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An Interpretation of Digital Humanities

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There is a common thread running through this collection which highlights a new level of interaction with data and text, integrating thinker and machine in a complex relationship which questions the very concept of 'humanity'. This may have profound implications for our understanding of what we mean by the humanities; what exactly is a 'text' if it changes in the moment of consumption? Deep reading has always been a process of interaction with text (Carr 2010; Kittler 1999), but the digital humanities take this one step further. Instead of simply losing ourselves through our imagination, the nature of digital technology is such that we are becoming integrated with the text itself; our brain is not simply picturing a new world, it is instead developing a new world, opening up new neural pathways in reaction to the speed and expanse of interaction with digital data (Carr 2010: 141). The new digital readers, with hyperlinks and notes, offer a new mediated experience of 'reading'. What then can we define as the text itself if each person's interaction with it is completely different, following alternative links and pathways?

As the digital humanities provide us with new technologies such as 'cultural analytics'[1] and 'distant reading',[2] the importance of human hermeneutic interpretation potentially diminishes as patterns emerge to 'show us what we would never have been aware of otherwise' (Currie 2010: 1). It is not a question, however, of discarding deep reading in favour of new digital methods; we propose that the issue is more complex.

These essays follow a broad spectrum of work theorising media and the digital humanities and the way in which media alter our interpretation of 'reality' or, indeed, create a new reality for us. Kittler, for example, talks of how sound, film and video cameras can liquidate real events by creating new accounts which overlay existing versions in our memory, so that our recollection is of the packaged event, forged from spliced media clips and commentary, rather than our actual experience of it (Kittler 1999). The power of this kind of mediated reality is explored by authors such as Dyan and Katz who focus

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on the 'causative power' of such 'pseudo' media events, and their ability to 'actively reinforce dominant paradigms' or replace them with new ones (Dyan and Katz 1994: 153–60). Silverstone considers the way in which media affect our interpretation of reality by directing our processes of recollection via 'the media's capacity to construct a public past' in which 'the texture of memory is intertwined with the texture of experience' (Silverstone 1991: 128).

We want to argue in this chapter that in some senses the 'computational turn'[3] is simply a continuation of a process which has led humans from an oral, to a written, to a visual tradition through the media of oratory, printing, and broadcasting, impacting during each phase a wide range of human activity from scientific interpretation and terminology, war technology, to political processes and social engagement (Kitter 1999; Dyan and Katz 1994). The fundamental argument is the same: media do not simply convey messages, they affect our very relationship with the world.

The idea of a blurring between human and machine is equally not revolutionary. The introduction of sound recording and film technology brought concepts of the 'other', of a new reality, that in the process of mirror-imaging 'reality' actually created a new entity, built from the cuttings of hours of recordings – something that looked real, but wasn't (Kittler 1999: Carr 2010). What is different about digital technology is that it may be challenging even further a fundamental acceptance of the boundaries of physical human identity. The first wave of cybernetic development, for example, brought about a new epistemology incorporating the concept that 'the boundaries of the human subject are constructed rather than given' (Hayles 1993: 84).

Carr's (2010: 22–35) overview of academic theory documenting the way in which our brains change in response to interaction with digital technology seems to confirm some of the concepts developed in this volume – that the digital change is profound. With each new interaction, we become something different, as our brains adapt to the new requirements of digital data processing. We become tailored to a 'hyper-attention mode (related to electronic media)', rather than a 'deep-attention mode (related to print)' (Hazel 2010).

This is a completely different conception from early Christian, courtly, and romantic notions of communications leading to the 'mutual salvation of souls' or 'shared interiorities' (Durham Peters 1999: 45–65). The exploration of patterns using new graphic analysis methodologies, such as Lev Manovich's use of 'cultural analytics' to explore correlations between 4,553 *Time* magazines (Hazel 2010), bypass the difficulties of word signification which plagued the ideal of this early notion of communication. Such new digital approaches address the problematic interpretative nature of language use, and bring us closer, perhaps, to Augustine's idea of divine communication which transcends the problems of translation: 'Angels carry dispatches that are never lost or misdelivered or garbled in transit' (Durham Peters 1999: 75). The digital

humanities, to some extent, capture the excitement brought by the introduction of radio which reactivated the concept of contact between people 'via an invisible or elusive material linkage' (Durham Peters 1999: 103). Berry suggests that software code is providing a new kind of elusive linkage, bringing evolutionary dimensions to human interactions and communications through networked software which enables a highly communicative, intensely creative environment of new human and non-human aggregates (Berry 2011: 8).

If we accept that modernist art and literature focused on the way in which human bodies 'may never be in absolute contact' (Durham Peters 1999: 178), then the posthuman digital media version would be an abandoning of the importance of even attempting such connection; instead, the new possibility is the notion that it is the machine that connects us, uniting us via a series of actions to become a new kind of temporary aggregate, made momentarily 'whole' via a system of actor networks and interactive loops.

