Communication Design and the Digital Humanities
Visualizations and Interfaces for Humanities Research

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Abstract
This paper presents an ongoing research focused on understanding the role that design, especially through the definition of information visualizations and interfaces, can have within digital humanities research. A review of the current involvement of design within the digital humanities is provided and several projects, coming from a two-year collaboration within a digital humanities initiative, are then presented and discussed in detail, with particular attention to the design processes involved. Finally, a collaborative model for research is articulated, emphasizing the need for new hybridized forms of thinking and making between designers, scholars and computer scientists.

Keywords: digital humanities, interfaces, communication design, visualization

1. Introduction
Digital technologies affect academic research in many, different, ways. By transforming publishing models, collaborative activities or supporting the storage, the analysis and the dissemination of data and information, computers and Internet have deeply changed the way research is conceived, conducted and communicated. While natural, medical and social sciences have a longer and well-established relationship with these technologies, humanities have been more reluctant to the adoption of digital methods and tools. In the last twenty years, however, new research areas and activities have emerged from the intersection between humanities and computing. What is today known as *digital humanities* represents a heterogeneous set of studies and practices that aims at understanding the implications and the opportunities that digital technologies may provide as media, tools, or objects of study in the humanities. Digitization, the process of encoding information in a machine-readable format, has provided new modes of accessing to and working with traditional materials. Moreover, the cultural and social dimensions of software and hardware constitute new and challenging fields of study for traditional and emerging humanities disciplines (Fuller 2008; Berry, 2012). These new relationships between the 'digital' and the 'humanities' are rapidly demanding for new, adequate instruments and methods for their observation and interpretation. Information visualizations and interfaces are proving to be essential tools to explore and make sense out of big and

heterogeneous amounts of data. In a context where most of the methods and the technologies are still adopted from other disciplines, the biggest challenge seems to imagine new genuine research tools capable to embrace and emphasize humanities endeavor (Drucker, 2009). This scenario provides a great opportunity for design - especially communication design - to actively participate in the current definition of new forms of scholarships, contributing at both theoretical and methodological levels and, at the same time, defining new collaborative models with emerging disciplines in the academies.

2. Designing (in) the Digital Humanities

Like, and perhaps, more, than other disciplinary contexts, the digital humanities are increasingly looking at design as an indispensable set of practices and knowledge to be integrated in their activities (Balsamo, 2009; Burdick and Willis, 2011). The question about the design of digital tools to support humanities inquiry is still central in current research activities and agendas (McCarty, 2003; Drucker, 2011; Lunenfeld et al, 2012). According to Anne Burdick, the perspectives for design in the digital humanities appear, at the same time, challenging and dramatic. Challenging because design thinking, as *situated*, *interpretative*, and *user-oriented*, is well suited to the kind of initiatives carried out in the field (Burdick and Willis, 2011). Dramatic because while design is already practiced and sometimes even 'theorized', in English, Literature or History departments, it is hardly recognized as such, and designers are nowhere to be found (Burdick, 2009). As chair of a graduate media design program and as a designer in computational linguistics, literary science, electronic literature, and media theory and criticism, Burdick notices that design, in the digital humanities, "is not the discipline that we know and love—that is, it's not the province of design practitioners, researchers, and educators. Instead, 'Design' is variably a value-add, an everyday event, a working method, a byproduct, a literacy, and a complete abstraction" (Burdick and Willis, 2011). In fact, most scholars design their own projects or allow research assistants or IT staff to do so. Moreover, the lack of designers and, especially, design researchers, leads often to an appropriation of the theoretical aspects of the discipline by humanities scholars. This can be partially explained by the fact that one of the most interesting and, perhaps, most significant change that digital technologies have brought into humanities research is a reconsideration of the relation between practice and theory, *making* and *thinking*. Some digital humanities scholars (Schnapp and Presner, 2009; Ramsay, 2011a; Lunenfeld et al., 2012) consider theory and knowledge production as deeply and inevitably anchored in the action of making, building, modeling and creating. Ramsay (2011a) argues that "there's always been a profound - and profoundly exciting and enabling - commonality to everyone who finds their way to dh. And that commonality [...] involves moving from reading and critiquing to building and making." The capacity to build and make - to design - becomes not only an important skill that can facilitate the work of a scholar, but it represents the most distinctive element of a digital humanist, something so peculiar that can be even used to establish "who is in and who is out" the field (Ramsay, 2011b). The centrality of the *project* in the research process appear as a fundamental aspect in the theorization of digital humanities and, at the same time, represents a strong element of connection with design and design research, so long focused on the epistemological implications of practice (Schon, 1983; Buchanan, 2001; Friedman, 2003).

