Resisting the Seamless Interface
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In this paper we examine the quest for seamless computer interaction from the point of view of cultural theory, in so far as this study draws on Freud and his critics. The paper adopts Ricoeur’s critical stance, examining the roles of metaphor, repetition, resistance and a time-based perturbation, as means of challenging the imperative towards the seamless interface. We also draw on our experience in teaching and creating interactive digital media works.

Keywords. HCI, seamless interaction, tangible computing, time-based media, metaphor, Freud
1. Introduction

The promise for seamless integration drives much of the research into interfacing digital technologies, environments and users. On the subject of virtual environments, Kalawsky observes:

At their most complex, they promise a seamless interface between real and synthesised environments. [1, p.128]

According to Diegel et al., networked communications (e.g., Bluetooth) and user tracking provide the opportunity for transparent interaction.

The key to seamless machine integration is for the machine to know who the user is, where the user is, and what the user’s spoken or unspoken needs may be. [2, p.168]

Even critical commentary on the implications of new computer media presupposes a smoothing between the computer and environment:

This generation of computers is so well integrated with the environment that it will be difficult to distinguish between the two, which represents a profound transformation of everyday life. [3, p.43]

The development of tangible computing provides a clear indication of a tendency towards techno-human environments that are integrated, seamless and smooth.

Tangible computing ... attempts to exploit our physical and spatial skills and to extend interaction into arenas where these skills can be brought to bear for smoother and more natural forms of interaction and expression, … it sets out to unify computational experience and physical experience, … It attempts to unify the physical and electronic worlds to create a blend which is more closely matched to our daily experience and abilities. [4, p.189-190]

User-centered computing suggests transparency, ubiquity and an appreciation of the environment in which the user works.

As computing elements become more wireless, wearable, mobile, and create seamless information surrounds, new frontiers for human interaction are revealed. [5, p.51]

The “tangible” approach to HCI (human-computer interaction) is laudably embodied, human-centered, and acknowledges the social dimension of user expectations, of software design, and the contingent nature of systems research and design. The approach is an effective foil against rule-based, overly empirical and abstract modes of HCI and CAD (computer-aided design) research, but the approach is not immune from criticism and improvement. The quest for the smooth is ubiquitous in human affairs, contemporary reflections on science [6], and embraces notions of unity.
completeness and wholeness, about which Freud [7] and the philosophical tradition have much to say [8].

The discourse of smooth and seamless interaction also enjoys metaphorical extension to the realm of smooth forms (Figure 1). Characterised by smooth surfaces, metaphors of organic growth, responsive and integrated surfaces, the early digital work of architect Greg Lynn [9] [10], represents an exercise in spatial averaging. The articulation of the smooth is in fact one of reductive resolution as the angle is replaced by curvature, difference is read as a state within a process of continual mutation, and the human, technological and architectural emerge as states in a seamless, integrated environment. In the praise of the sphere, Lynn remarks that

as a blob, it is capable of fluid and continuous differentiation based on interactions with neighboring forces with which it can be either inflected or fused. [10, p.31]

The language is of continuity, flow, viscosity, and a celebration of the spline curve. The notion of parametric architecture [11] – a responsive architecture that draws on the possibility of interpreting incoming data (contextual parameters) – commits the designer further into a process of polite integration. The designer negotiates the type variance attributed to each interactive parameter, the most likely result being an interpolated series of deformations and mutations, which intimate distress but commonly result in variations on the theme of a kind of “blob architecture” [12].
In contrast to this ambition towards the smooth, there are numerous examples of tools and technologies the use of which seems to rely on the obviousness of the seam, a conspicuous and distessed relationship between the performer and instrument (Figure 2). Tools, technologies and apparatuses (analogue) used in painting, sculpting and music performances are often uncompromising when it comes to a potential merge with the human. A violin or cello can be likened more to an instrument for discipline, than a harmonious continuation with human agency. There seems to be little impetus to develop a violin that blends ergonomically with the player, independently of a digital frame. Certain tools, like musical instruments, are characterised by a resistance to the smooth interface.

