SENSES OF SPACES THROUGH TRANSFICTION

Alok Nandi, Xavier Marichal

nandi@transfiction.net : Alterface - 4 clos Tchantchès - B-1348 Louvain-la-Neuve – Belgium

marichal@tele.ucl.ac.be : Laboratoire de Télécommunications et Télédétection - Université catholique de Louvain – Bâtiment Stévin, 2 place du Levant - B-1348 Louvain-la-Neuve – Belgium

Abstract: Transfiction is a system allowing the exploration and the realisation of concepts involving multiple places, both physical and virtual, and multiple media channels (visual, audio...) for enhancing the human-to-human communication. The human variable is back in the loop of complex Mixed Reality systems design and is positioned at the core of the narrative through the participation of users as “interactors”.

Key words: immersion, interaction, spatiality, presence, narration, distributed architecture.

1. Introduction

" Sense what's missing and imagine what is yet to be." *Pina Bausch*

“Travel is a kind of doorway through which you leave reality as though you were entering an unexplored reality that seems like a dream”. Guy de Maupassant is quoted by Paul Virilio, French media theorist, who is proposing that: “after the circle of the horizon and the surface of the transhorizon screen, it is now the volume of cyberspace that holds sway”. [1]

Fragmentation of spaces and senses of these mediated spaces, whose sum can be defined as cyberspace, are apprehended through research and applications at the intersection of arts and sciences, in the field of Mixed

The original version of this chapter was revised: The copyright line was incorrect. This has been corrected. The Erratum to this chapter is available at DOI: [10.1007/978-0-387-35660-0_65](https://doi.org/10.1007/978-0-387-35660-0_65)

R. Nakatsu et al. (eds.), *Entertainment Computing*

© IFIP International Federation for Information Processing 2003

Reality. The sense of presence [of "being there"] is explored in interactive virtual environments. Cognitive, affective and emotional signs are interpreted by users for reacting to visual or audio signals generated by computing devices, for triggering physical actions in front of displays, for interpreting audio cues. Experiences are designed in a rich-media way in these immersive spaces, offering features that are integrated as never any previous media could have done.

This paper gives an overview of a series of works at the convergence of art and sciences, of technology and design, at the edge of Mixed Reality. These were showcased in prestigious settings such as the Bercy Parc in Paris and the UNESCO World Heritage Arc-et-Senans Saltworks, as well as in international conferences focusing on arts and sciences.

New modalities for interaction within Mixed Reality resulted in the development of the Transfiction system that is presented in section 2. Concerns with respect to spatiality (frame, point of view...), presence in the space and narration (the spatio-temporal articulation that has to be re-appropriated for this new media, with a reference to film making) are developed in section 3. Section 4 shortly re-questions the notion of identity through the use of avatars, while possibilities brought by an architecture based on the Internet Protocol (IP) are exposed in section 5. Finally, a conclusion is drawn in section 6.

2. Transfiction

Transfiction [2] is designed for mixing synthetic and natural images in real time and allows one to interact in these input/output screens. Transfiction is a system for intuitive interaction in a non-obtrusive manner, allowing one to develop a novel media, accumulating the representation knowledge of previous media, such as cinema, performance, theatre.

In any human interaction with real or virtual environments, the nature of the relationship between perception and action underlies the ability to successfully perform tasks. To optimise the effectiveness of virtual environments, users must be able to perform meaningful activities in an intuitive way and that supports achievement of clearly understood behavioural goals. Successful interaction relies on user ability to coordinate cognitive perception and physical action within the virtual environment.

In these hybrid action spaces, narrative modalities are investigated through body tracking, position detection and image recognition systems. The developed technical architecture allows the implementation of "narrative graphs" (interactive scenarios, [3]) and opens the possibility to analyse the

cognitive and visual actions and reactions to an immersive intuitive interactive system.

In order to provide users with the intended experience(s), different technical solutions have been combined into a scalable and distributed architecture. The software platform has been designed with the main constraint of usability, both in terms of fluidity (real-time aspect, with a latency lower than half-a-second) and intuitiveness of interaction (the body as a joystick).