3. Information Visualizations and Interfaces in the Humanities

In the last years, new interpretative models, capable to overcome the limits of standard and consolidated techniques to study human culture (e.g. close reading, deconstructionism), have been required and explored by humanities scholars, especially from History and Literary studies (Pope, 1994; McGann and Samuels 2004; Moretti, 2005). While digital technologies are not necessarily or directly involved in the definition of these new forms of 'reading' and 'writing',

the possibilities that they provide to work with data and information have been immediately exploited to apply and test new theoretical and methodological research practices. Information visualizations and dynamic interfaces, especially in the form of web applications, have been increasingly used within research projects in the digital humanities. However, while the recent developments of visualization languages and technologies have made much easier to build interfaces for data exploration and representation, few efforts have been made to better understand how to adequately situate them within digital humanities contexts. In order to provide a more detailed scenario of the current use of visualization and interfaces in the digital humanities, we want to resume and illustrate some of the predominant approaches to the design of these tools, emphasizing the underlying assumptions, the contexts and the processes that led to their development. More than focusing on the intrinsic and distinctive features of single visualizations and interfaces, we want to emphasize the roles that designers have within digital humanities projects, making use of both a critical review of the literature and the direct experience in the field.

A first approach to visual interfaces, within the digital humanities, involves designers mostly in the definition of the 'look and feel' of the tools. This approach is usually adopted in the development of *dashboards*. By dashboard we mean here those interfaces constituted by a set of juxtaposed modules, each of which focused on a specific aspect of a predetermined analysis, carried out on a dataset. These interfaces usually make use of standard visual representations (e.g. tag clouds, charts, bars, scatterplots) and they are frequently employed in literary studies, to perform text analysis (Voyant) or other kinds of text and data mining (Orbis). The underlying idea behind a dashboard is to allow the user to perform the analysis and to look at its results, making use of different views at once. This model has been imported from disciplinary contexts outside the humanities, such as statistics, business management and economics, where quantitative analysis is one of the predominant investigative tools. Since both the analytical components and the representational models use standard and consolidated techniques, designers (especially graphic designers) usually participate in the composition of the different modules and in providing a graphical coherence of the modules.
A further participation of designers in the development of digital tools for humanities is represented by the work on their *user experience*. This generally happens when it is necessary to conceive ways to better understand the data by visualizing and exploring them, a kind of situation usually involving *browsers*. Used for the exploration of digital collections, browsers allow the user to have a better idea about the material she is working with, in terms of general overviews of the entire collection, as well as detailed focuses on single items or their metadata (Digital Profiles; Mandala Browser). Browsers usually present isomorphic representations of the data collection - each item has a correspondent symbol or image in the browser. Sorting and filtering operations can also be performed in order to focus the attention on particular subsets. The design of these tools is often based on transparency and flexibility concepts: the interface is conceived in order to 'disappear', leaving the user free to explore the data and minimizing the interference. The browser is often conceived to be used with a large number of collections, in order to make it usable in other contexts, while optimizing the resources. This approach, coming from Human Computer Interaction contexts, is probably the most common in digital humanities projects and it involves an idea of design as the definition and the application of patterns and solutions to generalizable situations. The interface is meant as something 'in between' the user and the data: information exists *a priori* and has to be 'discovered' by the user. User experience and user interface designers work with developers in defining the features of the tools, through iterative processes that usually involve prototyping and developments phases (Ruecker et al, 2011). The relation with the scholars is often limited to an initial phase of requirements definition and subsequent testing phases.

A different approach can be found in the idea of digital humaniteis *speculative tools* (or *games*) (Nowviskie, 2004; Drucker, 2009). Here interfaces are seen as environments where performing subjective readings of texts (or other cultural objects). Embracing the idea that the best way to understand a work is actually to intervene on it (McGann and Samuels, 2004), modifying it and 'playing' with it, this approach aims at building digital tools capable to host such a game (Ivanhoe, Temporal Modeling). Goal of the game is to construct an interpretation of the text by modifying it or by adding comments, annotations or relationships between its elements. Similarly to a role-playing game, a set of rules defines what and how the players can intervene on the text. What seems more interesting in this approach, from a design perspective, is the fact that the 'interpretative game' carried out by the scholars using the tool, can be described as a design activity itself. In fact, the interface is used here as a design tool: by *acting* within a given situation (the text) and *representing, sketching* and *modeling* the material. In this sense, more than in building the tools, design participates *as* the *heuristic practice* that implies the interpretation of the data. This perspective implies a different relationship between the two disciplines, a relationship where designers can bring into humanities research their experience and sensitiveness in defining the research process itself, as practice-based, situated, subjective and performative.

