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UNDERSTANDING SPACE IN VIDEOGAMES

METHODOLOGICAL CONTRIBUTIONS FROM ARCHAEOGAMING AND GEOFICTION

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Abstract

This paper posits that archaeogaming and geofiction are hermeneutic adaptive tools to examine space in videogames. This approach can extend the geometrical and analytical understanding of space in videogames. The geometrical understanding of space means a reduction of space's concept into lines and points. Although the results are useful to designers, it is insufficient for a deeper understanding of space. Therefore, a theory is needed that nuances interpretations about space in videogames.

Thus, archaeogaming applies archaeological methods and theories to the study of digital games, offering a novel approach to deciphering the spatial narratives embedded within virtual worlds. Geofiction expands the discourse by exploring the speculative and imaginative aspects of spatial representation in videogames through elements of geography. Thus, archaeogamers and geofictionists can examine the ways in which developers use space to evoke emotions, convey narratives, and engage players in immersive experiences.

Keywords

archaeogaming, geofiction, hermeneutics, space, videogames

Introduction

In 1995, anthropologist Marc Augé published a book titled, *Non-places: Introduction to an Anthropology of Supermodernity*. In this book, the author claims that space is determined by humans, since they make space the place of living. Thus, the concept of space depends on the meaning of human behavior to inhabit a place. That is what the author calls "anthropological place." This statement means that social life, uses, customs, traditions, and rituals shape the space. Such thoughts are not fremd for an anthropologist.

However, the main understanding of space is related to geometry. The classical roots of the word γεωμετρία reveal its meaning: geo (earth) and metria (measurement). The way to grasp space is to measure it. It is a typical ancient idea that can be easily found in Plato. Between different arguments on *Timaeus*, Plato claims that space is made of triangles.

> "The starting-point is, of course, universally accepted: that fire, earth, water, and air are material bodies. Now, this means that, like all bodies, they have depth, and anything with depth is necessarily surrounded by surfaces, and any rectilinear surface consists of trian-

> gles... These, then, are the principles of fire and the other bodies, or so we assume, since we are continuing to let likelihood, supported by logical necessity, guide our account; if there are any principles more ultimate than these, they are known only to the god and to men who are dear to him." (Timaeus, 53c-53d).

Triangles are the main cosmic shape of space, according to Plato. From Plato to Unreal Engine 5 (Epic Games 2024) it can be said that the best way to study space is by taking a geometrical approach based on triangles. This means that triangles are reliable for constructing intricate 3D shapes, as they maintain consistency during rendering. As such, modern GPUs (graphics processing units) are designed to swiftly process triangles, and consequently, developers capitalize on these optimizations for efficient rendering by employing triangles (Kücklich, 2004). Now, the question is, can a space, understood as just a bunch of triangles, also be an anthropological place?

For an anthropologist such as Marc Augé (1997, 56-57), the anthropological space can also be understood as a geometrical one, since it can be grasped as lines, intersections, points, etc. However, he adds a technical difference to distinguish them, based on the ideas of Maurice Merleau-Ponty. In his *Phenomenologie de la perception*, he draws a distinction between 'geometric' space and 'anthropological space' in the sense of 'existential' space, the "scene of an experience of relations with the world". This idea shapes the whole argument of the book, in order to nuance the meaning of an anthropological place and a geometrical space.

So, the question could be asked under these terms: Which perspective would be useful for games studies in order to grasp the meaning of space: a geometrical or an anthropological one? The aim of this paper is to answer this question, choosing the second perspective.

Geometric space and human space

Almost 20 years ago, Clara Fernández-Vara published a paper explaining "the basic spatial configurations (which) are defined by a few basic features: cardinality of gameplay, cardinality of gameworld and representation (2005). This paper summarizes the current understanding of space in games studies. It claims that just three *basic spatial configurations* are enough to explain how space in videogames works.

Cardinality of gameplay are defined by the axis, which describes the possible movement of the player. So, there are three possible gameplays according to this geometrical understanding of space: One-dimensional gameplay, if the player can move along a single axis (X or Y); Two-dimensional gameplay, if the player can move along two axes, (X and Y, or X and Z); and Three-dimensional gameplay, if the player can move along the three axes, X, Y and Z.

In his book, Prof. Mark Wolf (2001) states that there are "eleven different types of spatial structures or configurations, and ways of representing a three-dimensional space on-screen" (p. 51). His thesis is simple: cardinality orders the space of the gameplay. Cardinality shines as a powerful criterion to classify space because the player is used to be "static" as "zero-point". So, geometrical space gives physical orientation criterion for a body (Nitsche, 2008), and therefore, for the player. In this context it is possible to refer to "up and down" and "left and right" as a game space.

