

## **The Sense of Being ‘There’: a Model for the Space of Presence**

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### **Abstract**

*With respect to the common definition of presence as the ‘sense of being there’, most studies concentrate on the ‘sense of being’ part of the concept, addressing users’ interior state during the technologically mediated experience. In this work, we would like to emphasize the role of the ‘there’ part, introducing a model for the “space of presence” not as a component but as a defining dimension of presence itself. The paper starts by emphasizing the central role of place in the constitution of presence, and then elaborates on this concept in the light of recent developments in human geography, ethnography and cognitive science. Such space consists of physical, cognitive and cultural resources dynamically structured by the unfolding action and is then very different from physical or even mental spaces. The conclusive section illustrates some of the main implications of the proposed model, that do justice to the richness of the concept of presence and show its potential insightfulness in the study of mediated experiences.*

### **1. Locating presence**

As the architect William J. Mitchell provocatively puts it, electronic environments ‘are not just interfaces; we are beginning to live our lives *in* them’ ([1] p. 31). For some authors, the setting up of a space represents the crucial characteristic of new digital media. Technologies are no longer tools through which we act upon the environment, but environments themselves. From scrolling a document on a two-dimensional sheet, to driving a car on a simulated three-dimensional road, we intervene on a reality that is electronically generated and possesses its own spatial rationale [2]. It is not clear, however, whether such space, reflected also in the terminology (‘cyberspace’, ‘virtual environment’, ‘navigation’) is to be taken literally or metaphorically. On the one side, the tangible consequences, observable events and shared practices emerging from digital environments seem to legitimate them as spaces, worth ethnographic approaches such as those adopted by Christine Hine in her ‘Virtual Ethnography’ of on-line communities [3]. On the other, there is no physical counterpart to these territories and the user is ultimately

more likely to be described as located at her desk using the computer than within a digital space. On the one side, digital media are singled out because of their different spatial-temporal characteristics [4]. On the other, it cannot avoid similarities with older technologies that blur any sheer differentiation with older supports [5]. In the area of virtual environments, the issue of digital spaces has a great relevance, where a crucial theme is the user’s sense of being within the simulation. The way in which such feeling is interpreted depends strictly on the way in which virtual spaces are considered: for instance, when they are considered as by-products of energy and information, then ‘virtual presence’ will be taken as a mental illusion [as in 6].

The concept of ‘Presence’ has the advantage of introducing in the study of technologies a reflection on the change in the main coordinates of human experience, spatial and temporal. Being present is tantamount to being somewhere: whenever a person is qualified as ‘present’ above any other attributions, her location is the salient, characterizing feature. In Martin Heidegger’s words, “‘Being-in’ is thus the formal existential expression for the Being of Dasein, which has Being-in-the-world as its essential state” [7, p.80]

The nature of human presence is then illuminated by a reflection on the constitution of human place and can be extended to see if it holds to include digital spaces as well. Which are the places of human experience? How do technologies contribute to draw them? In the conventional definition of virtual presence as ‘the sense of being there’ [8, 9, 10] the environment is invested with a crucial role: the deictic ‘there’ points directly to the surrounding space and leaves to it any further specification of the users’ psychological experience. While a spatial dimension has been frequently added to theories on presence in virtual reality [11 for a review], it has not been given an actually constitutive force and is merely limited to a geographical surrounding. In the rest of the paper, we will start from the assumption that there is no presence without a place and reflect on the way in which technologies affect both of them.

### **2. Human places**

At the beginning of the 20th century, philosophers and thinkers were struck by the extent to which the human sense of space was affected by cultural changes. The historian Stephen Kern illustrates how writers such as Proust, poets such as Marinetti and directors such as Münsterberg began rendering the psychological space in their work [12]. About in the same period, the concept of 'place' made its re-appearance after centuries of disregard, emphasizing an experience of space not reducible to the pure, abstract, homogeneous dimension portrayed by Newtonian physics. 'Place' identifies a space conventionally and recognizably associated to meaning on a psychological and cultural basis: it is transfigured by emotional meaning, scanned by different professional wisdoms, rich with valuable resources, modeled by aesthetics canons [13]. It is this kind of 'space' that pervades our experience and that, far from limiting our appreciation of space, orients human action [14].

