty, and highlight the connections between people sharing this sentiment. So, for example, we discover that these positive sentiments related to the Via Francigena co-occur

with themes such as night, flowers, Mother Nature, twilight blue, tree, cloud porn, sky lovers, dusk, sunset and twilight.

Figure 5 : Example of social graph view of co-occurrences Gallery view of connected resources associated to themes (beautiful, love, happy, pretty and beauty (right))



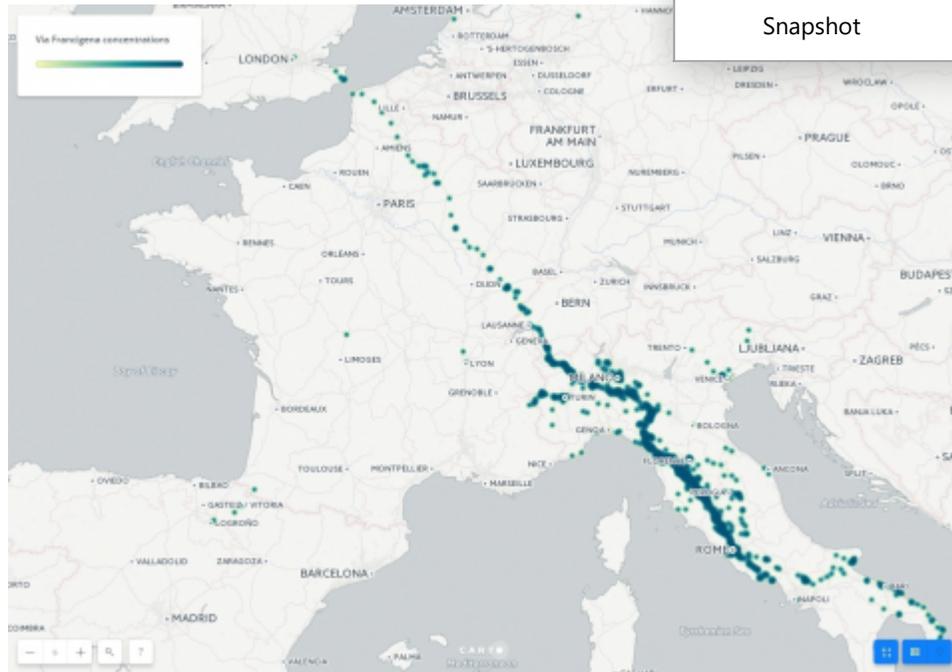
- 33 The graph of *location to location* highlights the co-occurrence of posts which mention the same places in the captions or titles. This might not be the place where the picture was taken – places tagged in the caption are suggestive of the following dimensions: (1) locations not on the actual the route, such as Jerusalem, (2) specific places on the route but not the location at which the photograph was taken, (3) regions or countries that are currently being visited, (4) countries of origin. Zooming in on the graph reveals references to both physical places along the route of the Via Francigena as well as other places that capture the imagination of the visitor such as Jerusalem, Camino de Santiago, London, Germany, England and Naples. If we delve deeper, we discover that the node for Germany is related to people commenting about serendipitous encounters with people from different cultures: for example, in March 2015 one user wrote, “...Here I met a German gentleman, in his mid 50s, which on his own pilgrimage journey, WALKING from Lausanne to Rome. How cool is that??...”. Such posts reveal information about the sociability of the route in the physical space. Based on these types of relationships, we could build a hypothesis that the route is a meeting place which acts as a receptacle for serendipitous social interactions, the essence of which cannot be unravelled by a distant reading of the resources. Cultural routes maybe interpreted as drivers for intercultural mingling. The distant reading of such visualisation could be used to provide a globalised perspective of the cultural route, revealing the constellation of social relations that are meeting and weaving together at a particular locus (Massey 1991). Yet, in order to have a qualitative estimation of the intercultural mingling, it would be necessary to have a closer look to read the individual messages and to perform more time-consuming ethnographical observation.