This volume provides pathways of thought for refracting our study of the humanities through a new prism of digital media and technology, while simultaneously helping us to explore the intrinsic and inevitable connection between technology and humanity. The March 2010 conference it is based on[4] offered participants a snapshot of approaches to the digital humanities, which we propose might broadly be categorised into two waves of activity: the first based on new quantitative approaches to understanding the humanities, and the second an arguably more revolutionary qualitative approach in which the digital is embedded within our very perceptions of the humanities, providing a completely new interpretation and therefore the development of new theoretical concepts.

Old humanities presented in a new cross-disciplinary digital way

In the initial wave of activity we see evidence of 'old' humanities presented in a new digital way, often as the result of cross-disciplinary cooperation. The main emphasis here is on new ways for scholars to work with an abundance of empirical material using modern automated analysis methods for aggregating, seeing and interacting with large data sets across a number of disciplines. Such a multidisciplinary perspective offers different and potentially better ways of making sense of phenomena (Berger 2000). The promise of the new technology is potentially intoxicating: the ability to process more data than ever before with greater breadth and depth of analysis; extended zoomability between micro and macro; and the revelation of patterns and structures which would be impossible to discern with the naked eye. Two different types of software provide different technological methodologies: the first assists with deduction and hypothesis testing; the second helps with the exploration of data. Such software has the potential to offer researchers new and particular

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perspectives on the phenomena being studied by helping certain properties and relations to become visible (Rieder and Rohle 2012).

Sredniawa and Hayes' Virtual Witkacy project provides a collaborative, multidisciplinary Web-based tool, adding semantic and social networking dimensions to provide a dynamic way of representing and analysing the broad corpus of work of the twentieth-century Polish polymath Stanisław Ignacy Witkiewicz or 'Witkacy' (Sredniawa and Hayes 2011). The use of cultural analytics here is presented as an enabler, providing approaches for analysing cultural history and contemporary culture by facilitating multidisciplinary collaboration to generate a full view of multi-form texts and by doing so revealing complex relationships which exist between different genres of activities.

For Cole and Giordano (2011) such techniques enabled a cross-disciplinary team of historical geographers, GIScientists, dynamic cartographers, historians, and architectural historians to draw upon the methodologies of GIScience (Geographic Information Science) to visualise and interpret the spatiality of the Holocaust in a completely new way. The creation of an historical GIS map of the process of ghettoisation undertaken in Budapest in 1944, for example, enabled existing more traditional research to be re-analysed and represented differently. While providing new insights into a variety of themes, such as the spatial separation of Jews from other Jews, and the hiddenness of the ghetto over time to bystanders, it also raised new ethical questions. The digital visualisation tools used in the project provided a way of aestheticising human suffering, challenging the researchers to find a way of visualising serious subjects without reducing them to pretty pictures.

Some of the methodological issues raised by the application of digital processes are considered by Lin (2011) in her comparative study of the use of digital data-mining versus human coding in Frame analysis. The study found that the text miner produced a more expanded corpus than the human coder, but critiqued the way in which the subsequent digital data analysis incorporated an element of subjectivity, from the initial manual creation of a training data set to inform the algorithms. While the human coder was better able to detect different levels and layers of meanings, the text miner was potentially more objective in its rigid observance of standardised units of measurement, although such standardisation may jeopardise the flexibility of interpretation.

New humanities formed from digital media

Alongside cross-disciplinary opportunities, we propose that another emerging theme of the first wave of digital humanities research from the conference was the focus on new areas of the humanities formed from digital media. Currie (2012) considered the use of controversy as an epistemological device to map editors' concerns within Wikipedia. Using Actor Network Theory as a tool,

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her research touches on the 'complex dynamism' of Wikipedia, arguing that a new analytical approach is needed for a digital text which is a continuous, non-static, collaborative process in which an article can evolve from editorial conflicts over a considerable period of time. The use of 'scraping software' facilitated graphic analysis of an article's editing history, of peaks of editing activity, and of actor dispersal, leading to the mapping of controversy both within an article and through its network. What we see here is not revolutionary; it involves a traditional theoretical framework being applied to the dynamic qualities of digital media, using new software technology to produce source material and represent it visually to facilitate interpretation.

For Hadzi (2011) the new area of humanities needing interpretation as a result of digital developments is the concept of open source and the intellectual property right challenges of the digital media environment. Hadzi uses Rousseau's Social Contract as a framework for analysing issues of sovereignty and community in collaborative computer-mediated communications, such as the collaborative Deptford TV documentary project. In parallel to Currie's work, it is the re-usage, re-mixing and re-interpreting process of digital media that Hadzi focuses on. He develops the concept of the 'data sphere', an extension of the public sphere, created by a coming together of coalitions by way of mechanical processes, arguing that a new approach to copyright is required for the shared cultural heritage of the file-sharing generation. Hadzi is mirroring new thinking introduced by Berry (2008) in which he identified two strands of theoretical development brought to light by issues of the digital creative commons: (1) a new 'model of human productive capabilities (often pre-capitalist, or previously held back by the fetters of capitalism)' or (2) 'a new form of collective production that undermines/re-writes capitalism' (2008: 98). Berry (2011) later also introduces the idea of code as a research subject, summarising the ways in which academic work on software to date has focused on phenomena created by code, and code as engineering, rather than code itself as an object. He proposes a new phenomenological approach to highlight the 'pragmata of code' and by so doing improve our understanding of how computational devices are influencing and affecting the shape of politics, society, economics, and everyday lives (Berry 2011: 11–15).

