Spatial interpretation: between action and coding of the physical world (mixed by the author; courtesy of Alex Abboud

From real to virtual and vice versa: migrations. Performing Media as a sensorial practice of inhabiting physical hybrid space

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Abstract: This article explores the dynamics and effects of the current processes of spatial migration from the real physical world to the virtual digital one. While our society is aware of the move towards a virtual and computerised universe, it seems to ignore what moves from the digital world towards the physical one: the process of importing intangible laws from the virtual world towards the concrete one is less evident. An increasingly vague and invasive blurred line is involving our way of inhabiting physical space through our body, which is the element most challenged in this process. Indeed, the characteristic of virtual spaces is that of being intangible (at least in experience) and immaterial. To enter immersive virtual space, one must leave one's organic and sensory body outside. Recognizing the current level of dependence on technological devices and given the risks of spatial and sensorial alienation posed by the information technology era on humanity, causing a crucial alteration of its interaction with its environment, this text contemplates the necessity of redefining the relationship between humans and technology. Focusing on the practice of Performing Media, the paper illustrates how multimedia interactions can reconnect humans with their lived spaces, creating vibrant, augmented stages for daily life.

Keywords: Haptic And Sustainable Design; Worlding; Amplification Of Physical Reality; Immersive Technology; Post-Organic.

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1. Introduction

The advent of new technologies has more than ever disrupted the relationship between the body and the lived environment. A true revolution is underway in the theoretical foundations of neo-phenomenology: Maurice Merleau-Ponty's assertion that "the body is made of the same flesh as the world, and the world shares in the flesh of my body" (Merleau-Ponty, 1964, 172) is no longer current or factual. Similarly, Juhani Pallasmaa's conviction in The Eyes of the Skin, which posits that the human body is the navel of the world and a crucial system for centering and reorienting when coordinates are lost, is also faltering (Pallasmaa, 2007, 14).

Merleau-Ponty and Pallasmaa refer to a still-organic world, where the natural processes organizing nature are the same as those that determine the life, evolution, and sensory experience of the human body. This article outlines the alterations in the relationship between the body and the physical and virtual environments that humans inhabit daily, often unconsciously, in what has been defined as the post-organic era.

Antonin Artaud[1] asked at the beginning of the last century what becomes of vitalism, of the possibility of expressing a vital action in an increasingly mediated, hybrid, and complex world, referring to the psychic and cultural superstructures that, in his view, were imprisoning physicality. Today, vitalism is further mediated by humans' ability to interact with technological devices and by the devices' ability to represent the world.

Whether it concerns immersion in artificial digital worlds or the experience of the physical world, one must recognize the pervasiveness and almost the necessity of a technological interface. Miguel Benasayag and Gérard Schmit, in their essay *Les passions tristes. Souffrance psychique et crise sociale*, identify the tendency to seek refuge in video games, as it is there that humans can find an illusion of satisfaction (Benasayag & Schmit, 2003, 27): the video game projects one into a constructed world designed for specific actions to be undertaken and lead to success. A limited universe tailored for the user entering it, where they can achieve the game's intended goal, which the player adopts as their own.

The difference is evident between the virtual world, welcoming and adapted to the user, and the real world, unyielding and indifferent to the achievement of human goals. Implicit, however, is the progressive loss of human adaptability and relational capacity with contexts not explicitly designed for them or mediated by technological or informational devices.

This article examines technological devices through a lens alternative to the predominant one: instead of viewing them as tools for virtualizing and reconstructing reality, it seeks to highlight their characteristics and potential uses as amplifiers of the properties of the real world.

Recognizing the current hierarchies of power and relationships of dependence, it becomes necessary to seek a balance between the technological sphere and the human biological and sensory realm. As John Naisbitt stated in *Megatrends*, every introduction of a new technology into society must be counterbalanced by a human-driven effort to restore equilibrium. The more high-tech there is, the more high-touch is required (Naisbitt, 1982, 39). Following this same line of thought, twenty years later, Carlo Infante argued that we must "live change by seeking the balance between our cultural evolution and technological advancement" (Infante, 2006, 25). The author of the term Performing Media, Infante recognizes this balance in the practice of playing the device rather than being played by it.

Entering the immaterial virtual reality with the awareness of living a reality effect, while simultaneously reclaiming the physicality and sensoriality of the concrete and tangible one, enables one to gain a new dimension without losing the ability to inhabit the original. On the contrary, it may even strengthen that experience.

An attempt will therefore be made to reveal a different approach to technological devices that enable simulations and are shaping a different conceptualization and perception of lived space. Generative design algorithms, domotics, virtual reality, digital twins are tools that recalculate and virtualize the environment to be mainly experienced through the device. In this article technology is rather interpreted as an interface to be acted upon through bodies, a filter that amplifies physical reality by revealing its more difficult-to-perceive sides. This multimedia approach reclaims the significance of physical spaces in their interaction with technological advancements, transforming them into arenas of action, movement, and bodily experiences.

2. Methodology

The analytical framework of this article lies within the social paradigm introduced by Marshall McLuhan through his initial deductions and potential forecasts about the implications of the electronic age. A social paradigm is understood here as a semantic domain not supported by scientific data but rather identified through sociological

and behavioral analysis of how people "make sense of their social lives in their communities or environments" (Dankasa, 2015).

