

Processed Meaning

Perspectives on Semantic Computing in a Hybrid Culture

*"Quelque chose se produit : des effets de machine et non des métaphores."*¹

Deleuze/Guattari, *L'Anti-Œdipe*

The ongoing debate about the power of search engines² has recently been heated up by Google's plans to enter the stock market and Microsoft's alleged expansion into the search engine business. The excitement is not only due to the enormous commercial potential of both decisions but also to the perceived cultural significance of finding, weighting and filtering information. Even in notoriously conservative social science departments, the term "page rank", being easily relatable to well-established concepts like *gatekeeping* or *agenda setting*, has begun to acquire a meaning. From the more general perspective of cultural theory, the issue of search engines is the tip of an iceberg that leads into the larger field of the ever growing entanglement of computing with human affairs. What started out as number crunching in a military environment, has become ubiquitous: computers nowadays are more than talented calculators, more than boundless data storage facilities – they have become tools of creativity and communication, access points to virtual worlds and the defining media of what has been called "the Information Age". The search engine debate sheds light on what seems to be the next logical step in the history of computing: the attempt to tackle the complex and fuzzy realm of human semantics in a pragmatic application context, outside of the secluded microcosm of artificial intelligence research laboratories.

This article will outline an approach to conceptualizing – at what is still a rather early stage – the cultural significance of this fast growing effort to use computers to

¹ "Something is produced: effects of machines, not metaphors." Deleuze, Gilles / Guattari, Felix: *Capitalisme et Schizophrénie. L'Anti-Œdipe*. Paris: Les Editions de Minuit, 1972 p.7

² e.g. Gallagher, David F.: *Sites Become Dependent on Google*. The New York Times, 9.12.2002 (<http://www.nytimes.com/2002/12/09/technology/09NECO.html>), or for a more scientific account: Gerhart, Susan L.: *Do Web search engines suppress controversy?* First Monday 1/2004 (http://www.firstmonday.org/issues/issue9_1/gerhart/index.html)

process not only symbols, but also the meaning attached to them. The starting point for such an endeavor must be the popular concept of *network*.

1. Networks

The rise of computer connectivity and especially the Internet has catapulted the notion of network to the prime compartment of not only the cultural theory toolbox, but that of any science. Despite the dilution that is often adjunct to proliferation, the network model is one of the most promising concepts when discussing the complex and fluid relationship between culture and technology, permitting to seamlessly move from one level to the other. Manuel Castells goes as far as saying that "networks constitute the new social morphology of our societies" and that the networking logic, disseminated mainly through the collective embracing of information technology, "modifies the operation and outcomes in processes of production, experience, power, and culture".³

When looking at the organization of society, the clearly delineated structures of modernity, epitomized in social hierarchies and workflow pyramids are replaced by flexible and seemingly anarchic connections of nodes. The formerly well regulated streams of information, control and accountability give way to temporal and transversal relations between disparate elements. Following Lyotard's account of the "postmodern condition"⁴, various theorists⁵ have argued that the "grand narratives" (religions, political ideologies, Enlightenment) have lost their ability and legitimacy to prescribe consistent worldviews, and without the unifying rationale of clear canons, the status and authority of knowledge changes. Atomization, fragmentation and globalization have shattered the coherence of the nation state and in part replaced it with networks of dominance and contestation.

On the level of information technology, the classic distinction between producer and recipient is increasingly blurred and archetypal container institutions like the library,

³ Castells, Manuel: *The Information Age: Economy, Society and Culture. Volume 1: The Rise of the Network Society*. Malden MA: Blackwell, 2000 [orig.1996] p.500

⁴ Lyotard, Jean-François: *La condition postmoderne*. Paris: Les Editions de Minuit, 1979

⁵ For the most complete account, see Jameson, Fredric: *Postmodernism, or, The Cultural Logic of Late Capitalism. Post-Contemporary Interventions*. Durham, NC: Duke University Press, 1991

the book or the newspaper are complemented – if not replaced - by the flatness of the World Wide Web where everything is reduced to symbol and packet.