The digital and humanities: emerging research issues

A third theme of the digital humanities quantitative wave we have identified is a focus on research issues, encompassing theoretical debates and tensions, some of which surfaced at the Computational Turn conference. The 'computational turn' inevitably has its doubters. Cheeseman (2011) confessed being sceptical about the computability of most of the problems he dealt with as a literary translator, editor, critic, and cultural historian, while conceding that

digitisation and computation make helpful tools. For instance, digital software might be able to systematically and thoroughly analyse the differences and similarities between a large set of redactions of 'a' text, and would probably be essential, for example, to manage a large data set such as a broad corpus of texts across different languages. But, Cheeseman questions, what is it exactly that computation can offer other than searchability and low-level pattern recognition? He accepts that computation is capable of identifying recurrent or parallel lexical and syntactic features, but sees it as little help in dealing with semantics. For Cheeseman the connective, pattern-seeking abilities of digital machinery cannot replicate the deep reading of primary readings, the cultural context provided by further texts, and the development of a cognitive critical argument. Dixon (2012), on the other hand, sees pattern itself as worthy of contemplation and critiques its use as a research tool, proposing pattern as a useful epistemological construct for research projects which focus on evolutionary subjects.

The process of researching digital humanities is currently facing intense scrutiny. The gap between the critical thinking inherent to traditional humanities research and the quantitative approach common to computations studies, increasingly being incorporated into 'big humanities' projects, is a problem for Almila (2011), Van Zunder (2012) and Antonijevic (2012). Almila suggests that the issue is not simply the practicalities of collaboration between humanities scholars, scientists, and programmers, but their differing goals and epistemic traditions.

Almila (2011) encountered problems, such as discipline-specific terminology, when conducting a digital research project to analyse keywords from a selection of texts from three disciplines (art history, visual cultural studies, and cognitive science) and also identified the tension between a traditional humanities approach, where questions and methodologies might evolve during the course of study, versus computational methods which require the early identification of parameters, with little flexibility for ongoing structural change. Almila proposes that computational methodology is a further issue as humanities scholars do not normally have the expertise to write their own software programmes, thereby limiting new research to existing software programmes and concepts. The use of bibliometrics to analyse a large-scale corpus of Leonardo journals provided only a general overview and Almila concluded that in order to delve more thoroughly into the research question (did Leonard create a new culture?) a more traditional deep textual analysis of selected texts would be required. Almila, however, sees the practical problems of digital humanities research as minor, and concludes with an evolutionary vision for digital humanities, proposing a concept that we will return to later in this chapter; the digital, Almila suggests, will 'disappear' once it becomes accepted and integrated into the infrastructure of humanities research overall, which

will have expanded or redefined itself to incorporate newly classified research processes and discourses facilitated by digital technology, rather than simply being considered a tool for assisting existing humanities scholars with their studies.

Before it can disappear, however, Rieder and Rohle (2012) suggest that there are five specific research challenges facing digital humanities: objectivity; visualisation as rhetoric; black-boxing; institutions; and total science. While automatic collection and processing appears to eliminate problems of human error and subjective judgement, the process of inputting units of analysis necessarily involves elements of subjective judgement regarding selection, operationalisation, and modelling, and therefore cannot claim to be entirely objective. Here we see digital humanities facing the same technical problems as traditional research approaches in which it is argued that facts are inevitably shaped by the researchers who collect them (Booth et al. 2008) with the inevitable conclusion that objectivity is virtually impossible to achieve.

Likewise, visualisations, it is argued, are a specific kind of representation and not objective transfers from world to image. As such, they often perform a rhetorical function of presenting data, rather than interpreting it. The process of formalising empirical data into structures, algorithms, and symbols reduces the transparency of methodological procedures and makes secondary analysis and judgement of processes problematic. Rieder and Rohle perceive dangers to the structure and funding of existing research methodologies, born from the speed and efficiency of new digital technologies to interpret large scale data, in that more labour-intensive research approaches will appear increasingly unattractive and expensive. Again, this is not a new problem for the humanities. In the mid-twentieth century there were debates about the efficacy and value of empirical research, arguing that it tends to be expensive, and is generally paid for by someone, leading to concerns over objectivity, style, and methodologies which favour commercial paymasters (Wright Mills 1959: 64). Lastly, Rieder and Rohle caution against the use of 'big humanities' to seek a specific ontology of total science which reveals underlying cross-disciplinary constructs, citing structuralism, cybernetics, and systems theory as examples where this did not work.

