Dispersed Selves

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Abstract

The human organism is a well-located entity, bounded by the skin. But the human mind and self do not respect the bounds of skin and skull, and even our sense of location proves to be a leaky and malleable moment-by-moment construct.

0. Beyond the Skin

The skin is the largest human organ. And it is indeed a kind of organ, not just a neat plasti-seal for keeping your innards where they belong. This critical metabolic boundary, however, need not coincide with our sense of physical presence, it need not determine our sense of self, and it need not enclose all the machinery of mind. In all these realms dispersal is, increasingly, an option.

1. Touched By Your Presence

“Distance,” as my philosopher-friend Brian Cantwell-Smith once commented, “is what there is no action at.” Our sense of our own location (like our sense of self and of what we know- see below) is the fruit of an ongoing project. The sense of location is a mental construct, one formed by our implicit awareness of our current set of potentials for embodied action, engagement and intervention.

Consider work in so-called 'telepresence': a term introduced into the literature in 1980 by the computer scientist and A.I. (Artificial Intelligence) pioneer Marvin Minsky [1]. Full telepresence, insofar as it is achievable, would seem to require a high-bandwidth multi-sensory bath of information with stand-in local sensory stimulation: in effect, the full Virtual Reality body-suit, with feed-out and feedback connections for sight, sound, hearing, touch, and smell, as well as heat and resistance sensing . Most crucially, the user needs the ability not just to passively perceive but to *act upon* the distant environment, and to command the distant sensors to scan intelligently around the scene, and so on. For a sense of true distal presence arises only as a result of close, ongoing real-time correlations between neural commands, motor actions and (usually multi-sensory, e.g. combining vision and touch) inputs. The intimate web of closely correlated signals and responses necessary for such rarified reinvention of the body is, however, quite fragile and easily disrupted. The most important kind of disruption is temporal: if there is a noticeable time-lag between issuing the command, and receiving the sensory feedback, or (worse still) if the time-lag is variable (due to the traffic on phone lines and so

on), the illusion is shattered. This is what often happens, however, as applications grow in complexity, and distance increases. Insofar as the timing issues can be dealt with (for the range of options for addressing this issue, see [2]), however, the human sense of presence reveals itself as highly malleable. Blake Hannaford, a Professor of Electrical Engineering at the University of Washington in Seattle, sums it up like this;

> "As robots and advanced user interfaces are connected to the Internet, we raise the possibility of the Internet connecting distant points in space with virtual, visual, aural and physical links. If the resolution of sensors and activators is high enough, and the bandwidth and latency adequate, we create “knots” or “ports” in space through which we can see, hear, touch and manipulate distant objects or people as though they were present ….What this will mean for human…sense of presence is just beginning to be studied." (quote from [2] p.274)

2. New Knots in Space

The transformative potential of the technologies of telepresence is enormous. But the precise *shape* of these imagined ‘knots in space’ is still hard to determine. For we should not simply assume that the most effective use of these technologies lies in the attempt to re-create, in detail, the *same kinds* of personal contact and exchange with which we are currently familiar. In fact, if we expect these technologies to deliver, at a distance, the very same kinds of sensory input and interactive potential that we encounter in “normal” daily life, they will almost certainly (courtesy in part of the temporal and bandwidth hitches mentioned above) continue to disappoint. What if we instead allowed them to define *brand new niches for genuine action and intervention*?

The idea would be to allow the technologies to provide for the kinds of interactions and interventions for which they are best suited, rather than to try to force them to (badly) replicate our original forms of action and experience. After all, our single most fantastically successful piece of transparent cognitive technology, written language, is not simply a poor cousin of face-to-face vocal exchange. Instead, it provides a new medium for both the exchange of ideas and (more importantly) for the active construction of thoughts. We celebrate it for its special virtues, not as an impersonal, low-bandwidth, less rapidly responsive stand-in for face-to-face exchange.