However, Merleau-Ponty claims that the body is the "point zero" of space due to its consciousness. This means that just a body cannot be an absolute reference for every possible coordinate in a system. That is what Ponty calls *human space*. It goes further than the analytical representation of geometrical space and reaches a deeper understanding of the meaning of space. In contrast to geometrical space, human spaces are meaningful and described by the consciousness as a *lived space*. Ponty actually claims that "I never wholly live in varieties of human space, but am always ultimately rooted in a natural

and non-human space" (Ponty 1981, 293). That is not a matter of measurement, but a matter of meaning.

Limitations of analytical understanding of space in videogames

Analythical understanding of space is useful to design videogames, if the space is understood as a *geometric extension*. But it does not definitely fit with human expectations regarding the meaning on space. Thus, it is necessary to attempt a hermeneutical approach to space in videogames. Of course, this is not the first attempt of this kind. There are many and very recent studies about space in videogames from this perspective (Bashandy 2023), (Attademo 2023), and (Sweeting 2023). However, this approach to understanding space in videogames is not new. Previous works have developed this approach years ago (Fernández-Vara, Clara, 2007). Some speak about the *liberation of space in videogames* (Babic, 2007), since it is possible to tackle videogames from different perspectives than analytical ones. *Space and place as expressive categories in videogames* was published by Paul Martin (2011), and it presents an approach to interpret space as *expression* from a hermeneutical perspective. This enables designers to include *allegories of space* in computer games. As Aarseth (2007) stated, space has meaning.

This does not mean that geometrical perspectives are out of trend; on the contrary, there are many studies about analytical and geometrical applications of space for game design and even for game experience. Clara Fernandez (2011) gives many examples of how to articulate both approaches to space in game design, as does Fraser (2011). These ideas are useful when one wants to articulate the notion of space in videogames and the possibilities of artificial intelligence to study physical spaces, as Sabato (2023) demonstrates, and Fraser argues (2015). Analyzing space in video games, therefore, requires accounting for the subjective experiences of players, which adds a layer of complexity to the analytical process. But geometrical space does not enable these subjective experiences of space in videogames

(Leirfall, 2013). In addition, video games provide multimodal experiences, incorporating not only visual but also auditory and haptic elements to create immersive environments (Jenkins, 2006). In summary, one of the most significant limitations in analyzing game spaces is the unpredictability of player agency and emergent gameplay. Players often have the freedom to explore, interact, and manipulate game spaces in ways that designers may not anticipate (Cabañes, 2013). Understanding how player agency influences spatial experiences requires a nuanced approach that acknowledges the dynamic interplay between player actions and game spaces, not only in physical spaces, but also in digital ones (Newman, 2004).

As an answer to these limitations, this paper presents a hermeneutical approach to the notion of space, in order to enrich the notion of space from an academic perspective.

Geofiction and archaeogaming as hermeneutical approaches to space in videogames

It is possible to define geofiction and archaeogaming as two new branches of the humanities, in the framework of hermeneutical tools of human sciences, as Palacio and Guajardo have shown (2022): archaeogaming and geofiction are two possible ways to tackle space in videogames from new perspectives.

Geofiction

The concept of geofiction was coined by the French geographer, Alain Musset, to describe a methodical approach, from geographical strategies to fictional spaces (Musset 2009). Geofiction transcends traditional disciplinary boundaries, intertwining elements of geography, literature, art, and game design to create immersive environments that captivate deeper meanings of space, however it is represented. So, geofiction explores the intricate relationship between human cultures and their environments, illuminating the

ways in which fictional geographies reflect and influence real-world landscapes and societies. This is the main idea of geofiction:

> Since it is impossible to transmit the reality that surrounds us without passing through representations, the only possible objectivity lies in the explicit recognition of the value systems that order our way of seeing and thinking about the world – within the framework of a true hermeneutics of geography (Musset, 2018, p. 123).

Musset illustrates this notion through an insightful analysis of the vibrant Coruscant, the famous city-planet in Star Wars. In his book, *From New York to Coruscant: A Geo-Fiction Essay*, Musset gives a reinterpretation of espace, based on science fiction, portraying it as a bold projection and magnification of tangible societal issues. Throughout the pages, Musset uncovers striking parallels between the fantastical realms of Star Wars and the earthly constructs upon which they draw inspiration. Acknowledging Star Wars' pivotal role in the global dissemination of images, models, and cultural archetypes, Musset sheds light on the intricate *dance* between urban landscapes and societal dynamics. In short: it is possible to shed a light on the modern spaces reading the many representations of the game space in the cultural production.