Preliminary geographical analysis

- 34 Following the initial topological network exploration we then conducted a number of experiments exploring the dataset from a geographical perspective (figure 3, step 4). To undertake these experiments we selected the web tool CartoDB because it is simple and easy of use but has powerful visualisation and analytical capabilities. Experiments were conducted using density maps, to reveal the concentration of resources based on their geotagged position and encoded themes. A straightforward density map representing all messages demonstrates that the majority of users interacting with the Via Francigena on Instagram are geotagging places in Italy, especially the part of the route between Florence and Rome²⁰. This pattern is not surprising and reveals the most popular segment of the route with the highest visitor numbers. It is important to note that what is most revealing

from this visualisation is the identification of places and segments where there are sparse resources posted (for example the lack of talk in the segment through northern France, see figure 6).

Figure 6 : Example of a density map of geocoded Instagram cultural route



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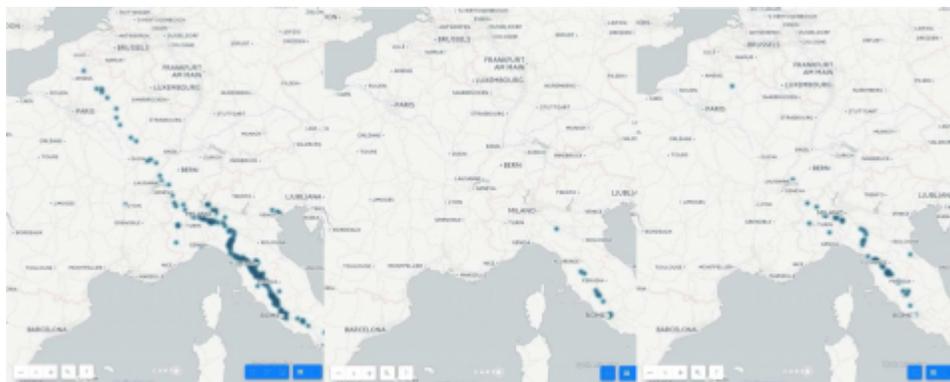
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- 35 Next we explored themes associated with the route such as church, pilgrim or jubilee expressed in either Italian or English. The term jubilee was included in relation to the 2016 Holy Year of Mercy (the “Extraordinary Jubilee of Mercy”) that was declared by the Pope. Figure 7 shows the series of comparable maps, revealing that by far the most commonly used tag is pilgrim. The spatial pattern reveals concentrations of the tag use for the segment between Siena and Lucca and a minor focus towards the south-west of Milan. The former segment represents section 14 of the Via Francigena, the most popular part of the route that is often referred to as the most spectacular section. The second is related to the Fidenza area, where the headquarters of the European Association of Via Francigene (which manages the route) are based.

Figure 7 : Example of density maps of showing the concentration in use of themes containing the English and Italian terms for pilgrim, church and jubilee (from left to right respectively)

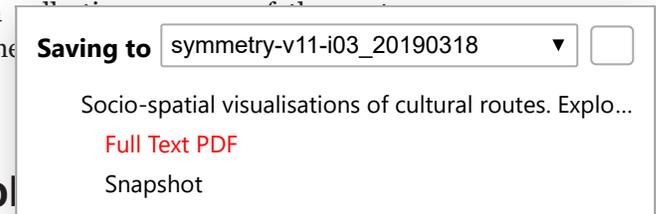


Drawn at same scale to enable comparison between the three maps.

- 36 Based on these first examples, it would seem that the geographic analysis of the dataset provides an overview of what people are saying and where they are saying it. It helps us understand the spatial relationships between the themes, people and both the places

visited and the places discussed. The data reveal the locations where people are most actively engaged with the Via Francigena to form a network of shared collective memory, highlighting the locations where a shared collective memory is present or not.