The paradigm opened by McLuhan envisions a mechanism of decentralization of processes and senses as a consequence of the advent of the electronic, electromagnetic, and pervasive age, which would supplant the preceding age of vision, characterized by linearity and rationality.

The article consists of two main sections. In the first, the state of the art will be analyzed, starting from McLuhan's intuition concerning the decentralization brought about by the electronic era. This will be interpreted primarily through the lens of the loss of centrality of the human being in determining the anthropized environment they inhabit. While it is now clear that the anthropocentric concept, which positions the human as the cause and measure of every transformative process, must be abandoned, it is equally interesting to observe that humans are not stepping back to allow other living or natural forces to assert their generative essence. Instead, the determination of the human habitat is increasingly entrusted to computational systems capable of generating and reproducing worlds.

Through the analysis of McLuhan's works and thoughts regarding the electronic paradigm; Palumbo's insights on post-organic convergence; Zuse's computational ontology in relation to Heidegger's concept of worlding; Asendorf's reflections on the disappearance of the physical body from space; Delgado's exploration of the transition from practiced space to conceived space; and the consultation of proceedings from the METAspace conference, which presents various derivative perspectives on the present, this section aims to establish a theoretical framework around the construction and perception of the worlds humans inhabit.

In the second section, the article seeks to move beyond a critical analysis of the state of the art. It aims to examine concrete and alternative examples of the relationship between humans and machines, concerning space creation, perception and usability. The selection criterion for the case studies presented in this section is centered on the type of approach the device takes towards physical reality: examples were chosen where the machine engages with the phenomenality of reality rather than merely reproducing it and enabling it to be experienced solely through the device, resulting in what would be an effect of reality. The analytical criterion for the case studies lies in identifying the type of relationship established between the user and the technology-generated context. The commentary will focus on the ability of the environment to draw out the body into the real—in other words, on the recognition of a form of theater in which the technological medium activates and engages the corporeality of those interfacing with it.

By examining the initiatives of technological activism practices of associations, artists and architectural firms that engage with the practice of Performing Media, this text illustrates how multimedia interactions can reconnect humans with their lived spaces, making these spaces vibrant, and now augmented, stages for their lives.

3. Between technological revolution and biological inversion

Technological progress has historically brought significant social changes. In 1968, at the dawn of computer age, the sociologist Marshall McLuhan observed in his book *War and peace in the global village* that the emergence of new technological tools has always created "new environments capable of inflicting considerable pain on individuals" (McLuhan & Fiore, 1968, 7). The swift changes brought by scientific advancements led to great confusion: "When print was new in the sixteenth century, Hieronymus Bosch painted the new confusion of spaces resulting from the Gutenberg technology invasion of the old tactile world of medieval iconography. His "horror" pictures are a faithful artistic report of the pain and misery that result from a new technology" (McLuhan & Fiore, 1968, 7) (Figure 1).

Gutenberg's invention of printing disrupted the cognitive foundations of the medieval world, leading not only to the ease of dissemination of information that quickly led to the revolution of Christianity, but also to a distortion in the personal perception of time.

McLuhan is one of the first to take an interest in the upheavals that contemporary technologies would trigger in both society and human biology. He views technology as software that makes the body's (hardware) efforts to cope with real-world challenges obsolete (McLuhan & Powers, 1989, 162). Considering media as reconstructions and extensions of biological capabilities that surpass human limits, the Canadian sociologist, at the dawn of the electronic revolution, equated the central nervous system with microchip geometries. Amid both opportunities and risks, he outlined the new nature of *homo electronicus*: liberated from the material and natural laws governing the physical body, humans became a consciousness capable of existing in multiple places simultaneously, dispersed by satellite technology, impervious to gravity, "sitting in his room receiving data, images, sounds, tactile

Figure 1 | Garden of Earthly Delights tryptich by Hieronymus Bosch (Courtesy of National Library of France).

sensations, from all over the world at hyperbolic speed [...] while the body remains fixed, the mind floats in the electronic vacuum" (McLuhan & Powers, 1989, 117).

The electrical machine's world influences the human body through physical expansion and spatial decentralization. As the body adopts the mechanical codes of invasive technology,[2] the electrical universe deciphers from the human model the abilities of sensitivity, flexibility, intelligence, and communication (Palumbo, 2000, 1). In fields concerned with space design and interpretation, this mirrors an aspiration to animate previously inorganic matter.

In this convergence, labelled postorganic by Marialuisa Palumbo, a dynamic shift occurs where the machine acquires the sensory role once held by bodies, which are progressively deprived of their capacity to perceive, react, and interact with physical reality.

This process of sensory appropriation by machines also extends to the natural environment and physical places. In the electronic age, space construction tends to organically replicate the sensory response mechanisms of both human bodies and natural environments. Regardless of anatomical or zoomorphic form, new spatial realizations or modifications reproduce organic sensory responses. The hypersurface thus translates into deterministic terms what was previously predictable through scientific studies but also rich in unpredictability.

