

TURNING PRACTICE INSIDE OUT

Digital Humanities and the Eversion

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I have argued elsewhere (Jones 2014) that a new digital humanities emerged around 2004–2008 in response to changes in technology and how digital networks were perceived—what author William Gibson has called the *eversion* of cyberspace. Gibson coined the term cyberspace in a 1982 short story, but it became famous in his 1984 cyberpunk novel, *Neuromancer*, where it was the name for an online realm that was an abstract, disembodied nonspace, above and beyond the physical world, a kind of wireframe landscape familiar in movies such as *Tron*, for example. Through the 1980s and 1990s, popular notions of the internet—widespread access to which was only just emerging—were dominated by the metaphor of cyberspace. It was where people went when they went online.

But starting about 2007, Gibson overwrote his own earlier metaphor: “Cyberspace, not so long ago, was a specific elsewhere, one we visited periodically, peering into it from the familiar physical world. Now cyberspace has everted. Turned itself inside out. Colonized the physical” (Gibson 2010). To “evert” is to turn inside out—as when an umbrella flips upward in a rainstorm, exposing its carrier to the weather. That image of exposure, the sense of being inside the network, of soaking in it, is what the eversion feels like. The digital network, with its connected data, is now recognized as being down here, in the world all around us.

This new perspective on the network, the eversion, was made possible by a series of changes between 2004 and 2008—for example, simple geographic information systems (GIS) based on the Google Maps application programming interface (API) (which was in turn made possible by the availability of U.S. satellite data after May 2000), the widespread introduction of mobile cellphones (and the integration of the cellular network with the internet), RFID and NFC chips for radio-frequency tagging of physical objects, increasingly pervasive data (thanks to embedded processors and sensors), as well as data-driven social network platforms, such as Facebook and Twitter, that promoted and exploited all of these changes.

Cyberspace was just a metaphor, a way to represent the experience of being connected to the internet. Gibson famously called it a “consensual hallucination.” The eversion represents a new consensus about our experience of digital technology, a shift in the collective

imagination of the network. What Gibson calls the eversion, N. Katherine Hayles characterizes as a shift from virtual reality to mixed reality:

Instead of constructing virtual reality as a sphere separate from the real world, today's media have tended to move out of the box and overlay virtual information and functionalities onto physical locations and actual objects. Mobile phones, GPS technology, and RFID (radio frequency identification) tags, along with embedded sensors and actuators, have created environments in which physical and virtual realms merge in fluid and seamless ways.

(Hayles 2010: 148)

A raft of new or newly configured technologies were introduced in the first decade of the 2000s, but the shift from virtual to mixed reality was ultimately a cultural phenomenon, a response to technologies but not fully determined by them. Like the everted umbrella, the metaphorical membrane of cyberspace no longer divided the human world from the ambient weather of the digital realm. At least in the developed world—though not only there—for better or worse, people began to take it for granted that the everyday world is a data-saturated, mixed reality. Cyberspace had turned inside out.

In *Spook Country*, William Gibson has a character remark that cyberspace was just “a way we had of looking where we were headed, a direction. With the grid, we're here. This is the other side of the screen. Right here” (Gibson 2007: 64). But “here” in this case is less a destination and more a point along a trajectory. Eversion is a useful metaphor precisely because it names a *process* of turning out toward the world. At roughly the historical moment of the eversion, between about 2004 and 2008, a new digital humanities emerged. This was not an entirely new field but—growing out of the long traditions of humanities computing, media studies, and library and information science, in particular—a new direction for practice: from merely *digitizing* humanities materials (mostly paper-based archives) to exploring the implications of the eversion, the new mixed reality.

The new digital humanities has often been associated with programming, tinkering, and making, sometimes with making tools for practical applications, such as building digital archives or scholarly websites. But these experiments were produced in many cases by practitioners who were keenly aware of the eversion as it happened—the rise of social networks, casual and mobile gaming, the geospatial turn and data mapping, distributed cognition, augmented reality, 3-D printing, wearables, and methods inspired by the maker movement—and digital humanities practitioners responded by bringing these new developments into their classrooms, libraries, labs, and centers, where the developments became the objects of critical attention. Much of the hands-on, practical digital humanities work that emerged around 2004–08 was undertaken as an experimental engagement with the materialities of mixed reality. In this way, the new digital humanities of the 2000s tested theoretical questions, in the workshop or lab, but also out in the world, where the network was already having important social, geospatial, and object-based effects on people, places, and things.