Validating a research project based on its intention to fuse the human senses, in all their sophistication and complexity, seems to be amplified in the digital domain. The state of the digital computer is grounded in incremental development – continuous, compatible, integrated, development. The smooth and the seamless are ultimately made possible by a system which developed from the discrete to the continuous. The smooth has also become a way of demonstrating computational power, speed and sophistication [13], and productivity [14]. It seems that the smooth is well served by technological advances. What of the seam and the disconnected?
2. A psychoanalysis of the smooth

Much HCI research draws on empirical psychology and cognitive science. Contrary to this tradition, cultural theory draws substantially on Freudian discourse, which advances insights into our propensity towards the smooth. There are numerous reasons for Freud's popularity in cultural and literary studies, not least is the appeal by Freud and his successors and critics to the mythopoetic tradition (eg the Oedipus myth), discourse, and narrative. The antipathy within various fields of psychology to Freud is another matter, and its investigation would perhaps help explain something of the modest reception accorded to literary theory within HCI and CAD research.

How can an appeal to Freud and cultural theory inform this issue of the seamless versus the resistant interface? We will bypass the obvious psychological connection between the smooth, and the issues that collect around the mother and child relationship [15]. More provocatively, Freudian scholarship also highlights the relationship between the analyst (therapist) and the analysand (patient). There are at least two models of this relationship. Freud as classically understood, or arguably as interpreted by the "revisionists" [16], seeks integration of the human psyche. (This reading resonates with the quest to unify machines with humans, merge the digital with the organic, and promote seamless interaction.) According to this integrative view of psychology, the factious nature of human beings and their tortured relationship within the environment is in need of repair. We deal with certain traumas, explicable in terms of the fractured relationship between mother/father and child, by repressing them within the unconscious. The model is of a suspicion of the surface condition, and an attempt to uncover the underlying distressed condition or malaise.

A second model of what happens between the analyst and the analysand, developed by Paul Ricoeur [17], is to recognise the power and force of narrative. The analysand is moved to a position of developing and accepting a new story about him or herself. The process of narrative construction is a work. The analysand offers resistance to some or other emerging narrative. Ricoeur takes his lead in the use of this mechanical and instrumental work-resistance metaphor from Freud: "It is not easy to play upon the instrument of the mind."

How does this distinction, between a model of psychoanalysis based on a discourse of fragmentation and integration versus a model based on the work of narrative, impinge on the issue of smooth human-computer interaction? There are several means of elaborating on Ricoeur's (Freudian) themes here in relation to interaction design.

3. Mixed metaphors

In the manner of a clash between narratives, an interface can present an incongruous metaphor that is at odds with our expectations. Many of the
experimental interactions proposed by Dourish [4] and others have an 
element of the surreal about them: a mixing of metaphors. There is an initial 
and perhaps charming absurdity about the concept of human-computer 
interaction that resembles manipulating clay, or removing lids from perfume 
bottles (Figure 3), standing in a cube and wearing stereo glasses, or pedaling 
a bicycle [18]. The interaction concept can already be imbued with the 
strange, or the strange can emerge from its attempted implementation. In 
the latter case there are many artefacts of the makeshift experimental 
condition, the cables, weird suits (Figure 4), shadowed projections, the limits 
of the spatial and technological conditions, the blurry and distorted edges.
From the point of view of metaphor this mismatch is the norm. For Ricoeur [19] this is where there is space for the working of the imagination, on the part of the researcher, designer and user. In fact by a phenomenological reading, any technological device can operate in the manner of a revealing and concealing. There is also accord here with an understanding of the world of objects developed by the surrealists, which also derived much of its impetus from a reading of Freud, particularly on the subject of dreams. In so far as we adopt the importance of metaphor in interaction design it is apparent that human-computer interaction is not, and need not be, smooth. Metaphors are not smooth.

4. Repetition

As a provocation to the idea of the seamless, human-computer interaction can be further characterised as an amplification of the opportunity to repeat. Repetition is one of the means of overcoming resistance: one thinks of resisting the defences of a city by the use of a battering ram, or gaining competence on a musical instrument by repetitive practice (and resisting the propensity of the fingers to move in a manner fit for grasping, pointing, or anything but the coordination required for playing a musical instrument). Repetition and resistance go hand in hand.

