DIGITAL SPACE

Introduction

A
Research
Proposal

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The concept of interactivity in computer science has generally referred to issues concerning *user interface* in the sense of those parameters of system control over which the user can exert influence. It is the intention of this proposal to expand upon this concept of interactivity to address its broader implications from a philosophical perspective with regard to the intrinsic properties of what we refer to as *digital space* and with specific interest in how such ideas impact the evolution of art through the existence of a new technologically derived perceptual environment for humanity at large. Additionally we hope to outline a preliminary research plan for the exploration of this perceptual environment which emphasizes the articulation and design of syntactical principles essential to this exploration. While our primary focus is upon the creation of works of art which would concretize these principles in the form of aesthetic research, it is our hope that the articulation of such syntactical principles will also be influential beyond the artistic domain and have direct application in such fields as *scientific visualization* and *artificial reality research*.

The design team that we have assembled is uniquely qualified to investigate the technical and intellectual questions surrounding this research. Steina and Woody Vasulka have pursued aesthetic research into the application of electronic technology to visual and audio art for the past 25 years. Their work has not only been seminal to the creation of video as an art genre but they have also substantially contributed to the development of digital image generation and electronic music from an interdisciplinary perspective. Likewise, David Dunn has pursued a related interdisciplinary investigation which links together research into the domains of music, bioacoustics, linguistics and systems theory. As a composer his work has focused upon the use of electronic and computer technology to explore the cognitive behavior of living systems in a manner which deeply emphasizes issues of interactivity. Media critic Gene Youngblood has long been associated with the experimental arts as a visionary philosopher of the new genre of technological arts. Lizbeth Rymland is a poet and performance artist whose imaginary worlds articulate non-linear spatio-temporal perceptions suggestive of new social vistas for communication technology. Well known European media artist, educator and promoter Peter Weibel is currently Professor of Media at the Stadsche Kunst Hochschule in Frankfurt, Germany. Together they form a compelling research group capable of articulating the issues herein outlined and in creating substantial works of art which instantiate those issues.

Interactivity and the Arts

While concepts of computer interactivity have been fueled and influenced by the creativity and philosophical visions of artists in the form of science fiction, actual developments have been dominated by the scientific assumptions of *artificial intelligence* research. While the ideal has been to optimally approach some sort of autonomous coupling between human and machine through the simulation of human intelligence and behavioral complexity within the technology, instances of this goal have not been particularly numerous. Actual implementation has often only addressed the expansion of user options within the confines of traditional concepts of system control. It is our contention that artists need to participate at the most fundamental level of systems design before a further advance in the concept of computer interactivity can unfold.

Our rationale for this assertion stems from a recognition that the computer signifies a new perceptual environment (which we refer to as digital space) in the sense of a domain for the unfolding of sensory, linguistic and social communication with new characteristics which impact our cognitive evolution, and that the exploration of this environment cannot substantially progress without human aesthetic fulfillment. While the issue of whether or not intelligence can be sucessfully simulated through the specification of systemic complexity within the machine remains an interesting and important research question for computer science, it cannot be the determinant of what constitutes the essential criteria of exploration and humanization of digital space. To this end we assert that artists must help to shape what is quickly unfolding as a fundamentally new perceptual environment which is ushering forth profound epistemological changes.

Our interest and insight into this new perceptual environment results from our many years of creative use of digital technology as an aesthetic tool that has often brought us to a direct confrontation with traditional ways of composing images and sounds. This conflict has not only been initiated by our interest in new forms in general but specifically by the profound implications of organizing our materials through a numerical code. What becomes apparent from the structural demands of this technology is that there is an ability and even an affinity for discrete genre to interact

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through the binary code in ways which transcend linear cause and effect relationships, revealing new compositional concepts with regard to space, perspective and morphology.

The experience of cinema informs us that the compositional decisions of editing are constrained by a syntactic set which results in a concept of narrative negotiable with an audience on the terms of the author. While this process seems fully justified for the pursuit of aesthetic communion within the confines of its medium, the intrinsic processes germane to the potential for interactivity in digital space demand other alternatives. The abandonment of a traditional syntactic set is essential within digital space since its organization is no longer the exclusive domain of the author. Since the narrative vectors can be organized by the biases of an other, new syntactic criteria not only becomes necessary but unavoidable. These new criteria shift the role of the author away from merely describing a world for aesthetic contemplation towards the design of worlds for dynamic exploration. Additionally this necessitates a redefinition of audience away from the time sharing of experience characteristic of cinema and performance to that of an individual who can exert greater free will in the exploration of an elastic perceptual environment.

While the use of computers within the arts has long recognized and taken for granted many of these characteristics, most computer art and music has not addressed them. There has been a general tendency to use the computer as a tool to emulate traditional art genre or extend formal principles of organization and structure. Many of these limitations have been structurally imposed in the sense that hardware iimitations have dictated what is possible. With regard to the concept of interactivity this has resulted at the most primitive level in providing the user/perceiver with a sense of choice and/or participatory role in the unfolding of a narrative or structural change. With the dramatic evolution in circuit design, computational speed and memory expansion which have occured in recent years, new strategies for interactivity have posed the possibility of artists creating worlds of sufficient richness to provide the user/perceiver with a sense of exploring an environment of new sensory relationships rather than a mere description of such a world. It is precisely this creative possibility and what it implies for the perceptual environment of digital space which is of primary significance. Thus the concept of computer interactivity can be understood to not only include the interface to a user/perceiver and the redefinition of authorship

which that implies but more fundamentally to include the potential for deep structural interaction between the different sensory modes of human perception. The significance of a serious aesthetic exploration of these aspects of digital space extends beyond the domain of art to proffer an expansion of human imagination through the merger of artistic perception and scientific process.