This point is nicely made in [3], a short piece by two Bellcore researchers, Jim Hollan and Scott Stormetta. The piece is called “Beyond Being There” and kicks off with an analogy. A human with a broken leg may use a crutch. But as soon as she is well, the crutch is abandoned. Shoes, however, (running shoes especially) enhance performance even while we are well. Too much telecommunications research, they argue, is geared to building crutches rather than shoes. Both are tools. And we may become as accustomed to the crutches as the shoes. But crutches are designed to remedy a perceived defect, and shoes to provide new functionality. Maybe new technologies should aspire to the latter. As they put it;

> [much] telecommunications research seems to work under the implicit assumption that there is a natural and perfect state – *being there* – and that our state is in some sense broken when we are not physically proximate….In our view, there are a number of problems with this approach. Not only does it orient us towards the construction of crutch-like telecommunications tools but it also implicitly commits us to a general research direction of attempting to imitate one medium of communication with another…
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> (from [3] p.120)

Consider e-mail. E-mail is often used even when the recipient is sitting in the office next door. I do this all the time. My neighbor is a university colleague and for certain delicate, slow conversations, we much prefer a slow, asynchronous e-mail exchange. But e-mail is *nothing like* face-to-face interaction. And therein lies its virtues. It provides *complementary functionality*, allowing people informally and rapidly to interact, while preserving an inspectable and re-visitable trace. It does this without requiring us both to be free at the same time. Cell 'phone text messaging has related virtues. The tools that really take off, Hollan and Stormetta thus argue, are those that "people prefer to use [for certain purposes] even when they have the option of interacting in physical proximity…: tools that go *beyond being there*." ([3] p.125).

Research into Virtual Reality (VR) has been – at times – a casualty of the crutches-not-shoes mind-set. So too has research into electronically mediated sexual contact, where the aptly-named program of 'tele-dildonics' aims to re-create standard sexual modalities at a distance, rather than (more imaginatively) using electronic means to expand the range and repertoire of touch and exchange. We can stick to VR. Large amounts of work in VR are hostage to three distinct problems. The first is that perception is not passive. As we mentioned earlier, it will not be enough to present the eyes with a fully-realized, rich 3D scene if we cannot also in some way move and act within the scene itself. The second is that even if you add moving and acting, the day of full, multi-sensory, high-bandwidth, real-time, two-way interaction via telepresence remains distant. The third, and most important, is that even full telepresence, thus achieved, might be more of a crutch than a shoe. It might effectively "stretch out the nerves", as Daniel Dennett [4] once put it, so that we experience ourselves at a new location. But it would not expand the *types* of engagement we enter into, nor fundamentally alter our own experience of being in the world.

The greatest potential of the technologies of telepresence, VR, and telerobotics may thus be transformative rather than replicative. It is not just a matter of (in effect) providing an electronic, information-based subway system so that we can move rapidly from place to place, avoiding the traffic and pollution! Rather, it is about expanding and reinventing our sense of body and action.

A really simple example [5] is the LumiTouch- a prototype picture frame. When one user touches the frame, the frame of a connected-but- distant picture lights up. If the distant partner sees this, and picks up her frame and squeezes, a feedback display area lights up on the originating frame, its color and intensity varying according to the force, location and duration of the distal squeeze. Over time, two distant participants can learn to exchange a kind of private emotional language of touch using the device.

Back in 1993, participants in California and New York experimented by placing their hands inside a "datamitt" (informally known as the Data Dentata) containing a very coarse array of touch sensors and actuators. Using the mitt, a hand squeeze could be executed in New York and felt in California, and vice versa. In this simple experiment, described in [6], people reported a strong sense of personal contact despite the very low bandwidth of the connection. Another example [7] from the MIT Tangible Media Group is 'inTouch'. This system comprises two distantly coupled triple rollers mounted on a base. Sensors monitor the forces applied to each roller, transmit the data, and the same forces are locally recreated on the distant roller. Users feel as if they are touching a single object, each one applying their own forces and motions and simultaneously feeling the forces and motions imparted by the other.