In fact, a theory that had been latent but pressing in recent decades comes to the fore: the advent and implementation of computing technologies increasingly aroused that part of the human intellect that wanted to reconstruct the world in order to understand how it works, to the point of devising algorithms that seem to reproduce, alter and control natural processes. In her contribution *Dimensioning. Toward a processual augmentation of space* to the volume METAspace, Livia Nolasco-Rozsas reports the attempts to approach and create computerized environments. Observing the role that calculating machines play in the development of new ontologies, she introduces the experience of Konrad Zuse, already known for having created the world's first programmable computer in 1938.[3] In 1969, Zuse proposed the concept of a computation-based universe in his book *Rechnender Raum (Calculating Space)*. In his hypothesis the universe is a large cellular automaton and all its processes are computational; the universe is a "system composed of cells that evolve following pre-set rules by considering the states of other cells in their locality" (Nolasco-Rozsas 2022, 197), this means that

the universe can be understood and reproduced, even changed, by a combination of many small computers that represent the cells of the automaton (Figure 2).

Fast forward to our days, Zuse's theory of Calculating Space is giving rise to a new season of the phenomena of worlding. In the exhibition *Spatial Affairs. Worlding* the evolution of cybernetics is addressed: known for being a movement that united organic and inorganic, cybernetics led to a "blurred boundary between the self and the machine" (Nolasco-Rozsas 2022, 200). Worlding is a hundred years old term that signifies the process of the setting up of a world; coined by Martin Heidegger in 1927 the term is rendered as an active verb, "to make world" or "to world". The gerund "implies the removal of the boundaries between subject and environment, and unite them in an ever-evolving flow" (Nolasco-Rozsas 2022, 201). If Heidegger term was intended as a fundamental part of the description of the human experience of being-in-the-world, with humans being a crucial part of the happening of the world through their actions, its translation in the computerized environments era becomes, instead, a *Entscheidungsproblem*, a completely mechanical procedure as "the world worlds itself" (Nolasco-Rozsas 2022, 201), is to say the worlding happens regardless of the presence of living and organic actors.

Progressively excluded from the definition of the world, what about the body, its sensoriality/sensibility, but also its perception of space and the actions it can perform in it? Anthropologist Cristoph Asendorf in his book *Ströme und Strahlen, das langsame Verschwinden der Materie um 1900*" (literally *Currents and rays, the slow disappearance of matter around 1900*) describes "how the increasing digitalization and mediatization is leading to an unstoppable decreasing of material, public sphere and, with it, the human body in space" (Schroter 2022, 417)

4. Endless possibilities, obvious impediments

Amidst the electronic revolution, a new paradigm for the body-space relationship must be acknowledged. At the beginning of the third millennium, Marialuisa Palumbo, exploring the interplay between new media, ecology, and space, identified new lines of architectural research. Instead of focusing on projects, this text aims to extend Palumbo's programmatic points to the body. Projected into a virtual dimension, the body becomes limitless, fragmented, and mobile; detached from physical form, it becomes a spatial vibration; virtual, it undergoes extreme dematerialization, moving towards the "multidimensionality of the dimensionless" (Palumbo 2000, 13).

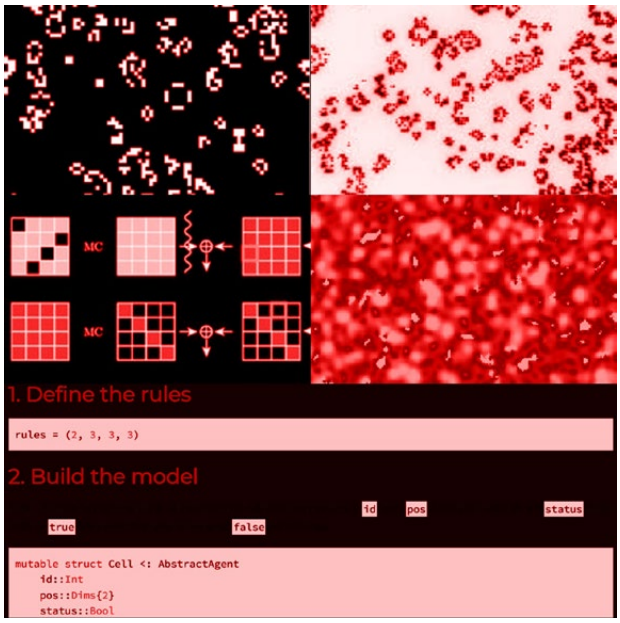

Figure 2 | One of the computing models that, according to a system of rules, generates an increasingly complex world. A famous computing model is Conway's Game of Life. (Source: by the author).

It is noticeable how the concept of contact with the physical world is extremely altered from this relationship. What it is being lost is the haptic factor, the capacity of getting in touch with the space, the ability for mutual contact between oneself and others. It is important to recall that from haptic derives the word adapt as from the opposite of being haptic derives inept, or improper. Anika Schroter, investigating about the possibility and modalities of translating analogue phenomenology in the digital world in her contribution *The skin of the Metaverse. A tactile journey* to the volume METAspace explores the concept of visual tactility. Recognizing the importance of the tactile sense on the human interaction with the world and its build environment[4], Schroter examines the conversion of the sensitivity of the tactile sensory organ, the skin, into a visual simulation that, through the synaesthetic mechanism, incorporates the perception that has been seen. According to the surrealist filmmaker Jan Svankmajer, visual tactility "is the essential value of sensual impressions that feed the bodily imagination" (Schroter 2022, 416). The relevance of visual tactility is confirmed by even traumatic experiences such as the cases of sexual abuse that occurred in the metaverse. Psychotherapist Nina Jane Patel testifies that she experienced group violence during research she was conducting in the Facebook Horizon Venues metaverse. The account of the surreal nightmare is characterised by the feeling of incorporation of the event, although this had nothing tangibly physical about it. Patel concludes by stating

that the already very frequent instances of violence, even if online, can no longer be accepted "because of the embodied, all immersive, nature of the metaverse, which is a multi-sensory experience"[5].

