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ON INTERPRETATION

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Material-ict

ABSTRACT

This article will contribute to a synthetic understanding of the factors that influence the subject's experience with digital data, in the presence of a new kind of 'materiality' that is formed in the confluence of physical matter and Information and Communication Technologies that I call Material-ict. The aim is to offer society a critical and creative way to deal with the process in which the electronic and physical dimensions of reality merge and enhance the awareness of the paradigm change that the Internet of Things is bringing to our experience. The article can contribute to the development of a new cognitive paradigm to challenge the current view that objects and environments are inanimate, and the shaping of a framework from which to reconsider interactions between people, social processes, things and environments in the society of knowledge. This framework offers insights into educative, technological developments and cultural programmes to integrate actants (actor–network theory) and citizens in the hybrid experience in which Internet, social processes and matter merge. The objective is to construct the first steps of an analysis framework to understand a few of the most important features that support the emergent model of representation that is impacting the subject's experience with digital data. In order to construct this framework, this research is grounded in the intersection of art, media and experience. The main dimensions analysed in the article are (1) the merging of digital and analogue forms of experience; (2) new actors and forms of interaction; (3) forms of heterogeneous knowledge construction; (4) lively interfaces and animated environments; and (5) biotechnological convergence. The article will show how the

KEYWORDS

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outcome of this confluence is taking shape in different forms of (1) indexation, (2) simulation, (3) translation of matter into data and (4) ubiquitous hybrid networks (social+matter/nature).

INTRODUCTION

The convergence of new technologies inscribes what we know as Internet in the core of our physical and social realities. This inscription affects not only the subject's experience with digital data, but also the very definition of experience, matter, self and the dominating sensorial regimen. The most important aspects that define the problem are linked to factors such as (1) the Cartesian split of mind versus matter (digital versus physical) that is still central in our so-called society of knowledge; (2) digital data are not considered as a layer of nature; (3) the sense of sight is still the dominating one; (4) the physical environment has lost its ancient role as interface for knowledge, a kind of book; (5) digital data are accessed mostly through its representations and simulations and not by a whole experience with the environment; and (6) the society of knowledge is not aware of non-human actors or actants (Latour)[1] that are taking part in the weaving of the World Wide Web.

One example of this situation is the high screen-based dependency, still central in data 'visualization', info 'visualization' and data and info 'aesthetics', that is frequent in the way the subject deals with digital data. This situation can be observed in a great number of platforms for the visual display of data (e.g. www.visualcomplexity.com). Nevertheless, in data-based art different possibilities for data representation through material or experiential interfaces, including 'others', are been explored.

OBJECTIVES

The article will focus on how the theoretical and practical field of digital data visualization and representation needs to be expanded to include other senses and parameters to enhance the subject's experience with digital data. A theoretical and experimental framework is proposed that emerges from the mixture of six dimensions that once blended together enable society to better comprehend and deal with the most relevant aspects linked to data representation: (1) digital data can be understood as matter and as a new form of nature (matter+ICT); (2) digital data could be accessed (experienced) in a multisensory way; (3) there should be an assimilated understanding that nowadays knowledge can be contextualized for social aims; (4) digital data could be radically liberated from screens and embedded into matter, into tissue and into natural elements, and assist social action in a more complete way; (5) matter could be seen as interface for digital data, that is to say, screens could dissolve into matter; and (6) actants should be included in our imaginary as data producers.

This article is part of research that aims at offering the first steps towards a more inclusive and comprehensive umbrella to understand the nature of matter, when matter is data, to define the essential features and parameters that could be taken into consideration to open and expand the hybridization of physical, social and digital layers beyond the way this hybridization is being carried out.

Art is a tool for understanding the nature of matter, and can greatly contribute to the field of data visualization by offering other sensorial layers to representing, mapping and dealing with data. For instance, *Live Wire* (Natalie Jeremijenko) is a functional sculpture that vibrates in real time to network behaviour (Manovich

1. Michael Callon and Bruno Latour developed the actant-network model. Actants can be anything that has the capacity to act, such as objects, inscriptions, artefacts, concepts, institutions, environments and other non-human living beings. Actants can network and associate forming actant networks that connect, influence and empower each other (Latour 1988). The actants' form of interaction is called 'heterogeneous engineering' (Law 1987: 113; see also Law 1992, 1994; Latour 1988).

2002[2]). It functions as a form of data mapping in an indexical way, and shows the difference between data visualization and data-based art.[3]

The research focuses on the question of the different implications and impacts of considering digital data as a new kind of matter and nature.

SOME REFERENCES

Various authors, such as Crary (1992), Negroponte (1998), Ascott (2003), Pepperell and Punt (2000), Alexenberg (2008), de Kerckhove (1995), Classen and Howes (1994), Basbaum (2005) and Nobrega (2009), have analysed the process of experience and mobilization of the subject and the impact of Internet and digital technologies on perception, experience and self from the point of view of what happens in the experience of the subject with the virtual dimension of data, but they do not take into consideration the process of the total blending of the virtual, the social and the physical to shape a new nature and a 'strange' reality. This strange reality does not fall inside the scope of society's perceptive window; it is invisible, and barely experienced, because of the high level of social illiteracy relating its features.

There are at least five important features framing the digital experience in the sphere of this 'strange'[4] reality: the merging of the digital and analogical, strange interactions, lively interfaces and environment, heterogeneous knowledge construction, and biotechnological convergence.

THE VISION

Regarding the merging of the digital and analogical, the embedding of Internet into the social-emotional-physical environment is becoming unavoidable because computing is increasingly ubiquitous, pervasive and invisible. Environments, social actions and situations, things and beings are being increasingly wirelessly networked, IP-tagged, geographically localized, augmented with Quick Response Codes, and supported by bio-mechatronics (MIT).