The augmented (or magic) mirror effect, which creates the illusion of **immersion**, is provided thanks to image segmentation and then re-composition. According to the context (indoor/outdoor: still/moving objects) different techniques have been developed that allow the system to separate the user(s) from its (their) environment. The user layer(s) (Video Object Plane(s) in MPEG-4 jargon) can then be composed with other layers in order to produce the final rendering. These layers can be stills (JPG, PNG...), animations (SVG), movie excerpts (MPEG)... External (mechanical...) effects commanded by the system can also reinforce the sense of immersion.

The **interaction** aspect is provided thanks to basic body/gesture analysis that allows users to use their hands and head to 'touch' or 'grasp' objects and participate through their body attitudes in complete interactive scenarios. These attitudes are represented through (MPEG-7) descriptors for the sake of concision, efficiency (the scenario engine, which drives the narration in terms of immersive scenes and authorized interactions at a given stage, does not have to care about the categories of input sensors) and dialogue between scenarios (see section 5). In concordance with such a description language, scenarios, through their representing narrative graphs, are written in XML.

Moreover, the screen-mirror has been enhanced and offers more than the reflected image of the subject. The subject's representation and the context within which she/he is present have become variable elements for the development of edutainment experiences and ludo-narrative experiments. Such enhancements include body and space mutations (section 3) and use of avatars (section 4).

3. Alteration Typology

Seeing one-self on a screen, like in a mirror was the first step of the Transfiction system, as shown on figure 1(a). The concept of immersion moved from a cognitive experience to a physical happening: the psycho-cognitive process of the projection of a spectator/viewer into the mind of the character in a film narrative and the interpretation of his/her role is now to be reconsidered in the physical framework of Mixed Reality; the spectator now

IS the actor. The mechanisms of perception and cognition are then located in both the actual and virtual spaces (for our definition of these, please refer to [2]) at the same time.

3.1 Space Mutation

Space alteration and viewpoint change are the first visual manipulation experimented in the Transfiction system. Spaces are socially constructed and mediated through big screens where the “interactors” (the users, people that interact with the system) can see themselves. The nature of space is moving in its perception and representation and therefore the experience of it is also changed.

These places are often constructed with spatial characteristics that create a sense of spatial presence. Presence is translated in the happening of a physical or cognitive experience. In figure 1(b), the user not only sees himself but also sees his image/representation moving coherently with the displacement of the car street, which is itself coherent with the overall narrative.

Figure 1. Transfiction scenes (a) in a fragmented space, (b) with coherence of motion.

3.2 Body Mutation

Yet, Transfiction takes its entire dimension when used to put the reality into perspective, not to mimic it. The image of the user is not to be preserved at all cost in order to offer her/him a pale(r) image of her/his real body. Image processing is used to artificially modify the size of the user’s image, its appearance in terms of colour palettes, textures... The perception of space can even be more dramatically manipulated by altering the notions of position and motion: a static user may see her/his image moving on the

screen, while a moving user may contemplate her/his image artificially glued to a precise point of the screen.

Remarkably enough, such manipulations of the body image, if well thought, reinforce the experience brought to the user, who feels them as real body mutations.

3.3 Cinematographic Grammar and Spatial Intelligence

Similarly to movie editing, Transfiction scenes are composed of (independent) sequences assembled in a specific order: the narrative experience, along with the related meaning, takes place thanks to this sequencing, with the consequence that a cinematic grammar is shaped. The first elements of a cinematic vocabulary were applied with the basic transition between scenes, like for example a “cut”. The user/spectator player did not feel any surprise in seeing her/his image in different contexts and positions (i.e. similar to the change of a camera viewpoint). Moreover, scenes change in correlation with some real action of the user, which serve as triggers to understand/announce/activate the change in the mixed and re-composed rendering. In figure 2, a jump performed by the user results in his image flying through the screen before changing the space representation, a process that is perceived natural with respect to the “story path”.

Figure 2. Body “mutation” used to introduce a scene change (cut).

The Transfiction spatial and narrative system proposes the user to find her/his way in the narrative (linear path, labyrinth path, game solving, puzzle solving). This action of finding is not only cognitive and requires a “body language”. In other words, it requires an understanding of space and action /movement within that space, as well as tackling with representations of spaces and of body images (or avatars as developed in the next section). These spatial relationships among places and things are the key features of the interface and the information overlays allow enriching the experience of the user. A similar interface showing spatial intelligence has been designed

in an embodied conversational kiosk, with embodied conversational agents (ECAs) [4].

