Extending Interface Practice: An Ecosystem Approach

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Abstract

Interface ecology is an emerging metadisciplinary approach, in which the creation of rich interactive experiences spans n disciplines -- such as computer graphics, mathematics, gaming, visual art, performance, and cultural theory. Interfaces extend beyond interactive artifacts, activities, and social spaces, forming intricate ecosystems. Interfaces are the catalytic border zones where systems of representation meet, mix, and recombine. Through this recombination, interface ecosystems generate fundamental innovations of form, experience, knowledge, and technology. This panel brings together a diverse range of practitioners who work from concept to experience not in terms of a particular discipline, métier, or medium but with a practice that interconnects multiple systems, forming a whole.

Keywords: interface ecology, interface, metadiscipline

1 Introduction

The creation of rich interactive experiences spans an n-dimensional conceptual space, in which disciplines -- including computer graphics, mathematics, gaming, visual art, performance, and cultural theory -- function as basis vectors. Interface ecology is an emerging metadisciplinary approach. In this ecological approach to interface, developers assemble diverse media (along with their epistemologies and creative, technological and semiotic processes) as expression. This gives form to human experience.

In social spaces, people's activities and behaviors are connected through interactive artifacts, processes and experiences. Interfaces extend beyond these artifacts, forming intricate ecosystems. Interfaces are the border zones where systems of representation meet, mix, and recombine. Through this recombination, signs - the semiotic units of meaning -- flow into new configurations that engage participants. The structure of interface ecosystems has a catalytic effect on these processes of recombination and engagement, setting emergent phenomena into motion. Interface ecosystems generate fundamental innovations of form, experience, knowledge, and technology.

This panel brings together a diverse range of practitioners who work within an ecological framework: *who ecologize*. Each of the panelists moves from concept to experience not in terms of a particular discipline, métier, or medium, but with a practice that interconnects multiple systems, forming a whole. They will discuss their processes of assemblage, and results that have emerged. They may also look to the future, and brainstorm about how the ecosystems approach will influence new interfaces.

2 Natalie Jeremijenko

Validating Interaction with Tangible Devices

Tangible interfaces to information technologies combine digital information and physical devices. These have proven popular, mediagenic, and yet remain difficult to validate. Of the accounts for the success of these interfaces, none provide empirical evidence or measures. I will present recent studies that examine the interactive activity with tangible interfaces, vis a vis a screen based display of the same information and purpose. The common claim, that Tangible Media is 'more intuitive' by virtue of its familiar physical form, is refuted by this data. Naive users made more errors with the tangible media devices than with the well-codified interaction strategies of screen based interaction. Nonetheless, this work does find evidence for the effectiveness of Tangible Media. Understanding how tangible media works requires the capture and measurement of the interaction through over and around, rather than with interfaces. This study presents evidence for understanding: a) the role of the physicality of tangible media; including its persistence and attention directing function; b) the role of peripheral participation, monitoring and interaction in the different contexts and applications; c) the role of shared use on interaction including: how errors are corrected and variability managed; how skill is developed; how to characterize a 'use career' of these applications; how multi-user interfaces effect the single user interaction; what aspects of the information and interaction scripts presented are legible to a wide variety of users and which are prone to more misinterpretation (or variability in interpretation); the role of open-ended interaction scripts.

I will show video data of the interactivity that is staged around the tangible devices in four studies. Building on these findings, I present several new projects that extend the potential of Tangible Media. One set of projects exploits mechanical actuation as the parameter with which to display information, and a second set of projects adapts the nonphysical strategies of tangible media to several screen-based interfaces.

Natalie Jeremijenko is a design engineer and technoartist, whose work examines how technology works, in technical and social accounts. Recently she was named one of the top one hundred young innovators by the MIT Technology Review. Her work has been presented at Tate Gallery, MASSMoCA, Rotterdam Film Festival (2000), Guggenheim Museum, Museum Moderne Kunst, Frankfurt, LUX Gallery, London, Whitney Biennial, Documenta, Ars Electronica, the Museum of Modern Art in New York, and at MIT Media Lab. She was a 1999 Rockefeller fellow. She did graduate engineering studies at Stanford University in Mechanical Engineering, and at the University of Melbourne in the History and Philosophy of Science Department. She is known to work for the Bureau of Inverse Technology.