As Edward Casey [15] explains in his essays on Place, place has reappeared when the Cartesian dichotomy between body (*res extensa*) and mind (*res cogitans*) has been abandoned. In ontological discourse, the mind was losing centrality in explaining the psychological experience. Philosophers have started to re-found the mental processes as emerging from the involvement with the environment instead of being pure ideas or universal structures. According to the phenomenological school started by Merleau-Ponty and continued by psychologists such as Mark Johnson [16] basic orientation categories such as up and down, front or back, symmetry or asymmetry would depend on the spatial orientation of the human body. More radically, thinkers such as Heidegger argued that the involvement with the world is the necessary condition of Being. Finally, other scholars such as Foucault studied directly the way in which the spatial structure influences the individual experience and incarnate the social organization.

The Copernican revolution stating the primacy of the relationship with the environment in the human experience rejects the entrapment within the confines of the individual mind, and privileges the public, negotiable experience. Place is neither an objective space (homogeneous and measurable) nor a mental space (pure and abstract). The field of human geography develops 'a relational concept of space in which space is 'folded into' social relations through practical activities' ([14] p. 769), and neuropsychology support the adoption of action as the reference point for coding spatial information such as objects' distance or position [17, 18]. Action becomes the criterion according to which place is organized [19,20] coherent with a perspective emphasizing the human involvement with the world. It also introduces a temporal dimension on place, for each activity is a developing

process exploiting cues from the past and projecting possibilities on the future.

The main lesson to be derived from this brief interdisciplinary foray is that places are not physical containers of human presence, but the main expression of human presence itself. In the following paragraph, we elaborate on these aspects with respect to technologies, benefiting from a link with the theories on 'situated action' and distributed cognition.

### 3. The space of situated action (Presence in mediated places)

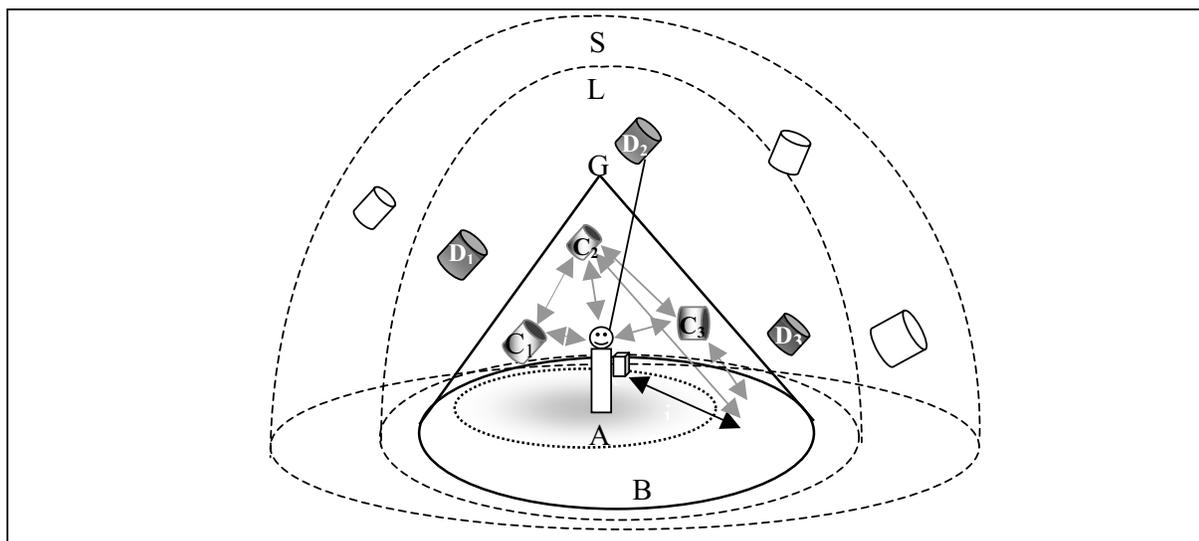
The body has its own modalities to reach out in the space and structure the environment. Pioneer psychologists have detailed the different sensory-motor parameters that organize the animals' space (e.g. [21]), anthropologists have outlined the characteristics of the human sensory spaces [22] and Environmental Psychologists have investigated the relationship of the human behaviour with the socio-physical space [23] sometimes together with Architects and Engineers [24]. In the model proposed here, *body* -including the brain, the motor system, the sensory apparatus and other biological mechanisms conjointly involved in action - is acknowledged as a crucial parameter for the organization of human experience in the world. While observing the body of a person immersed in a virtual task we will see that her movements accompany action as an essential part of it even though they are not possibly tracked by the virtual system or even necessary to the action itself. In a group of exploratory observations with 4 people engaged in immersive virtual environments of various emotional tone, participants changed their posture independently of the emotional nature of the park but in concomitance with the beginning of certain kinds of actions: they needed to take a more active posture during navigation and preferred to take a more relaxed one while watching a picture [25]. Mediated experiences are often considered free from physical impediments, but the body appears to be an inevitable component in the organization of a complex course of action. Downplaying its role while designing a technology, besides leading to unnatural and unhealthy work conditions, would neglect its capacity to interface our high level cognitive abilities in structuring our presence.