We can also think of disciplinary practice. The social theorist Foucault presents repetition as a means of subjugating the human body to a kind of mutually agreeable social calming [20]. Rather than outright mayhem, violence, and incarceration, civil society deals with complex power relations through constructing its architectures, institutions and practices in ways that comport the body, bringing it into subjection to certain socially distributed and pacifying power regimes. Though Foucault never discussed it in these terms, human-computer interaction is implicated in the socially soporific effects of repetition, from the bodily-based and highly repetitive rituals of the contemporary call-centre “sweat shops,” data entry pools and production lines, to the rituals of the distributed office space with its ubiquitous and democratic laptops, mobile phones and PDAs. The smoothly egalitarian interface is not immune from the operations of repetition. Repetitive operations are simply transformed from one medium to another. Repetition can provide resistance to the smooth, it can invoke the smooth, and it can itself assume the cast of something to be resisted.

The concept of habit succumbs to this analysis. Burroughs’ interesting account of drug addiction can be cast in these terms [21]. There are the repeated attempts to “kick the habit,” to resist the temptation, but then the addict (sometimes) succumbs to the triumph of the smooth declaration: once an addict, always an addict. Resignation signals the victory of the smooth, absorption into the status quo, submission to the inevitability of agreement (with an analyst), or conformity to some expectation. Acquiescence to technological constraints and determinism constitute
further instances of psychological smoothing.

Repetition also implicates time, or perhaps time is a means of making sense of the necessity to repeat. Freud advances a potent theory on the origins of the repetitive impulse, implicating the Oedipal condition. From Ricoeur’s narrative orientation we can see repetition as a feature of any narrative, the hermeneutical journey, the repeated encounters and boundary crossings, with variation, evident throughout any story, and the repeated telling of narratives and their variants. Computer systems, from games to the repeated use of word-processor operation, are constituted in a repetitive frame. In so far as human-computer interactions participate in the impulse to repeat they already participate in a kind of resistance for and against the smooth.

5. Resisting the unconscious

By a straightforward Freudian reading, the analyst assumes the role of the investigator, with the superficial symptoms of the analysand always under suspicion, and to be uncovered by analysical investigation and probing. The language of interface design commonly suggests a substrate of complexity lurking behind the interface. What is the interface covering up? What does it mask? How can we break through the interface so that the user has access to the hidden relationships of the work task? What are the thought processes of the user; the social practices in place; the essence of the data; 3d model; or the unmediated experience? Ricoeur resists the imperative of Freud’s construction of the unconscious. What is in place are a series of emerging narrative constructions on the part of the analyst and the analysand, a great deal of work in revising and adjusting these narratives to something mutually productive, and an inevitable resistance to one or other narrative. “Getting to the truth” or uncovering the unconscious, draw on archaeological metaphors that sound like work (digging). But for Ricoeur this labour is recast in terms of another kind of work: overcoming the resistances to stories. The analyst-analysand relationship is characterised substantially by talk, rather than by bodily dissection, surgery and other therapeutic and diagnostic procedures that perhaps require metaphors of surface and depth for their understanding. Of course the process may not result in resolution, but an ongoing and productive questioning.

If we take Ricoeur’s position, from an HCI perspective, we can dispense with the metaphor of surface, level, substrate, deep structure, essential structure. This is not to recommend a merging, fusing or blending between levels, but to recognise the primacy of the seam, the hard edge, the fracture. Perhaps there is nothing behind the interface. It is all surface. This is a theme developed by Deleuze and Guattari [22], that there are no deep roots, just surfical rhizomic connections across thousands of plateaus, and eruptions. As an example of narrative conflict in interaction design we can perhaps think of the productive conflicts (frictions) between rival metaphors as the...
site of rupture: the desktop versus the command line, hypertextuality versus hierarchy, tool versus medium, thinking machine versus theatre. In so far as we fuse these rival propositions into a single conception we deny the design possibilities offered by a consideration of the differences they invoke.

6. Perturbation

One approach to resisting the imperative towards seamless interfaces is to counteract it with the concept of perturbation: a time-based disturbance of the surface, that may tear, rupture and otherwise fracture the surface [23]. The continuity implied in designing spatial form can be troubled, resisted and ameliorated by an articulation of time in the design process. The notion of “real-time” (information that is updated at the same rate that it is received) offers possibilities in rupture, fragmentation and discontinuity; invading and propagating the condition at the edge of the smooth (Figure 5).