4. A case study: Mapping the Republic of Letters

The opportunity to better understand how the design of information visualizations can participate in the definition of humanities research processes, has been provided by the project *Mapping the Republic of Letters (MRofL),* based at Stanford University[1]. The project aims at reconstructing and exploring the intellectual community of the Early Modern period through correspondences, travels and social network data. MRofL is a collection of case studies in History and Literary Studies that makes use of information visualization to examine the scope and the dimension of underlying heterogeneous datasets. Since 2010, a collaboration between the research group (constituted by humanities scholars and developers) and a communication design research lab (the DensityDesign Lab[2] at Politecnico di Milano) has been established. Goal of the collaboration has been the development of new visual tools to support the exploration of historical data. Several projects have been developed during the collaboration, in order to experiment and verify new visualization techniques and, at the same time, to better understand and exploit theoretical and methodological synergies between the two disciplines.

A first, introductory project has been initially necessary for both the teams (designers and scholars) to know each other's work and, for designers, to become familiar with the nature of the data and the humanities research process. During this first experience, a tool conceived before the collaboration has been used and adopted by the design team in order to better understand the data, while revealing and emphasizing possible similarities or differences with already known contexts. The visualization tool has been applied on a small dataset in order to provide a generic and synthetic overview of the relations between its different dimensions (see FIG 1). While the project has been conceived more as a starting point, with no well-defined requirements or expectations, it has been extremely useful to know the potentialities and the limitations not only of the specific visual techniques but also of the design process itself. In particular, the different approach to data and digital tools by humanities scholars has been immediately emerges, especially if compared to other contexts such as statistics or social sciences. What has been clear since the beginning of the collaboration is the reluctance to formulate predetermined questions to be answered by the tool, while, instead, the research for the scholars moves through a continuous and open process of investigation and interpretation between the data, the visualization and the

[1] For more information about the project visit https://republicofletters.stanford.edu/
[2] http://www.densitydesign.org/

knowledge they already have. This important consideration has underlain the entire collaboration and has represented a first, significant, step in understanding the role that information visualizations can have in humanities research.