Crossing topology and topography

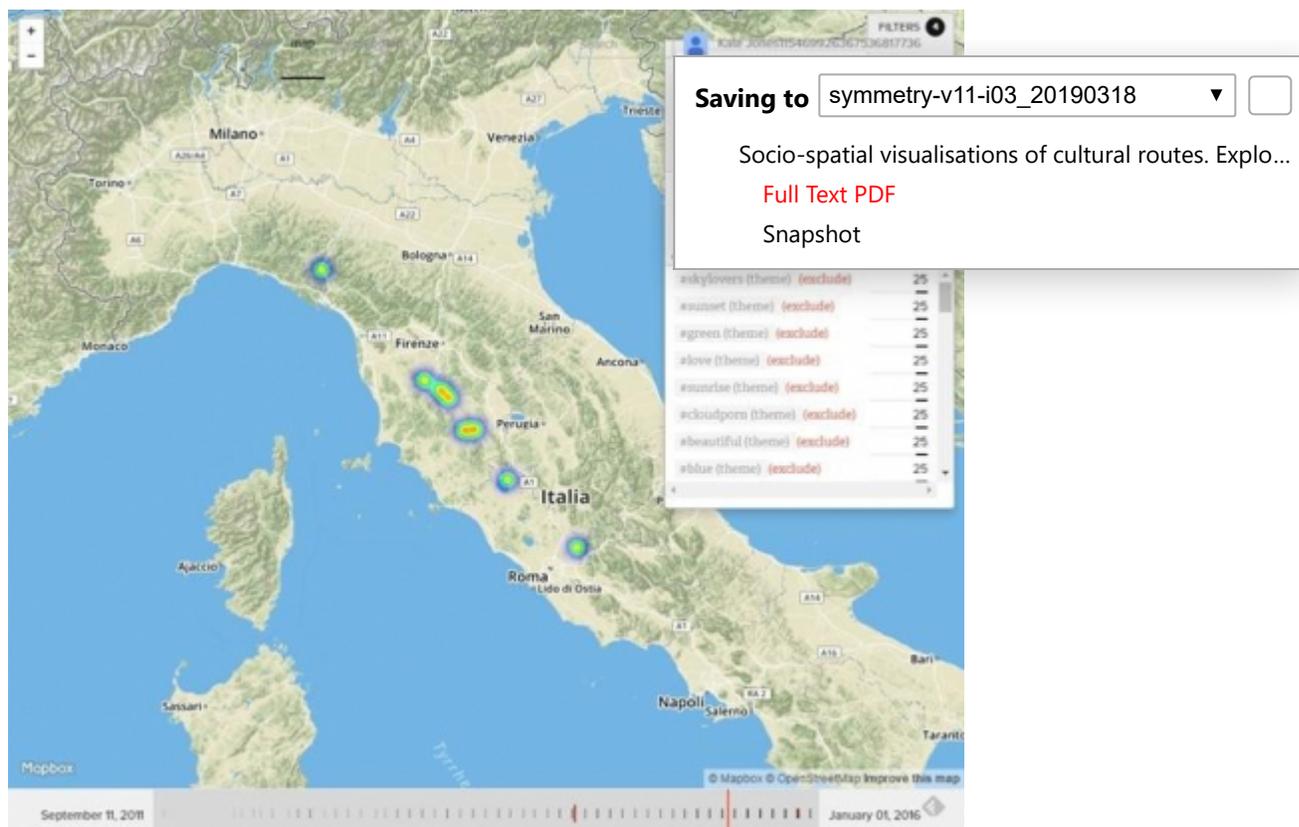


37 Following our initial explorations with the separate tools, it is apparent that bringing them together in the same workflow could help us in our explorations. It would then be possible to seamlessly explore the topological network and its geographical properties at the same time. This would help us to understand more about the social and spatial properties associated with the collective memory of the cultural route. An effective example of this type of visualisation is provided by the 'On Broadway'²¹ platform developed by Lev Manovich that combines social media data and other kind of data on a geographical map.