People

In the 1980s and 1990s, cyberspace was often visualized as a lonely landscape (despite the fact that actually going online was usually an intensely social experience). With the eversion, the social nature of networks moved into the spotlight. Beginning with talk of “Web 2.0” applications around 2004, there was an increasing focus on the fact that networks are people.

Now, of course, “social media” has become a cliché with supporting ideologies of its own. The institutional sexism revealed and organized in #gamergate, as well as the unsavory subreddits and comment sections across the internet, continue to demonstrate the violent underside of the social network (and of human social relations in general). At the bottom line, the technology companies that control most of the popular social network platforms see their billions of users as a potential data resource to be mined or harvested for profit, often with privacy sacrificed in the process. They are often joined (and sometimes subpoenaed) by government agencies engaging in networked surveillance.

All of this is to recognize that networks exist as a result of social interactions and that their most important effects are social. The social possibilities of networks also include opportunities for a wide range of people to contribute to making knowledge that has been the purview of the humanities, especially in the areas of public heritage or shared cultural resources. The social constitution of networks raises important questions for digital humanities and media studies. One way to address such questions is in practice, by building platforms or using existing ones to engage people in crowdsourced scholarship, for example, to create digital archives and artifacts, while at the same time self-consciously testing the limits of crowdsourcing methods.

Crowdsourcing is not by any means unique to the humanities. One well-known example of “citizen science,” The Zooniverse, calls itself “the largest online platform for collaborative volunteer research,” which “provides opportunities for people around the world to contribute to real discoveries in fields ranging from astronomy to zoology” (n.d.). Its motto is “people-powered research.” The networked platform allows for interested online volunteers (there are reportedly over 1 million) to contribute in small ways to a variety of research projects, from identifying individual humpback whales (actually, helping to train computer algorithms to identify them) to classifying data on everything from animals trapped in the Serengeti to stars and planets to subatomic particles. Micro-contributions to Zooniverse projects often amount to sorting or “scrubbing” large datasets of whatever kind. At present, only one of the projects listed by the site is classified as humanities research: Ancient Lives. Based at Oxford University, it enlists online volunteers to transcribe and help identify ancient papyrus fragments containing bits of Greek literature and other kinds of texts. While many contributors may be self-selected readers of Greek with an interest in papyrology, the project is open to anyone. Brief introductory essays are available, aimed at participants of varying skills. The project includes hundreds of thousands of images, and transcribers can browse databases of Ancient Greek texts to search for strings of letters or words that match their transcriptions. Human labor (across a broad swath of the population, potentially anyone with an interest and the ability to transcribe texts from the images) is combined with automated processes to analyze large sets of data.

This is “digitization” in the broad sense: transcribing from physical sources, producing metadata, and preparing archival materials for digital analysis. The first step, transcribing print materials to produce machine-readable texts, has been particularly amenable to crowdsourcing. Computers are getting better at reading images and printed texts, and optical character recognition (OCR) software has improved in recent decades. But, especially when it comes to older books, accuracy is still a problem, and the whole process of digitization requires significant contributions from humans as well as machines. A basic form of this combination can be seen in reCAPTCHAs, the bits of scrambled text at many website logins, in which humans collaborate with machines to edit scanned texts, one piece at a time.

Archives or databases of born-digital materials can also be seen as crowdsourced, in the sense that they are collectively produced in the first place by massively social networks, such

