Digital History and rgument

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Digital History and rgument

This white paper aims to help bridge the argumentative practices of digital history and the broader historical profession. On the one hand, it aims to demonstrate to the wider historical discipline how digital history is already making arguments in different forms than analog scholarship. On the other hand, it aims to help digital historians weave the scholarship they produce into historiographical conversations in the discipline. The responsibility for integrating digital history with argumentation thus rests both with the digital historians who make implicit or explicit historical arguments and with the rest of the profession who must learn to recognize them.

s the merican Historical ssociation's "Guidelines for the Professional Evaluation of Digital Scholarship by Historians" note, "Digital history in various forms often represents a commitment to expanding what history is and can do, as a field." Incorporating digital history into the profession's historiographical conversations about the past requires historians be able to recognize, read, and engage with those various forms of argument, as well as to incorporate digital components into existing forms. The H 's "Guidelines" highlight this need: "Wherever possible, historians should be ready to explore and consider new modes and forms of intellectual work within the discipline and to expand their understanding of what constitutes the discipline accordingly."[1] Since argumentation is considered a hallmark of historical scholarship, this white paper offers historians a brief primer on how to identify, analyze and construct arguments in digital history.

[1] merican Historical ssociation, "Guidelines for the Professional Evaluation of Digital Scholarship by Historians" (June 2015): https://www.historians.org/teaching-and-learning/digital-history-resources/evaluation-of-digital-scholarship-in-history/guidelines-for-the-professional-evaluation-of-digital-scholarship-by-historians. Similar guidelines have been compiled by cognate disciplines. College rt ssociation and the Society of rchitectural Historians, "Guidelines for the Evaluation of Digital Scholarship in rt and rchitectural History," (January 2016): http://www.collegeart.org/pdf/evaluating-digital-scholarship-in-art-and-architectural-history.pdf; merican cademy of Religion, "DR FT: R Guidelines for Evaluating Digital Scholarship" (July 2017): http://rsn.aarweb.org/articles/draft-aar-guidelines-evaluating-digital-scholarship; Modern Language ssociation, "Guidelines for Evaluating Work in Digital Humanities and Digital Media" (February 2012): https://www.mla.org/ bout-Us/Governance/Committees/Committee-Listings/Professional-Issues/Committee-on-Information-Technology/Guidelines-for-Evaluating-Work-in-Digital-Humanities-and-Digital-Media.

While arguments have been made in digital collections and digital public history, the incorporation of this work into historiographic conversations produced in books and journals has been limited. While digital public history projects address audiences beyond other academics, they present interpretive narratives framed through engagement with historiography. Similarly, historians are an audience for digital collections of primary sources, which make arguments through the selection, structuring, and description of the material they include. These digital history arguments could and should be cited in the print-based scholarship which most historians publish, but they are not. Their absence is part of a broader, problematic practice in which historians regularly use digital versions of primary sources, but almost never cite those versions. Instead, historians most commonly cite print or archival versions as if they had been consulted in the original.[2]

Recognizing arguments in forms of digital history including digital collections, datasets, and digital public history would build a bridge bringing historians to digital history. But this white paper also seeks to create a bridge for digital historians to directly contribute to the historiographical conversations which, to date, have mostly been carried on in journals and books. Edward yers and William Thomas III offered an early example of using digital technology not just for analysis but also for presenting an argument in a form generally recognizable to historians in their 2003 article in the *merican Historical Review*, "The Differences Slavery Made: Close nalysis of Two merican Communities."[3] In traditional venues like the *HR*, there have been very few other examples of such scholarship until recently. s a consequence, there is a widespread sense that digital history has over-promised and under-delivered in terms of its interpretative contribution back to the discipline.[4] Special issues of *Law and History Review* (34, no. 4; 2016), the *Journal of Sport History* (44, no. 2; 2017), and *ustralian Historical Studies* (47, no. 3; 2016) featured several pieces that make arguments with digital methods. dditionally, a number of recently completed dissertations depend in one degree or another

[2]Cf. Jennifer Rutner and Roger C. Schonfeld, "Supporting the Changing Research Practices of Historians," Ithaka S+R (December 2012), doi:10.18665/sr.22532.

[3]William G. Thomas III and Edward yers, "The Differences Slavery Made: Close nalysis of Two merican Communities," http://www2.vcdh.virginia.edu/ HR/; and William G. Thomas III and Edward yers, " n Overview: The Differences Slavery Made: Close nalysis of Two merican Communities," *merican Historical Review* 108, no. 5 (2003): 1299–1307; William G. Thomas III, "Writing Digital History Journal rticle from Scratch: n ccount," Digital History Project (December 2007): http://digitalhistory.unl.edu/essays/thomasessay.php.

[4]Edward yers, "Does Digital Scholarship Have a Future?" *Educause Review*, ugust 5, 2013, http://er.educause.edu/articles/2013/8/does-digital-scholarship-have-a-future; Cameron Blevins, "Digital History's Perpetual Future Tense," in *Debates in the Digital Humanities 2016*, ed. Matt Gold and Lauren Klein (Minneapolis: University of Minnesota Press, 2016), http://dhdebates.gc.cuny.edu/debates/text/77; William G. Thomas III, "The Promise of the Digital Humanities and the Contested Nature of Digital Scholarship," in *New Companion to Digital Humanities*, ed. Susan Schreibman, Ray Siemens, and John Unsworth (Chichester: Wiley Blackwell, 2016), 603–617.

on digital work.[5] Digital history has begun to make contributions to debates over historical interpretations within professional venues. By showing how these examples contribute to disciplinary conversations, this white paper aims to encourage such work.

Scholarly primitives for history

It is possible to bridge the practices of digital historians and the practices of the historical discipline as a whole because—however different the work of some digital historians may seem—these historical practices share an essential similarity. Historical thinking involves a set of basic actions which might be thought of as "scholarly primitives," to borrow a phrase from John Unsworth.[6] The art of historical interpretation depends on skillfully combining these techniques to create a persuasive account of the past, and this shared dedication to persuasive accounts of the past provides a framework for understanding the connections between history and digital history.

This list is by no means exhaustive, but we might say that all historians do the following. Historians *select* sources. They explore sources to answer their research question, and identify those that provide relevant evidence. The basis of that selection can be their judgement of the truthfulness of a source, its aesthetic qualities, its representativeness, or its uniqueness. Selecting sources requires that historians *synthesize* them in order to find patterns and structures, which guides how they *arrange* those sources into an argument, narrative, or interpretation which is the composite of the sources and not merely a retelling of any one of them. Historians may elect to arrange sources chronologically, geographically, topically, or along any other axis that reveals causation, experience, or consequences. rrangement along those axes is part and parcel of *contextualization*, which might also be called *comparison*. The most basic form of historical contextualization is to understand a source by comparing it to other sources from the same period, place, or topic.

Contextualization often takes the form of answering questions about *scale* or *periodization*. While in contemporary technical jargon "scale" has come to mean simple bigness, historians have a richer conception of scale. Historians work at all levels of analysis from the biographical and microhistorical to world systems

[5]Celeste Sharpe, "They Need You! Disability, Visual Culture, and the Poster Child, 1945–1980," PhD thesis, George Mason University (2016); Jason . Heppler, "Machines in the Valley: Community, Urban Change, and Environmental Politics in Silicon Valley, 1945–1990," PhD thesis, University of Nebraska-Lincoln (2016); Cameron Blevins, "The Postal West: Spatial Integration and the merican West, 1865–1902," PhD thesis, Stanford University (2015); Matthew D. Lincoln, "Modeling the Network of Dutch and Flemish Print Production, 1550–1750" PhD thesis, University of Maryland (2016).

[6]John Unsworth, "Scholarly Primitives: What Methods Do Humanities Researchers Have in Common, and How Might Our Tools Reflect This?" In *Symposium on Humanities Computing: Formal Methods, Experimental Practice* 13 (2000): 5ff.

over the *longue durée*, but in every case historians advance their claims within the context of a specific scale of analysis. Historical arguments often claim that one period can be delineated from another on the basis of some historical change. Finally, historians must *communicate* their ideas to a chosen audience, conveying the necessary information about the past to make their account of the past persuasive within an ongoing conversation among that group.

