Digital Representation and the Hyper Real

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Art has never been a mere mirror up to nature, yet as in no other medium has it been so easy to create a simulacra of reality as with digital technology: a 'heterocosm', both simulating the familiar while deconstructing it. This session brings together three theoretical papers that explore how mimesis might be used as a paradigm from which to explore the relationship between the digital world, the analogue world, and the space between them; digital surrogates and their analogue counterparts; how familiar terms like object, imitation, copy, original function in the digital realm; and the notion that a digital representation may be more appropriately termed a simulacral identity, reflecting, not the object itself, but our beliefs and conventions about it. This session will explore digital representation as conscious fashionings of hyper-reality, computational zones or subspaces which employ the unreal and non-existent to recreate the material world, pointing to the past, and the future, in unexpected, fresh, or subversive ways

Being Digital, or Analogue, or Neither

John Lavagnino

When I speak of something being digital or analogue, I draw on a connected pair of terms that is often thought to cover all possibilities in a way that's theoretically well grounded. But the origin of these two terms is not theoretical, and the conventional opposition reflects a pragmatic view of approaches to making computing machinery rather than deep and inherent qualities of information. The two terms also do not exhaust the world: most things are neither digital nor analogue, because those terms describe information that has been carefully prepared for machine processing. Nonmachines get by in the world without that restriction of input.

The separate ideas of digital and analogue representation come not from theory but from engineering. Digital representation has its background prior to the days of the digital computer, in the longer history of numerical calculating machines, and in particular in the use of punch cards and tabulating machinery, which could not only perform computations but provided ways to manage large bodies of information. Analogue representation goes back to a different tradition of calculating machinery, in which physical operations that could be interpreted as performing computations mattered much more than storage of information in any quantity. In the mid-twentieth century, a moment came when both approaches had significant applications, and two separate strands of technological development became a pair of options, both sometimes applicable to the same tasks (Wiener; Mindell). Today the two are commonly thought to exhaust all possibilities; but at the same time there is a marked status hierarchy, as digital systems continue to spread everywhere and analogue systems have a minor or nearly invisible existence in unexciting devices like thermostats. On this view, the digital has the prestige of being made by us, and the analogue has the consolation of covering everything that isn't manmade and a few things that are. Or, in one very common version of this opposition, thought is digital and reality is analogue.

Although many people assume in this way that everything is either digital or analogue, most things aren't actually either, because most things are not information prepared for machine processing. All our machinery for processing information, analogue or digital, has the common property of ignoring all but a restricted slice of the world as we experience it, and having no way to notice phenomena beyond that slice. We craft these machines to work with particular inputs and sometimes learn to change our behavior so that machines get the right sort of input. Representations made for other purposes (art, in particular) are based on selections, too, but because they are not created to serve as a basis for computation they don't present the same kind of claim to be authoritative versions of reality. Nothing is digital or analogue until we actually get it into a computational system; these properties result from our choices about how to process reality, and are not inherent in reality itself.

If reality is not by default analogue, thinking is not by its nature digital. Much work in artificial intelligence has been based on the hypothesis that the brain and mind work like digital computers: so that, while our current systems might be crude, they are still on the right path of development towards the real thing, and it's important that the real thing is digital. The hypothesis has been highly productive as a basis for useful work, but is at odds with the biological account of how the brain works; John von Neumann argued that the brain's machinery was essentially different from that of both digital and analogue computers. That difference is unsurprising, since machines of other kinds work very differently from biological systems with comparable functions. The natural form of technology “is typically tiny, wet, nonmetallic, non-wheeled, and flexible;

human technology is mainly the opposite: large, dry, metallic, wheeled, and stiff" (Vogel 271).

In one classical line of discussion of the digital-and-analogue pairing, Nelson Goodman's, written texts serve as an example of the digital mode: on this view, written symbols are intended as discrete and unambiguous tokens chosen from a fixed set (142). The way that texts lend themselves so naturally to transformation into electronic form may seem to provide evidence for this view: that they're not only readily made into usable digital objects but that they inherently *are* such objects. But in Goodman's account the digital nature of the alphabet is an idealization: you are supposed to be able to tell your letters apart unambiguously, yet we get by working with handwriting and bad print that fails in this regard. Much more significantly, we notice other things than the choice of token; as many accounts of communication point out (Roman Jakobson's, for example), there are many functions of verbal messages besides the transmission of the information. Digital representation in computers is different because they are designed to recognize nothing but the choice of token; what is an idealized account when applied to human use of the alphabet is a perfect account of computing, because it describes how computers are built to work.