as Twitter streams linked by hashtags and devoted to particular topics or historical events. A project at the Maryland Institute for Technology in the Humanities (MITH), directed by Ed Summers and Neil Fraistat, began with a collection of 13.5 million tweets posted in the first 2 weeks after the shooting of Michael Brown in Ferguson, Missouri on August 9, 2014. In the immediate wake of the shooting, Summers was inspired by Zeynep Tufekci's "What Happens to #Ferguson Affects What Happens to Ferguson" (Tufekci 2014). The Twitter stream marked by the hashtag #Ferguson (as well as #BlackLivesMatter) represented data out in the world, with obvious social and political implications. How data were distributed online (Tufekci was particularly interested in the issue of net neutrality), filtered, archived, and analyzed also mattered. Summers decided to use Twitter's open search API and a command-line program that he had previously scripted in Python (named *twarc*, for "Twitter Archive") to collect and archive Ferguson-related tweets for analysis (Summers 2014). The 13.5 million tweets represented data (both local and global) produced in the aftermath of the shooting, and patterns based on geolocation are potentially significant. It was not just a question of graphing trending subtopics. As Neil Fraistat pointed out in an interview about the project, a tweet is more than its 140 characters: besides carrying links and media files (images or audio), it comes with metadata, including in some cases geolocation (Kast & McKone 2015). And a collection of tweets is more than the sum of its parts. Mining, analyzing, and then visualizing or mapping the collection's data can be revealing, often in unexpected ways.

Despite clichés about the lone scholar scribbling in his (*sic*) cubicle, forms of distributed research are traditional in some areas of the humanities, especially the production of large reference works or scholarly and critical editions. It is no accident, therefore, that some of the earliest humanities computing projects (led by Roberto Busa, S.J., starting in 1950), which aimed to create lexical research tools through "literary data processing," required large teams of punched-card operators and other collaborators. This work included building a massive lemmatized concordance to the works of St. Thomas Aquinas, but also the analysis of some of the then-recently discovered Dead Sea Scrolls. At one point, Busa attempted to divide and distribute some of the tasks of digitizing and analyzing the Scrolls. Rather than a "crowd," he enlisted a relatively small, international, and interdisciplinary community of experts in ancient philology. Aside from that limited scale, he asked for a familiar kind of micro-curation of small pieces comprising a larger work—in this case, the lemmatization of a Hebrew, Aramaic, or Greek text to be punched onto cards and processed as linguistic data.

Computing in the humanities often works by "atomizing" source materials, for example, breaking texts down into individual words or letters, which can then be analyzed across a range of different dimensions. The micro-contributions of crowdsourcing fit perfectly into this process, and the division of labor into many small, discrete tasks opens the work to amateurs and volunteers. This is one way in which digital humanities research has turned outward to the social world. At the same time, the advent of social-networking platforms, which I have characterized as part of the eversion, has allowed for the massively collaborative production of new data, most of it potentially open to analysis, while raising ethical questions about the labor, privacy, and consent of the people whose contributions or whose data are being aggregated, mined, and analyzed.

Places

If the eversion means that cyberspace leaked out into the world, then the precondition was turning off "selective availability" to U.S. satellite data in May 2000. Global Positioning System (GPS) directions improved immediately. Within a few years, Google Maps was released as a

platform for connecting maps to location data and—crucially—many other kinds of data. In other words, this offered a form of GIS readily available online and relatively simple to build, thanks to the Google Maps API (2005). These changes led to what became known as the geospatial web, and to countless map-based applications, including many digital humanities projects. Location has always been studied by historians, literary scholars, and other humanities researchers. But new digital humanities projects often build layered combination of maps and data—representations of geographical places linked to analyzable, digital information. In literary studies, for example, fictional locations in nineteenth-century novels can be treated not just as settings but as manipulable data to be plotted, mapped, and analyzed. Or patterns in the long-term history of publishing—collected by mining and analyzing millions of digitized books—can be examined statistically, keyed to historical maps, and correlated with other data, such as economic data representing national gross domestic products.

That last example is taken from a project by Matthew Wilkens of the University of Notre Dame, “Mapping and Modeling Centuries of Literary Geography across Millions of Books” (Wilkens 2015). Wilkens combines natural language processing with GIS (via the Google Maps Geocoding API) to first extract and then analyze geographic references to place in the HathiTrust corpus, which contains the digitized texts of 12 million published books. The project investigates relationships between “patterns of literary attention”—which places get mentioned the most in texts—and “demographic and economic factors in the United States between 1800 and 2010.” Wilkens first extracts references to place from the texts, then statistically associates those references with geographic data using Google’s API, and, finally, maps the results. This approach allows him to see patterns across time, connecting references to place in American literature with data about economic influence during the time of publication, for example. Like other digital humanities projects of this sort, this project connects data with representations of place. It is not just that digital tools are applied to maps; projects like this make it clear that there is no clean line separating the physical from the digital. Work of this kind begins with the eversion’s spatially tagged mixed reality, in which digital data are already everywhere in the world.