Even this partial list of the actions historians take to form an interpretation of or argument about the past is a useful rubric for comparing digital history with more common research practices. Throughout this white paper, we will use these components of historical analysis to show how digital history makes historical arguments and where it falls short of making them.

This white paper considers the several common modes of digital historical work in terms of the arguments they make, how they can be incorporated into historiographical conversations and historical publication, and the ethical issues they raise. In addition, following Roy Rosenzweig's insight that "one of the most vexing and interesting features of the digital era is the way it unsettles traditional arrangements and forces us to ask basic questions that have been there all along," each section also considers the implications of that form of digital history for analog practices.[7]

1 rgument and digital collections

Digitizing and presenting historical sources online is the most longstanding form of digital history. In selecting (and excluding) material, a historian makes an argument about what sources are important for understanding a topic. Creating a digital collection further elaborates an argument through the organization, categorization, and description of sources, as well as the design of an interface for presenting and accessing them. This is particularly the case if the digital collection is aggregated from multiple archives and collections. Such collections reconfigure the historical record, bringing together material outside the governmental, organizational, and individual power structures reproduced by prevailing archival practices of collection and curation. If retaining the organization of an archive provides evidence about the activities and perspective of its creator, reassembling the archive can make visible other groups and individuals. When a digital collection reproduces a single archival collection, the selection of that collection is an argument for its importance, and the importance of considering it as a whole. The act of intervening upon a collection through enrichment of the holdings, metadata, or interface are key aspects of historical thinking.

[7] Roy Rosenzweig, "Scarcity or bundance? Preserving the Past in a Digital Era," *merican Historical Review* 108, no. 3 (2003): 735–62, doi:10.1086/ahr/108.3.735.

Example: *The Colored Conventions Project*
P. Gabrielle Foreman, Jim Casey, Sarah Lynn Patterson, et al.
http://coloredconventions.org/

The *Colored Conventions Project* is a digital collection that gathers the records of Black political conventions from the 1830s to the 1890s.[8] While the gathering of free and fugitive Blacks was a widespread phenomenon with significant effects on "educational, labor and legal justice" at the state and national level, these conventions "left rare proceedings, scattered newspaper coverage, and petitions that have never before been collected in one place." The *Colored Convention Project* does not reproduce an existing archive but rather gathers these sources into a single thematic collection. It also solicits the site's users to submit records for conventions which were known to have occurred but for which records are not yet known to survive. The site features a number of interpretative exhibits, as well as a bibliography, which are recognizably interpretative in the traditional sense. But the collection itself, even independent of those interpretative exhibits, is an argument. By assembling records that would otherwise be scattered, it reconfigures the historical record and it makes an implicit argument for the importance of these sources and the historical movement that gave rise to them. By bringing together those materials it contextualizes and periodizes them: conventions are organized by year and region, mapped, and presented as tabular data. Furthermore the site makes an implicit argument that goes against the grain even of the sources that it assembles: the convention attendees were mostly male, but the site elaborates "for the crucial work done by Black women in the broader social networks that made these conventions possible."

In assembling a digital collection, a historian makes an argument by structuring and describing the material in ways that highlight specific features and relationships. Metadata, the descriptive information attached to each item or group of items, provides a layer of information about a source, its origins, nature, subject matter, and relation to other items both within the collection as well as to external holdings that might be relevant. In documentary archives, records rarely provide such descriptions of individual items; archival records such as finding aids typically describe collections only at the level of each box or a folder within a box, rather than at the item level. In describing sources, historians construct an argument by making choices about which metadata schema to employ, which categories of information to include, which controlled vocabularies to deploy, and even the language and word choices used to describe the item. Tags may serve as an additional level of description that can be used to highlight thematic or other conceptual, methodological, or relational dimensions of a collection. s those structures

[8] P. Gabrielle Foreman, Jim Casey, Sarah Lynn Patterson, et al., *The Colored Conventions Project*, University of Delaware (2012–): http://coloredconventions.org/.

and descriptions frame the sources and provide the terms by which they can be searched, they determine what is most visible to users: they are an arrangement of historical sources that advances an argument. Providing standardized metadata in the appropriate formats, including linked open data opens connections to other collections and can expose additional relationships that extend the argument to other analog and digital repositories. Each person in a collection, for example, might have a unique identifier that connects that individual to related information. Digital collections thus synthesize sources and contextualize them.

Example: *What merica te*
Helen Zoe Veit, Peter Berg, Dean Rehberger, et al.
http://whatamericaate.org

What merica te is a digital collection of 2993 items from eight archives.[9] It comprises material collected during the New Deal by the merica Eats project, held at the Library of Congress and several state institutions; community cookbooks, held at the University of Michigan and Michigan State University; and a collection of materials produced by food companies, held at Michigan State University. merica Eats forms the bulk of the collection; the other two collections contextualize those sources. Community cookbooks show how a diverse range of mericans cooked and ate on a daily basis, rather than the rare and rustic habits that the staff of merica Eats favored; advertisements and other company material show the commercial and technological forces shaping merican eating in standard ways that counterbalance the different regional practices highlighted in the other collections. These three distinct angles constitute an argument about the competing forces that shaped and changed regional identity in the 1930s. The material is categorized at the top level by five regions, five formats (advertising, merica Eats, cookbooks, documents and photography), year (1929–1942 and undated), and archive of origin. The emphasis on region follows the orientation of the merica Eats collection, which sought to capture the regional character of merican food for a reference book. The search function allows keyword searching across all the metadata and transcriptions, or advanced search of particular fields, including another level of categorization that includes creator, original resource (a more extensive range of formats), and subject-based tags. map provides a visual interface for accessing content by region, further emphasizing this approach to the material. From this range of content, the site highlights recipes in a specific section, and as the focus of a crowdsourced transcription project.

[9] Helen Zoe Veit, Peter Berg, Dean Rehberger, et al., *What merica te: Preserving merica's Culinary History from the Great Depression*, Michigan State University (n.d.): http://whatamericaate.org/.

Digital collections and historiographical conversations

Incorporating digital collections into the discipline's historiographical conversations is not simply a question of publication, since the collections are published online. However, online publications are not readily visible to historians both because historians generally remain oriented toward print publications but also because the discovery of digital collections often relies on knowledge of keywords or access portals that may not be easily discerned by potential users. Reviews are one way to bring digital collections into print-oriented conversations. Digital collections are featured in the longrunning digital history review section of the *Journal of merican History*. Such reviews do not necessarily require expertise in digital history; scholars expert in the field of the collection, equipped with guidelines such as those offered by the *J H,* can undertake that task. However, while digital history reviews are in a separate section, as in the *J H*, the relationship of digital collections to other scholarship in their field is less visible.

Citing sources from digital collections in journal articles and books will bring digital history into disciplinary conversations. While historians increasingly draw on digital material in their research, the citation practices of professional publications continue to favor references to a print source and not the digitized version actually consulted. Including links to digital collections in articles and books puts the arguments in collections in conversation with those in the historiography, and makes readers aware of the dependence on digital sources.

Creators of digital collections should facilitate historians' engagement with their arguments by including introductions or "about" pages that identify the origins and context of the material in the collection. This page should articulate the choices made about selection, description, and standardization of that material. ddition-ally, digital collections should include a bibliography that has informed the collection and its argument to assist readers in the identification of historiographical connections. Digital collections should also offer a citation practice for their project and its material, providing a "how to cite" line that enables citation.

Implications for analog history

Digital collections prompt a heightened attention to these questions: What are our sources?, Where do our sources come from?, and What impact does the structure of an archive have on our historical understanding? What historians know about the provenance and organization of archives and collections they use is often opaque. In their scholarship, historians need to address how an archive has collected and arranged their sources, what has been excluded from those collections, and for what purpose. Those questions cannot always be answered from public descriptions of the materials; to answer them historians need to engage more with archivists.