Van Zundert and Antonijevic (2012) also reflect on the tense juxtaposition between the humanities and computing, arguing that critical reflection on formalisation practices is an important element of success. Echoing Almila's concern over the explicit definition of research objectives, van Zundert and Antonijevic seek to provide evidence of a more critical use of formalising technology. In historical analysis generations of interpretation can lead to layers of hypotheses too complex to fully compute neurologically and the process of aggregated argument and interpretation has been aided by the development of complex digital hypotheses dependency trees. Instead of taking the form

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of the original text, the digital model represents the argumentative structure as a series of symbols which capture the argumentative statements and the relations between them, but the ability of researchers to trust the process of transcribing an argument structure from idiolect into a computable form has proven problematic. Another example given was the use of the photo-sharing website Flickr as a resource tool for researchers studying graffiti and Street Art, and the acknowledgement that without the formalisation of the photos by way of self-produced Flickr tags, identification, collation, and comparative analysis would be impossible. The argument here is that formulisation is various in its facets, directions, and motivations and is not a single unitary principle underlying computation.

Van Zundert and Antonijevic's work in itself seems representative of the 'computational turn', the moment of change between an initial first wave of new digital methodologies applied to 'old' humanities and a new, more complex, qualitative wave. Their case studies focus on new approaches to support existing humanities research, such as the digital hypotheses trees, and research into new humanities formed from digital media, such as the critical analysis of formalisation and the critique of formalisation in Flickr. But Van Zundert and Antonijevic propose a reading which sees computational humanities as just one stream of contemporary humanities research, arguing that if we position non-computational scholarship as conservative we run the risk of evoking resistance towards methodological and epistemological innovation. Instead they caution against unified computational analysis as the answer to all questions in humanities research, urging the consideration of a perspective that recognises the opportunities forged by the concept of a hybrid cognitive system in which human cognition is enhanced by computer functions. In doing so, we propose that they begin to bridge the gap between methodological applications of digital technology within the humanities and the idea of a systematic integration of the human and the digital. The question then becomes one of a deeper role and significance: are such digital methods simply another set of tools for researchers to use or are they transformational to the extent that they challenge established epistemology? (Rieder and Rohle 2012).

A new computational turn?

These critiques of the research challenges posed by the digital humanities focus specifically on the practicalities of using new technology to illuminate and reveal new ways of studying, interpreting, and understanding the humanities. We would like to suggest that what is missing is a different type of computational turn, in which the humanities, by embracing digital techniques, might be able to have a profound effect on our understanding and approach to science; so instead of embracing 'scientific' computation to illuminate the

humanities, and worrying about how to integrate new technology, we might use our sociological understanding to illuminate and challenge the sciences. C. Wright Mills (1959) was to some extent calling for this over half a century ago when he advocated the use of the 'sociological imagination' to bring human meaning, and the social role of science, to the fore in order to understand and challenge the impact of science in the world; this being necessary because men of science were locked in a positivist concept of research and were no longer looking at the whole picture and therefore not measuring, or even concerning themselves with, the ethical impact of discovery and innovation. Perhaps the new digital humanities face the same problem – by being too caught up in the excitement of new analytical tools, are we in danger of losing sight of the bigger picture of the humanities and its role in questioning and revealing the human condition? Will we fall instead into 'abstracted empiricism' (Wright Mills 1959: 50) which focuses so minutely on macro data that it fails to refine meaning? Will researchers in this environment become so involved in method that they cannot tackle or problematise the major issues of studying modern society and the impact of data sets and texts on society and culture?

There is no question, however, that some of the new digital techniques facilitate the kind of switching between macroscopic conceptions and detailed expositions that Wright Mills was seeking. They also unlock huge interpretive potential in exploring new ways for people to make sense of their social world. Taking the concept of interpretive research one stage further, instead of a working methodology where knowledge is co-produced as a result of multiple human encounters, conversations, and arguments (Deacon et al. 1999), we move towards a situation where knowledge is co-produced from encounters between humans and machines. The constructivist task here, then, is less about social reality and routine, and more about digital meanings and interaction, which bring about new interpretations of reality.

The new wave: digital humanities as a new field and discipline

To return to our opening hypothesis then, the essays in this collection raise the question of what the digital humanities actually *is*. We begin to see the emergence of a division between digital humanities as a set of qualitative tools or methods, and the digital humanities as a newly emerging field influenced by computation as a way of accessing, interpreting, and reporting the world itself. The first distinctive wave uses quantitative data production and analysis, while the second wave is identified as a new field within the humanities that utilises digital tools to address existing concerns in the humanities. In doing so, this second wave reveals new analytic techniques and ways of exploring problems that the humanities tackle and seek answers for. It is this second wave (Hayles 2012; Schnapp and Presner 2009) that we will now focus on – that is,

research identified as within the digital humanities, in pursuit of goals and outcomes thought of as the preserve of the traditional humanities, and which service the core methodological strengths of the humanities, such as attention to complexity, analytic depth, critique and interpretation (Schnapp and Presner 2009). Furthermore, we will identify two distinct movements within the second wave: 1) a movement that takes the existing humanities and analyses them in a different way through the use of digital technology; and 2) a movement that theorises new concepts in the humanities involving the digital. Papers from this collection will be used to illustrate these two movements and argue that opposition to the digital humanities, based upon an understanding that the field does not address the concerns of the humanities, is misguided.