The haptic experience is thus transformed into an illusion of being touched by what one sees. But how can one identify or recognise a type of sensation if one has not first experienced it in the physical world? Many museums today offer the possibility of wearing a VR or AR visor and present the experience in an almost playful way. So you can get a taste of a 360-degree immersive reality where, if the quality is high, you will be truly afraid of a bee flying towards your body and seeming to sting you. But how will one know the pain of a bee sting in a future that tends more and more towards the colonisation of virtual spaces?

The human being, at the mercy of the technological storm, is delocalized, an inhabitant of a non-real space. Above all, he is an inhabitant of an artificial space.

5. A heavy relationship that seems not to exist

It must be recognized that there are points of contact and mutual distance between the two worlds and unveil the hidden material relationship between the virtual world, considered ethereal, and the physical world, which are erroneously and superficial described as two mutually unaffected identities. On one hand it is important to understand the physical and energetically heavy substrate of what try to appear as impalpable. In the article *Beyond binaries – the digital sphere* Charlotte Reuss identifies the correlations, the points of contact, between the digital sphere and the real world. Reversing the theory that the two worlds are antithetical, Reuss argues that the virtual world is nothing more than a kind of expansion of the physical world; far from having transposed atoms to bits, as Nicholas Negroponte has put in —vision strengthened by terms like the Cloud or the Metaverse that seem to float—, the digital realm is not a second, new world, it is rather consuming the physical one. (Reuss 2022)

On the other hand, less obvious because it is less calculable in terms of erosion, there is the process of acceptance and submission of the physical world to the incorporeal rules of the virtual world. If, as has been argued, the human being finds himself decorpoured, expanded, virtualized in projecting himself into the electronic virtual world, virtual technologies permeated and integrated into the physical world. Luciano Floridi (2014) introduces the binomial envelope-environment: importing the term from the field of robotics[6], the philosopher argues that humanity has been adapting the world around the technology that has, to make sure that it copes with what devices are able to detect in order to act. In other words, humanity is enveloping the environment into an ICT and AI-friendly atmosphere (Floridi 2014).

City planning shifted into evidence-based design characterized by the preliminary analysis of the big data collected by the smart city mechanism; the physical urban form will then be determined on the basis of simulation models that will define the meta-planning documents on the basis of which architects and urban planners will draw up master plans and strategic urban plans.

At a more detailed level, on the other hand, we can see how the relationship with physical space is increasingly charged with a sense of danger and alertness, how the extent of wilderness areas is increasingly limited and replaced by regulated and civilized zones with devices that attempt to prevent any unexpected or impervious contact. In what the anthropologist Manuel Delgado calls the transition from practiced space to conceived space (Delgado 2004), one can in fact glimpse the subliminal but increasingly demanding imposition of the user-friendly mode of life, that is, of experiences mediated by interfaces specifically designed to make the user experience as pre-imagined and risk-free, possibly with feedback of liking that perfects the algorithm to ensure an increasingly user-modelled experience.

In the name of a holistic principle of safety[7], traditional architectural practice is also accommodating the trend toward decorporealization. This process of alienation from the experience of lived space involves both the usability of existing architecture and new interventions. Anything that does not conform to contemporary indexed standards and parameters is excluded. The case of the *Scandinavian Pavilion* in the gardens of the Venice Biennale, designed by Sverre Fehn in 1958, is emblematic: in its quest to interpenetrate interior and exterior in the name of a dialogue between the rationality of architecture and biological organicity, the pavilion features a majestic staircase that projects the visitor from the building into the garden and recalls the tiers of a theatre. Today, the staircase is no longer usable, not because it is damaged, but rather because its steps have uneven heights, which are considered a risk for falling (Figure 3).

It is also significant to compare contemporary spatial concepts with historical ones. The Portico di Ottavia is a monumental complex in Rome, initially a sacred space during the time of Octavian, transformed into a fish market during the Middle Ages, and a filter between the city and the walls of the Jewish ghetto during the Renaissance. However, it always remained a public space

Figure 3 | Detail of the staircase of the Scandinavian Pavilion in the gardens of the Venice Biennale. (Source: by the author).

with multiple and varied uses, as evidenced by numerous illustrations from different eras. Today, the spatiality of the Portico di Ottavia is no longer accessible: the architectural recovery intervention consists of a walkway that floats above the square without ever reaching it. This element not only inhibits the spatiality of the place but also alters its temporality: the walkway invites crossing rather than lingering (Figure 4).

Therefore, the concept of loss, dictated by a silent but prevailing system, of the haptic capacity that makes one adapt to the impervious world, becoming compliant only to predetermined and apparently non-threatening experiences, returns.

In terms of sustainability, the estrangement from direct environmental experience and the loss of human interaction with the physical world contributes to the ecological and energy crisis threatening humanity.

This also occurs at the level of perception of the physical world: on the one hand, simulation and analysis generated by Machine Learning from large data resources —real-time sensor networks, planning documents, and 3D spatial information, as well as from synthetic data generators (Glass & Noennig, 2022)— contribute to optimizing energy management, minimizing emissions and consumption; on the other hand, cities conform to principles of comfort and safeguarding that mitigate environmental effects as much as possible. Thus, a paradigm is being established of needing to protect oneself and mitigate atmospheric effects. Rather, an approach to design that rehabilitates the phenomenological aspect of reality leads to rebuilding a dialogue with the physical world, considering its preservation as the method for continuing to enjoy its emotional and sensory richness.