Ethical considerations

Historians making arguments using archival material need to acknowledge the work of archivists, students, genealogists, fellow historians, and other contributors whose work rarely receives proper credit. Mention in an acknowledgments section alone does not adequately identify and credit that labor. Citations should be included to finding aids and other discovery tools, and metadata derived from archival descriptions needs to be identified.

The creation and use of digital collections also requires establishing not just the copyright status of material, but, for more contemporary sources, investigating whether individuals who appear in digitized material have consented to have information about them online, and adopting procedures that enable individuals to have materials removed.[10]

2 rgument and digital public history

Digital history created for audiences other than academics presents arguments in forms that meet the needs of public audiences and stakeholders. To that end, digital public history does not necessarily include explicit reference to how the arguments that it makes relate to the historiography of the subject, since references to ongoing academic conversations can exclude the intended audiences. Instead, digital public history promotes a conversation with its users that often includes collaboration on a project and privileges shared authority. Notwithstanding those differences, digital public history, like most scholarship by historians, sometimes takes a narrative form. In creating a narrative, historians make an argument by choosing which stories to tell, which sources to rely on, and how to organize and arrange different stories. Digital public history narratives can differ from print narratives in incorporating the sources themselves as a central element, which can allow for more analysis and engagement. They also often take advantage of the digital medium to incorporate non-textual sources as well as visual argumentation including graphs and maps.

t the same time, significant numbers of digital public history projects effectively present non-linear narratives to engage the public with the past. Those arguments unfold differently than a journal article or book, but take an interpretive stance in the same way. If reading such a narrative involves making choices that a linear narrative does not require, reading in that way is not at odds with following an argument. Moreover, the choices offered by non-linear narratives through the structure of the project offer one means by which the argument is made. Questions,

[10]Discussion of ethical issues around digitizing archival materials can be found in Tara Robertson, "Digitization: Just Because You Can, Doesn't Mean You Should," March 20, 2016, http://tararobertson.ca/2016/oob/.

pathways, topics, and exhibits are derived from a synthesis of the historiography and active engagement with historical sources.

Example: *Histories of the National Mall*
Sheila Brennan, Sharon Leon, et al.
http://mallhistory.org/

Histories of the National Mall is a mobile-first website that combines historical map layers, contemporary scholarship and primary sources from the history of Washington, D.C.'s National Mall.[11] The site employs a form that "meets the needs of the public users accessing the material within the space of the Mall." It makes an argument "about the space, its role in national life, and the expressions of merican ideals that have taken place there," focused on highlighting its messy origins and how it changed over time. This argument disrupts the understanding of the Mall as a planned landscape. The site's non-linear narrative can be accessed by four different entry points: Maps, Explorations, People, and Past Events. Maps argues for the importance of temporal and spatial perspectives and the relationships between events and locations that it highlights. Explorations highlight questions that have shaped the historiography, and offer answers based on that scholarship and linked to 440 selected sources. Past Events presents an argument about change over time and its nature. People asserts the importance of lesser known individuals, whose stories are absent from the monuments on the Mall itself.[12]

Digital public history and historiographical conversations

s with digital collections, digital public history is published online; incorporating it into the discipline's historiographical conversations is not a question of publication. Creators of digital public history can facilitate engagement with their arguments by incorporating bibliographies that show the historiography underlying their narratives. gain, digital public history should be brought into the historiographical conversation by having it reviewed in scholarly journals. This would be more visible as contributions to specific historical fields by not putting those reviews in a separate digital history or public history section.

[12]Roy Rosenzweig Center for History and New Media, *Histories of the National Mall* (n.d.): http://mallhistory.org/.

[12]Sharon M. Leon, "*Histories of the National Mall*: Place-Based Public History," *H Today*, March 30, 2015: http://blog.historians.org/2015/03/histories-national-mall-place-based-public-history/.

Implications for analog history

Digital public history raises questions about historians' use of the narrative form. If the digital environment was once seen as a threat to long-form narrative, it is now clear that it offers a platform for creating various forms of narrative in, and across, multiple media. Even as books and historical journals are increasingly read online, their content remains limited to what can appear in print, unaugmented by other media. To achieve historians' aim of effectively communicating knowledge, professional publications need to explore how to prevent the publication and preservation of alternative forms of scholarship from being limited to the affordances of the printed page. Print versions of those arguments could still be produced alongside the online versions, but print would not define the narrative form.

shift to the online medium as the default for historical argument would also allow the incorporation of digitized sources in narratives, permitting different relationships between argument and evidence such as the annotation of images, data visualization, inline audio or video, and hyperlinking to primary sources.

Furthermore, the digital medium permits engagement with public audiences outside of more traditional venues for public history such as museums. The mere fact of online publication does not make a digital history project a public history project, since public history is characterized by engagement with audiences. Nevertheless, digital history does facilitate public history, with the implication that historians can engage with the public in new and meaningful ways using digital forms.

Ethical considerations

Historians working with communities have an obligation to engage with those communities on their own terms. They should also indicate in their publications whether their work is about a community or has been done in consultation with the community. dditionally, historians should consider the origins of their sources vis a vis community authority. It is important to note that sources can be implicated in histories of colonization that might require ethical assessments of their provenance, not just of their contemporary copyright status.

3 rgument and methodological discussion

Method is a central element and concern of digital history arguments. On reason for that prominence is the unfamiliarity of many digital methods to historians more generally. But more centrally, the methods themselves require that they be elaborated, in the sense that they involve a process of implementation that can follow a multiplicity of different tracks. Using computational text analysis, for example, requires assembling a corpus of texts, using optical character recognition (OCR)

to create plain text files, making decisions about how to deal with OCR errors, how to organize or split the text for analysis, deciding which algorithms to use, and choosing how to visualize and interpret the results of those calculations. Each step in the process needs to be articulated in relation to the research question and sources justified as part of elaborating an argument. The question of relation is particularly important given that digital historians borrow methods from other disciplines, adapting, in the example of computational text analysis, the measurement of words, document frequency, and similarity to historical questions.

Example: "Space, Nation and the Triumph of Region"
Cameron Blevins
http://web.stanford.edu/group/spatialhistory/cgi-bin/site/pub.php?id=93

Blevins's article in the *Journal of merican History*, "Space, Nation, and the Triumph of Region: View of the World from Houston," analyzed the view of the world a Texas newspaper produced for its readers. The article examined whether the forces of national integration in the late nineteenth-century United States altered the relationship between region and nation. It is accompanied by an online essay, "Mining and Mapping the Production of Space," that elaborates on the discussion of method in the article.[13] Method shaped Blevins's choice of the particular newspaper he analyzed: he needed a publication which had been digitized and processed to produce machine-readable text that was freely available, which meant one from the Library of Congress's *Chronicling merica* collection. Blevins analyzed the publication using term frequency, counting how often 600 states, cities, and towns occurred across 1,700 issues. The key feature of Blevins' methodological argument came from the interplay of source and method: term frequency flattened the text, counting an appearance of a place on the front page and a classified ad in the same way. fter initially perceiving that result as a problem of missing context, Blevins made it the basis for an argument for a more holistic approach to newspapers that recognized that different content appealed to different readers. t a later point in his analysis, Blevins needed to know where in the paper particular results came from, he turned to sampled content analysis and an image grid to categorize content and approximate the percentage of page space dedicated to different categories of newspaper content and places. Finally, Blevins visualized the quantitative results of his term frequency analysis, using mapping to show his argument, to offer a view echoing the view of the world from Houston. He found that a Houston newspaper "privileged region over nation" and "shaped its imagined geography of the nation along the specific commercial network that connected Houston to the merican Midwest."