2 Thecla Schiphorst

Body Interfaces: Navigating Sense and State Space

Dominant western paradigms underlying the development of digital technologies have typically excluded knowledge domains of experiential body practice. Interface design can be informed by, and extended through the application of methodologies articulated within these practices. These include fields of somatics, theatre, dance, and non-western movement forms such as tai chi and martial arts. Rigorously articulated, first person or experiential

methodologies provide models for knowledge acquisition, information design, networked connectivity, remote sensing and ecological multivocality. Applications of these models suggest an ecosystem approach in which inter-activity is coupled with inter-subjectivity and inter-affectivity.

Body interfaces can share system states between multiple bodies and their multiple interactions. The answer to the question 'What is Body?' is an evolving, shifting construction in the arts as well as the sciences. Within interface practice, intentional grammars can be developed to intermingle meaning, presence and agency. We need to draw on our ability to dynamically map our understanding of 'what is body' into interface practice. We can alleviate current expressive impoverishment to extend dynamic range, by including the intimate, the intelligent, the sensory, and the taboo. I will illustrate these concepts through my work,

In *Bodymaps: artifacts of touch* (1996), the input of touch re-directs and re-posits the habits of our visual perceptual systems. This creates interplay between the liminal, sensual connections made through the direction of the body's attention. *whisper* is a new work based on small wearable devices and handheld technologies. The *whisper* [wearable, handheld, intimate, sensory, personal, expressive, responsive] system constructs networked messages based on inferred states of the carrier bodies [which host the small wearable devices]. *whisper[s]* are wearable body architectures. Intention functions to direct and apply whispered messages, which range between direct and subliminal, suggestive and overt, seductive and definitive.

Thecla Schiphorst is a Vancouver based computer media artist, and an Associate Professor in Interactive Arts at Simon Fraser University. She is the recipient of the 1998 Canada Council biennial PetroCanada Award in New Media. Her formal education in computing science and contemporary dance has shaped her work, which integrates models of scientific representation with the experience of the physical and technical body. She is a member of the original design team that developed Life Forms, the computer compositional tool for choreography, and has worked with choreographer Merce Cunningham since 1991. She is a PHD Candidate in the CaiiA-Star program at the University of Plymouth in the School of Computing, and has an interdisciplinary MA in computer compositional systems from Simon Fraser University.

3 Michael Mateas

Expressive AI

My work is in Artificial Intelligence (AI) based art and entertainment. I simultaneously engage in AI research and art making, a research agenda and art practice I call expressive AI.

Expressive AI has two major, interrelated thrusts: (1) exploring the expressive possibilities of AI architectures - posing and answering AI research questions that wouldn't be raised unless doing AI research in the context of art practice, and (2) pushing the boundaries of the conceivable and possible in art - creating artwork that would be impossible to conceive of or build unless making art in the context of an AI research practice.

The fusion of art and AI can be conceived of in terms of a shared interest in exploring what it means to be human, and a shared methodology of knowing-by-making. The field of Artificial Intelligence is a recent incarnation of an age-old quest or dream, the dream of building an image of the human in the machine. It is this dream, fueled by science fiction representations of AI such as Hal 9000 or Commander Data, which is the initial inspiration for many researchers entering the field. This dream is not just about modeling rational problem solvers, but about building machines which in some sense engage us socially, have emotions and desires, and, through our interactions with them, tell us something about ourselves. AI is a way of exploring what it means to be human by building systems. An AI architecture is a machine to think with, a concrete theory and representation of some aspect of the human world. Art also explores what it means to be human by building concrete representations of some aspect of the human world. Artists often explore aspects of humanity which have been under-explored or ignored in AI research.