Regarding strange interactions, quantum computing is starting to open up the possibility of inscribing superposition and entanglement in computing operations,[5] which suggests a transformation of 'digital' culture into 'quantum bit'[6] culture. In this context, actants are being given the technological opportunity to be interactive with human networks and take part in heterogeneous forms of knowledge construction.

Interdisciplinary or multidisciplinary knowledge is turning into networked knowledge (Roger Malina), immersed and pervasive in lively interfaces and environments. These pervasive knowledge networks are supported by a broad array of miniaturized technologies to access and sensor data. An aesthetics of the 'small', similar to microscopic lives, is conforming artificial bio-inspired organisms that blend with the environment and draw the landscape of bio-interfaces (use of smart micro-organisms and devices), triggering a transformation of our well-known screens into natural, organic and tangible smart interfaces.

There are different forms in which the subject experiences digital data and a smart reality. Here I will refer to three important ones. The first is *Indexing*, that is to say, the tracking and data mining of existing physical, cultural, emotional or political processes (platforms such as We feel fine, Visual Complexity, the wavy shapes produced by the tracking of Twitter messages in the Arab Spring street demonstrations, or the mesh-like forms of Lisbon traffic). The nature of this kind of representation is almost indexical and specifically centred on visual experience. The second form, *Simulation*, is a modelling

2. www.manovich.net/DOCS/data_art_2.doc
3. For examples of data-based art, see Mackay, Donald (1969) and Manovich (2002).
4. Poslad (2009) talks about smart devices, smart environments, smart interaction and middleware, and Outlook.
5. A quantum computer performs data operations by using quantum mechanical phenomena such as superposition and entanglement.
6. Bits, either classical or quantum, are the simplest possible units of information. They are Oracle-like objects that, when asked a question (i.e. when *measured*), can respond in one of only two ways. Measuring a bit, either classical or quantum, will result in one of two possible outcomes. At first glance, this makes it sound like there is no difference between bits and Qubits. In fact, the difference is not in the possible *answers*, but in the possible *questions* (http://arstechnica.com/science/guides/2010/01/a-tale-of-two-qubits-how-quantum-computers-work.ars, accessed 2 December 2010).

of reality supported by tools to construct virtual objects and computer-aided design that enable manipulation and trial with virtual models of reality,[7] especially in science or virtual reality environments. The third, *Internet of Things*, is a networking of physical reality by means of technologies such as QR Codes, RFID[8] and GPS that reveals the hidden digital dimension of anything, from nature to buildings, a digital aura that envelops all that has a counterpart in Internet.[9] Among other references are haptic computing (Poslad 2009) and Things That Think (Ishii[10]).

CONCLUSIONS

In spite of this trend, western society's techno-imaginary, digital-mediated data perception and experience are still impregnated by the dominant Renaissance model based on separation of matter and mind, and by vision. We lack a more comprehensive analytical model supported by a broader sensorial approach to analyse the way data are being transformed into matter and forging a different kind of experience with data.

This analysis should take into consideration specific global trends that are deeply impacting human experience with digital data. It is possible that the confluence of various technological changes (Internet of Things, Web 2.0, Web 3.0, social ubiquitous networks, social mobile media, augmented and diminished technologies, quantum computing, cloud computing and the actants network) is turning digital culture into a Qubit culture and the society of knowledge into a universal society of knowledge. A Universal Society of Knowledge could be understood as a new phase in digital culture that implies a different framework for experience with data that include actants and 'strange' realities as actors. Actants are considered special forms of subjects that include the four elements plus a fifth element, that is, fire, earth, water, air and digital data (digital data as a form of essential matter).

Only a new form of networked knowledge can bridge the Cartesian interval between different dimensions of reality, that is to say, digital and matter; human and non-human; knowledge and experience; science and technology and art, and turn matter (matter+ICT) into an interface for digital data experimentation in a multisensory way (including as many senses as possible) and taking into consideration all kinds of data sources (for instance, uploaded directly and in real time by actants).

Material-ict would offer society a networked, multisensory, hybrid (digital+analog) and universal (human and non-human) way to understand, deal with, manage, construct, interact with and experience digital information and knowledge. This approach forces us to review the field of 'data visualization' as a vision-centred kind of data representation that is still representative of the dominance of vision, and to assume that a new layer should be added to the experience of the subject with data representation: the retrieval of the role of matter, understood as data, and as direct interface in human–machine communication.

From a medieval notion of anonymous subject to a subject silenced by religion (group domination and collective construction of reality), and later on to the celebration of the subject in Renaissance and its posterior dissolution into the camera obscura (seventeenth and eighteenth centuries), we arrived at the rebirth of subjectivity with Modernism and at the global theatre, in which the presence is multiplied and networked within collective intelligence systems in

7. Scientific modelling is a process of abstracting reality.

8. See the TED presentation of Sixthsense (Pranav Mistry, Patty Maes): (http://www.ted.com/talks/pattie_maes_demos_the_sixth_sense.html. Accessed 18 November, 2011).

9. One example is WiredBook & Electronic Margin, a system to add a digital layer to texts by means of QR Codes developed by Universal Margin.

10. According to MIT's website, Things That Think began in 1995 with the goal of embedding computation in both the environment and everyday objects (http://ttt.media.mit.edu/vision/vision.html. Accessed 2 October, 2010).

Internet. The next steps might take us to a future universal society, a Qubit culture in which 'strange' forms of intersubjectivity develop, including actants.

The new phase retrieves (McLuhan's tetrad) some of the features that constituted the pre-Renaissance logos of oral cultures, before the Cartesian split between subject and object changed the experiential oral and multi-sensory model of data-experiencing proper of pre-modern societies. In this significant historical moment we may be witnessing the transformation of digital culture into an emergent Qubit culture.

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