Archaeogaming

Archaeogaming is the study of video games as archaeological sites, treating virtual environments as cultural artifacts worthy of examination. This approach considers video game spaces as repositories of cultural, historical, and social significance. By applying archaeological methodologies such as excavation, documentation, and interpretation, archaeogaming allows researchers to uncover the layers of meaning embedded within game worlds.

The founder of this methodology is Andrew Reinhard (2018), who authored *Archaeogaming: An Introduction to Archaeology in and of Video*

Games. Reinhard led the archaeological excavation in 2014 at the Alamogordo landfill in New Mexico, USA (2014). This excavation confirmed the burial of thousands of video game cartridges by Atari in 1983, which by this point had become a legend. Many cartridges of 'ET' were found, a bad game that led to the company's bankruptcy. This excavation was the perfect context in which to question the relationship between archaeology and videogames. And the answer was *archaeogaming*.

Reinhard's thesis holds that, just as physical artifacts enable insights into past societies, the material culture of video games provides clues about the people, practices, and values associated with their creation in modern times. For Reinhard, archaeogaming involves analyzing in-game objects, structures, and landscapes to reconstruct the virtual past and explore the socio-cultural contexts in which games are produced. So, "Archaeogaming could be considered a part of video game studies just as it is a part of archaeology" (p. 13), since "Video games are both: artifacts and sites" (p. 88).

Geofiction and archaeogaming as a hermeneutical tool for games studies

In the videogame, *Rise of the Tomb Raider* (2015), Lara Croft is on a mission, and going through a glacial cave in Siberia. Suddenly, she notices a Byzantine ship frozen vertically on the wall of the cave. Thus, Lara Croft can go inside the ship by walking along the mast.

Figure 1: *Screenshot in game of* Rise of the Tomb Raider.

Why is there a Byzantine ship hanging inside a cave in Siberia? The easy answer is to avoid the question and blame the imagination of designers. It is not false, but this does not show the meaning of space. The presence of this ship in this game is totality justified: an ancient prophet of Constantinople had sailed to the north to find the Divine Source, an artefact with the power to give immortality to his owner. The ship hangs on the wall due to a weather disaster, but the sailors no longer needed the ship because they had found the sacred artifact. This is the plot, which explains the presence of the Byzantine ship in the game.

But it is possible to delve further and ask why some prophet of the Byzantine Empire should travel so far as Siberia. There is no historical evidence that suggests that people from the Byzantine Empire were ever in this part of the world. It is just imagination. But following the ideas behind geofiction and archaeogaming, it is possible to reconstruct the meaning of this space, even if this is just a space made by a fantastic imagination, as Antonie Bailly claims (1995).

Since this paper holds a hermeneutic perspective of geofiction and archaeogaming as tools to understand the space in videogames, it is possible to modify the structure of the *hermeneutic circle*, adapting it to needs of geofiction and archaeogaming.

At its core, the hermeneutic circle emphasizes the interconnectedness between the parts and the whole, suggesting that one's under-

standing of the whole is informed by an understanding of its individual components, and vice versa. This circular movement characterizes the iterative and recursive nature of interpretation, wherein the interpreter continually revisits and refines their understanding through a dialogical process.

Geofiction, over the schema of hermeneutic circle could be seen as follows:

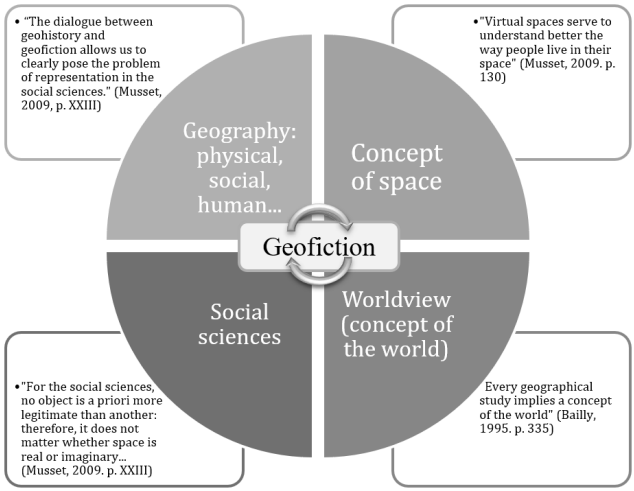

Figure 2: *Scheme of geofiction over the blueprint of a hermeneutic circle.*

Reading this schema in terms of the hermeneutic circle, it is possible to analyze the meaning of space. So, let's discuss the Byzantine ship in *Rise of the Tomb Raider.*

Figure 3: *Concept art of* Rise of the Tomb Raider.