In organizing the space of human action, the body benefits from tools working in intimate relationship with it, which postmodernists would call 'prostheses' [26]. Since time began, prostheses have supported human activity in near space (the 'A' area in Figure 1), overcoming bodily limitations while manipulating, cleaning, constructing

objects and inevitably has been influencing back the human beings and the spatial-temporal structure of their action (the bidirectional ‘i’ arrow in Figure 1). Today, human possibilities have been modified, amplified and differentiated by technical innovations, further extending the repertoire of human spaces (the area ‘B’ in Figure 1). From this point of view, technologically mediated environments do not represent a discontinuity in the human landscape, but a further instance of a pervasive phenomenon, its peculiarity residing in the specific kind of mediation afforded. In figure 1, the human actor is at the center of two concentric circles; the inner one represents the space reached by the body, possibly incremented with the help of local technical artifacts (area ‘A’); the outer one represents the space reached through Information and Communication Technologies (area ‘B’), extending human presence on a remote physical space.

Activity theory [27, 28] and cultural psychology [29, 30] maintain that any action relies on some kind of tools, not only material such as arms, but also symbolic such as language or plans. To inhabit a space through action, *cognitive-cultural* artefacts are needed (language, mathematics, norms, preferences) to integrate the physical

dimension with meaning, expectations, implications. They serve as tools, schematically represented by the objects C<sub>1,2,3</sub> in Fig. 1. The digital space is inhabited according to what it entails in terms of memory and culture, myths, fears, joy. In a study [31, 32], participants visited a virtual museum presenting a selection of Lang pictures from the International Affective Picture System (IAPS, [33]) divided into positive, negative and neutral ones; the analysis of the human-interface events (observation time, distance from the picture during the observation) automatically recorded during the interaction revealed that users’ spatial behaviour changed according to the emotional nature of the picture observed. In treating virtual stimuli as threatening or pleasing, participants were influenced by streams of sensory data (real and virtual) as suggested by Slater and Steed [34]. It is worth stressing again that human place is created by *action*, which works as a catalyser attracting the physical, cultural and cognitive resources orienting the relationship with the environment. Such resources are selected for their relevance to the ongoing action out of the complete cognitive and cultural endowment of an actor, represented by the outmost semi-sphere ‘S’.



**Fig 1: The space of mediated action, consisting of physical (A, B) and cognitive-cultural resources relevant (G) and possibly relevant (L) among those available (S)**

The actor’s presence is distributed on a place represented by the cone G in Fig. 1. The cultural-cognitive resources are rooted into the physical realm (see for example [35]); conversely, the physical environment needs to be culturally and cognitively shaped in order to take on its familiar appearance (see for instance [36, 37]). The fact that the place is structured according to the action

performed is shown in a study where an outbreak of fire turns an the task from exploration to escape [38]. As shown by a deep human-interface events analysis and by a qualitative video analysis supported by split-screen technique [39], subjects transformed their movement style to cope with the new situation in a manner similar to the one that many people would have used in a real fire

emergency. Participants transformed their joystick and HMD movements in quality and quantity, changing the trade-off between speed and precision in the light of a new activity. Place is then not a mere portion of space, but *the heterogeneous ensemble of resources that converge on action and have spatio-temporal features*.