[13]Cameron Blevins, "Space, Nation, and the Triumph of Region: View of the World from Houston," *Journal of merican History* 101, no. 1 (2014): 122–47, doi:10.1093/jahist/jau184; Cameron

Methodological discussion and historiographical conversations

For digital methods to be part of the historiographical conversation, academic publications need to allow space for them. The experience of workshop participants has been that reviewers and editors frequently insist that methodological sections be cut or shortened to avoid disrupting the narrative. One approach has been to append a methodological discussion to a publication and place that supplemental section online, as was the case with Blevins' article. That approach has the advantage that it can accommodate digital elements such as interactive visualizations and code. But it comes at the cost of disconnecting method from other elements of the argument, which can lead scholars to make invalid assumptions or judgements about the historical conclusions. shift to the online medium as the default for historical argument would allow for the development of forms that interweave method and narrative.

llowing digital historians to articulate their methods will not in itself make methodological discussion a required feature of all historiographical conversations. Yet digital methods raise basic epistemological questions about how historians can best approach different questions and various kinds of sources, about what evidence is needed to support particular claims, that need to be addressed by historians whatever method they use.

Implications for analog history

framework for historical argument that gives little space to methods is increasingly untenable for all historians. gap has opened up between the assumed method of historians—consulting archives or published material to find sources and then using close reading to identify evidence for an argument—and their actual research practice. Even if they do not use other digital tools for analysis, historians already utilize digitized primary and secondary sources retrieved using computational tools, in the form of database searches that rely on algorithms. Historians searching digital newspapers, for example, are doing very different research than those reading them on microfilm or in print. Rather than browsing the entire publication and reading sections in the context of what else is on the page and in the issue, those conducting searches are reading only those sections returned by a search, which depend on the terms used and the accuracy of the text generated by OCR software. Generally, they are reading those sections apart from the context of the entire page on which they originally appeared. Consequently, to know what a historian has read, it is not enough to know that they consulted the newspaper; readers need to know what method they used to consult the source. Yet neither

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Blevins, "Mining and Mapping the Production of Space," Spatial History Project, Center for Spatial and Textual nalysis, Stanford University (2014): http://web.stanford.edu/group/spatialhistory/cgi-bin/site/pub.php?id=93.

narrative arguments nor the citation practices that support them currently record the use and scope of those digital tools, making an assessment of the arguments derived from that research less certain.

Ethical considerations

The H 's *Statement on Standards of Professional Conduct* identifies one of the shared values of historians as a commitment to "the accuracy with which they use and document sources." To fulfill this commitment in a digital environment, in which digitized material and digital interfaces are proliferating, historians can no longer rely on assumptions about method. They need to elaborate how they found their sources, and cite the digital version of a source if that is what they read, elaborate how they analyzed those sources, and highlight any ethical issues associated with the digital source.

4 rgument and computational digital history

There are several recognized digital history methods that take a computational approach, including text analysis, spatial analysis, and network analysis.[14] These methods are not mutually exclusive. For instance, once historians begin to consider texts as data, it is often a next step to consider them as a network. In computational history, primary sources are not treated as sources to be read individually, but rather as elements of data to be transformed in service of a specific question. Creating data requires a different engagement with evidence than historians typically have used. Where, to use Miriam Posner's words, we usually immerse ourselves in sources, dive in, and understand them from within, to create data is to extract information and features from sources, requiring the decomposition of a subject or object into attributes and variables.[15] Diverse sources do not fall straightforwardly into categories; creating data involves working with messy data, often normalizing it to fit the chosen categories in service of particular research goals.

In computational digital history, historical sources are deliberately transformed (changed into data) and simplified (reduced to a model) in order to explain the past. Computation can often depend on taking collections of sources, themselves implicitly argumentative as previously discussed, and further transforming them to make them datasets amenable to computation. Just as digital projects should

[14]There has been some interest among digital historians in "deep mapping." But since deep mapping aims to gather multi-perspectival sources inside a free-form archive, it is more akin to digital archives than to thematic maps.

[15]Miriam Posner, "Humanities Data: Necessary Contradiction," June 25, 2015: http://miriamposner.com/blog/humanities-data-a-necessary-contradiction/.

be reviewed by journals, datasets can be also be critically reviewed.[16] Datasets are then used to create a representation of the past through computational methods. This representation might take the form of statistical models, but it might also take the form of data schemas that represent complex historical relationships.[17] Computational history shares this technique of modeling with 3D modeling or video games, which likewise create simplified representations of the past whose simplicity enables understanding. (3D modeling and videogames are discussed below under visualization.) The practice of digital representation, or modeling, of historical phenomena is not dissimilar from analog historical work. historical narrative, after all, is a deliberately simplified account of the past which is illuminating because of, not despite, its simplifications. For all the surface dissimilarities of a statistical model and a historical narrative, they share a fundamental similarity as representational models.

The models that computational historical work create are necessarily incomplete. While this is true of all historical work, computational models are unusually constrained. While they are powerful means of representation, they must usually be combined with close readings of sources in order to generate useful historical arguments: they can identify patterns through correlation, resemblance, or proximity, but not causation and experience. In this mode of working, computational research is not a replacement for other kinds of historical research, but one method among many.

While historians who use computational methods must always integrate them purposefully with other methods, the relative size of the role that computational approaches take may vary from project to project. Certain applications of textual, network, or spatial analysis may be used to highlight documents, persons, or events of interest from a much larger corpus, which the historian then reads and synthesizes using non-computational methods. Other projects, however, may draw on theoretical paradigms such as information entropy and similarity, graph-based processes such as information brokering and community roles, or spatial phenomenon like autocorrelation, in order to explain historical phenomena. Both models of computational history are valid. The former can crucially situate previously neglected sources within existing historical frameworks. The latter will often outline entirely new paradigms for interpreting a defined set of historical evidence. Some projects will mix both approaches productively.

Computational research can give detail to latent patterns which traditional historical research might guess at but be unable to verify or document. For exam-

[16]The journal *Cultural nalytics* has recently begun http://culturalanalytics.org/category/datasets/. See ndrew W. Piper, "Introducing Data Sets— New Section," *Cultural nalytics*, October 12, 2017: http://culturalanalytics.org/2017/10/introducing-data-sets-a-new-section/.

[17]Miriam Posner, "What's Next: The Radical, Unrealized Potential of Digital Humanities" July 27, 2015: http://miriamposner.com/blog/whats-next-the-radical-unrealized-potential-of-digital-humanities/; Matthew Lincoln, " Radical, Useable Data Model," July 25, 2017: https://matthewlincoln.net/2015/07/25/a-radical-useable-data-model.html.

ple, the *Viral Texts* project has documented in great detail through databases and network graphs the specific patterns of reprinting in nineteenth century newspapers.[18] While any historian could observe that reprinting was common by reading newspapers, and one might even attempt to chart that relationship for a newspaper or two through painstaking work by hand, only computational methods can reveal those patterns in great detail. Once revealed those patterns can be productive of additional historical work that might expand, amend, or explain patterns. Given that those approaches work with a whole dataset, they also establish a context for the material selected for analysis.

Viral Texts is a useful example because it includes both textual, network, and spatial representations of the past. These forms of computational history each have their own patterns of historical argumentation.

Text analysis

Historical research practices have already been transformed through the widespread availability of keyword search in large textual corpora of digitized sources as well as the internet more generally. Keyword search is not a neutral methodology, but depends on algorithms as much as other forms of text analysis. The resulting implications of text searching for historical practice have been discussed at length in Lara Putnam's article, "The Transnational and the Text Searchable."[19]

Understood as distinct from text-driven search, text analysis is a means of computing on large numbers of primary sources. Historians have most commonly applied algorithms for topic modeling, word-embedded modeling, or identifying text reuse to their corpora.

Historical text analysis uses several common patterns of argumentation. One common pattern is that text analysis is used to "stir the archives," to borrow a phrase from Lauren Klein.[20] model of text can be used to locate discontinuities and continuities, patterns and anomalies from them, in the use of language. Text analysis can identify what is typical and what is atypical in the use of language. Some techniques like topic modeling are useful for showing changes in the use of language over time. Other techniques like word-embedded models are useful for mapping discourses synchronically. When the archive is stirred in this way, it opens up opportunities for historians to look more closely at the reasons for discontinuities and create interpretations which explain them.