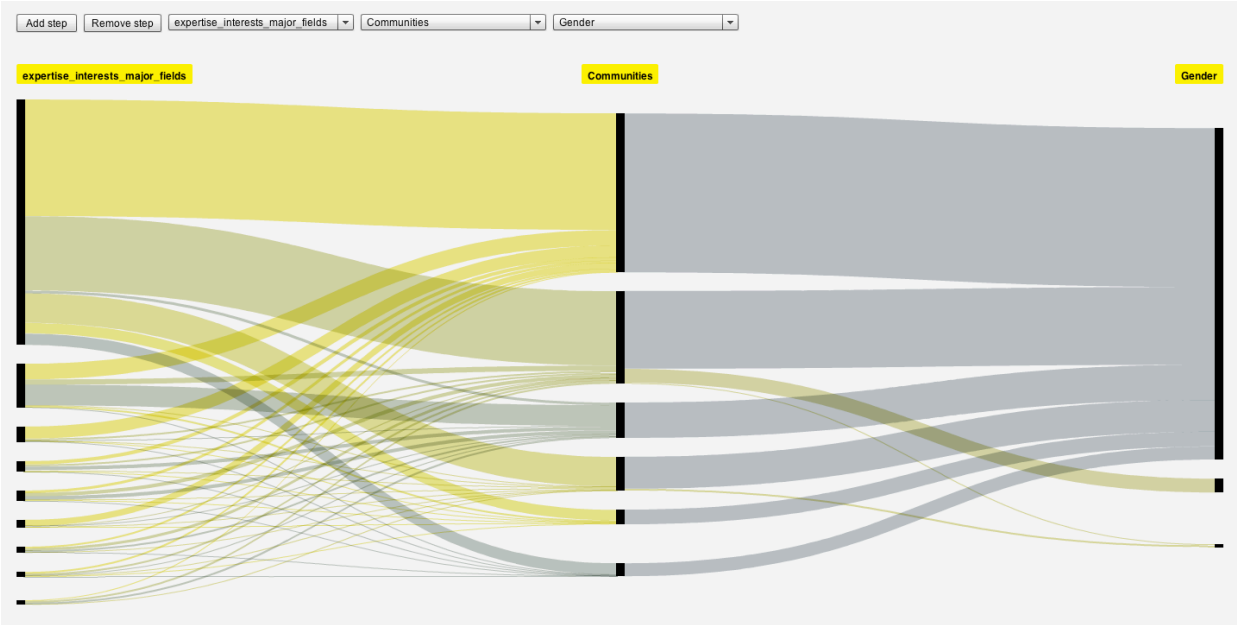

FIG. 1: *Fineo*, a visual tool to explore flows and relations using alluvial diagrams and developed by the DesnityDesign research lab, has been initially employed in the collaboration with Mapping the Republic of Letters, to explore Athanasius Kircher's correspondence network.

The need and the will to go deeper in the exploration of potentialities and limits of visualizations for the digital humanities, has lead to a series of further projects within the MRofL initiative. As we have previously anticipated, the work of the scholars can be hardly confined in strict and predefined investigative paths. In order to allow the users to explore the data in an easier and more flexible way, different tools (FIG 2, FIG 3) have been conceived and designed following some generic principles: a) the lack of a single, predetermined, *entry point* to the data (e.g. looking for a specific author or within a period of time, or between two persons or group of people); b) the ability to perform *multiple and interrelated selections* (e.g. correspondence by a specific author during a specific period of time, from specific places); c) the possibility to have direct *access* to the original documents in any moment (e.g. retrieving the actual digitized version of the letter); d) looking the data through *different views* at the same time (e.g. through a geographical map, a network graph, a temporal distribution); e) knowing the amount of data not currently shown in the visualizations, due to their *ambiguity* or *incompleteness*.