4. Avatars, Identity, Presence

Sanskrit word ‘avatara’ means “manifestation of god”. This word is now coined to (the audio-visual representation of) entities that inhabit virtual worlds in cyberspace. Such entities can be fully autonomous (like the ECAs mentioned in the previous point) or ensure the presence of remote (human) users. ‘Presence’ is the feature of “being there” in an environment where one can not be physically.

The third step of the alteration process consists in using the (MPEG-7) descriptors generated by the users’ gesture to animate graphics or avatars: users do not see themselves on the screen but control the moves of artificial characters: **moves and gestures are the identity of the users**. The “emotional” attachment with their avatars takes place after the “identity” (identification = movement or action) process: when users realise that they control the avatar actions through their movements, they perform more reactively and become fully involved in the narrative. Autonomous avatars can also be used in any Transfiction system.

Exploration in the Transfiction installations focuses on the subjective experience of presence within narratives and on the resulting perception. Users enter Mixed Reality worlds and realised that only customised representations (as an alternative persona) allow them to act in the environment. In the Arc-et-Senans installation (figure 3), the focus was on the physical usage of avatars where users were transformed into butterflies.

Figure 3. Humans and avatars represented in a Transfiction sequence: (a) autonomous avatars with 2 interactors; (b) one of the interactors took control of (became) an avatar.

5. The Communication Era

Established around client-server architecture with IP communications, Transfiction systems are able to cope with ubiquity (simultaneous re-use of the same camera images within various Mixed-Reality scenes) and composition of scenes from various local or remote sources. Users may be transported into other (remote) spaces through the duplication and transmission of their images. In addition, different Transfiction systems are able to exchange meta-data under the form of descriptors that allow one scenario to command events in another one.

Such an interconnection of places (anywhere and everywhere) opens many new possibilities but strongly challenges the notion of presence. The barriers of collaboration but also competition (and cooptation, an activity at the edge of cooperation and competition, or looked through a temporal axis, cooperation is first needed to find the competition terrain where the opponents can then fight for their due) are moving.

Figure 4. A multi-spatial setting for a Transfiction sequence.

Figure 4 for instance presents a dual-screen Transfiction set up to apprehend "interactive experiences" and narratives/games involving several actual and virtual spaces, allowing an exploration through multiple places with specific narrative features. The actual spatial separation and the reintegration of the filmed interactors in the same screen space reinforce the possibilities of interaction, both in cooperation and in competition. Image-intensive compelling applications are designed to fully exploit the potential of physical spaces and subsequently the Internet network.

6. Conclusion

Mixed Reality allows the reinsertion of the "human" in the loop. In terms of design process, there is a humanistic approach bringing an extra layer in

the iterative development between conception and technology and hence enriching the end result of a Mixed Reality project. The end result is not only a technical-centred object but also, or mainly, an experience of human sense augmentation thanks to technology.

The present paper started introducing the concept of Transfiction and its underlying technology. It then elaborated on the apprehension of space that can be offered to the users by fully exploiting the features of Mixed-Reality through its non-real aspects: body and space mutations, avatars or virtual ubiquity all reinforce the experience offered to the users while relying on a cinema-like grammar.

7. References

- [1] P. Virilio, "*Open Sky*", Verso, 1997, ISBN 1-85984-880-X, p. 65
- [2] A. Nandi and X. Marichal, "*Transfiction*", chapter 2, pp. 13-33, in M. Eskelinen and R. Koskimaa (eds), "*CyberText - Yearbook 2000*", Publications of the Research Centre for Contemporary Culture 68, 2001, ISBN 951-39-0905-0.
- [3] art.live consortium, "*Immersive Interactive Narratives*", International Conference on Augmented, Virtual Environments and Three-Dimensional Imaging (ICAV3D), May 30 - June 1, 2001, pp. 259-262.
- [4] T. Stocky and J. Cassell, "*Shared Reality: Spatial Intelligence in Intuitive User Interfaces*" Proceedings of the International Conference on Intelligent User Interfaces (IUI 2002), January 13-16, 2002, San Francisco.