38 The final step in the workflow (figure 3, step 5) was therefore to extend the original tool to include a geographic map view and create a new prototype of the (geo)histograph tool combining three types of dynamic interactive visualisations for navigating the enriched data resources using either the gallery view, the graph view or a map view. Using Leaflet²², a JavaScript library for interactive maps, the prototype mapping interface was built (see figure 6). The main requirement for this visualisation tool was to use the graph database to provide co-occurrence analysis that filters resources based on different entities that could be queried and displayed spatially.

39 The prototype has the ability to display the geocoded Instagram resources and filter the dataset based on the different types of entities that have been encoded. In the prototype the display is a very simple heat map that highlights the density or spatial concentration of the resources (according to the filter settings). The interface uses a hot-cold colour scheme to imply higher concentrations of resources in a location displayed in red and lower concentrations in blue. The user is then able to switch effortlessly between the interactive map, the image gallery and the co-occurrence graphs to facilitate a deeper reading of the resources through the various social-spatial scales and visualisations.

Figure 8 : Example of prototype interface for the geospatial extension



Density map showing concentrations for the use of the tags *love*, *beautiful*, *pretty*.

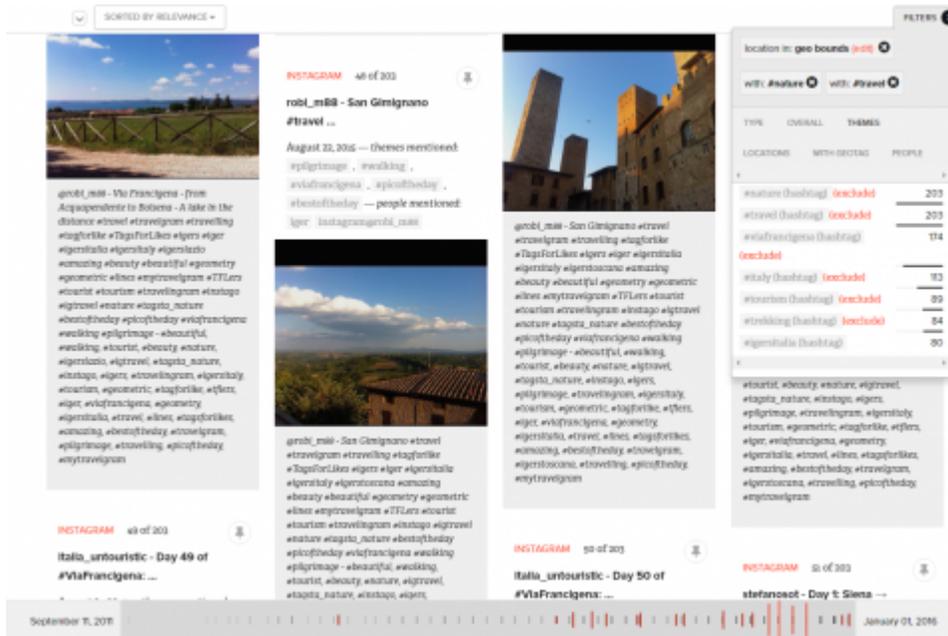
40 We returned to our co-occurrence social themes and filtered the map to explore a sample of three tags that express positive sentiments (*love*, *beautiful*, *pretty*). This revealed that in the collective memory of Via Francigena, these tags are used collectively to exclusively describe small hotspots of the route between Rome and Milan (see figure 8). Likewise if we filter the map to show the co-occurrence of the themes *nature* and *travel* we discover concentrations of resources not only in Italy but in different places along the route in France (north of Reims), Switzerland and south-east England (see figure 9²³).

41 In Italy we see hotspots emerging beyond the popular region and route segment of Tuscany. Exploring the tags that coincide with the two filtered themes, we observe a coincidence in the use of themes that embody a sense of movement (*trekking*, *walking*, *on the road*, *walking girl*, *hiking*) together with terms linked to pilgrimage. A review of the gallery shows greater diversity in the content of the images. For these themes, not only do we see landscape pictures with sweeping blue skies; we also observe pictures of paths (through forest, countryside, etc.), signposts, bridges, villages, individual buildings and animals. There appears to be an absence of pictures in the popular social media 'selfie' style.