Conventional accounts of digital representation rarely mention how much of the workings of a computer are there to keep the digital data digital, to prevent it from being degraded by noise; works on electronic engineering never omit the point. We miss a key feature of the digital and the analogue when we think of them as static properties that happen to everything without effort; they are instead deliberate creations. They have been highly successful creations, representations of reality that lend themselves to many uses; we ought to recognize them as our creations, and not mistake them for natural phenomena.

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Looking Backward, Figuring Forward: Modelling, its Discontents and the Future

Willard McCarty

Alan Turing's scheme has not been adequate to computing "in the wild" for more than 50 years (Mahoney 1997: 621), but it does have two fundamental implications for work in the humanities. Its first implication is that intellectual gain from the computational analysis of a cultural artefact comes primarily from comparing it to its digital representation as this is improved through repeated trials and adjustments. Its second implication is that in principle there can be no limit other than human ingenuity to the forms computing can take. Hence computing's basic tradeoff: on the one hand, reduction of the artefact to computational form guarantees a permanent though changing gap between its transcendent reality and its calculable representation; on the other, the mutability of computing allows for no end to the perfective attempt to reach the former with the latter. This attempt I have called "modeling" (McCarty 2005).

The proposed paper takes the centrality of modeling for granted, but it attempts to move beyond the inherent limitations of a process that by definition only imitates. Modeling is directed to a pre-existing conception of an artefact one wishes to study; its strength is in contesting that conception in comparison against one's best attempt at representing it rigorously. The discrepancies it discovers may well be, in Jerome McGann's words, "the hem of a quantum garment" that trails into our future (2004: 201), but modeling gives us little help in imagining that future. Turing's scheme guarantees innumerable forms of computing, but how best are we to work toward them? Although, as Edsger Dijkstra remarks in his contribution to *Beyond Calculation: The Next Fifty Years of Computing*, it may seem "utterly preposterous" to predict this future, as teachers we do it all the time in deciding what to teach, what to ignore (1997: 59). As researchers we get hints of the future, or hopes for it, when no existing data model, or way of using computers, will do – when (to take an example from my own work) neither textual encoding nor relational database design satisfies, and we are left with a hunger for something other than what we have. Can we do better than such backward looking glances into the future? Can we imagine it directly?

One answer is supplied by Empirical Modelling (EM), presented to the last North American ACH/ALLC conference (Beynon, Russ and McCarty 2006) and further articulated in a recent MSc dissertation (King 2006). EM focuses on the present and presence of tacit experience, which is as close to the future as we ever get. Another answer comes out of work in critical

theory, e.g. by N. Katherine Hayles, whose focus on writing, and cultural productions generally, lifts the gaze to what is emerging – to "emergent" phenomena, as they are known (1999). Taking clues from both, I propose to explore and talk about a third answer arising from reflective work in the history, philosophy and anthropology of the natural sciences. In the philosophy of physics, for example, Ian Hacking has argued that rigorously imagined entities are made real when we learn to manipulate them (1983). In the history of technology, Peter Galison shows that the devices we invent tend to pull us forward into conformity with them (2007) – an argument quite close to one Northrop Frye made at the first joint ACH/ALLC conference, citing such human inventions as the wheel and the book (1990). In the history of chemistry, Mi Gyung Kim examines how 19th Century researchers worked to establish the reality of their substances, suggesting a surprisingly immediate interrelation of the imagined and the real (2000). In biological anthropology, Terrence Deacon argues beyond the uncomfortable limitations of a mechanical world-view and strict Darwinian evolution to a new conception of teleology, "to identify a real and substantial sense of the 'pull' of future possibilities in terms of 'pushes' from the past" (2006).

In the proposed paper, I summarize this work in the natural sciences and use it to construct a theory of emergence in humanities computing. I base my exposition on the underlying argument that use of computing, with its emphasis on "how we find out, not… what we find out" (Hacking 2002), brings us into productive relation with the experimental sciences without in any way compromising our orientation to the humanities (McCarty 2002, 2006, 2007). Sumarizing my earlier work, I suggest briefly at the beginning of the paper how computing has allowed us to create within the humanities a computational zone or subspace, within which practitioners may treat cultural artefacts *as if* they were only data, and so apply to them *something like* natural law. I argue that the conjectural, as-if status of what may be done within this zone gives us a defensible way of importing powerful scientific conceptions, such as Hacking's realization-by-manipulation or Deacon's biological teleology, and apply them to our artefacts of study, not in order to test what we think we know but to imagine and realize what we do not know.

In earlier work I have used this conjectural relation with the natural sciences to ground the practice of modelling in its scientific past (McCarty 2005). Here I use it as entry-point to speculations on how humanities computing might lead the disciplines which it most immediately serves into a fruitful relationship with the sciences and so to an end of the epistemic wars foreseen by Richard Rorty (2000).