But against the hopes of the digital utopists of the eighties and nineties, the network logic neither abolishes control nor hierarchy; it only changes their configuration and temporal stability, rendering them elusive and adaptive. There is no "outside" of power, even if we need some sort of *microphysics* to trace its lines. Flatness without structure is nothing more than random noise and, as Hartmut Winkler points out, "hierarchies fulfill a semantic function and semantic systems are necessarily hierarchic"⁶. Meaning implies structure and in a network, hierarchical structure is not abolished but temporalized, liquefied. Meaning and orientation is no longer guaranteed by the edifice of state, religion and science but increasingly becomes something that has to be actively *produced* from one moment to the next. In a postmodern society, making sense is not a byproduct of living anymore, but a full time job.

When focusing on the technical expression of the network condition, the current predicament seems obvious: since the early days of the Internet, storage and transmission of information have been the main functions performed by the underlying technical infrastructure. With the sudden ease of stocking and sharing, companies, institutions and individuals began to pump vast amount of largely unstructured data into the channels – mainly the Web, but also Usenet and P2P. Private and public databases have become *content silos* and people have started to wonder how all this information is ever going to be useful given its amorphous condition. It took a moment to realize that "storage does not correlate with significance, nor volume with value"⁷ but today, the point is understood: information does not guarantee knowledge and meaning will not emerge just by putting everything into a huge database and waiting for something to happen. Making the shift from quantity to quality – from *noise* to *signal* – takes an active effort.

On the technical level, there are two non-exclusive directions from which the problem can be approached: the first possibility is to convert all existing and future information into semantically structured document formats using for example

⁶ "Man wird erkennen müssen, daß Hierarchien eine semantische Funktion erfüllen und daß semantische Systeme grundsätzlich hierarchisch sind." Winkler, Hartmut: *Docuverse. Zur Medientheorie der Computer*. Regensburg: Boer, 1997 p.180

⁷ Brown, John Seeley / Duguid, Paul: *The Social Life of Information*. Boston: Harvard Business School Press, 2000, p.XIII

Semantic Web standards; such a costly and onerous task will be done – realistically – only in part and very slowly. The second option is to write software that creates structure from analyzing the information content. This is what can be called "semantic computing".

2. Semantic Computing

I have chosen "semantic computing" – a term that is not quite established in computer science, but illustrates very well the point I am trying to make – as an umbrella concept for a plethora of technologies, which all try to do the same thing; the idea is to start from the very basis of what computers do – processing symbols – to reach the one plane that seems to necessarily elude the grasp of the machine: meaning created by human beings. The technologies I refer to come under different names and guises – they are called *data mining*, *software agents*, *search engine technology*, *knowledge extraction*, etc. and they make use of mostly established artificial intelligence (AI) algorithms that have finally found a practical use. Fast computers provide the necessary raw power and the Internet is the perfect data environment to play and experiment in. Semantic computing might just be another word for AI but it redirects attention from the abstract philosophical question of whether machines are or can be "intelligent" to the tangible level of task efficiency in a very concrete cultural context.

If established structures and hierarchies – both social and technical – are continually dissolving into networks, the established modes of information filtering, which range from physical access barriers⁸ to canons of knowledge, break up as well. With (mostly digitalized) information proliferating everywhere and little or no prescribed modes of understanding, we can either drown in the flood or develop strategies to recreate order in chaos; but not the type of exclusive, uniform order, that has lost its credibility, but a temporary, fluid kind of order, a way of setting things into perspective without eliminating alternative views. Referring to Paul Virilio, semantic computing could be described as a special type of *Vision Machine*⁹ – a technological apparatus that not only supplements or enhances human perception, but produces

⁸ The French National Library for example grants access to large parts of its stock only to graduate students and researchers. Blocking access is a very classic solution to the problem of information overflow.

⁹ Virilio, Paul: *La machine de vision*. Paris: Galilée, 1988

on its own an interpretation of the objects it analyzes; this "view" becomes in return an artifact of cultural significance.

As Lev Manovich points out, new media consist in general of two distinct layers – the computer layer and the cultural layer.¹⁰ Semantic computing basically tries to bridge those two dimensions in a rather specific way – by transposing the cultural layer of meaning into the domain of binary logic, transforming it into just another object to be processed. If culture and technology have already become largely indistinguishable, the practical application of AI in an everyday context is yet another step on the ladder.