The artist and theorist Lev Manovich [24] draws on the time-based media of film as the source of alternative metaphors for digital media design. Extending his argument, there is potential for realising spatial and temporal discontinuity when space and time are processed in relation to each other. Film can use time to render spaces disjoint. Instead of the broad sweeping panorama (smooth), filmmakers cut from one scene to another. Instead of conveying a scene as one continuous time sequence they introduce an element of temporal disruption by switching from one spatial location to another. Of course cuts can also be used to convey a sense of the smooth. Perhaps in a film and MTV-enculturated world everything is
cuts. Whatever the “impression,” be it of smooth or distressed, the effect takes place at the cut, the conflation, and this is time-abetted, culturally nuanced, and interpretational, sometimes bordering between coherence and incomprehension. In any case, by this reading it is a temporal plus spatial control that gives new media its power. HCI design can perhaps exploit this manipulation of the temporal in conjunction with the spatial. One thinks of the jitter module to MAX/MSP (www.cycling74.com) used by music technologists, which allows time-based manipulation of spatial forms. The results are very different to, and more fragmented than, those produced by traditional CAD and 3d modelling software which begin with a premise of 3d spatial geometry and smooth photo-realism, rather than temporal connections and dis-connections.

Some digital artists further exploit technological limitation to investigate the “glitch.” To create a seam/disruption, a designer might push a computer system to its limits and beyond. An example is the frame rates for GL graphics rendering. The designer makes an image sequence so complex that it cannot be rendered without a glitch, or uses obsolete and unstable media (a dot matrix printer). This thinking leads to a less composed use of resistance and can result in spontaneous instability (like the re-buffered audio/video stream), and can lead to interesting interactions. (There is then the challenge to carry such glitch design into the realms of functionally prosaic desktop systems.)

Figure 6. Screen display from “The Spectral Tourist” by Martin Parker, a dynamic digital media “composition.”
The Spectral Tourist is a reactive performance system that analyses live audio signals and stores spectral information about these signals in a database. Using the joystick as an interface, this data is traversed and brought back to life through sonic impulses and white noise. Although controlled by a joystick, the Spectral Tourist does not behave well if subjected to dynamic gestures and movements. The stick is thought of as a traveling device, allowing movement through an environment. To reach the extremes of this space takes actual time in the performance which is analogous to the playing of a musical instrument. It is not easy to reach the highest and lowest notes of the violin in quick succession; the instrument resists you.

Figure 6 is a screen shot from the Spectral tourist created using Max/MSP. It shows two interfaces: the controlled and safe information displays and the MAX/MSP work zone which is kept open so that programming can be carried out during the performance if necessary. Max/MSP allows for changes in the performance environment in real time. In some performances, the software the performer begins with is completely different by the end of the piece.

7. Conclusion

There are at least five strategies for resisting smooth human-computer interaction. One is to recognize that the smooth is a chimera, the pursuit of which can lead to frustrated expectations. Human-computer interaction is not smooth, nor need it be.

A second strategy is to call on advocates of the smooth to be more explicit in what they mean by the smooth and the seamless. Perhaps there is a typology of the smooth. Without this analysis, the appeal to the smooth presents merely as a hollow attempt to enhance the legitimacy of an interactive project.

A third strategy is to claim the cut, work on the seam, not to blur it away, but to appropriate and promote it. Works by installation and digital media artists commonly elaborate on the theme of the incongruous, the unlikely connection, the discontinuous. Interaction design can similarly seek to render the operations of digital processing conspicuous, rather than trying to meld it away. More to the point, the interaction designer can work with both the seam and the smooth, the space between the conspicuous and the inconspicuous.

A fourth strategy is to posit and explore alternative metaphors that move the research agenda in different directions; for example, to work with interaction design that is both a revealing and a concealing, a masking and an unmasking, perhaps leads in directions different to a research agenda based on melding the human with the machine. Furthermore, interaction design suggests different agendas to interface design, narrativity suggests something different to user modelling, and so on. Metaphors are complicit in the setting of research agendas.
A fifth strategy is to move away from the issue of the resistant and the smooth and to work within a frame that automatically opens up possibilities that are already operating in the space between the resistant and the smooth. Such a frame might be the use of time-based media, as in the case of film and sound design, which open up the possibility of working with perturbation.

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