Text analysis can aid in delineating historical periods. Periodization is a primary form of historical argument; historians typically work within, or against,

[18]Ryan Cordell, David Smith et al., *Viral Texts: Mapping Networks of Reprinting in 19th-Century Newspapers and Magazines* (2017), http://viraltexts.org.

[19]Lara Putnam, "The Transnational and the Text-Searchable: Digitized Sources and the Shadows They Cast," *merican Historical Review* 121, no. 2 (2016): 377–402, doi:10.1093/ahr/121.2.377.

[20]Lauren Klein, "The Carework and Codework of the Digital Humanities," May 2015: http://lklein.com/2015/06/the-carework-and-codework-of-the-digital-humanities/.

historical periods inherited from secondary sources. Large-scale text analysis often lays out patterns of language usage over long time periods in time series that can problematize existing periodizations. This kind of longue durée text analysis reveals turning points and major discontinuities. For example, Jo Guldi's examination of the topics that structured British Parliamentary debates in the nineteenth century revealed changing party alignments around infrastructure in the 1880s, thus changing how she periodized British history.[21]

Example: "The Old Bailey Proceedings, 1674–1913"
Tim Hitchcock and William J. Turkel
https://dx.doi.org/10.1017/S0738248016000304

In an article titled "The Old Bailey Proceedings, 1674–1913: Text Mining for Evidence of Court Behavior," Tim Hitchcock and William Turkel used computational text analysis to reassess the character of the *The Proceedings of the Old Bailey* as a source.[22] They questioned the validity of a narrative of change in court practice derived from misapprehensions about the character of the source. Contrary to arguments based on statistical sampling and selected close reading, comprehensively counting words, and charting trial lengths and guilty pleas and verdicts for the whole corpus revealed that the Old Bailey *Proceedings* after 1800 "represent a much more accurate reflection of courtroom practice and behavior than was the case in the preceding century." That finding calls into question arguments that the major moments of transition in the evolution of the trial occurred in the last quarter of the eighteenth century, when the *Proceedings* cannot be relied upon as a source. Instead, computational text analysis uncovered a "dramatic evolution of court practice between 1800 and 1860" due to the rise of plea bargaining and a declining number of trials. The project thus used computational text analysis to re-periodize British legal history.

Network analysis

Network analysis can be used to explore the relationships between people, places and things. It can describe which entities are most central to a set of relationships, or be used to describe the character of the whole network, such as its density or centralization. It can also be used to compare multiple networks, or contrast the

[21]Jo Guldi, "Parliament's Debates bout Infrastructure: n Exercise in Using Dynamic Topic Models to Synthesize Historical Change," article under review.

[22]Tim Hitchcock and William J. Turkel, "The Old Bailey Proceedings, 1674–1913: Text Mining for Evidence of Court Behavior," *Law and History Review* 34, no. 4 (2016): 954–55, doi:10.1017/S0738248016000304; Tim Hitchcock, Robert Shoemaker, Clive Emsley, Sharon Howard and Jamie McLaughlin, et al., *The Old Bailey Proceedings Online, 1674–1913* (2012): https://www.oldbaileyonline.org/.

state of a network at one point in time versus another. If one of the common practices of historical argumentation is thinking in systems, then network graphs generated by a mathematical model provide a way of rigorously describing historical networks. These networks could be trade patterns, borrowings of texts, or social networks. Network analysis methods assume that their source data represents a network; therefore, an historian cannot use network analysis merely to argue that their subject is or is not a network phenomenon.[23] Rather, having established a priori that a network paradigm is appropriate, the historian can then apply computational methods to describe complex behaviors in a network, including change over time, that are difficult or impossible to see at the level of individual document or biography.

The ability of networks to contribute to historical argumentation goes beyond the practice of visualizing them. In fact, visualizations are often counterproductive, given the difficulties in rendering them meaningfully. The mathematical graph is the primary model created by network analysis, from which the visualization is a secondary product.

Example: "Where Is merica in the Republic of Letters?"
Caroline Winterer
https://dx.doi.org/10.1017/S1479244312000212

This article and its parent project examines the republic of letters, the international world of learning that spanned the centuries roughly from 1400 to 1800, analyzing "the ways in which early mericans participated (or hoped to participate) in the ideal of the republic of letters, and the specific geographical, political, religious, and historical circumstances of early merica that shaped that participation."[24] It maps networks of correspondence using a large dataset in order to reveals patterns notwithstanding gaps in the data. Those visualizations showed that British merica's orientation in the broader republic of letters was centered on England, and London in particular. To understand the extent to which British merica was a periphery of the republic of letters required shifting from cartographic mapping of the network, which makes the mericas appear peripheral due to the size of the tlantic Ocean, to network graphs, which position entities based on the strength of their ties not their geographical location. Benjamin Franklin appears anything but peripheral from this perspective. Without the tlantic to stretch out his correspondence, it is easier to see the massive scale of his network, the multiple languages that helped made possible the breadth of his connections, and his role as a "clearinghouse of knowledge," connecting other people and facilitating information exchange.

[23] Mushon Zer- viv, "If Everything Is a Network, Nothing Is a Network," Visualising Information for dvocacy, January 8, 2016, http://visualisingadvocacy.org/blog/if-everything-network-nothing-network.

Spatial analysis

Spatial analysis, as distinct from mapping, considers the role of space and place in historical processes, whether that analysis occurs conceptually through theory or empirically through statistical computation. Classic historical works, from Frederick Jackson Turner's argument about the role of the frontier in merican history to William Cronon's study of Chicago's environmental history in *Nature's Metropolis* have been fundamentally spatial without being digital. Digital historians make arguments through spatial analysis whenever they compute on location data in order to understand how geography or region shaped a historical process.

Example: "Seeing Space in Terms of Track Length and Cost of Shipping"
P. Shannon, K. Hanson, M. Datta, J. Watson, E. Steiner, and Richard White
http://railroaded.stanford.edu/

s part of a set of maps and visualizations about the development of railroads in the nineteenth-century United States, "Seeing Space in Terms of Track Length and Cost of Shipping" reimagines distances in California not in terms of geographic miles but in the cost of shipping freight. By using the rates of freight from various stations in California, the visualization "provides a graphic demonstration of how the railroads constructed and manipulated space." Prices were not equal along the line as railroads set rates to maximize profit and eliminated competition from steamboats. The visualization takes our received understandings of California's geography and distorts them to show the effect of railroad pricing policies. While presented in a visual form, the argument is inherently a spatial model of economic competition over transportation. The argument of the model was further elaborated in Richard White's book *Railroaded*.[25]

Computational digital history and historiographical conversations

While computation can provide important support for a historical argument, it rarely provides the complexity of explanation that historians seek. Computational digital history relies on homogenous sources. Though it far exceeds any historical monograph in volume of sources, almost any monograph can easily exceed it in the variety of sources employed. Computational history also tends to work

[24]Caroline Winterer, "Where Is merica in the Republic of Letters?," *Modern Intellectual History* 9, no. 3 (2012): 597–623, doi:10.1017/S1479244312000212. See also the data schema and data: http://republicofletters.stanford.edu/publications/franklin/#introduction.

[25]P. Shannon, K. Hanson, M. Datta, J. Watson, E. Steiner, and Richard White, "Seeing Space in Terms of Track Length and Cost of Shipping," part of *Railroaded*, The Spatial History Project, Stanford University (2011): http://railroaded.stanford.edu. See also Richard White, *Railroaded: The Transcontinentals and the Making of Modern merica* (New York: W. W. Norton, 2011).

on a scale that elides individual historical actors. Few meaningful historical questions can be reduced solely to a quantitative answer. Complex historical arguments about causation and experience are typically made using multiple kinds of analysis, subtle inferences, interpretation and interpolation. Computational approaches involve similarly-intricate interpretive decisions, and thus fit within a long historiographical tradition. But without being woven with non-computational methods of history into a coherent argument, they cannot provide the complexity of explanation nor the range of sources that historians are accustomed to. s a result, computational history's interventions in the historiography necessarily comes as part of an argument that draws on other interpretive approaches.