Figure 9 : Example of map showing posts filtered by the theme of nature and travel



Figure 10 : Example of map showing posts filtered by the theme of gallery of posts related to nature and travel



42 With the prototype we are able to filter the data on the map and simultaneously explore the co-incidence of other related tags and see how they are distributed geographically. With the linked views to the gallery and graph we are then able to dynamically explore the networks. This enables the rapid and dynamic comparison of visualisation and enquiry at different social-spatial scales.

Discussion

43 The analysis of the Via Francigena, presented in the previous part, is meant to help us to answer to three research questions. First, our research aims to verify the utility of a (geo)humanities tool and of the related workflow in order to study collective memories related to geographical objects through the exploration of social media data corpora. The second question concerns the type data and the requirement to investigate the usefulness of social media data as a pertinent source for studying social representations

and collective memories. Finally, the third question is related more specifically to cultural route and to understand if this workflow can provide insight into the collective memories built about the technology mediated collective memories built

44 As regards the utility of the tool, the capabilities visualisation methods described in this exploratory work prototype with potential for future research that could collective memory of the Via Francigena. It combines qualitative data through a social-spatial lens. The linked reading of the complex dataset and simultaneously enable us to examine more deeply the nuances of Big Data and the use of Instagram data as a potential historical resource. Yet some significant limitations and areas for improvement emerged during the testing of the prototype.

45 First of all, the visualisation and subsequent distant/close reading of this type data, which includes enriched entities derived from machine processing using named entity recognition and disambiguation tools, makes it easier for humans to identify, validate and correct spurious or incorrect assignments. For example, a closer reading of the co-occurrence network relations between people highlighted that some themes have been disambiguated as people (for example 'wasser'). Some of these errors are related to multilingualism, so they can be solved by a better language management, but others are related to the 'messy' form of Instagram 'texts' and can only be identified through a closer reading. Whilst the histogram tool enables individual annotations and corrections for resources, with a dataset of this size it is not feasible. Any future workflow using these resources must incorporate a mechanism for managing, cleaning and/or eliminating the noise²⁴.

46 Moreover, the posts are 'messy' with respect to their structure and content. Tags such as those frequently used in Instagram create noise that casts a shadow over the valuable tags. Each post has been deliberately created by an individual person with many different motivations for doing so and by corollary the dataset is multi-dimensional in terms of the motivation of the contributions. Each and every post, whilst containing an image, a caption and a set of tags, also acts as a social document which embodies the underlying cultural practices that are entangled in today's social media habits. We must acknowledge this multiplicity when working with such resources and try to limit the noise and impact it creates in our dataset. For example in Instagram, it is not unusual for users to tag an image with 10 or more hashtags to reach people searching for different things, using terms such as #tagforlikes or #picoftheday. Following a close reading of a sample of resources and a review of the frequency curve of tag use (which was in the shape of a long tail), we discovered many 'oddities' related to the tags. So whilst these tags are not relevant for explore the meaning of the cultural route and create noise they do offer insight the culture uses of Instagram.

47 As regards the second question related to the data, it is fair to say that despite the messiness of our dataset there is still considerable potential in using social media data as a set of historical resources which would aid our understanding of the social and spatial meaning of the Via Francigena. Indeed, exploring the collectiveness of the dataset would potentially contribute to a deeper understanding of the memory of the cultural route as revealed through the continual reproduction of representations that emerge through the (re)posting of images²⁵ and their tags. What these datasets provide are new forms of technologically mediated rememberings which exist in addition to the traditional methods of knowing, remembering and engaging across time (Elwood and Mitchell, 2015). That said, we must be careful when analysing the photographs and their tags and pay attention to the context in which they have been created. It is important not to overestimate the potential of these data (as analysed through (geo)histograph) that can be useful to carry for explorative and comparative analysis on the collective representation, but they are less appropriate as a methodology for understanding the behaviours of individual walkers.