Bringing technological media back to a more physical dimension contributes so to undoing this mendacious ethereal condition in which they are now idealized, considering their weight more carefully and releasing them from a —this time also energetically— unbearable lightness.

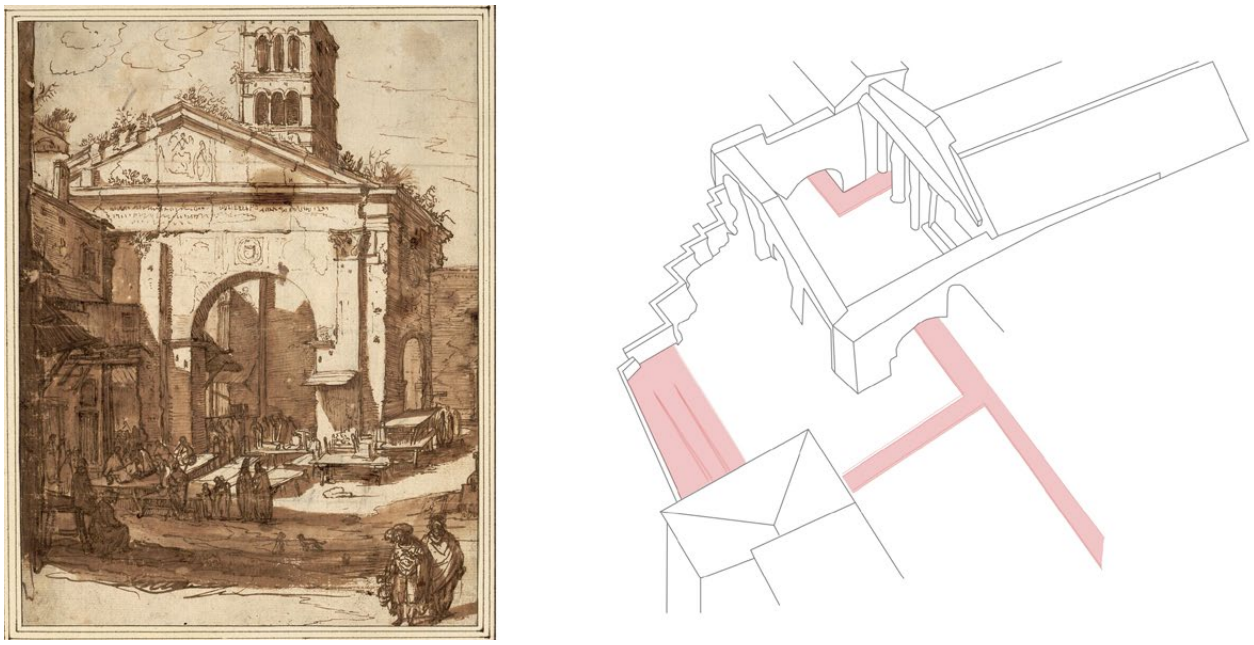

Figure 4 | Historical representation of the dynamic life of the Portico di Ottavia - Der Portico di Ottavia in Rom, mit leeren Markttischen und wartenden Männern (Fischmarkt, Sa. Maria in Porticus; vgl. Inv.-Nr. 9992) by Cornelis Claesz. van Wieringen (Courtesy of Albertina, Austria), and schematic depiction of the contemporary intervention that suspends and distances it from the square below (Source: by the author).

6. The practice of Performing Media

This text seeks to use multimedia tools to reclaim concrete and tangible physical reality from the paradigm that technology has excluded. Following Carlo Infante's concept of Performing Media, the multimedia tool amplifies physical reality. The interface gains haptic character through bodily gestures in physical environments. The body engages with the multimedia tool, activating space; the multimedia tool performs space, enhancing physical characteristics that are harder for the body to perceive. Carlo Infante coined the term Performing Media. Here it is reported the encyclopaedical description: "New interactive, mobile and personalized media establish a new human-machine relationship that is increasingly symbiotic, made fluid by ease of use and the perceptual and sensory design solutions, where the haptic interface with a gesture, explicitly extends the body. Interactive technologies thus become performative in direct proportion to the performance of our actions. This is creating a new paradigm for what we define as culture: the relationship between humans and the world is not only mediated by technologies, but involves a sensitive integration".[8]

Carlo Infante's thought aligns with the theories that explore interaction between the human and the non-human. Updating the concept of Postphenomenology introduced by Don Ihde in the second half of the 20th century and proposing an interaction similar to that of the Actor-Network Theory (ANT) developed by Bruno Latour,[9] the practice of Performing Media has specific repercussions in the field of artistic forms that impact the experience of space.

It is thus entirely the opposite of technological determinism and, more specifically, of the uncritical approach to data-driven methodologies: a creative and interpretative relationship is established with the concept of script as understood by Latour (1992), that is, with the prescriptions of behaviour implicitly imposed by technology on humans.

In the practice of Performing Media nature is not built in the device and then experienced by the subject; rather is the environment which is enhanced in its most elusive aspects by the media (Figure 5). This relationship is possible only when a human activity that involves the media is going on, rebalancing the notion of worlding with the reintroduction of the human component.