First, we want to question what the digital humanities are as an area of study. In Hayles' *How We Think: Transforming Power and Digital Technologies* (2011), one definition of the digital humanities is offered through theoretical discussion. Hayles poses the possibility of what could be achieved by using computers to 'read' a greater number of books than would ever be possible for a single human or team of humans. The critical question would be what kind of 'reading' occurs when machines are analysing books. The mass analysis of such work (it could be argued) cannot reveal the fine detail and meanings that a traditional analysis can provide, but what is produced – structure, frequency of lexical choices, patterns of language use – can in itself form the foundation of a qualitative reading of the material. Rather than the reading of a few texts, text mining and computational analysis can extend the scope of an analysis of texts theoretically into the thousands, and with this provide a more complete analysis of an area or theme. In short, text mining can aid hermeneutic analysis – not replace it. Here, the qualitative approach of the digital humanities is laid bare. The text itself is treated to a hermeneutic analysis with the advantage of digital tools that uncover patterns, themes, and information that a close reading might miss or that would be outside of the scope of a traditional reading. The discussion of 'reading' (Hayles 2011: 8–9) is illustrative of the shift from the first to the second wave, and of the apparent rift between the traditional humanities and the digital humanities:

> In the traditional humanities, reading connotes sophisticated interpretations achieved through long years of scholarly study and immersion in primary texts. At the other end, 'reading' implies a model that eschews human interpretation for algorithms employing a minimum of assumptions about what results will prove interesting or important (Hayles 2011: 8).

The fears of scholars from the traditional humanities – that computer reading 'removes' the human eye for insight and interpretation, and therefore reduces the process of reading itself from a higher-level functioning position

of interpretation and evaluation to a lower-level function of identification and description – is clear. Hayles' interjection is that computer 'reading itself involves a necessary level of human intentionality and interpretation through the programming and implementation of 'reading' algorithms, along with the human interpretation of results', (Hayles 2011: 9). What we want to argue here is that the computational turn is an extension of the aims and desires of traditional research, along the lines that Hayles is proposing; that research in the digital humanities is driven by the same desire to know as traditional humanities, but that through the new 'knowing-how' that the presence of computation has given, the topics and areas of research, the methods and the results have changed, but the humanities are the humanities, whether digital or traditional. This is the second wave – the activities and functions of the humanities being served through digital methods, as well as through traditional close reading, but leading to a change in the methods and output of the humanities.

Hayles offers an analysis of the shifting ontology of the digital humanities based on this functional analysis of what the field is capable of, and how it is utilised in the humanities. Drawing on the first/second wave distinction of Schnapp and Presner (2009), Hayles contends that the digital humanities represents a movement from text-based study (although retaining this link) to closer links with time-based art forms (film and music), visual traditions (graphics and design), spatial practices (architecture and geography) and curatorial practices (Hayles 2011: 4). The qualitative, interpretive, experiential, emotive and generative character of the digital humanities as characterised by Schnapp and Presner (2009) are expressed in these expanded fields of enquiry, while the relationship with text that has characterised the humanities as a field since its inception is not severed, but augmented, by the computational techniques that are a feature of the new field. Hayles characterises the new field as one of diverse practices associated with computational techniques and going beyond print in its modes of inquiry, research, publication, and dissemination (Hayles 2011: 5). The human eye does not withdraw from the digital humanities, and it is not necessarily so that the digital humanities are posthuman in character, but the changes are radical enough to necessitate the label 'digital humanities'. In the future, perhaps it will be the humanities that will be discussed again, which, in the view we offer here, would be a victory for the second wave as an absorption of digital practices seamlessly into the field of the humanities. In such an event, the data and streams that concern the digital humanities are not considered apart from meaning, but are either a route to semantic understanding, or are understood semantically in themselves. Hayles argues this (2011: 15), and offers the view that the digital humanities will either follow this path or become a separate field with distinct aims and character from the traditional humanities. It is outside the scope of this discussion to argue the implications of the latter – what we want to follow here is a line of argument

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which outlines and explains the second wave of digital humanities and proposes that it is this movement that links digital methodologies with the traditional concerns of the humanities, and in doing so redefines and positions the field of digital humanities firmly within the humanities itself.

New analysis of existing humanities: looking at things in a different way

A series of essays in this volume offer novel approaches to tackling existing research areas based on the use of digital technology. Manovich's paper, *Cultural Analytics: Annual Report 2010*, provides an update on his ongoing project of using visualisation techniques (computationally based) to explore cultural data – giving the examples of over a million manga pages, and every *Time* magazine cover since issue 1. The phrase 'Cultural Analytics' demands attention – the analysis of culture is the humanities, and analytics is the application of computation, computer technology, and statistics to solve a problem. While culture is the object of study, the methods of solving cultural questions here are quite clearly computational, and hence this is illustrative of the digital humanities tackling traditional humanities with the use of computational tools. Manovich argues for the application of cultural analytics software that can lead to insightful conclusions about changing trends over time, but also that those trends can be *seen* by the person observing the research. The graphic below – a visualisation of every Time magazine cover since the first publication – shows changes in colour and contrast over time, as well as how the present style and convention was reached over the entire history of the publication, thus offering a genealogical, rather than causal, history of the development of the publication.