Combining these two ways of knowing-by-making opens a new path which takes seriously the problem of building intelligences that robustly function outside of the lab to engage human participants in intellectually and aesthetically satisfying interactions which, hopefully, teach us something about ourselves.

My presentation will explore methodological and conception issues in expressive AI, particularly the notion of a doubled system which consists of a technical machine engaging in uninterpreted computation, and a semiotic machine which organizes the rhetorical strategies used to narrate the operation of the machine. These ideas will be illustrated with example AI-based artworks, such as the interactive drama, Facade.

At Carnegie Mellon, Michael Mateas is adjunct faculty member in the Entertainment Technology Center, Research Fellow in the Studio for Creative Inquiry, and a PhD student in Computer Science. Michael has presented work at SIGGRAPH, New York Digital Salon, AAAI, the Carnegie Museum, the Warhol Museum, and the Walker Museum. Previously, Michael worked at Intel Labs, where he co-founded GEAR (Garage Ethnography and Applications Research), a research group employing ethnographic techniques to understand how new computing technology fits into people's lives. Michael received his BS in Engineering Physics from the University of the Pacific and his MS in Computer Science (emphasis in HCI) from Portland State University.

4 Wolfgang Strauss

Interfacing Mixed Reality as an Ecology of Aesthetics

To connect the notion of interface with the term ecology reminds me of a passage by Paul Virilio: "traditionally architecture and design are related to interface the exterior world to the human, the design of landscape, buildings, stages etc.; now we have to care both for design of exterior and interior spaces; those new electronic interior spaces, mainly imagery, build up the look and feel of our electronic mindscapes. They are part of the urban ecology."

Unfortunately, ecology in our built environment is usually fed by very traditional visions directed backwards. This makes life quite boring. An example arises in Berlin, a former focal point of cold war. There is a serious decision about rebuilding the traditional heart of the city. The Schloss (castle) represents the hierarchical Prussian state of last centuries. Situated on the Schloss site, and opposite the central government building of the former GDR, the Palest deer Republic (palace of republic), has been renovated at a cost of 80M Euro, due to the ecological disaster of asbestos contamination. The palace building is now finished and will be closed for demolition. Estimated costs to run the building in a provisional condition, giving space for emerging culture, is just 1.7M Euro. Politicians say: "No money, no way."

The vanishing aesthetic awareness of public spaces is beaten by digitized consciousness, somewhere on the net, in favor of a castle

in the air. What we really need are interfaces for living in mixed realities, creating ecosystems rather than constructing artifacts.

The goal of the development of netzspanung.org is an architecture for making visible the interrelations between media art, science and technology. In order to realize this, we are exploring the extension of the common notion of web platforms as means of presenting and sharing information, toward the model of an *online media laboratory*. By this, we mean a web-based platform that combines tools for contextualization of information into a collaborative knowledge space, with tools for active experimentation with networked media spaces. This takes into account the fact that the use of the web for creation and distribution of information in different disciplines (e.g. art, science, technology) is today perhaps the most significant example of mixed realities: the contents of the web represent a myriad of different perceptions of "realities", of "knowledge about" and representations of the world, expressed as networked constructs combining different media (text, image, video, 3D, mobile communications etc.) and often as a result of a collaborative process. Such a highly meditated situation of communicating and constructing knowledge requires new models for discovering contexts and relationships and for understanding how meaning is encoded in complex structures of networked media. This concern cannot be met with the "old" model of a passive user with arbitrarily intelligent" technologies. Rather, tools that enable (empower) the user to actively explore her/his own ways, and construct her/his own models for dealing with information, become essential.

Wolfgang Strauss is an architect. He has held teaching positions in Interactive Art at the HDK Berlin, at the KHM Media Art School Cologne, at the School of Fine Arts Saarbrücken and the Kunsthochschule in Kassel. He co-founded Art + Com, Berlin Currently he is research fellow at the Fraunhofer - Institute for Media Communication. In opposition to the theory of the disappearing body, he introduces intuitive interfaces for playful interaction. His work has been presented at ZKM, Nagoya Science Museum, SIGGRAPH, ICC Tokyo, Imagina, ISEA and was awarded with the Golden Nica at Ars Electronica 1992.