Various experiences of applying the Performing Media concept, observed in different social, cultural and geographical spheres, are presented below. Basing on the methodological framework outlined in the article, the following examples have been chosen for their

distinctive quality of involving an interplay between the technological device and the physical world. These cases are subsequently analysed in terms of their ability to create an environment that elicits and fosters bodily engagement, not only with the immediate context in which they operate but also through the active utilization of the technological medium itself.

6.1. Teatro Incarnato, Koiné Teatro sostenibile, 2009

The technological activism practice of Koiné and Teatro Mobile deal with the practice of Performing Media: in their acting theatre experience they are equipped with the collaboration of technological tools to augment the acoustic reality of the environments they traverse: through a narrative voice, they exhume the DNA of the sleeping territories they traverse, act within them, and interpret them as a stage, merging with the physical and sonic conformation of the places. This is the case of the experience of the *Teatro Incarnato* proposed by Koiné in 2009. *Teatro Incarnato* means embodied theatre: the experience took place in the ancient amphitheater of Sutri; here, participants with headphones listened at the voice of the ancient roman theatre, who gave them instructions to deal with it, to establish a relation that went beyond the only contemplation of the space (Figure 6). What the voice was saying to the participants was about activating feelings and sensoriality, as they had to compare their smell with the smell of the grass, of the stones, practically with the smell of the theatre. They had then to get in touch with the ground, the walls, the seats, always guided by the instruction coming from the media they were using to explore the space. We can say that rather than ordering existing reality into an artificial cosmology, the action performed by technology in this case is to create unpredictability, surprise and an unthought-of way of approaching archaeological space. The request to come into contact with the remains of the theatre not only runs counter to the way in which historical artefacts are approached, but also provokes a different perception of places and of one's own presence, rehabilitating an enjoyable and engaging playful experience of physical space, an experience that is increasingly entrusted instead to technological escapism, be it a video game, or alienating oneself from current reality by checking one's smartphone.

6.2. Corpo Morbido, Andrea Zampella & Luca Mauceri, 2009

Another example of the practice of Performing Media is the installation *Corpo Morbido*, presented at the RGB 2022 festival in Rome by Andrea Zampella and Luca Mauceri. *Corpo Morbido*, literally "soft body" is composed by a block of clay which is filmed by a

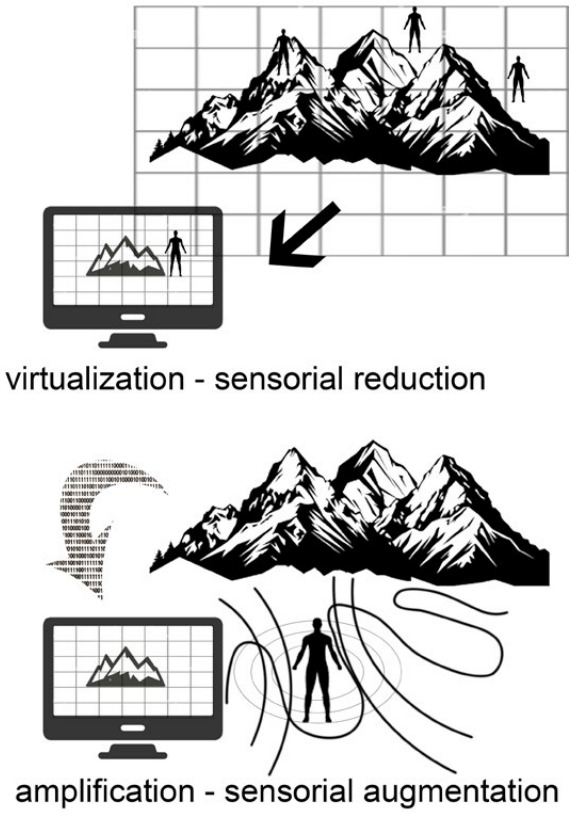

Figure 5 | Media introduces new sensorial possibilities (Source: by the author).

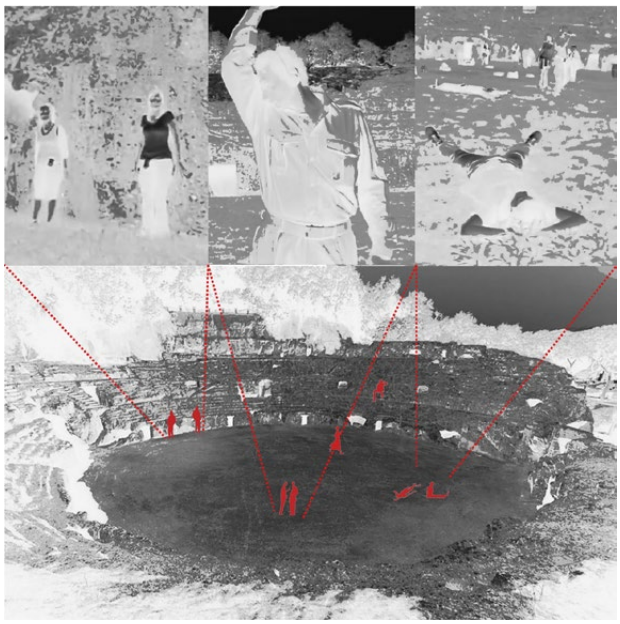

Figure 6 | In the *Teatro Incarnato* experience, no defined choreography was planned. Participants listened to the voice of the theater through headphones and interpreted its instructions with their own gestures, connecting with their own bodies and the body of the theater. (Source: by the author).