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48 Indeed, if we consider the third question related to collective memories of cultural routes, we need to pay attention to the fact that the resources could lead us to believe that it never rains in a sweeping blue sky, or stunning sunset. More often than not, a location with very few inhabitants or visitors (an observed marked absence of people/communities). The Instagram type of idealised representation that delinks events and media from the real-time context (Elwood and Mitchell, 2015 ; Graham, Zook and Boulton, 2014). They are one snapshot. They provide insight from particular perspectives where social media participants are known to present a highly curated version of themselves and their experiences (Mendelson and Papacharissi 2010). These digital expressions convey a portrayal of both our experience of place and how we socially produce that space through remembering. As a source of collective memory they are limited to what people choose to share and what they choose to take pictures of – the data are already preselected.

49 In isolation, these data may not help our detailed understanding of the nuances of the cultural route, but if used as a complementary asset to traditional historical resources and datasets, they could potentially enhance our knowledge of the emergent patterns of use of these routes. Therefore, to further our understanding of how and why these routes are used it would be necessary to integrate a range of historical resources. This will counterbalance the one-dimensionality of the memory space that is returned in our resources derived from Instagram. Further resources that could be selected include the formal review data described earlier in this paper, Twitter/Facebook social network data, historical diaries and writings associated with the route and questionnaire and fieldwork data that has been gathered. By integrating more diverse resources we would be able to produce a multi-dimensionality of resource layers to form a more holistic perspective. It would help us to identify the perceptions of socially relevant places, both real and imagined, encountered as people interact with the cultural route, revealing the shared commonalities in an imagined community driven by pervasive social and spatial technologies.

Conclusion

50 The workflow and its resultant prototype as described in this paper proposed the adaptation of a tool originally developed for exploring humanities collections to include a mapping component. The result is a set of linked visualisations that provide a scaled social-spatial approach of close and distant readings of a corpus of Instagram resources. This aids in the exploration and unravelling of collective memories as expressed through these resources as well as providing insights into the cultural practices of Instagram tags. They can potentially contribute to the act of digital field work.

51 By extending a tool that was originally created for the specific use case of exploring multimedia archive resources via co-occurrence networks to include the perspectives of topology and topography visualisations, we were able to identify both potentially useful linked visualisations and a set of requirements for a future workflow and tool that could contribute to a more rounded collective memory space that symbolises how people express their representations of cultural routes.

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Notes

1 In 1954, it is also ratified the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict. This Convention constitutes the basis for the 1972 UNESCO Convention Concerning the Protection of World Cultural and Natural Heritage.

2 This was carried out in connection with the research project numérique : topologies et topographies des itinéraires culturels and the University of Lille.

3 As a proof of these synergies, we can consider the cultural routes organised along the routes, but also the building of shared preparation of a UNESCO candidature as in the case of the Camino of Santiago and on the via Francigena.

4 <https://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/018>.

5 <https://rm.coe.int/16806f57d6>.

6 This double face of the value is demonstrated by the touristic attraction of these itineraries but also by the initiatives of local residents organised around them.

7 These data are described as « volunteered » since motivated users willingly contribute and share photos and texts. Yet, this term is somehow inappropriate because data aren't produced for the goal of the research.

8 <http://www.viefrancigene.org/en/piedi/>.

9 In the context of the wider research project that this study is part of, two fieldwork investigations have been carried out, one in northern France and the other in northern Italy.

10 The extraction was performed before that the restriction of the API in June 2016.

11 We didn't extract personal information related to users for ethical reasons.

12 Approx. 2,702 posts were originally geotagged.

13 <http://histograph.eu/>.

14 All the images of the tool are meant to provide an illustration of the interface are not meant to interpret data represented on the interface.

15 The code of the (geo)histograph tool is available on GitHub, and it is a documented function from <https://github.com/C2DH/histograph/blob/master/models/resource.js#L702>.