Computational history is the form of digital history most readily amenable to publication in monographs or journal articles. Quantitative outputs can be described in prose, in tables of numbers, or in standard charts and data visualizations. nd, significantly, this type of static outputs are familiar given the six decades or more of work in population history, quantitative history, and social history which have long used numerical approaches in their scholarship. While quantitative social history may have grappled with the problem of how to write with numbers, it did not fundamentally question the form of publication.[26]

The primary obstacle to publishing computational historical work is that many historians do not judge themselves competent to review its methodology, even if they are comfortable critiquing its interpretations. The burden here is in part on computational historians to make their code, data, documentation, and other artifacts of their research available for inspection. In some cases, this inspection includes an expectation of reproducibility reliant on access to original datasets that were used as inputs. The burden of inspection and reproducibility far exceeds the expectation that are placed on analog historians, who are expected to produce research notebooks only in very rare cases of accused plagiarism. Emerging best practices of computational transparency shared across fields in the humanities, social sciences, and sciences, make availability of this data a requirement of peer-review. Yet the burden also falls on publishers and journal editors to find and cultivate peer reviewers capable of evaluating such work. Such peer reviewers must be solicited primarily on the basis of their methodological expertise rather than their chronological or topical specialization. This too is salutary for the profession, because it acknowledges the importance of methodological expertise.

Implications for analog history

While many historical interpretations pivot on claims about what was typical and what was exceptional, in establishing a foundation for case studies or to create

[26]David Hackett Fischer, "The Braided Narrative: Substance and Form in Social History," in *The Literature of Fact: Selected Papers from the English Institute*, ed. ngus Fletcher (New York: Columbia University Press, 1976), 109–33.

context, such claims are rarely empirically grounded. Computational historical research excels at understanding what is typical versus what is exceptional. For example, a historian who topic models a text corpus can say with some degree of certainty whether subjects of interest were a large or small part of the corpus, and how those proportions changed over time. This empirical approach to the validity of representativeness raises questions about the details of how analog approaches make their connections. The basis for claims and their representative nature suggest answers that can frame historiographic conversations.The implication, then, is that computational research provides an important check on the interpretations of analog research. Beyond addressing claims of representativeness, computational methods can also suggest novel paradigms for synthesizing historical arguments. For certain questions pertaining to highly complex systems over long periods of time, for example, computing affords a view of the *longue durée* otherwise obscured by individual examples.

Ethical considerations

Computational historical work is seldom a solitary endeavor. Part of the ethical requirements of its practice is appropriately citing the labor of the historians, librarians, archivists, and curators, who create the datasets, as well as the labor of software developers who create the methodological tools that make such work possible. When working with experts in computational fields such as computer science and statistics, co-authorship might be necessary. While that ethical consideration is significant for all historical research, it is especially important for computational history. Computational history works by aggregating sources and so obscures dependencies which might be clear in more typical patterns of citation.[27]

In working with data, historians need to look to the practices and policies of fields centered on data. In particular, the transformation of sources into data, and the transformations of that material through categorization, annotation, association of ontologies, can obscure uncertainty and ambiguity. clear description of how a dataset was created needs to accompany a dataset. For examples, see Vagrant Lives and Mapping the Republic of Letters. Historians may also serve as a vanguard in advocating for better tools and language for representing and computing with uncertain and partial data—a challenge for which there are many mathematical approaches, of which few have yet been taken up by the digital humanities community.

Computational methods are not value neutral. Text analysis algorithms, for example, rely on cultural assumptions regarding language and its use that have repercussions for historical analysis. Computational historians are obligated to un-

[27] nna St. Onge, "Collaboration Between rchivists and Historians: Finding a Middle Ground,"June 29, 2017: http://activehistory.ca/2017/06/collaboration-between-archivists-and-historians-finding-a-middle-ground/.

derstand carefully how their methods operate, and to deliberately weigh how assumptions in the creation of certain algorithms, datasets, or pre-trained models may impact their use for a given project.[28]

5 rgument and visualizations

Much digital historical work, especially but not exclusively computational work, takes the form of a visualization. Maps and standard statistical charts are common, but so are visualizations of network graphs, 3D models of historical spaces or buildings, and serious video games created to make a scholarly point.

Some kinds of visualizations such as time series are inherently historical because they show change over time. They are able to suggest historical periodization at a glance. Other forms of visualizations such as maps have long been used to convey historical knowledge—arguably, longer than the peer-reviewed journal article has been a common form of publication in the profession. These forms of visualization can convey thinking about historical systems, not least because they are often dependent on data created by systems such as nation states or international trade.[29] Digital historians, as well as scholars in cognate fields like data science, computational linguistics, and the computational social sciences, are in the process of developing other conventions for visualizing computational models, such as word collocates or topic models.

Visualizations can be multivariate, using multiple graphical tools to express as many variables in the data as possible. They are rich, browsable interfaces that reveal the scale and complexity of the data behind them, and provide a context that enriches the exploration and interpretation of that data. In that way they contribute to representing the past in its complexity. Yet at the same time, visualizations are powerful tools for historical communication. They quickly and economically convey historical arguments with symbols, and thus strike a balance between representing all possible variables and representing the interactions most significant to an argument.

While it is certainly possible for visualizations to mislead or be misunderstood—a property, it must be pointed out, that they share with prose—there is a growing body of work studying how visualizations convey knowledge. Creating visualizations requires choices about which data are to be used and how they are to be arranged and represented—but then, those are common practices in the writing of historical prose as well. Visualizations are therefore reliable means of communication which, though they appear new, are rooted in several centuries of practice.

[28]See, for example, Tolga Bolukbasi et al., "Quantifying and Reducing Stereotypes in Word Embeddings," arXiv:1606.06121 [Cs, Stat], June 20, 2016, http://arxiv.org/abs/1606.06121.

[29]Susan Schulten, *Mapping the Nation: History and Cartography in Nineteenth-Century merica* (Chicago: The University of Chicago Press, 2012).

n important question for the relationship between visualizations and historical arguments is whether visualizations (perhaps including their captions and annotations) are sufficient as a form of historical argumentation, or whether they must necessarily be embedded in prose that explains and advances the argument. In other words, can visualizations be arguments on their own, or must they always be only evidence in support of an argument?

Historical visualizations are often presented as arguments. *Visualizing Emancipation*, for instance, makes an argument about the agency of enslaved people,[30] while *ORBIS: The Stanford Geospatial Network Model of the Roman World* is a simulation of travel and connections across the ancient world expressed in visual form.[31] If historical argumentation contains a number of scholarly primitives, historical visualization differs from historical prose primarily in the process of representation and communication, but otherwise partakes of the same practices of arranging, contextualizing, and comparing evidence, as well as thinking about historical systems.

key sign that visualizations are arguments is that visualizations can argue with one another. Just as one historian can write an essay on the same topic as another historian, using the same sources, and yet disagree with the original historical interpretation, so historical visualizations can revise one another. For instance, Jason Heppler's timeline of the wars of the United States revises Elijah Meeks's visualization of the same dataset by changing the categories used.[32]

But historians who create visualizations should also realize that the arguments their visualizations make are not always readily apparent to other historians. Framing prose can serve to explain visualizations, while allowing the visualization to do the primary work of argumentation.

3D modeling and video games

Three-dimensional modeling, interactive video game simulations, and other forms of playable reality are related to other practices of digital history visualization in that their mode of presentation is visual, but differ from them in that their form of modeling is not statistical or numeric. Within 3D modeling there is variation between models which are static, such as re-creations of architectural spaces, and models which are meant to be experienced, such as computer game simulations. Models can be presented as the end product in and of itself (as is common among

[30]Scott Nesbit, Edward L. yers, et al. *Visualizing Emancipation*, Digital Scholarship Lab, University of Richmond (2013): http://dsl.richmond.edu/emancipation/.