Figure 7 | The Ira Keller Fountain in downtown Portland by Lawrence Halprin & Associates (Courtesy of Alex Abboud).

camera and projected on the blind façade of a residential building; citizens are invited to play with the clay, putting their hands on the material and shaping it in different ways, at the same time their hands are projected on the building that changes of conformation every moment, and seems to be touched by the action. Here, of course, that of touching is modifying the city is an illusory impression, but the brain operates a kind of transference from the block of clay to the building. In a way, Zampella and Mauceri's installation seems to reverse the process of visual tactility on which the haptic experience of the metaverse is based. If in Svankmajer's provocations, in fact, the visual image through synaesthesia becomes tactile perception, in *Corpo Morbido* it is through touch that one has the impression of modifying the image, although the frustration of not seeing the manipulated building collapse or crumble under the blows of one's own hands certainly remains.

6.3. Digital Water Pavillon, Carlo Ratti, 2008

On an architectural level, the dynamics of the *Digital Water Pavilion* designed by Carlo Ratti and Walter Nicolino for Zaragoza Expo 2008 is interesting. The Pavillon is a flexible and multifunctional space that uses water as an architectural element. As described on the architect's website 'the walls are composed of digitally controlled water droplets, which can generate writing or patterns or accesses to spaces. Years earlier, the Canadian landscape master Lawrence Halprin used water to animate the spaces he designed. One example among many is Portland's public spaces, built with the intention of bringing the Columba River into the urban fabric, re-proposing the dynamics, both natural and human, that are associated with the life of the river (Figure 7). The result of Halprin's design is a space where it is practically impossible to remain still and impassive in front of the cascades of water that now fall thunderously into the fountain below, now flow in winding, gurgling rivulets in the volutes of the canyon of

monoliths arranged by the architect. It is in itself a space that calls for play and a physical relationship with the elements.

Now it is not known whether Carlo Ratti's group was aware of the dynamics generated in Halprin's spaces, what is certain is that the result of the *Digital Water Pavilion* was similar to that of Portland's spaces. In fact, when the mechanism that regulates the water went haywire, unpredictable sprays of water replaced the controlled progression of surfaces that opened elegantly as visitors passed by. People, initially surprised, took a short time to take the opportunity to play with the structure gone mad, revealing the possible dual nature of the work (Figure 8), which, while on the one hand was self-regulating with a computer, domotic and photoelectric control system, on the other employed a natural element that stimulated the corporeity of those passing by.[10]

6.4. CARNE y ARENA (Virtually Present, Physically Invisible), Alejandro G. Inarritu, 2017

A different form of hybridization compared to the previously discussed examples can be observed in the installation *CARNE y ARENA (Virtually Present, Physically Invisible)* by Alejandro G. Iñárritu, presented at the Fondazione Prada in Milan in 2017. The analysis focuses on the second of the three experiences offered by the work, which most directly engages with the human-machine paradigm. In this instance, the phenomenality of reality collaborates with the virtual scenario accessed by the viewer through a VR headset; yet, there is a notable sense of relief in not being physically impacted by what is visually perceived: in the installation one is intensely projected into a fragment of the journey of a group of immigrants in the act of crossing the border between Mexico and the United States. They walk, guided by a coyote, until the police swoop in and a helicopter hover menacingly over the scene. At that point a blinding beam of light, the sound of the engine and the screams of armed soldiers shouting orders sow panic and chaos. The sensation of visual tactility provoked by the traumatising events and phenomenology in the videos is combined with a real physical tactile experience. The viewer, equipped with a visor, is enveloped by the desert wind, which, in addition to being reproduced through the audio speakers of the visor, is also a current of air that invades the room. Also, the spectator has his or her bare feet on a sandy ground, which projects the body and spirit in a real way into the Mexican desert and on which he or she is induced by events to run to escape capture. Counterbalancing this tactile condition of presence is the programming of the visor that makes the spectator's body disappear, so that he cannot even see his hands, symbolising in a very strong way the sense of invisibility

Figure 8 | The dual nature of the *Digital Water Pavilion*. The sensor recognizes the presence of a body and opens the wall to let it pass (above); a human body attempting to pass under the water wall before it gets wet (below). (Source: Courtesy of Ramak Fazel).

that stigmatises those who migrate. As Adriano D'Aloia writes in his review of the work, phenomenologically, there is a repeatedly paradoxical dynamic. "it is a hypercorporeal but incorporeal experience: although it literally invests the spectator's corporeity, it eclipses it in its own device, generating a conflict between tactile and visual stimuli"[11] (Figure 9). The work has such a physical and psychological impact that access to the auditorium is subject to the signing of a disclaimer stating that one is aware that 'the experience may involve risks of a certain severity: physical, mental and health damage, such as nausea, disorientation, dizziness, vertigo, convulsions, kinetosis, physical discomfort in general, headaches or anxiety, pain, suffering, temporary or permanent disability and/or emotional blockage".[12] Interviewed, Inarritu states that his intention 'was to experiment with VR technology to explore the human condition and overcome the dictatorship of the frame, through which things can only be observed, and reclaim the space necessary for the viewer to experience the immigrants directly in their shoes, under their skin and inside their hearts"[13].