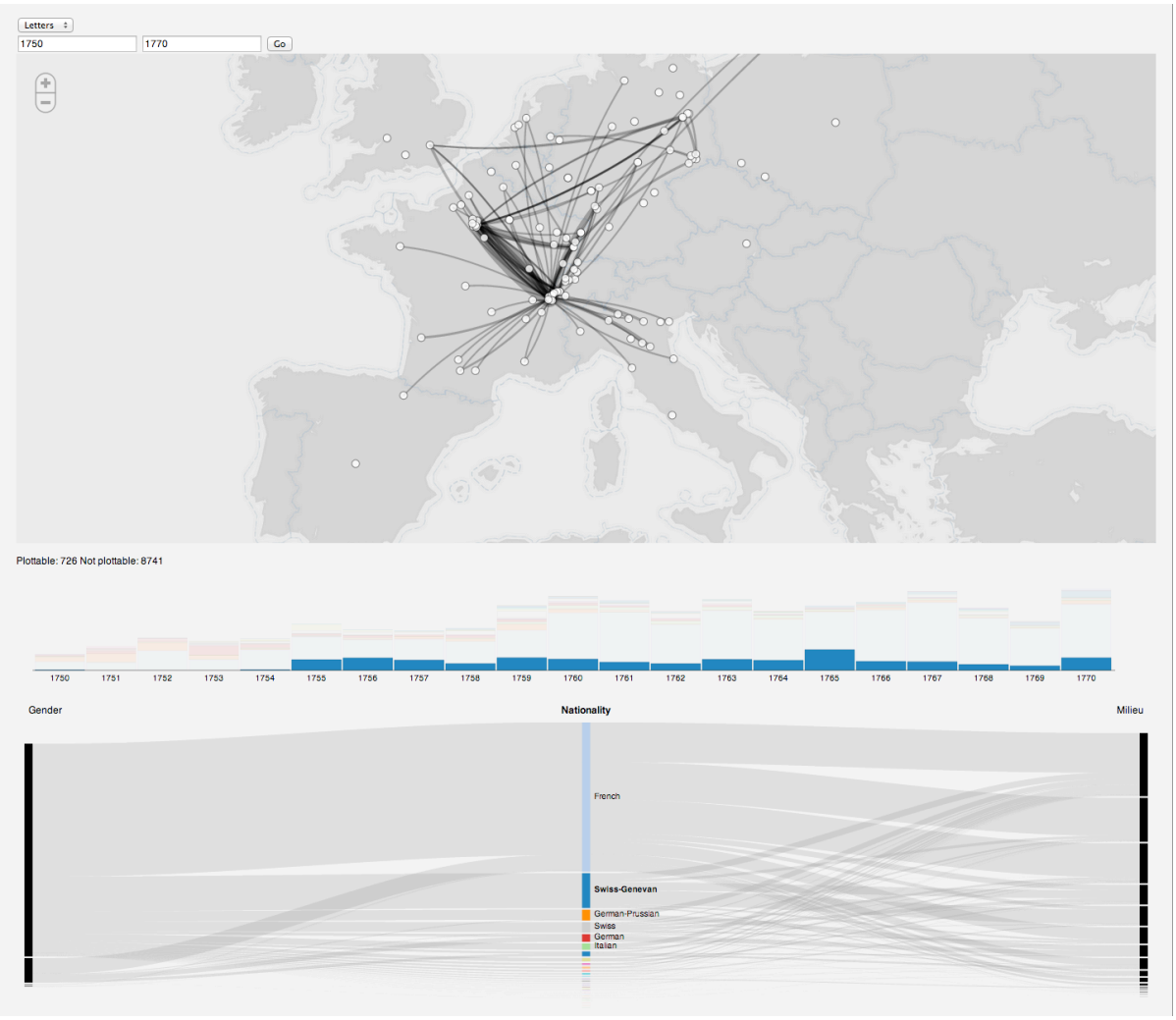

FIG 2: *Ink* has been designed to collect, in a single environment, different but interrelated views on correspondence data. The tool is composed by three main visualizations: a) a *map*, depicting the path of the letters; b) a *stacked bar*, indicating the number and the type of correspondents per year; c) an *alluvial diagram,* for exploring the composition of correspondents groups.

During the collaboration, the role and the use of information visualization has deeply changed. If in the beginning, visualizations have been primarily seen as tools for better understanding and embracing the complexity of already constituted datasets, at the end, they have become a way to deal with almost the entire work with and on the data. In fact, from the design of single-purpose visualizations (like the one previously described and represented in FIG 1), the project has gradually moved towards the inclusion of design processes in a more holistic way (FIG 3). More than focusing on single visual models to depict this or that aspect of the datasets, visualization has worked as a (unifying) language capable to shape the workflow itself, while bringing together the different case studies. In other words, the design process ceased to be limited to the development of the interfaces and, somehow, started to be the design of the research process itself.