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Beautiful Untrue Things: The Digital Dilemma

Susan Schreibman

In Oscar Wilde's dialogue *The Decay of Lying*, Vivian and Cyril discuss the interdependence of Nature and Imagination, with imagination, in that typically Wildean fashion, more faithfully representing the real than the material world. For much of the dialogue, Vivian reads an essay that he has authored to Cyril: his thesis is that there must be a return to 'lying in art' (5): a return to the roots of art in the purely imaginative abstract. This imaginative work, rooted in the 'unreal and non-existent' takes as its rough material life, 'recreates it, and refashions it in fresh forms, absolutely indifferent to fact', to what is true or natural or real (20).

Wilde's theory of artistic process can also serve as a starting point in articulating a theory of digital mimesis; of understanding the relationship(s) between the original and its digital manifestation(s), as well as the relationship between and amongst digital surrogates. Moreover, it can be taken as a framework for exploring the complex and shifting relationship between a digitally-presented hyper-reality and material reality.

As has been argued elsewhere, art has never been a mere mirror up to nature, but in no other medium has it been so easy to create a simulacra of reality; a 'heterocosm', simultaneously simulating the familiar while deconstructing it. While the mimetic effect of visualizations, simulations, and virtual reality inherit a set of conventions between an audience and its expectations of a work, these conventions are ultimately unstable, shifting as the technology, and our expectations of it, change.

Digital representations of three dimensional objects, necessarily, lose their corporeality, becoming two-dimensional artifacts[1] engaged with through the mediating presence of an electronic viewing device (a computer monitor, a mobile phone, an e-book). What we engage with, however, are only representations of digital corporeality: what we see are manifestations of the underlying code, much as the prisoners in Plato's allegory of the cave saw only shadows cast on the wall. What we engage with is in fact, not the digital object, but a representation of it.

Johanna Drucker in 'Digital Ontologies: The Ideality of Form in/and code Storage – or – Can Graphesis Challenge Mathesis?' posits that although throughout the Western history, images have been charged with being essentially deceptive or illusionary, the algorithmically-generated code of digital images may, in fact, be a perfect representation of an object; a representation which is not tainted through display or representation. On the other hand, without the representation of the code, the image exists outside our ability to perceive it. In traditional discussions of mimesis the thing being represented typically reflects, however distorted the lens, the represented; the essence of the represented recognizable in the simulacra. With digital media, however, paradoxically, to see beyond the surface of the material world, objects are transmuted into a series of electric currents represented to the computer as binary code. What is being encoded is the object as it never existed, a simulation or hyper-realization.

The intention of a simulation may be to represent an object as it never existed in the material world reflecting our theories and beliefs about it. Digital imagery may be used, for example, to make visible the characters of a manuscript which are no longer perceptible to the human eye. What is represented is not the manuscript as it existed before the damage occurred, nor the manuscript as it exists today: it is not the shadows on the cave wall, nor the reality which casts those shadows, but a hyper-reality which exists between these worlds

As more of our cultural heritage is represented in digital form, the artifacts that people engage with are the simulations without reference to the originals. These disembodied objects exist outside time and space in a way that material objects do not. Digital objects to not decay due to the ravages of time or environment (although digital objects may be rendered useless by our not having the proper hardware and software to read it). Our display paradigms privilege certain readings of these objects; they are surrounded by metadata, typically, if part of a library's holdings, Library of Congress Subject Headings which categorize and group the known world according to a Victorian perception of the universe. Images are not represented to scale, so a map that is 3x2 feet appears the same size as one that is 8x10 inches. Our search engines reduce hundreds, thousands, even millions of objects to a text string displayed ten to a page, or a table populated by 40 2x2 inch thumbnails. This homogenization of results further decontextualize digital simulacra. These deconstructions of the object's material existence reframe the relationship between the perceived and the perceiver, refashioning it, as Wilde writes, 'absolutely indifferent to fact' of what is true or natural or real (20).

This paper will thus explore mimesis from two distinct, but not unrelated aspects of digital technology. The first part will explore the relationship between digital surrogates and their analogue counterparts; how familiar terms like object, imitation,

copy, original function in the digital realm; what is lost and gained in the transfer to the digital when the materiality of a three-dimensional object is transmuted into a two-dimensional plane; the concept of 'trusted digital objects': digital files that will live on when we, and the objects they were created from, no longer exist; the notion that a digital representation may be more appropriately termed a simulacral identity, reflecting, not the object itself, but our beliefs and conventions about it. The second part will explore mimesis from the viewpoint of digital representations as conscious fashionings of hyper-reality or in Wildean terms, employing the unreal and non-existent to recreate the material world in unexpected, fresh, or subversive ways.

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1. This is true even when the computer emulates three-dimensional space, such as utilizing software to be able to view 380° of a sculpture, or using virtual reality software to emulate perspective.