Things

The eversion was made possible by satellite data as well as the increased use of sensors, transponders, cameras, and small processors in the physical environment—by the distribution of computing out in the world. The internet itself now depends not only on copper and fiber-optic cable spanning the globe but also on radio waves permeating the atmosphere, experienced as WiFi and cellular connections (along with additional short-range protocols, such as Bluetooth). Cards of various kinds, toys, game tokens, key fobs, appliances, pets, things we wear and things we carry, even our bodily interactions with the physical environment of buildings and streets—all are potentially connected, networked, whether we are always aware of the connections or not. The Internet of Things (IoT) is an old idea, but, in the past decade or two, what was once called (with some exaggeration) “ubiquitous computing” has become a mundane reality, sometimes in the most banal ways. Consider, for instance, the spread of QR codes as machine-readable optical quick-response tags. It is now assumed that almost any object can be made to collect, use, and transmit data of various kinds through everted networks, and that networks consist of many possible connections among things of all kinds.

In a kind of thought experiment or design fiction, author Bruce Sterling imagines the advent of what he calls “spimes” (a portmanteau of “space” and “time”), each an object consisting of a physical thing plus data about the thing, resulting in a cloud or halo of data about

the thing's interactions with humans and the environment as it moves through the world (Sterling 2005). A spime would be data-rich, and each interaction with it would become part of the potentially available data. Today's tagged or "chipped" things are mere harbingers of spimes, nowhere near as sophisticated as what Sterling imagines, but his concept is an important reminder that the effect of the eversion is to make us think about the physical objects around us in a new way, as potentially linked to ambient data. This view of mixed reality raises important social, political, philosophical, and ethical questions for the humanities. And digital humanities can address some of these questions in practice, in part by making and exploring the possibilities of data-saturated things—prototyping and theorizing design fictions, as Kari Kraus has argued (2012; see also this volume)—and in part by engaging in critical analysis of developments out in the world.

This is the remit of the Maker Lab in the Humanities at the University of Victoria, which opened in 2012, inspired in part by extra-academic makerspaces that emerged in the era of the eversion. The Maker Lab is a hands-on research lab focused on the intersection of humanities research with "tacit learning through physical computing, fabrication, material culture studies, and comparative media studies" (Sayers 2012). Work in the Lab often takes the form of tinkering or experimenting with everything from small Arduino and Raspberry Pi circuit boards to 3-D printers and scanners, videogames, maps, chips, and wires as well as code—and it includes self-conscious research on its own status as well as on the implications of the laboratory as a model for humanities research, by asking: "How can experimental methods inform materialist research and cultural criticism?"

Similarly, Harvard's metaLAB is "dedicated to exploring and expanding the frontiers of networked culture in the arts and humanities" (metaLAB n.d.). Its research focuses on what it calls the "artifactual knowledge" and the design of exhibitions that "conjoin media and physical objects," on "digital extensions of physical exhibitions," and on the "animation" of archives and built environments. Like the Maker Lab in the Humanities, the metaLAB resists the idea that digital humanities tinkering and making is a refuge from theory: it sees its hands-on research with mixed-reality objects and environments as addressing "fundamental questions regarding experience in a connected world, democracy and social justice, the boundaries between nature and culture." Founding co-director of the metaLAB, Jeffrey T. Schnapp, has said that the "defining design challenge of our epoch" is "to weave together information and space in a meaningful fashion" (Schnapp 2015; see also this volume). And the premise behind this challenge is one aspect of what I have been calling the eversion: the fact that "every cultural object is a network; every collection is a set of collections." He asks rhetorically whether there are "any 'analog only' cultural objects left in museums today" and argues instead that "nearly all cultural objects, whether belonging to the remote past or the immediate present, circulate surrounded by a halo of data and *capta*."