For something even more exploratory, consider Canny and Paulos' [8] research on computer-mediated interactions that deploy real physical robots acting as personal representatives. The robots are called ProPs (Personal Roving Presence devices). Your ProP would be unique to you (rather like an avatar in virtual reality). But it would not look like you, so much as like a kind of mobile cubist statue, an unruly assembly of hands and eyes and display screen. Each ProP would provide gaze-control, body-control, posture and dialogue. Canny and Paulos' hope is that over time, the human and her ProP become so well-coupled that we learn to use the rather restricted range of ProP motions and displays to convey rich and subtle messages, much as skilled text-messagers use that low-bandwidth resource to convey subtle emotional messages. Part of the idea is thus that a few relatively simple kinds of tele-interaction might yield a more robust sense of presence than a failed attempt to re-create the full gamut of human 'intercorporeality'. The avowed goal of Canny and Paulos' research is to produce "not a human and robot hybrid but a new kind of embodied person".

The larger lesson, then, is that embodiment is everywhere *essential but negotiable*. Human persons are never disembodied intelligences, and work in telepresence, virtual reality, and telerobotics, far from bolstering any (mistaken) vision of detached, bodiless intelligence, simply underlines the crucial importance of touch, motion, and intervention. It is the ongoing two-way flow of influence between brain, body and world that matters, and on the basis of which we construct (and constantly re-reconstruct) our sense of self, agency, and presence. The biological skin-bag has no special significance here. It is the flow that counts.

3. Our Worlds, Ourselves: A Near-Future Diary (see Note 1)

Day 1.

I live and work in a world animated by invisible spirits. Or at least, that's certainly how it seems. My house, my automobile, and my office are all constantly aware of my needs and movements. My 'fridge knows when I am running out of milk (and it orders more). My car knows what the weather is like and begins to de-ice itself as soon as I fill the dedicated car-beverage container with hot coffee. My office knows when (and where) I have parked my car, and alerts my clients (and coffee-maker) accordingly. Even the clothes I am wearing are part of this web of intercommunicating support systems. My shirt monitors my heart rate, temperature, and mood, and talks to the room and car when things look dicey.

Day 2.

I really needed to spend time with Karen today. So in the morning, after a long, sultry chat, I tele-manipulated her arm and hand (she is still away in California), and she tele-manipulated mine. It was all a bit jerky, but the sensation of being touched by her is worth the effort. But this technology still has a way to go. (I recently read, however, of a pair of dancers who are really taking this stuff somewhere. While they dance, each one controls half of the others body. It must take a lot of practice, but the feeling sounds strange and intimate.)

Day 3.

Seems I have a problem. One of my software agents (my Mambo Chicken Bot, which has been learning about, and contributing to, my taste for the weird and exotic for three and a half decades, since coming on-line when I was five) is temporarily disabled. In fact, it has been out of action for a few months. I only found out today when a diagnostic web-surfing Bot emailed me the bad news. But

I had been feeling unusually flat and uninspired for a while, so I should have guessed that something was wrong somewhere in my distributed cognitive web. The Mam-Bot's occasional unexpected inputs (I call them my inspirations) really do help. Well, at least it was only the Mam-Bot and not something more central. What must it be like to wake up one morning and find your most important Bots compromised by some horrible accident!

Day 4.

I was animating the car (it's one of those new models that weaves the driver right into the road management system) when my neuro-phone signaled me. I suddenly remembered the old extrinsic mobile 'phones of my mother and father: chunks of metal and plastic that you had to actually carry around! The neuro-phone is interfaced directly to my cochlear nerve, and the microphone in my jaw is sensitive enough to allow me to merely mime the words if I am in a public place. Lately, I forget that the ability to 'phone other people is actually a technological aspect of my being at all – it just seems like something I can do, like shouting someone's name.

5. Soft Selves

Do you feel an identity crisis looming? Where, in this increasingly dense -yet-dispersed bio-technological matrix shall we locate our (human?) minds and selves? The question can quickly confound, since the notions of mind, self and identity are notoriously elusive.