Aspects of Digital Space

In contemplating the important aspects of digital space as a perceptual environment for aesthetic exploration, a number of essential characteristcs become evident. From our perspective as artists the most obvious possibility of the computer as a creative tool is its ability to generate entirely new and unique constructs of sound and image. However this possibility must be understood in the larger context of the more profound reality of the structural biases and potentials of digital space as a perceptual environment.

Perhaps of principal importance are the dual aspects of random access to stored data and the fact that this data can be comprised of information corresponding to different sensory modes of human perception reduced to a common structure in the form of numerical code. This later attribute is especially significant in the sense that our usual experience of the electromagnetic spectrum as divided into discreet domains of sensory perception (i.e. sight and sound) can be coerced into an interactive space. The aesthetic and experiential possibilities which emerge from these characteristics of digital space are those of the non-linear specification of events in the sense of a polychronic and polytopic narrative of image and sound, a non-linear interpenetration between human sensory modes (i.e. sound controlling image and vice versa), and the ability to specify and control (either by the author or the user/perceiver) the characteristics of change between these various behaviors.

What becomes evident is that a kind of digital synaesthesia could emerge from this perceptual environment which can provide an experience of the concept of non-linear complexity which has become so profoundly significant to the sciences at large. It is precisely the perceptual issues and problems which arise in attempting to comprehend this alien domain which we desire to explore. Since it is these same issues which face the scientific community from a different perspective, we understand that such an exploration could have profound consequences as tools for the perception of non-linear complexity in science

and education. In fact, our interest is in formulating compositional and syntactical principles which might hybridize concerns and issues relevant to a variety of research fields in the context of the necessity for artists to participate, at the most intrinsic creative level, in the development of these technologies for the sake of cultural evolution and preservation.

As already discussed, the characteristics of digital space which imply new structural possibilities for art are those of random access, interaction between sensory modes within the numerical code, and a redefinition of the author's role towards the specification of a world for potential exploration. Because of the radical nature of these qualities they demand the articulation of intrinsic organizational principles which do not simply borrow from old forms. Since such principles could constitute what we have referred to as a syntactical set for digital space in the sense that tonality constituted a deep structural principle for 18th century music or perspective for Renaissance painting, it could be argued that the emergence of such principles might be better left to the self-organizing capacities of individual creative necessity. It is not our intention to specify dogmatic rules for the manipulation of digital space but rather to help set an exploration in motion which will undoubtedly be transcended by subsequent explorers.

Proposal for Research

While it is apparent that the evolution and exploration of this perceptual environment, and its implications for the art of the future, does not depend upon any specific technology (or integration of technologies), since it is the revolutionary event of the digital code as an infinitely malleable domain of possibilities which is of primary significance, we have chosen to focus upon CD ROM and its future progeny as the most currently viable technological environment in which to address the aesthetic exploration of the non-linear and sensorily interactive attributes of digital space. Hopefully the results of this investigation will extend to future incarnations of hardware.

We plan to implement an ongoing research project comprised of a design team and work stations appropriate to create works of art which can be distributed as CD ROM media. While our general goal is to create works of art which will substantially contribute to the evolution of these technologies as authentic art genre, our specific approach is to create these works through understanding and articulating the fundamental structural properties germane to digital space as our primary compositional

criteria. Towards this end we have begun to formulate tentative research questions. For example:

1. Are there non-linear processes germane to random access which might constitute syntactical principles for the organization of digital space?

2. Is there an aesthetic of "emergent properties" which arises from the redefinition of authorship possible in an interactive art environment?

3. Are there functional equivalents to the cinematic techniques of edits or dissolves in a non-linear simulation of 4-dimensional space/time?

4. Is there a "grammar" of transformation to be discovered for the deep structural interactions between human sensory modes possible within digital space (i.e. how might image dynamically modulate sound or text?).

5. Are there strategies of transition to be specified for movement between different artificial worlds?

In contemplating such questions we have begun to emphasize terminology which focuses upon the non-linear spatio-temporal qualities of transformation rather than concepts which reinforce the linear attributes associated with traditional film syntax or montage. It has seemed appropriate to speak of *interpenetration between worlds* rather than edits, or to imagine *morphological modulations* between sensory modes rather than dissolves.

Ultimately we desire to implement an environment of knowledge and tools which would not only seek to answer the preceeding questions but also make possible this pursuit in the context of a variety of concrete research scenarios as illustrated by the following hypothetical example:

A real world event has been simultaneously documented in a variety of media (sound, video and text description etc.) These different descriptions would be digitized for storage on disk as parallel event streams to be accessed in a specific non-linear fashion designed by the artist. This access program would also be stored on disk along with the necessary algorithms for a variety of strategies for interaction between the user/perceiver and the sensory data in addition to transformational interactions between the diverse media descriptions of the same event. Because of the random access capability of this technology, the total data