Manovich's cultural analytics intersects the distinction between the first and second waves of digital humanities: on the one hand, the data mining is a quantitative method of analysing a large data set, and allows for the understanding of that data in a novel way which deep reading or analysis would not allow, but this work also illustrates how a digital toolkit can be put to use in the service of the digital humanities, that is, the technique and software allows for a traditional hermeneutic analysis, while retaining the advantages of large scope and comprehensiveness which digital data mining can provide.

The emphasis on hermeneutics, and the meaning of the array or stream, makes the link to the traditional humanities explicit, but there is also the clear change of material from text to other sources, and by returning to the five tenets of the digital humanities (qualitative, interpretive, experimental, emotive, and generative) it is clear that this work is rooted firmly in the second wave of the digital humanities. Heftberger (2012) offers an account of a research methodology, and method of visualising data and findings, used to explain

the work of the Digital Formalisation project in Vienna in relation to the work of the Soviet filmmaker Dziga Vertov. In doing so some alternative uses of the technology developed in Manovich's research work are offered. The digital formalism of the project had the intention of developing computer-based media tools for a digital analysis of the work, and aimed to assess what cinematic elements play on different aspects of perception – therefore, assessing how high-level media analysis can contextualise the phenomenal or experiential dimension of the cinema experience. In this research, there is not the intersection of analysis that can be traced back to textual analysis and its crossover with computation, however, the phenomenal, as a research area, has had long traditions in the fields of philosophy and literature to name two; this is still research with aims rooted in the humanities, with computation at the heart of the methodology.

The intersection of meaning and method is explored further in relation to textual analysis in Hildebrandt's 2012 paper, *The Meaning and Mining of Legal Texts*. Hildebrandt proposes that legal texts have an authority that is not inherent in literary texts – that is, legal texts form precedents that inform the legal process, and the meaning of the law comes from this reading. Due to the proliferation of legal texts on the Internet, Hildebrandt argues that data mining will eventually become the primary research method in the legal profession, but that this also poses the question of the difference between human interpretation and pattern recognition, and whether this difference will result in difference in the meaning of the law. The computational nature of the algorithms used (hidden and withdrawn from everyday understanding) is at the root of this question, and the digital humanities, informed by code and awareness of the nature and ontology of computation, seems ideally placed to identify, tackle, and theorise such an issue. Ganz and Murtagh (2011) address data mining as the possibility of a new analytic framework for film and TV scripts, by analysing the deep structure in narratives and the relationship between these textual prototypes and the visual narratives in the text itself. Carvalho (2011) outlines the intensive use of computational techniques that contribute to the understanding of historical processes, in particular an uncovering of complex self-organising historical processes that emerge without the intervention of a centralised coordinating entity, but rather as the result of local interactions of agents. The emergent nature of the process shows itself as a mathematical distribution called a Zipf law, and the case studies of settlement patterns, mail routes, and kin networks can also be presented visually in summary.

All these papers are thematically linked – they show traditional problems in the humanities (narrative analysis; semiotic analysis of magazines; textual analysis) and propose not just how computational methods and analytics can be used to investigate the area, but also how the findings derived from the method offer new insights and results that traditional methods cannot. Moreover, the

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methods themselves pose new questions for research which were previously outside the scope of research and which will inevitably lead to new findings and interpretations. That the traditional questions of the humanities are being addressed is important – that computational techniques can offer new methods, results, findings, and paradigms is critical.

Theorising the new: concepts of the humanities emerging from the digital

In this collection there are a series of speculations on how the digital humanities may open new conceptual areas of study for the humanities, thereby evolving the discipline. When one questions whether the humanities have always been digital, what is being asked is whether technology and the relationship between technology and humans has always been a feature of the humanities. Fabretti (2012) uses the question of the mutual co-constitution of the human and technology as a staging post for questioning the nature of computer code and software, and whether deconstruction of software can be a means to exploring the relationship between the human and technology. In doing this, the project proposes a new contour in the humanities – not only in the methodology of a hermeneutic deconstruction of software, but also in proposing that the result will reveal a new position on the relationship between man and technology, and therefore questioning the role of computation in the constitution of the concept of the human. The 'deep opacity' (Stiegler 1998: 21) of technology makes such a reading difficult, but that difficulty is reflected in the constitution of the human in that decisions and actions are made with escalating uncertainty due to this opacity in the increasingly ubiquitous digital technology on which we depend. Fabretti demands that this opacity is tackled in order to understand the relationship and therefore bring a new perspective to the concept of the human. This certainly constitutes an application of humanities methodology in the pursuit of a novel theory in the humanities – using the digital to investigate the change in the human (following traditional research into the effect of new technology through history on the concept of the human).

Dexter (2011) also proposes a questioning of software, not on the level of what it does but *what it is*. A reading of code as poetics would involve not only the analysis along literary lines, but also an appreciation of the history and open nature of code – and hence a new form of criticism emerges. While these theorists deal with the changing nature of textual analysis in the digital humanities, Carusi (2011) questions how visualisation techniques derived from digital methods can infiltrate and enrich areas of the humanities that have been text dependent, and whether this approach is appropriate and can be successful – again, questioning the future of the humanities after this digital turn.