The resources excluded from place are not equivalent, because some of them are possibly connected with the ongoing action ( $D_{1,2,3}$  in the figure, semisphere L). They create a grey area of discarded alternatives and relevant objects that human cognition cannot consider because of its own limitations. Notice also that the place in the picture is simplified: if the place of a person at any single moment were to be depicted, then the illustration would show a complex chaining of partially overlapping cones. The cones overlap in the space created by the relationship; where they do not, there is an asymmetry emerging from that local relationship, due to different resources, belongings, participations. In any case, the cone is not an individual exoskeleton with a fixed extension carried around by individuals across all circumstances; it is defined by the interaction.

#### 4. Implications

New technologies, especially digital interactive media, accentuate the flexibility of the cone. The modes of presence multiply because human action expands on unprecedented spatio-temporal configurations and because of an extensive use of the cognitive-cultural dimension. The definition of presence as distributed on the *heterogeneous ensemble of resources that converge on action* has important consequences on the way in which the human interaction with technologies can be conceptualized. Some of the most important are described below.

a) Technologies do create **virtual places**: such places do not need to occupy a material slice of territory, they need actions with peculiar spatial-temporal configuration. To outline the characteristics of this virtual places, one has to describe the actions that are possible there and the cultural and physical resources available. It also won't be necessary for such resources to be located in close continuity in the same stretch of land, but to be part of the same course of (inter)action. So people talking on a mobile phone are inhabiting the same communicative place supported by mobile phone technology and characterized by physical and cognitive-cultural resources.

b) When the gamut of potentially accessible places and people is spreading, it is not only the spatial and temporal distance that is manipulated, but the kind of participation, access and actions afforded. Mediated places will have own mode of presence, including roles, competence, benefits. They are ways of locating ourselves

in human places as such they are never neutral, but **positioned** vis-a-vis other alternatives.

c) The concept of presence acquires a great force representing an **active process, not a state**. If place is related to action and possible actions, then human beings can be engaged in several places at the same time and change them dynamically.

d) Presence is always **relational**: being in a place always means being involved in peculiar ways with specific objects. As a consequence, presence is not confined within the realms of the individual mind, but is shared, espoused, communicative. It can be recognized by an observer, both in real life and in research.

e) For the acting subject, digital spaces are **simultaneously physical, cognitive and cultural** [40], since none of such dimensions can exclude the other. The position of the body continues to influence the interaction for its possible exposure to other events besides the navigation, for the structure it imposes on the interaction, for the change of state (fatigue, ...), for the practices available.

f) Finally, when the concept of presence is used, one must **specify** the place to which it refers. Being present does not mean anything without specifying where one is present. And again, such specification may not be vaguely based on rough categories, but should be defined with respect to specific places for action.

#### 5. Conclusions

The concept of 'presence' provides a chance of reflecting on the effect that technologies have on the basic coordinates of our experience. The model proposed in this paper has two main advantages for what entails virtual environments.

First, it can be applied to presence in 'mixed' real and virtual situations that are not accountable for in terms of dichotomised models such as the 'Break In Presence' (BIP) model by Slater & Steed [34], as shown by Spagnolli and Gamberini [41, 42] and highlighted by Slater, Brogni and Steed [43] and Brogni, Slater, Steed [44], where a binary response is deliberately adopted in order to provide a viable solution to the Presence measurement problem. Among other things, mixed responses are at the basis of the most significant virtual environment applications in clinical psychology. Considering, as suggested by Riva [45], the applications for which controlled trials with at least 10 patients were run, it appears that all situations include a complex relational setting with therapist, patients and virtual words, located in a mixed (real and virtual) environment. Presence departs from the virtual environment not when it departs from the digital perceptual stimuli per se, since they do not define a place, but when *the ongoing*

activity is no longer primarily mediated by the virtual environment and oriented to it.

Second, the role of perception in presence is balanced by the role of other cognitive, physical and cultural resources within the well known framework of situated action [20] and distributed cognition [36]. The consideration of the complex context in which a technology is used borrows from central concerns in design and ergonomics studies, where a greater consideration of the users' environment and activity scenario is pursued [46, 47, 48]. In the model depicted here, which needs to be investigated and tested further, presence becomes a central, inclusive concept in the design, development and evaluation cycle of technologies and will give new artefacts a richer human dimension.

### Acknowledgements

The authors would like to thank the two anonymous referees for their extremely valuable suggestions.

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