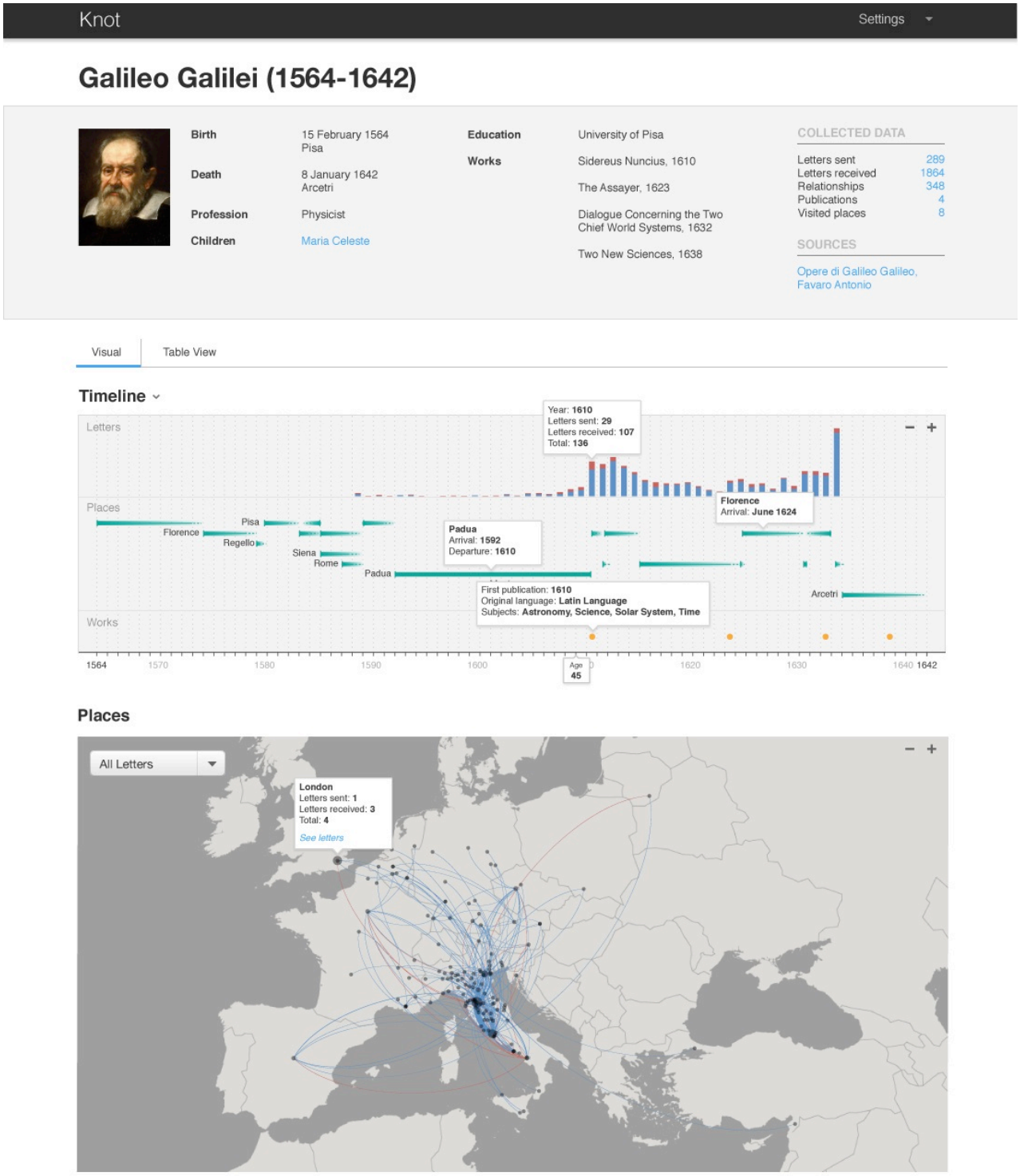

FIG 3: *Athanasius* aims at providing an integrated system not only to look at the data but also to manage, edit and expanding them. Information visualization leads the whole experience of working with the data.

5. Discussion

As we have seen, from both the review of the current state of the art and some direct experiences in the field of digital humanities, design can play an important role in defining new scholarship forms and research processes. If the more common entry point (for design and designers) seems

to be related, and limited to, more technical and specific aspects of the development of the tools, it is also true that the nature of humanities inquiry and their relation with data and data representations, provide an almost-perfect context for design, especially communication and interface design. We argue that design not only represents a valuable partner for humanities scholars, but that humanities inquiries themselves can (and have) to be conceived as *design processes*. In fact, while different are the effects and the opportunities that digital technologies have brought into the activities of scholars and researchers, a reconsideration of the relation between practice and theory appears, however, as the most significant and distinctive one. Making, as we have seen, becomes the *sine qua non* condition for theory production. Research is carried out through projects where practice and experimentation has a primary role. Scholars becomes professional practitioners. Embracing the long tradition in design research and design theory that recognizes the activity of design as a form of *knowing-in-action* and designers as *reflective practitioners* (Schon, 1983), we call for an highly interdisciplinary model of collaboration, where the ability of modeling of both communication designers and developers joins the interpretative work of scholars for the generation of new, contaminated and hybridized ways of thinking. In such a perspective, communication designers and developers do not iterate in the development of interfaces, according to a traditional design-prototype-developing process, but, instead, they, together with scholars, proceed through a continuous exchange of modeling and interpretative activities where each 'move' can work as trigger for the next one. Together with a more strategic and mediator role that designers are widely assuming in many disciplinary and professional realms, communication designers can also offer specific competencies and knowledge about modeling and meaning-making practices that appear as crucial within new interdisciplinary contexts. Moreover, their increasing sensitiveness and confidence with digital tools and culture (coming especially from web design, information visualization and computational design activities) is an indispensable aspect for establish a deeper dialogue with developers and computer scientists.

6. Conclusions and further work

In this paper, we have presented and discussed an ongoing interdisciplinary research that aims at understanding how design can participate in the recent intersections between humanities studies and computing, known today as the digital humanities. A collaboration involving design researchers, scholars and developers has been established and several projects have been developed and discussed here. Focus of the research is the use of information visualizations within humanities inquiry. A review of the current state of the art of the relations between design and digital humanities has been provided in order to understand and discuss the cultural and theoretical background the research stems from and lives in. A more detailed investigation of the predominant approaches in conceiving and designing visual tools for humanities has been also articulated, emphasizing the role designers have. The experiences carried out so far within the collaboration, have been finally presented and discussed. A discussion from both the literature analysis and the review of the projects developed, has then lead to a new theoretical and practical framework in which the three 'cultures' (humanities, designers and informatics) can combine their languages and activities to better observe, manipulate and interpret the human experience through digital technologies. This model is now having a first opportunity to be implemented in an upcoming collaboration between a design research lab at the Politecnico di Milano and a digital humanities group at Stanford University.

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