The most basic notion of the self is perhaps simply that plastic, multiply negotiable, sense we have of our own physical presence in the world. The distinctively human self has ,however, another dimension. For I think of myself not just as a physical presence, but as a kind of *mental* presence. I think of myself, that is, in terms of a certain set of capacities, ongoing goals, projects and commitments. These goals and projects are not static. But nor are they arbitrarily changeable. I recognize *myself*, over my lifetime, in part by keeping track of this flow of capacities, projects and commitments. Some writers (see e.g. [9]) speak here of the *narrative* self – the self identified by a story told both to ourselves and others, and told both by ourselves and others.

This narrative self may be a bio-technological hybrid in a different – perhaps even a deeper - fashion. For the narrative self is indeed a self built out of our own, and others', conceptions of our capacities, possibilities and potentials. Can we really suppose that it would make no difference, to the "I" thus identified, to find itself moving, thinking and acting in a more highly bio-technologically dispersed world? In a world where dedicated software agents constantly search the web for items of special interest and for new opportunities to carry forward the projects dearest to the heart? In a world where the capacity to use certain complex machines and software packages is as fluent and direct as the capacity to move my own biological body?

The selves we construct reflect (and always have reflected) the specific patterns of opportunity that our cultural, physical and technological environments provide. Accustomed to the (now automatic and unreflective) use of, say, a retinal display that allows me to invisibly retrieve information from a plug-in or courtesy of a wireless accessible database, it may seem less and less clear where what "I" know stops and what "it" (the plug-in) makes available starts. Rather than remaining a mere tool, the device seems poised to act as a genuine cognitive prosthetic. Imagine that over a period of use you become so accustomed to this pattern of easy, on-demand access that the plug-in becomes automatically, unthinkingly deployed, and that you usually trust what it delivers. As a result, perhaps you start to behave, and subsequently to feel, as if you simply *know* certain classes of fact that the device

makes constantly available (just as you might already feel, watch securely on wrist, that you *know the time*). Would you be wrong to feel that? The answer is by no means cut and dried. True, your knowing these things depends on the proper operation of the plug-in. But your knowing other things depends, equally, upon the proper operation of parts of your brain. And in each case, damage and malfunction is always a possibility. True, you need to retrieve the information before it is present to your conscious awareness. But knowledge stored in long-term biological memory is in the much the same boat, until some kind of retrieval process poises it for the control of verbal report and intentional action (for a longer and more philosophically nuanced version of this much-compressed argument, see [10]).

What is true of this toy example is becoming more generally true, I suggest, of the contemporary human situation. New social networking sites, new applications for those sites, new modes of collaborative filtering for goods and services, new kinds of search engines, new storage devices and new interfaces (this list barely scratches the surface) are emerging daily in a kind of Cambrian explosion of 'mind tools' [11] [12]. What we, following Dennett, may ultimately need to *reject*, is the seductive idea that all our various (neural and non-neural) mind- tools need a kind of stable, detached (very small?) inner user. Instead, we should consider the possibility [13] [14] that it is just *tools all the way* down. Different neural circuits provide different capacities, and contribute in different ways to our sense of self, of where we are, of what we can do, and to decision-making and choice. External, non-biological elements provide still further capacities, and contribute in additional ways to our sense of who we are, where we are, what we can do, and to decision-making and choice. But no single tool amongst this complex kit is intrinsically thoughtful, ultimately in full control, or plausibly identified as *the* ‘seat of the self’.

Perhaps we (we human individuals) just *are* these shifting coalitions of tools. Perhaps we are "soft-selves", continuously open to change and driven to leak through the confines of skin and skull, annexing more and more non-biological elements as aspects of the machinery of mind.

Where do you stop and where does the world around you begin? Skin may not be the answer.

* This contribution gathers together material originally dispersed within my book *Natural-Born Cyborgs: Minds, Technologies and the Future of Human Intelligence* (Oxford University Press, 2003). Thanks to the publishers for permission to reprint this material here.

Notes

1. The diary entries are mostly based on ideas from two now-classic sources: Mark Weiser " The Computer for the 21st Century" *Scientific American*, September 1991, and Donald Norman *The Invisible Computer* (MIT Press, Cambridge, MA 1999). The linked dancers are imagined by the performance artist Stelarc (see his website at stelarc.va.com.au)

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