[D]ata is the defining cultural material of the twenty-first century: it is our marble and clay, our coal and petroleum; but raw data alone don't do anything; they have to be collected, processed, curated, and shaped.

(Schnapp 2015)

Although Schnapp is speaking directly to the design of museums here, what he says applies to the digital humanities as a whole, both the mixture of digital and physical materialities and the role of data—not only in museums but in everyday lived experience—as points of focus for engaged humanities research.

Schnapp's aphorism about the "halo of data *and capta*" (my emphasis) reminds us that, as Drucker (2011) suggests, the etymology of the term, "data," is itself problematic from a humanities perspective. Data assume what is "given" as its starting point, rather than what is taken or construed by humans. But, as should be clear by now, the eversion—the shift in perspective occasioned by the turning inside out of the network in relation to the physical world—has come with a heightened awareness of the collaborative roles played by objects and observers, computers and humans, in collecting, curating, and analyzing the data that saturate the everyday experience of people, places, and things—and of the profound questions raised by these processes.

The statistical analysis of large corpora of texts as linguistic data is perhaps the best-known example of digital humanities practice today. In the larger context of the eversion, it is revealed as only one way to experiment with the relationship between physical objects (such as printed books) and digital data, one among many ways that humanities researchers can explore the implications of the mixed-reality world.

Further Reading

- Gibson, W. (2007) *Spook Country*, New York, NY: Putnam's.
- Hayles, N. K. (1999) *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*, Chicago, IL: University of Chicago Press.
- Jones, S. (2014) *The Emergence of the Digital Humanities*, New York, NY: Routledge.
- Sayers, J. (2015) "Why Fabricate?" *Scholarly and Research Communication* 6(3), retrieved from src-online.ca/index.php/src/article/view/209/428.

References

- Drucker, J. (2011) "Humanities Approaches to Graphical Display," *Digital Humanities Quarterly* 5(1), retrieved from digitalhumanities.org/dhq/vol/5/1/000091/000091.html.
- Gibson, W. (2007) *Spook Country*, New York, NY: Putnam's.
- Gibson, W. (2010) "Google's Earth," *New York Times*, 31 August, retrieved from nytimes.com/2010/09/01/opinion/01gibson.html.
- Hayles, N. K. (2010) "Cybernetics," in W. J. T. Mitchell and M. B. N. Hansen (eds.) *Critical Terms for Media Studies*, Chicago, IL: University of Chicago Press, pp. 144–56.
- Jones, S. (2014) *The Emergence of the Digital Humanities*, New York, NY: Routledge.
- Kast, S. and J. McKone (2015) "The Politics of Archiving #BlackLivesMatter," *Maryland Morning* (radio broadcast), WYPR Radio, May 15, retrieved from wypr.org/post/politics-archiving-blacklivesmatter.
- Kraus, K. (2012) "Rough Cuts: Media and Design in Process," *The New Everyday*, New York: New York University and *MediaCommons*, retrieved from mediacommons.futureofthebook.org/tne/pieces/introduction.
- metaLAB (n.d.), *metaLAB at Harvard*, retrieved from metalab.harvard.edu/.
- Sayers, J. (2012) "The Humanities Lab as a Makerspace," *The Maker Lab*, September 5, retrieved from maker.uvic.ca/makerspace.
- Schnapp, J. T. (2015) "Aphorisms on the 21st Century Museum," *Jeffrey Schnapp*, January 26, retrieved from jeffreyschnapp.com/aphorisms-on-the-21st-century-museum/.
- Sterling, B. (2005) *Shaping Things*, Cambridge, MA: MIT Press.
- Summers, E. (2014) "A Ferguson Twitter Archive" 30 August, Retrieved from inkdroid.org/journal/2014/08/30/a-ferguson-twitter-archive/.
- Tufekci, Z. (2014) "What Happens to #Ferguson Affects Ferguson: Net Neutrality, Algorithmic Filtering and Ferguson," *The Message*, August 14, retrieved from medium.com/message/ferguson-is-also-a-net-neutrality-issue-6d2f3db51eb0.
- Wilkens, M. (2015) "Mapping and Modeling Centuries of Literary Geography across Millions of Books," at Digital Humanities 2015, Global Digital Humanities conference, Sydney, Australia, July 3.