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These speculative papers ask questions of where the humanities are going, and what we as humanities researchers might be doing and producing. This constitutes a treatise on the future of the humanities. Equally, in looking to the future and how new concepts will emerge there is a lineage to past theory that can inform such findings. Klocubar (2011) questions the role of databases and information technology used in everyday life and how this affects the phenomenal and existential truth of the place of the human subject in that world. Tracing the effects of location-based services and geospatial information technology back to Kant's transcendental subjectivity – the ephemeral nature of the transcendental subject akin to the blue dot on a Google map that locates a device on a map – and through Hegel and Foucault's notion of the 'modern episteme', Klocubar argues that mobile, accessible database technology creates an epistemological agnosia akin to Hegel's observation that human rationality involves a suspension of the subjective relationship between human and world. The agnosia is technologically induced – by having the world of knowledge at our fingertips we will miss the world itself. Bloom (2011) questions how digital technology, and the ubiquity of computation, alters the desire of an actor, and therefore the sense of self that an actor has – and then considers how this reflects upon the critical hegemony of our times. The creation of a computational subject is a fantasy in the Lacanian sense, which serves to legitimise the dominant capitalist ideology of our times through the strengthening of the shared utopian visions that are part of the capitalist hegemony.

These reflections indicate how the digital humanities through the use of, and reflected by, the proliferation of computation, are opening questions on the nature of the human in the world and how this status is subject to change thus requiring theoretical framing and debate. Hui's 2011 *Computational Turn or a New Weltbilt*, which uses Heidegger's concept of the world picture or world disclosure, acts as a critique of the entire collection of papers in this volume. The paper identifies the role of the discursive network as the key representation of understanding the world in the computational turn, and moves from there to use Heidegger's notion of the world disclosure, and this computational image, to sketch a theory of understanding a new way that entities could be disclosed to us in the world. Hui's paper points towards a different, alternative (in every sense of the word) view of the computational turn, not as a means and method of *doing* research, but as a turning in the sense Martin Heidegger meant it – a turning in the way we are oriented towards the world. It is apparent to us that while many of the papers in this volume do not address computation in this way, they do offer a scope to ask the question of whether what is being discussed is a change in methods or a change in viewing the world and the humanities itself, with those methods a manifestation of this new orientation.

These papers provide an illustration of the second wave of the digital humanities – using and theorising the computational to produce qualitative,

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interpretive, generative, experiential, and emotive work within the humanities. Far from being quantitative, the digital humanities, as presented in this section, are examples of work that actively engage digital methods to probe existing questions in the humanities in a qualitative manner, or propose new theories and areas of research in the humanities by accepting and making problematic the inevitable presence of computation in the world, and therefore in the humanities. We argue that the digital humanities are concerned with addressing the key concerns of the humanities, and while the methods may differ, the intentions of the researchers – to address and reflect upon the human condition – are the same in the traditional and digital humanities, at least in this second wave of digital humanities research.

Digital humanities: in the world

The effect of new technologies on the humanities and writing in the humanities can be insidious. Carr (2010) has outlined how Nietzsche's writing was affected by the use of a typewriter, bought in 1882 to aid his failing eyesight and powers of concentration when writing. Carr notes the comments of a composer friend of Nietzsche's, who observed that his prose had become tighter and more telegraphic. Kittler writes that the prose had 'changed from arguments to aphorisms, from thoughts to puns, from rhetoric to telegram style' (Kittler 1999: 203). The aphorismic style attributed to the use of the typewriter can be seen clearly in *Beyond Good and Evil* (1886), *On the Genealogy of Morals* (1887) and *The Antichrist* (1888), a departure from the florid prose of earlier works such as *The Birth of Tragedy* (1872) – and indeed a crueller and harsher tone of criticism can be clearly seen in the later works (although technology may not be as culpable as mood and ill health in that case). Nietzsche himself said, 'Our writing equipment takes part in the forming of our thoughts' (Carr 2008). The argument is that the typewriter elicited a change in the practices and product of thinking in the great philologist, and that this change (in working habit and the direction, content, and style of work) was the result of a change in the conditions of the world that Nietzsche found himself part of in 1882. Nietzsche neither invented nor pioneered the use of the typewriter – it was already a presence in the world before his usage. His use did affect change in his work clearly though, and it is along these lines that we should consider the digital humanities. Digital technology, as a concrete and pre-existing thing in the world, is unavoidably affecting the way humanities scholars conduct research (or think about the world). It is also affecting the product of that research – the material that reflects how researchers in the humanities are reflecting on the world.