16 <https://www.textrazor.com/>.

17 Yago is a semantic knowledge base made up of 10 million entities : <http://www.mpi-inf.mpg.de/departments/databases-and-information-systems/research/yago-naga/yago/#c10444>. Yet, an important limitation to take into account is that error rate of this tool was not calculated as we were developing in proof of concept mode.

18 This service was chosen just to test the overall pipeline. The general idea was to build rapidly a prototype to get insights on Instagram. As for the Named entity extractor services, the cartographic tool used is “interchangeable” as long as it ships web support and provides the basic features we identified for the map visualization. For further development, other solutions would be tested. <https://developers.google.com/maps/documentation/geocoding/intro>.

19 The treatment involves : (i) cleaning the text of the resource : transformation of histogram hashtags into single words ; (ii) automatic language detection ; (iii) parsing the “cleaned” text via Text Razor extraction and disambiguation service API ; (iv) creating an entity “topic” for each hashtag in the post ; (v) update the graph, creating missing nodes (newly added entities) and generate the links between a post and an entities, counting the frequency of each named entities in the post ; (vi) for locations, generate the geographical coordinates. Note that at the time there was no custom dictionary service and there is a black box effect in using Text Razor (results cannot be replicated). Optionally we run the AIGA entity extraction and we put the two system in “collaboration mode” - we score highly if the same entity has been disambiguated with both services.

20 It should also be noted that a part of this route in Tuscany is equipped with WiFi.

21 <http://www.on-broadway.nyc/>.

22 <http://leafletjs.com/>.

23 As a further step, that we could imagine normalising the data to transform it from simple absolute counts to relative representation perhaps by calculating and index score to account for the overrepresentation of tags for each segment.

24 In this prototype we use the “blackbox” NERD engine. This was a straightforward solution, yet several incorrect assignments are related to it. Future development of the tool will therefore require enhancing this phase of automatic entity recognition with a complementary approach to exclude spurious entities based on consensus of two or more services, such as Yago and Text Razor.

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25 As a further step, it would be interesting to automatically analyse the content of the images. Some tests have been done, but the error rate of tools that could be integrated in the pipeline was too high

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	Titre	Figure 1 : Official trail of the Via Fra
	Crédits	Source : Paulsburg [CC BY-SA 4.0 (http://creativecommons.org/licenses/by-sa/4.0/)], via Wikimedia Commons.
	URL	http://journals.openedition.org/netcom/docannexe/image/3674/img-1.jpg
	Fichier	image/jpeg, 2,2M
	Titre	Figure 2 : Example of histogram's gallery view, showing the corpus of Instagram resources for the Via Francigena¹⁴
	URL	http://journals.openedition.org/netcom/docannexe/image/3674/img-2.jpg
	Fichier	image/jpeg, 152k
	Titre	Figure 3 : Exploratory workflow for exploration of the Via Francigena social media corpus
	URL	http://journals.openedition.org/netcom/docannexe/image/3674/img-3.png
	Fichier	image/png, 402k
	Titre	Figure 4 : Example of person-to-person network (left) and of person-to-place network (right)
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	Titre	Figure 5 : Example of social graph view of co-occurrences between people and themes (left) ; Gallery view of connected resources associated to themes expressing positive sentiments (beautiful, love, happy, pretty and beauty (right)
	URL	http://journals.openedition.org/netcom/docannexe/image/3674/img-5.jpg
	Fichier	image/jpeg, 56k
	Titre	Figure 6 : Example of a density map of geocoded Instagram posts of the Via Francigena cultural route
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	Titre	Figure 7 : Example of density maps of showing the concentration in use of themes containing the English and Italian terms for pilgrim, church and jubilee (from left to right respectively)
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	Titre	Figure 10 : Example of map showing posts filtered by the theme of gallery of posts related to nature and travel
	URL	http://journals.openedition.org/netcom/docannexe/image/3674/img-10.png
	Fichier	image/png, 646k

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