5 Will Wright

SimCity and The Sims

One of the primary roles of any designer is to fully represent the end user of a product. As a game designer I find myself not just standing in for the typical player but for all potential players regardless of their skill, interest or motivation. Many recent games are beginning to "leave the box", that is they're using web sites, player customization tools, databases of player-created scenarios and so forth to expand the scope of what users can do with the product. In a sense the players are becoming more and more an integral part of the development team. As a more diverse set of player activities becomes available the players themselves diversify to fill these niches. The different niches of player activity (tool builders, skin artists, web masters, browsers, casual players) grow to be quite interdependent and self-supporting. The game community functions as an ecosystem. As the activities around a product leave the box, so must the responsibilities of the designer. I used to think that my job as a game designer was to create a cool game, I now think my task is to facilitate the creation of a cool community with a game at the core.

Will Wright is the creator of both the SimCity and The Sims franchise. SimCity was released in 1989, and within a few months became a hit. The latest incarnation and definitive version of SimCity, SimCity 3000 Unlimited, has continued in this tradition. Wright's game, The Sims, puts players in charge of the lives of a neighborhood of simulated people. Released in February of 2000, this title has become a cultural phenomenon. The Sims has sold over 5 million copies worldwide to become the best selling PC game of all time. The Sims has inspired four expansion packs; Livin' Large, House Party, Hot Date and Vacation. Combined sales for The Sims' franchise total 11 million units life-to-date. Next up for Wright is The Sims Online(tm). Scheduled for release in the second half of 2002, The Sims Online will enable you to take your Sims to an online world where you get to be yourself or whoever you want to be.

6 Andruid Kerne

The Conceptual Space of Collage

CollageMachine [http://mrl.nyu.edu/collagemachine] is a creative web visualization tool that learns while you surf. Instead of waiting for you to click a hyperlink, the program proactively crawls the web, seeking content of interest. *CollageMachine* parses websites, modeling the web as collections of linked documents and their constituent media elements - images and chunks of text. These media elements continuously stream into a dynamic, user-interest-driven collage.

You can use collage design tools to create your own look and feel. By engaging in visual design, you also express dis/interest in media elements. *CollageMachine* learns about what you like from these interactions, and annotates its model to represent your interests. Decisions about what content to pursue and how to build the collage are made according to the model. The Collage Visualization Grid allocates screen real estate and history-enriches collage elements as a representation of your intentions. Unlike typical information visualization systems, perceptible structure develops bottom up. Navigational trajectories and combinatorial concepts emerge. The user experience blurs boundaries between web browsing and art-making.

The *CollageMachine* interactive artifact and the interface ecology theoretical framework are being co-developed, through back and forth loops of reference on multiple levels. *CollageMachine* promotes the emergence of new ideas through hypermedia combinations. Interface ecology, as a metadiscipline, investigates the process of combining whole systems of representation. This investigation proceeds both structurally, and in the situated contexts of particular applications, connecting theory and practice. For example, through investigation of *collage* and *emergence* -- in the context of *CollageMachine* development -- their application on the conceptual level -- in interface ecology -- became apparent. Thus, in this co-development process, theory does not inform practice simply; rather strange loops of reference, operation, and influence emerge through multiple levels of collage.

Andruid Kerne [http://www.andruid.com] is a research artist scientist who specializes in information visualization, agents, databases, audio, video, distributed real time systems, and public installation. He opens the range of social processes embodied by computational artifacts, for instance, substantiating play as a mode of activity and interaction. His work has been presented at SIGGRAPH, SIGGCHI, the Guggenheim Museum, New York Digital Salon, ISEA, Milia, Ars Electronica, and the Boston Cyber Arts Festival. Kerne holds a B.A. in applied mathematics from Harvard, an M.A. in music composition from Wesleyan, and a Ph.D. in computer science from NYU. Andruid was recently a visiting professor at Tufts University, where he taught courses in human computer interaction, object oriented game programming, and public web installation.