The humanities exist as part of the world, and we are not removed from the world, staring down with all-seeing, critical eyes that are permanently detached from the patterns and chaos of human activity. We are not, to quote Thomas

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Nagel, in a position where we have a 'view from nowhere' (Nagel 1986: 3). The methods of the humanities though may provide extractions and abstractions from this all-encompassing milieu, but to argue that the humanities may be in a position detached and above the world that it studies is fallacious. This may seem self-evident, and should be; however, any debate over the effectiveness and appropriateness of digital methods, and the digital humanities in general, raises doubts around this point. The sceptic who states that data mining and pattern recognition in works of literature debases close reading ignores the prevalent mood of human action in a time of computational ubiquity – close reading has a role in the humanities, but it will not deal with the sprawl of textual information being produced daily and added to the incomprehensible deluge of textual information in the digital age. There will be no argument here that canonical texts should not be subject to close readings, but there is an underlying argument that digital humanities methods are necessary and appropriate as we attempt to grasp the information landscape available to us. It is this availability which is critical; we exist alongside, and interact with, computational devices continuously, and these devices offer easy, instant, and unhindered access to incomprehensible amounts of information. These conditions of availability have not been part of human life before, and hence the humanities require new, appropriate, and digitally focused methods to deal with this new condition of being-in-the-world.

We live in a world in which computational devices – computers, mobile phones, satellite navigation devices and so forth – exist alongside us, and, as Berry (2011) argues, these devices have become *embedded* in our everyday lives and being. Berry is arguing that the computational dimension is now a given – a part of the background to being where life experiences become procedural chains of digital information that are stored in databanks (Berry 2011: 149). The referential totality (which is the world) made up by the entities around us is increasingly populated with actors enabled with computational techniques and abilities, and it is through this continual exposure to computation that a computational 'knowing-that' (a presence-at-hand or *vorhandenheit)* emerges socially. The computational becomes therefore comportment towards the world, that takes as subject matter the manifest entities which it can transform through calculation and processing interventions (Berry 2011: 143), resulting in a form of computational reason.

It is this computational 'knowing-that' which is important in thinking about the place of the digital humanities in the world. We are comported towards the world computationally by the fact that the world is made up increasingly of computational things. As we use computational devices daily, new ways of interpreting and evaluating the world – and this includes the subject matter of the humanities, be it literature, visual material, speech, or any other information we care to study – become apparent to us through that usage. We can

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now use databases to store and sort vast amounts of information that could not be done through traditional methods (without teams of thousands and time aplenty – two commodities even the most heralded of researchers cannot call upon) and have access to software to analyse visual material exponentially quicker than the eye can manage. These methods then are a product of the world itself – the world that the humanities purports to study.

We argue that digital technology is integral and embedded in the humanities (imagine the mess if we handwrote this rather than used a computer ...) and that the emerging digital methods, some of which are described in depth in this volume, are a product of the role of digital technology within the world, evolving from our everyday practices as researchers, and our position as everyday people in our time. We already depend on digital technology to produce our work, just as Nietzsche depended on his typewriter, and we are seeing a change in the form, content, and product of research through the integration of the digital into practice. We caution against knee-jerk reactions to this change though; Nietzsche's style changed, but his scepticism, genealogical method, and perspectivism did not alter – the basis of his philosophical system remained the same. What can be said conclusively is that the technology allowed Nietzsche to continue to work, and that it effected a change in his working habits, and the product of his work (in style). This is what we are witnessing in the humanities; digital technology will change the way that some of us work, research, and produce *material*. It will likely also change the conclusions we draw from our work, because of the changes in the conditions of the world brought about by the presence of technology. Technology has always done this, and will do so more in the future. The humanities are about the world, and the research in this volume reflects as much the changes in the world as it does the changes in the research practices and thinking that embrace what we consider to be the humanities today.

Notes

1. In the synopsis to his keynote address at the Computational Turn conference in March 2010, Lev Manovich summarises a Cultural Analytics Annual Report 2010 which states: 'When we started work on Cultural Analytics in 2008, we established a number of larger goals: (1) being able to better represent the complexity, diversity, variability, and uniqueness of cultural processes and artifacts; (2) create much more inclusive cultural histories and analysis – ideally taking into account all available cultural objects created in a particular cultural area and time period ("art history without names"); (3) develop techniques to describe the dimensions of cultural artifacts and cultural processes which until now received little or no attention (such as gradual historical changes over long periods) and/or are difficult to describe using natural languages (such as motion); (4) create visualisation techniques and interfaces for exploration of cultural data which operate across multiple scales; (5) from

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details of structure of a particular individual cultural artifact/processes (such as a single shot in a film) to massive cultural data sets/flows (such as films made in 20th century).'

2. In the synopsis to her keynote address at the Computational Turn conference in March 2010, N. Katherine Hayles summarises some of the characteristics and issues of the concept of 'distant reading': 'Within the Digital Humanities community, there is an on-going dispute about the relation of human to machine reading, in particular whether finding patterns can be a goal in itself or whether it must be linked to interpretation and meaning. This presentation argues for the importance of interpretation and illustrates it with results from data and text mining on Mark Danielewski's "Only Revolutions", an intricately patterned Oulipo-like work in which patterns compete (and cooperate) with overwhelming amounts of loosely structured data.'
3. The Computational Turn conference was held at Swansea University on 9th March 2010, focusing on a broad corpora of work examining the digital humanities. Organised and conceived by Dr David M. Berry the conference explored the potential for a turning point in our understanding of digital humanities, conceptualised as the 'computational turn'.
4. The Computational Turn digital humanities conference held at Swansea University on 9 March 2010.

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