To flesh out the concept of "semantic computing" with an example, I will make a short reference to a software prototype I have developed in the course of my master's study at Laboratoire Paragraphe. Framespace¹¹ is at first glance a rather simple Web-based outliner application, enhanced with some basic groupware features like the exchange of comments between users. Internet Resources, e.g. scientific articles, can be linked into the system and organized into a classic folder structure. On a second level, the system integrates a software agent that downloads the newly linked document, strips it of anything not deemed "content" and puts it into a database. At the inside of the system, an algorithm – using a statistical approach to AI – calculates what is supposed to be semantic closeness. Based on that data, framespace automatically provides links to semantically similar articles, both inside of the system as well as on the Web. Additionally, the documents in the local database are organized into topic clusters in order to provide another way of exploring the system's content in addition to the hierarchical folder view or plain full text search. What framespace tries to prove, is that it is possible and feasible to integrate currently existing semantic computing technologies into the framework of established types of applications, adding depth and functionality in the process. In the context of this article, which does not focus on the technical side of semantic computing, framespace can serve as an exemplary backdrop against which a clearer understanding of the issue can emerge.

¹⁰ Manovich, Lev: *The Language of New Media*. Cambridge MA, London: MIT Press, 2001 p.46

¹¹ The prototype is accessible on <http://fs.01100010.com>

Although my example uses text as prime material, semantic computing creates what physicist Heinz Pagels calls a "state space"¹², a mathematical representation of one or several dimensions of structural analysis that can be performed on any kind of information that is not completely random noise. Although often fuzzy and irrational, there is order in what people do, order in natural language and order in meaning; what AI does is to elaborate and process a model of that order. Everything that comes afterwards, the semantic connections and networks, images, cartographies, maps, dialogic narratives, and whatever other way we chose to create our interfaces, is based on that model.

But the realm of meaning is not only extremely complex, but also saturated with all kinds of human motivations; and while there surely are some parts of human semantics that can be processed by a machine (sufficiently well to make practical applications not only possible but highly probable), others may never be brought into the limited domain of symbolic logic. In order to get an understanding of the potential of semantic computing and gauge its possible cultural importance, we have to develop a concept of "what computers can do" that translates some of the technical limitations into the language of cultural theory.

3. A theory of action

One of McLuhan's main points was to look at media not as tools for the transport of messages, but as *active metaphors*¹³ that give a specific form to everything that passes through and the relations that are created as a result. As translators of experience media are the main factors in shaping the fate of societies. "Active" means that, in Aristotelian terms, McLuhan attributed media the power to *cause*. They are not just vessels but possess some kind of *agency*, in part through their material nature (*causa materialis*), but most of all through their specific form (*causa formalis*).

I would argue that the computer adds, in this perspective, a third layer of causation, the *causa efficientis*, which Aristotle reserved for the (normally human) creator of *movement*. Semantic computing, especially when equipped with some degree of

¹² Pagels, Heinz: *The Dreams of Reason*. New York: Simon & Schuster, 1989

¹³ "All media are active metaphors in their power to translate experience into new forms." McLuhan, Marshall: *Understanding Media. The Extensions of Man*. London: Routledge, 1995 [orig. 1964] p.57

autonomy, exceeds the scope of an active metaphor; there is a very pragmatic "machine effect" to be considered that goes beyond the aesthetic dimension of the form, however important. There is effective *behavior* implied in the processing of meaning and this calls for no less than a theory of action.

In *The Shape of Actions*¹⁴, Harry Collins and Martin Kusch develop a morphological theory of action that classifies intentional behavior not from a merely logical point of view (as it is often done), but rather according to how it is embedded in and determined by the larger context of cultural meaning. Their basic distinction is between *mimeomorphic actions*, where regularity (and thus the sameness of two actions) could be seen by anybody, and *polimorphic actions*, where only somebody with intrinsic knowledge of the cultural context can perceive order and repetition. In the case of the first type, we would be satisfied if the action was executed every single time in the same fashion, like a golf swing, the elimination of spam from a mailbox or the clustering of scientific articles; in the case of the second type however, variability is essential – if we used the exact same words every time we wrote a love letter to our dear one, the effect would probably be perturbation rather than romance. One of the strong points of this distinction is that it does not necessarily work along the lines of simple/difficult – there are highly difficult mimeomorphic tasks like regulating a nuclear power plant (a job that no human could do alone) and rather simple polimorphic actions like voting. It is much rather the degree of enculturation necessary to understand and perform an action that the difference in types is based on. To recognize and appreciate a polimorphic action, we have to – again in Aristotelian terms – attribute a *causa finalis*, a purpose or meaning that is profoundly implicated in the moral environment of a culture.