[31]Walter Scheidel, Elijah Meeks, et al., *ORBIS: The Stanford Geospatial Network Model of the Roman World*, Stanford University Libraries (2012–2015): http://orbis.stanford.edu.

[32]Elijah Meeks, " ll the Wars of the United States": http://elijahmeeks.com/wars/; Jason Heppler, "Visualizing the Wars of the United States," September 28, 2015: http://jasonheppler.org/projects/war/.

digital archaeologists), but they can also act as a stage on which various reenactments or simulations can take place, where the simulation carries the weight of argumentation.[33]

These 3D models and video games share practices of historical argumentation in that they require a series of choices about selecting and arranging sources that amount to an argument about what a space might have looked like. The exact subject of what a model might argue for depends on the insight of a historian. s in historical prose, many of those decisions are hidden in a final product. s with visualizations more generally, 3D models may serve as a means of exploration. The act of modeling can surface insights and prompt new research questions that are best communicated through prose journal articles or books. But some models are more focused on the narrative or outcome (like a videogame or immersive environment) and may not provide the architectural or historical precision that other models do. Scripting ways within a virtual environment to navigate around modeled structures can reveal or advance arguments about the power of the built environment upon viewers of different historical backgrounds. One such scripting environment is the NEH-funded VSim which will allow for a scripted tour of a 3D environment that makes an argument.[34]

In creating the artful scripting of a digital history experience or work of scholarship, an explicit argument may be counterproductive to a player's engagement: too heavy-handed or obviously leading and trite scripting can easily undermine the ultimate goal of enhancing and challenging both scholarly and broader public understandings of the past.[35] Nevertheless, scripted interactions share the majority of historical practices of argumentation even if they use a different rhetorical device for conveying their insights.

Example: ***partheid Heritages***

ngel David Nieves et al.

http://apartheidheritages.org

partheid Heritages is an ongoing "virtual heritage" project that includes a 3D model of Soweto in 1976 being developed using the Unity game engine.[36] The project aims to presenting the experiences and narratives of the students involved in the June 16 uprising against apartheid and provide a digital means

[33]Jared Katz and lexandre Tokovinine, "The Past, Now Showing in 3D: n Introduction," Digital pplications in rchaeology and Cultural Heritage (September 1, 2017): 1–3, doi:10.1016/j.daach.2017.09.001; Erik Champion, "Indiana Jones and the Joystick of Doom: Understanding the Past Via Computer Games," *Traffic* 5 (2004): 47.

[34]Lisa Snyder, "Virtual Reality for Humanities Scholarship," in *Digitizing Medieval and Early Modern Material Culture*, ed. Brent Nelson and Melissa M. Terras, *New Technologies in Medieval and Renaissance Studies* 3 (2012): 395–423. For the VSim project, see https://idre.ucla.edu/research/active-research/vsim.

[35]Ian Bogost, *Persuasive Games: The Expressive Power of Videogames* (Cambridge, M : MIT Press, 2007).

> of analyzing competing analyses of the key events. The 3D archival interface links image, video, audio, and text assets to a location, and links those locations to one another, and allows users to guide themselves through a recreation of the places, people and past of Soweto. It provides an immersive context for exploring the events of the uprising, and more broadly a means of understanding the history of Soweto's built environment and its role in the liberation movement.

Mapping

In many ways mapping is the computational method which is most easily understood by historians, who have long used maps. Maps, or more broadly spatial analysis, allow historians to understand how historical processes play out over geography. Mapping makes it possible to explore patterns in where people, places and events are located, and to ask what are the spatial relationships between different people, places and events. Maps are good at demonstrating the big picture of how structures influenced the past rather than the ways those same historical contexts affect individual lives. Mapping is thus related to a move in the discipline towards understanding large, limiting structures. In that way, it participates in the systemic thinking which is a hallmark of historical argumentation.

Mapping is also able to contribute to historical argumentation when it engages in question formation on the basis of theoretical reflection. Questions about core and periphery or the social production of space allow historians who make maps to engage with existing conceptual structures in historical discussions.

But as is the case for network analysis, maps are often themselves the arguments. *Visualizing Emancipation*, for instance, makes an argument about the agency of enslaved people in freeing themselves. The map is thus closely connected to the existing historiography on slavery and emancipation. But the map demonstrates in detail in a way that prose could not the connections between federal occupation and the actions of enslaved people to emancipate themselves.[37]

Spatial narratives more extensively and dynamically integrate maps and narrative to visually combine data and interpretation, while retaining the orientation toward putting data in context afforded by mapping. Vincent Brown's spatial narrative, *Slave Revolt in Jamaica, 1760–1761*, is a pathway through a map that relies on visual features, in which, he argues, "the interpretive focus of [the] story emerges from its visual design." Brown argues that by "tracing [combatants'] locations over time, it is possible to discern some of their strategic aims and to observe the tactical dynamics of slave insurrection and counter-revolt."[38]

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[36] ngel David Nieves et al., *partheid Heritages: Spatial History of South frica's Townships* (2017): http://apartheidheritages.org/.

[37] Scott Nesbit, Edward L. yers, et al. *Visualizing Emancipation*, Digital Scholarship Lab, University of Richmond (2013): http://dsl.richmond.edu/emancipation/.

[38] Vincent Brown, *Slave Revolt in Jamaica, 1760–1761: Cartographic Narrative* (2012): http://revolt.

Example: ***ORBIS: The Stanford Geospatial Network Model of the Roman World***
Walter Scheidel, Elijah Meeks, et al.
http://orbis.stanford.edu

ORBIS is a geographic network of travel in the ancient Roman World.[39] It features a map of the Mediterranean on which is superimposed cities and travel routes by both land and sea. These routes form a network between places in the Roman World. By manipulating the controls of the interactive visualization, the user can explore a simulation of travel around the Mediterranean. By changing the season of the year, one's priority for the fastest or cheapest route, and the mode of transportation (foot, oxcart, horse, and military march, among others), one can see how sites in the ancient world were closer or farther away in terms of time. This change is strikingly visualized by turning the geographic network into a cartogram which distorts the geographic distances to render them as time distances. The visualization thus offers a comprehensive argument about the nature of travel in the ancient world. In a subsequent article, Walter Scheidel elaborated on that argument to show how that geospatial model and visualization shaped Roman imperial expansion and decline.

Visualizations and historiographical conversations

The print orientation of historical publication is an obstacle to incorporating any form of visualization into historiographical conversations. Only some visualizations can be rendered as static images able to be published in print. Visualizations generally rely on color, but few, if any, historical journals publish color images, and book publishers are generally reluctant to take on the cost of including color images. In the case of journals, PDF versions of articles could include color versions of visualizations. But that access might be available to some readers, raising questions about the extent to which that affordance actually creates greater scope for incorporating visualizations. Which version of the article is the version of record? If all subscribers have access to the PDF version, then it could be the version of record. It is also not clear that all journals make their readers aware that color images are available in PDF versions of an article.

Visualizations that rely on interactivity cannot be rendered as static images to appear in print publication. It is important to note that an interactive visualization does not necessarily need to appear in a publication in an interactive form; it depends upon how it is used in the argument. Interactivity allows for the exploration

axismaps.com/.

[39] Walter Scheidel, Elijah Meeks, et al., "ORBIS: The Stanford Geospatial Network Model of the Roman World" Stanford University Libraries (2012–2015): http://orbis.stanford.edu; Walter Scheidel, "The Shape of the Roman World: Modelling Imperial Connectivity," *Journal of Roman rcheology* 27 (2014): 7–32, doi:10.1017/S1047759414001147.

of a visualization and its underlying data. Historical argument generally does not ask readers to explore a body of sources, but instead selects and frames evidence that advances specific claims. When an interactive visualization is part of an argument, it could be embedded in an online publication. Journals produced by major publishers now routinely supplement the print version with both PDF and full text or HTML presentations of an article. There is scope to introduce embedded content into the HTML version, but that would require that the online rather than print version of an article be the version of record. There is similar scope to embed content in e-book and online book formats, with similar implications when print editions are also published.