Figure 9 | In *CARNE y ARENA (Virtually Present, Physically Invisible)*, the viewer is equipped with a headset that projects them into an artificial scenario where they are invisible: the headset prevents them from visually perceiving their own body. At the same time, the viewer interacts with physical elements present in the room, such as the sand they walk on barefoot and the wind. (Source: by the author).

7. Conclusions

The examples presented were chosen to highlight the possibilities offered by a certain use of the technological device, constituting a basis for a technologically integrated design that can counteract the risk of detachment and alienation from the physical environment.

In all the case studies, a conversion of the viewer into the figure of the spect-actor[14] takes place. Those who engage with the works are, in fact, both consumers and authors of the contexts: the works emphasize or exalt an aspect of reality that is otherwise invisible or barely visible; at the same time, they suggest and empower the viewers to connect with the contexts in which they arise, to modify them, to perceive them, and to interact.

However, a distinction must be made between the three case studies where technology integrates with physical reality, generating or enhancing dormant sensations of the context (*Teatro Incarnato*, *Corpo Morbido*, and *Digital Water Pavilion*), and the last one presented, *CARNE y ARENA (Virtually Present, Physically Invisible)*, where it is the phenomenology of physicality that makes the virtual setting the participant is projected into more plausible and perceptible.

The concept of worlding takes on different characteristics in the two cases: the first three case studies make the viewer of the works effectively a co-author of the context they inhabit, being able to freely colonize and connect with the Amphitheatre of Sutri in *Teatro Incarnato*, overturning the perspective they knew and learning a new way of inhabiting matter, generating a changing and mutable urban backdrop according to the impulse of the clay sculptor in *Corpo Morbido*, projecting, with a significant leap in scale, human limbs onto the bodies of the city, and finally, rediscovering a new mode of interaction with the walls of the architecture in *Digital Water Pavilion*, tuning their actions to an ordered or disordered movement of the material and sensitive surface. In contrast, in *CARNE y ARENA (Virtually Present, Physically Invisible)*, the perception of being a co-author of reality is only apparent. The limits of the technological narrative scenario are evident: those who experience the work can only endure the events that happen, with no possibility to influence or alter them. While participation may seem apparent, passivity is actual.

In conclusion, while the integration of virtual technologies into architectural practice reveals a profound potential to augment the perceptual and functional dimensions of space, it is essential to reassert the foundational value of architecture as a real, tangible experience. The advent of spatial simulation technologies is transforming the approach from “look-don’t-touch” to “interact-don’t-touch,” turning architecture into an increasingly ethereal and conceptual matter. Interpreting the new possibilities introduced by devices in relation to the physical characteristics of places could, on the contrary, expand the choreographic role of physical space, reinforcing the current of thought of interaction design, within which James J. Gibson (1986) coined the term *affordances*, and Halprin defined the *Motation* system.

The device thus becomes a tool for revolutionising and enhancing the human experience, embracing the revolution that McLuhan announced: from a visual, perspectival, linear world to an acoustic, multicentric, diffuse, yet real world.

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Notes

[1] Playwright, actor, essayist, and French theater director, author of the manifesto for the 'Theater of Cruelty,' coined the term 'virtual reality' in 1938.

[2] Neuralink is the latest in a series of invasive medical technologies that monitor, control and intervene in the body's natural mechanisms, resolving specific pathologies. The field of research is now receiving a great deal of attention and is increasingly extending to neuronal connections, leading to great reflections on bioethics as well. Also in the same family is the cardiac pacemaker, now fully integrated into society

[3] Six years before the Colossus produced by Alan Turing in 1944.

[4] In agreement both with the more empirical and sensory theories expressed by Pallasmaa in Eyes of the Skin Architecture and senses, whose title Schroter's contribution recalls, and with the neurological medical evidence from which anthropologist Ashley Montagu starts his volume Korpekontakt in which he examines the connections between the lack of physical contact during childhood and the development of certain diseases, and the tendency to expose oneself to certain natural elements such as sun and water understood as biological and social activities.

[5] https://www.independent.co.uk/news/uk/home-news/metaverse-sexual-harasment-assault-racism-b2015741.html

[6] In industrial robotics, the three-dimensional space that defines the boundaries within which a robot can work successfully is defined as the robots' envelope.

[7] The concept of anaesthetisation of danger is addressed by philosopher Roberto Esposito in his reflections in Immunitas. Protection and Denial of Life. The book's thesis is that in order to immunise us from the danger of death, humanity has incorporated the principle of it. This results in anaesthetised and anodyne spaces in which life is increasingly algid.

[8] http://www.performingmedia.org/

[9] Following the idea that technology and humans co-create experiences, highlighting their mutual agency in shaping reality (Latour, 2007).

[10] Further documentation can be found in the official video of Digital Water Pavilion, accessible at https://www.youtube.com/watch?v=C5pw354oHIM.

[11] https://www.fatamorganaweb.it/virtualmente-presente-fisicamente-invisibile-carne-y-arena-alejandro-inarritu/

[12] Prada Foundation policy to be read before accessing the experience

[13] https://www.fatamorganaweb.it/virtualmente-presente-fisicamente-invisibile-carne-y-arena-alejandro-inarritu/

[14] Spect-actor' is a Augusto Boal coinage to describe a member of the audience who takes part in the action in any way; the spect-actor is an active spectator, as opposed to the passivity normally associated with the role of audience member.

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