This is the point where we can draw the line between man and machine. Even the most complex program is not able to create the cultural commitment at work in human actions. Machines can execute even very complex mimeomorphic actions like the sorting of articles through statistical interference that would take humans an eternity to process. But if we state that the *efficient cause*, agency, has been transferred to programs, the *final cause* has not.

¹⁴ Collins, Harry / Kusch, Martin: *The Shape of Actions. What Humans and Machines Can Do*. Cambridge MA, London: MIT Press, 1998

The advantage of the concept of Collins and Kusch is that although there is a barrier implied for what "computers can do", this barrier is neither stable nor does it uniquely depend on technological progress. On the one side, we are able to better and better simulate polymorphic actions through immensely complex series of mimeomorphic actions, basically fooling the user in the way of Weizenbaum's *Eliza*¹⁵ where it is the user's eagerness to *believe* that fixes the obvious holes; on the other side, the more machine-like and repetitive our society becomes, the easier it is to simulate and delegate. Whenever we are indifferent to *how* something is done, it may be mechanized – if the journey is no longer the reward, we can go by car. The tasks computers are finally able to perform thus depend essentially on both technology *and* culture.

What is interesting for the next step in my argumentation is that Collins and Kusch situate every action in the larger context of an *action tree* that spans from the tiniest micro-action (normally mimeomorphic) to the largest level that is always completely immersed in culture and therefore polymorphic. In that view, every cultural practice consists of a specific combination of mimeomorphic and polymorphic actions. When we begin to replace parts of an action tree with machine behavior, a practice becomes hybrid. In the case of framespace for example, there are some low level tasks like site surveillance, but also more complex parts like the interpretation of semantic similarity that are in part delegated to an algorithm. The practice of searching and organizing scientific articles on the Internet has of course always depended on tools, but with the integration of AI, new parts of the action tree enter the scope of simulation. The rise of semantic computing, as a response to the problem of information overflow and disorientation in a network condition, implies that in the equilibrium between human and machine behavior is far from stable and that we will see a progressive increase in the part played by complex algorithms. Our culture on the whole thus evolves to be increasingly hybrid, in order to master the challenge of complexity it has itself created.

¹⁵ Weizenbaum, Joseph: *ELIZA - A Computer Program for the Study of Natural Language Communication between Man and Machine*. Communications of the ACM Volume 9, Number 1, 1966 p.35-36

4. Hybridity

The notion of hybridity is, of course, not a new one. The moment one of our ancestors grabbed a stone to smash that hard to open nut, we entered what is basically a hybrid condition. The novelty in the case of semantic computing is that we do not delegate a physical property like hardness to an artifact (stone) – nor muscle power (engine) or the cognitive task of perception (photography). This time, the tool performs interpretation, the "cerebral" task of processing meaning. This does not mean that this interpretation or its results are the exact simulation of the way a human being performs. At least at the moment we are using complex mathematical and logical tricks to produce a semantic analysis whose value is judged in the specific context of its application. There seems to be enough order and regularity in many parts of human semantics to make a *machine reading* of information quite often an interesting addition to the human perspective. Although the idea of a software artifact processing meaning sounds spooky to some and improbable to others, the results seem to be satisfactory enough to make semantic computing one of the fastest growing fields in the area of informatics.

In absence of functional equivalence, there is no need to subscribe, on the level of theory, to the complete symmetry between human actors and technology as proposed by the *actor-network theory* developed by Bruno Latour¹⁶ and others. Hybridity as a concept does not imply that we have to flatten all differences and dissolve all distinctions. The morphology of actions elaborated by Collins and Kusch already points into the direction of a gradual way of understanding the roles that both humans and machines (can) perform in the complex networks of hybrid cultural practice. This account is never final because the network is constantly evolving. For the moment, we need a sensible understanding of the space of possibility in which semantic computing operates in order to assess the possibilities for cultural participation and impact. The logic of symmetry and replacement somewhat distracts from noting that the effective potential of hybrid practices lies in the complementarity of skill: computers can process enormous amounts of information in very short time, but even the most advanced semantic algorithms not even closely match the ability of a human being to *make sense*. Although software is slowly

¹⁶ e.g. Bruno Latour: *Pandora's Hope. Essays on the Reality of Science Studies*. Cambridge MA: Harvard University Press, 1999

creeping up the action tree, it is the increasingly dense amalgamation of the polymorphic abilities of human beings with the mimeomorphic prowess of machines, by which we profoundly change the way we produce and experience the information space that continues to grow around us.