Currently, interactive visualizations such as 3D models that rely on software engines cannot be readily embedded. Stanford University Press's digital publishing initiative is providing a process of peer review, publication, marketing, and archiving for digital projects created on platforms not developed or hosted by the press. n analogous approach could be taken with journals, linking out to digital projects hosted on external platforms that have gone through a review and editorial process. Externally hosted publications raise questions about sustainability and ongoing access. Where Stanford University Press, through the Stanford University Library, is taking on the responsibility of archiving their publications, the sustainability of publications not hosted by the publisher could be addressed in other ways. Publishers could require authors to provide a sustainability plan, as increasing numbers of funders such as the National Endowment for the Humanities and the National Science Foundation already do. Many visualizations are the products of grant-funded projects and so already have a sustainability plan. uthors could also be required to deposit material in their institutional depositories or organizational repositories such as *Humanities Commons*.

Implications for analog history

Historical visualizations present arguments in complex, multivariate ways that text cannot. While they may marshal evidence for more common forms of historical arguments, they can also be the argument itself. Historians have typically given little attention to developing the visual literacy to read visualizations, orienting themselves toward text. In our current digital environment, visual literacy is a more central concern, and must become part of the skill set of historians. Requiring a prose framing for a visualization should be regarded as at best an interim measure. That requirement should be weighed against the potential for it to distort a project and be at odds with the need for digital scholarship to be evaluated in its native medium—a need that the H *Guidelines* identify as one of the responsibilities of departments, and by implication the historical profession as a whole.

Ethical considerations

The creation of 3D models or video games of historical events are fraught with ethical issues because they often place the user in the viewpoint of a historical actor. This ethical challenge, however, has its parallels in traditional historical argumentation, which is often concerned with analyzing varying perspectives on events.

Conclusion

The wider historical profession has not often recognized the arguments digital historians make in their work. This lack of recognition has limited the impact of digital history projects. Equipping historians to recognize those forms of argument will help extend their engagement with digital history, while uncovering the practices of argumentation in digital history will help digital historians to more fully engage their discipline.

Obstacles to discipline-specific argumentation in digital history

Digital historians who wish to make discipline-specific contributions to historiography face barriers to doing so. Publication patterns remain a primary obstacle. Digital historians who wish to address scholarly audiences still need to do so by bringing their work to traditional publication venues, which may mean reframing a digital project to fit the scope and shape of a journal article or book. To better accommodate the changing research practices of historians, digital and otherwise, which include digital sources, visualizations, and non-linear narratives, journals should be willing to treat the online version of a digital history article as the version of record. Journals and book publishers should also recognize that all historians use digitized sources when available rather than print or archival materials, and they should require citations to the version of the source used in order to bring digital historical collections into disciplinary conversations. Creators of digital collections can in turn encourage other historians to engage with their arguments by foregrounding how they have selected and their materials, and providing suggested citations. Journals should also make disciplinary space for conversations about historical method. This includes soliciting reviewers competent to evaluate digital history methods, including computational methods. While a few journals do have digital project reviews, those reviews should be integrated into reviews of historical work more generally.

But some of the barriers to discipline-specific argumentation are also inherent in the methods that digital history uses. The reliance of computational methods on a single type of input runs contrary to historians' traditional willingness to use any and every kind of source. This reliance also limits the explanatory power of those methods. These are limitations of digital history as it is sometimes practiced,

but they are not inherent limitations. For example, a project that uses a single kind of source with a single kind of method can make a useful historical contribution, just as analog historical studies have sometimes focused on a single kind of source. However, the contribution of such projects is likely to be constrained to a limited intervention, rather than a kind of capacious argumentation. Conversely, a single kind of digital source can lend itself to many kinds of digital historical analysis. For example, a project which is primarily a form of text analysis might also incorporate mapping and networks, as the *Viral Texts* project has done. Computational historians who wish to make persuasive historical arguments must either find ways to use their methods to synthesize multiple kinds of sources or to bring multiple kinds of methods to bear on a single source, to make limited interventions into the historiography or to mix their computational methods with more traditional historical methods. We might contrast this limitation to the way that some historians have used digital mapping as a means of integrating and synthesizing multiple sources by contextualizing them in their shared space.

Implications for both digital historians and analog historians

The ways in which digital historians make arguments offer the basis for a number of interventions in the historiography.

ttention to the organization, structure, and description of archives and collections of the kind involved in curating digital collections and creating data can bring new perspectives to historiographical conversations. Questions about how the structures of archives impact our thinking extend arguments about how to interpret sources.

Computational analysis can be used to bring new perspectives on historiographical conversations by expanding the scale of the analysis, by adding detail and context and systematically exploring claims about patterns such as what is typical and representative. It can provide a way of establishing the periodization of historical discourses.

Visualizations can provide a means of addressing and communicating the complexity of the past, make explicit physical changes over time, and address the spatial dimensions of historical events and lives.

In summary, digital history has often presented itself as a new, even revolutionary approach to the study of the past. The wider discipline has often questioned when the interpretative payoff would come from those methodological claims. This white paper has shown that, while digital history is indeed a fresh approach to the study of the past, it is also deeply rooted in the practices of interpretation that define all good work in history. The arguments and interpretations of digital history have in many instances been there all along, and this white paper explains how traditional historians can understand and engage with those arguments. It also aims to demonstrate to digital historians how they can more directly engage

with disciplinary arguments by following common patterns of successful digital history arguments.

How this document was written

The rguing with Digital History Workshop was organized by Stephen Robertson and Lincoln Mullen of George Mason University, with funding from the ndrew W. Mellon Foundation. The two-day workshop was conceived with a focus on one particular form of digital history, arguments directed at scholarly audiences and disciplinary conversations. Despite recurrent calls for digital history in this form from digital and analog historians, few examples exist. The original aim of the workshop was to promote digital history that directly engaged with historiographical arguments by producing a white paper that addressed the conceptual and structural issues involved in such scholarship. Input from the participants expanded the scope of the white paper to also elaborate the arguments made by other forms of digital history and to address the obstacles to professional recognition of those interpretations. The result was a document with the goal of bridging the argumentative practices of digital history and the broader historical profession.

The organizers invited twenty-four participants to the workshop, seeking a diverse mix of scholars at different stages in their careers, working in a variety of fields with a range of digital methods. Ten of those originally invited could not attend or withdrew prior to the event. We also invited Seth Denbo, the director of Scholarly Communication and Digital Initiatives for the merican Historical ssociation and Jeffrey McClurken, chair of the H 's Digital History Working Group and contributing editor for the "Digital History Reviews" section of the *Journal of merican History*.

Prior to the workshop we asked each of the participants to prepare a two-page papers responding to questions to be addressed by this white paper. The response papers were circulated to participants prior to the workshop.

The workshop began with a plenary session featuring presentations by the creators of four digital history projects—Ryan Cordell, Micki Kaufmann, Lauren Tilton, and Edward Baptist—focused on how they dealt with argumentation in their work. The organizers then put participants into three sets of small groups, the first on the basis of their digital methodologies, and the second on the basis of the chronological periods on which they worked. set of questions was posed for each session, with each group asked to write responses or notes on those topics, and then report back briefly to the larger group. For the final small group session, the participants sorted themselves into groups to discuss topics they felt needed to be addressed in the white paper that had not been covered to that point: ethics in digital history; recognizing varieties of argumentation; visualization as a form of argument; genres of digital argument; methodology in historiography; and ways that digital history can intervene in historiography.

fter the workshop, Robertson and Mullen shaped the documents created by the small groups in the course of the workshop, together with the response papers submitted by participants prior to the workshop, into a draft of the white paper. That draft was made available as a Google doc to the participants, along with those who had been invited but had to withdraw, for comment. Robertson and Mullen then revised the draft in response to that feedback to produce the final white paper. ll those who participated in the workshop or provided feedback on the draft are credited as authors of the white paper.