The hybrid condition of symbiosis between culture and information technology can be characterized on (at least) two different levels. The first dimension is located on the plane of *causa formalis*, of form, metaphor, concept, representation. Through information filtering, structuring and processing, we insert yet another layer of *mediation* between ourselves and the world. But instead of the fixed set of transformations of experience that characterizes classic media, the *active metaphors* assembled through semantic analysis imply a fluidity and multiplicity of form. Aesthetic representation will adapt to both the internal context of the semantic relations found in the information stream and the external environment it is embedded in. The mathematical state space elaborated by AI techniques is made of pattern and form, but it is pre-aesthetic. How to transform it into a visual (or other) representation is a matter of interface design and while still in the early stages, the space of possibilities seems vast. Remarkably, *medium*, or the form of experience, becomes in a way a parameter of *message* – or rather: mediation becomes a fluid combination of form and content. The computer translates seamlessly from lists to maps, from *database* to *narrative*, and back. It is a *vision machine* that will gladly execute whatever hallucinating interface we can come up with. Imagination and representation are becoming more hybrid than ever.

The second dimension – *delegation* – concerns the level of *causa efficientis*, of movement, action and agency. Blocking Spam, sorting and retrieving articles or making a financial transaction *in our stead* goes well beyond the domain of aesthetic representation. Software Agents, which are part of the wider field of semantic computing, use AI not only to produce an interpretation of some sample of information, but translate their analysis into action. The degree of autonomy of modern information technology is constantly growing, taking over the actions and practices where the *how it is done* is of secondary interest to us and no cultural commitment is asked for. We do not care how the annoying Spam leaves our Inbox, we just want it out. Hybridity in the sense of delegation of action thus implies not only the availability of a technology, but also the fitting value system for its effective integration; it is, after all, an intervention into how a society *works*.

Semantic computing provides a fluid way of mediation and the possibility of delegating entirely new task areas. Any possible impact on society will be in alignment with those two axes. But already today, semantic computing reflects and shines light on not only the ongoing integration of technology into the fabric of industrialized societies, but also the larger cultural transformations that center around the notion of network, where perspective is temporal and actions are part of hybrid chains.

5. Folding Culture

The practical value in specific application contexts and the promise of orientation and perspective in the desert of data entail the practical integration of semantic computing into the way we produce, distribute and make sense of information. The production of meaning, which could be described as the addition of a *cultural layer* to the vast amounts of information produced every day, is thus becoming an increasingly hybrid practice where the machine is not only medium or tool, but a seemingly active partner. This development can be seen as another step in the realization of what Roy Ascott calls "cyberception"¹⁷, human beings becoming computer-mediated and computer-enhanced.

But both on the level of mediation and delegation we should not think about the concept of a hybridity as the marriage of culture with some external technological force that sprung from the mind of an invisible inventor. Semantic computing (and perhaps technology on the whole) can be seen as *a folding of culture on itself* or, as Manuel Castells calls it, "the action of knowledge upon knowledge"¹⁸. This becomes especially clear when looking at the connectionist approach to AI: neural nets suck in semantic order, they learn, and when applied to a task like text sorting, they make an educated guess based on their internal representation. Like with *origami*, there is only a white sheet at the beginning, but after it has been processed by means of an exact technique, an intelligible form appears. Every sheet of paper contains nothing more than flatness, but also the potential for infinity of forms.

¹⁷ Ascott, Roy: *The Architecture of Cyberception*. Essay presented at ISEA '94, The 5th International Symposium on Electronic Art, Helsinki (e.g. <http://www.retortmag.com/mindcandy/essay03.htm>)

¹⁸ Castells op. cit. p.17

In the postmodern condition, the classic universal prescriptions of how to encounter and understand the world do not work any more and we seem to be unable or unwilling to revive the pyramids and hierarchies that structured society for so long; we refuse to be oriented in central perspective and religion, ideology or science are no longer able to provide cognitive coherence. It is in part through technology that we try to produce meaning, folding one network onto the other or a network onto itself (which is the same thing, depending on the level of zoom), creating perspective through the temporal intersection of different parts of the same clustered space - *data making sense of other data*¹⁹. With all certainties gone, says Vilém Flusser, the only thing left is the "attempt to codify the world in such a way that it can be cybernetically described in its unexplained complexity in order to acquire a meaning"²⁰. It is with help of the machine that we make sense.

6. Conclusion

Cultural theory has adopted for some time now the concept of an identity that is essentially decentered²¹ – in opposition to the clearly delineated subject that Descartes so aptly meditated upon and that still dominates the popular imagination. In this view, much inspired by the work of Michel Foucault, identity is something that is constantly being produced and shaped in the mobile space of discourse; a point of intersection. This production has already been set in relation to technology in the works of different authors²² and through influencing the way we relate to information at large, semantic computing will only enhance the already diffuse dualism between our tools and our bodies. The next stage might even be to think of the individual as a network of agents, not only in the sense that we play different roles at different times, but literally as a dense combination of human and machine agency, connected by mutual and directed adaptation. We should however remind

¹⁹ Johnson, Steven: *Interface Culture. How New Technology Transforms the Way We Create and Communicate*. New York: Basic Books, 1997 p.32

²⁰ "Im Grunde handelt es sich um den Versuch, die Welt so zu kodifizieren, daß sie kybernetisch in ihrer unerklärten Komplexität beschrieben werden kann und so einen Sinn erhält." (Kommunikologie 155)

²¹ e.g. Turkle, Sherry: *Life on the Screen*. New York: Touchstone Books, 1995.

²² e.g. Haraway, Donna J.: *A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century*. In: Haraway, Donna J.: *Simians, Cyborgs and Women. The Reinvention of Nature*. New York: Routledge, 1991

ourselves that – following the last works²³ of Foucault – the subject is not only the result of a complex production process, but at the same time a point of origin, disseminated and disseminating at the same time. We shape culture and are culture, shaped.

In this spirit, we can go back to where this article started out: the debate about page ranking and the power of search engines has created a certain sensibility to the question of cultural significance of semantic technologies. I have tried to show that behind this very visible problem lays the larger field of semantic computing that forces us to recheck some of our intellectual tools and concepts. If folding the network onto itself through mediation and delegation is a new way of acting and making sense in a world that seems to have lost its center, control of the folding techniques is a major source of power. Uniquely conceptualizing this form of control in terms of censorship and domination does not get us very far, because what we need to understand is its subtlety: "This power has neither the form of law, nor the effects of prohibition."²⁴ As Foucault pointed out, power rarely realizes its full potential when working directly on the surface. It is through setting the context for the production of meaning, the shaping of *what can be said and what can be seen*, that it is most effective. Semantic computing will probably not create new regimes of oppression, but it already is associated with strategies of control.²⁵ No matter how autonomous a software agent might act however, we should not forget that semantic algorithms not only participate in the production of meaning; they are first of all the product of a meaningful culture. While *emergence* may be a powerful feature of complex systems like neural nets, there is no magic at work here. Behind the concept of a hybrid culture remains the production of technology as a cultural practice. If meaning becomes in part *machine effect*, the cultural and political implications of the design process cannot be overestimated.

The true challenge in semantic computing is thus not the technological problem, which is well-financed and coming along just fine, but the question whether we will be able to understand the cultural dimension of such "cerebral" technology and create environments that permit technical development in an open and democratic fashion. While the importance of technology is constantly growing, while larger parts

²³ Foucault, Michel: *L'histoire de la sexualité. 3 Tomes*. Paris: Gallimard, 1976-1984

²⁴ "Ce pouvoir justement n'a ni la forme de la loi ni les effets de l'interdit." Foucault, Michel: *L'histoire de la sexualité. Tome I: La volonté de savoir*. Paris: Gallimard, 1976 p.64

²⁵ Deleuze, Gilles: *Post-scriptum sur les sociétés de contrôle*. In: Deleuze, Gilles: *Pourparlers*. Paris: Éditions de minuit, 1990 p.240-247

of the action tree get mediated by and delegated to machines, transparency of software development decreases and the public's ability for critique is reduced. If software is eligible for protection by patent laws, and it seems like it will be just about everywhere, it means (with an eye on semantic computing) that specific interpretations of information, specific ways of analyzing and acting upon data, *specific ways of looking at and doing things* will become the property of companies that answer not to the public but solely to their shareholders.

How will we be able to tap the enormous artistic and intellectual potential of semantic algorithms when artists and developers have to constantly be afraid of violating somebody's patent property? As Donna Haraway points out, technophobia is not a valid answer to questions and problems installed by our hybrid condition. The task of both researchers and artist today is to defend the opportunity to produce meaning through technology, in an open environment where creativity and critique are not a liability.

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