Geography: In the context of the game, the physical geography of the Siberian region plays a significant role. Siberia, known for its harsh climate and vast expanses of wilderness, serves as the backdrop for Lara Croft's exploration. There is no reason to find an ancient ship there from the time of the Byzantine Empire, but the ship is there. So, players expect to find some additional information around the ship about Byzantine Empire and its population.

Concept of Space: The concept of space in this mission extends beyond mere physical dimensions. In games in this series, it is common to switch between spaces by traveling through a cave or swimming in a lake. In Tomb Raider, there is no nuance of spaces: a snow-capped mountain can be found beside a jungle. In this context, the vertical ship frozen against the wall of a cave represents a unique spatial anomaly, but is not unexpected within the game world. It challenges conventional notions of space by defying gravity and traditional modes of navigation, but at the same time, provides context to the question, why there is a ship there?

Figure 4: *Screenshot in game of* Rise of the Tomb Raider.

Worldview: The discovery of the vertical ship prompts players to reconsider their worldview within the game. It challenges preconceived notions of what is possible within the confines of space and time. At some point, a Byzantine ship hanging over an abyss in Siberia may seem unrealistic. And of course it is, but this is the main idea of fictional spaces: not to be a copy of actual and real space, but to transform it. This allows to transform the question from geohistory to geofiction. There raises the question, what if the Byzantine Empire did extend as far as Siberia?

Social Science: The presence of the unlikely suggests the presence of the supernatural. Its discovery guides players to contemplate the ways in which human societies interact with their surroundings, and the lasting impact of their actions. The ship serves as a relic of a bygone era, hinting at the technological prowess of ancient civilizations. The vertical ship serves as a focal point for Lara Croft to question its significance within the broader context of Byzantine history, in the framework of the game. So, analyzing the space of the vertical ship unveils a complex interplay of geography, concept of space, worldview, and social science, shaping a new meaning of cultural space. Inside the ship are some objects that reveal their Byzantine origin, and at the same time, show how the sailors adapted to new environments.

And here is where archaeogaming fits with geofiction.

Since this fictional representation challenges players to confront

the collision of ancient civilizations, the players, as Lara Croft, navigate this enigmatic space, and are compelled to reconsider their worldview, grappling with the mysteries of history. This exploration transcends mere gaming escapades, inviting players to ponder the broader implications of geographical representations, where a fictional Byzantine ship is hanging in a remote area of Siberia.

According to Andrew Reinhard, archaeogaming shares some tools and methods with traditional archeology: "What does it mean to "dig" within a game? Is there a dirt archaeology equivalent? This section outlines tools and methods as it raises issues that make archaeogaming different from more traditional fieldwork" (2018, 108). He describes tools to do archeological research "in-game" and lists five of them: 1. The so-called "in-game drones": like photo mode. 2. Modding: "Archaeologists can create these mods, or better yet they can partner with members of the modding community who can create mods based on specs provided by archaeologists" (2018, 109). 3. Standardized grid overlay: that indicates the drawing and placing of objects in the space "in-game," to understand why some objects are there and others are placed closer or farther. 4. Measurement: the author discusses Smart-Measure of space and time "in-game." Measurement establishes the limit between what has meaning and what does not. 5. Probes: "probes could be used to map areas of a game not yet visited by the archaeologist, reporting locations of finds or structures, possibly recording geotagged images of them as well as a video of the trip" (2018, 110).

Since archaeogaming views games as "site and artefact" at the same time, it is possible to delve deeper to understand the meaning of the objects that can be found in game. To achieve this, it is important to define the archaeogaming methodology. Andrew Reinhard describes it in five steps: 1. Conservation purpose; 2. Documenting digital worlds; 3. Synthetic "excavations"; 4. Documentation, chronology, and location; 5. Synthesis and publication (2018, 113-124). Given these five steps, it is possible to redraw the hermeneutic circle in terms of archaeogaming:

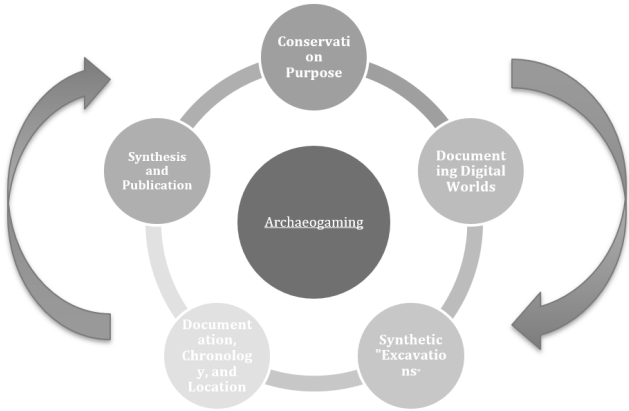

Figure 5: *Scheme of archaeogaming over the blueprint of a hermeneutic circle.*

Conservation Purpose: The conservation purpose in this context would involve understanding and preserving the digital representation of the Byzantine ship within the game environment. It aims to conserve the virtual artifact as a piece of digital heritage, ensuring its accessibility for future study and enjoyment, and as a reflection of the impact of the cultural representation on the Byzantine era. The game itself provides some evidence, or artefacts, of the *conservation purpose*, like collectibles.

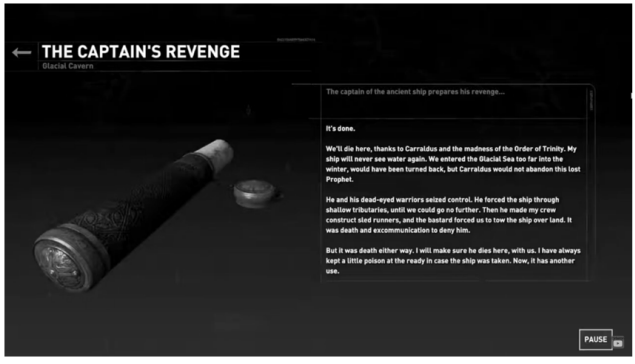

Figure 6: *In-game screenshot of* Rise of the Tomb Raider.

Documenting Digital Worlds: This step involves thoroughly

documenting the digital world of the game, including the virtual representation of Siberia and the Byzantine ship. It requires capturing screenshots, videos, and other digital artifacts that depict the ship and its surroundings within the game environment. There are a lot of gameplays on many platforms to fulfill these archeological documentation needs.

Synthetic "Excavations": In the archaeogaming context, synthetic "excavations" refer to the process of exploring and analyzing the virtual landscape to uncover insights about the Byzantine ship and its significance within the game narrative. This step implies examining the historical and cultural context of the ship, as well as its portrayal within the game world.

For instance, in the game experience, collectibles can be found that provide the background story of the situation in game:

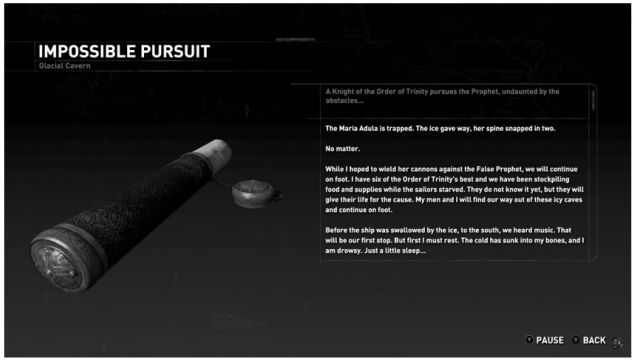

Figure 7: *In-game screenshot of* Rise of the Tomb Raider.

Documentation, Chronology, and Location: This step focuses on documenting the findings from the synthetic excavations, establishing the chronology of the ship's history within the game, and determining its spatial location within the Siberian environment. Lara's surprise at finding the ship is the beginning of this documentation. She notes some thoughts in her diary, creating a comprehensive record of the ship's digital representation and its contextual placement within the game world, which the player can read. There are many elements inside the ship that serve only as decoration.

However, these elements represent what can be understood as "Byzantine" while playing the game.

Figure 8: *Screenshot in game of* Rise of the Tomb Raider.

Synthesis and Publication: Finally, synthesis and publication involve synthesizing the insights gained from the archaeogaming analysis of the Byzantine ship, and sharing them with the wider scholarly and gaming communities. This step attempts to distinguish the meaning of "Byzantine" in this game, compared with its meaning in other games.

Conclusion

In conclusion, this paper has articulated a compelling argument for the methodological significance of archaeogaming and geofiction in the study of space within video games. Through the application of the hermeneutic circle framework, both approaches emerge as powerful tools for navigating and interpreting the intricate spatial landscapes inherent to digital gaming environments.

In the context of geofiction and archaeogaming, researching space in game studies holds principal importance for several key reasons. Firstly, as video games continue to evolve and grow in complexity, the spatial dimensions of virtual environments play a crucial role in shaping player experiences and narratives. Understanding how space is constructed, represented, and navigated within

games provides insights into the design principles, cultural influences, and player interactions that contribute to the overall gaming experience. From the thesis of Marc Augé to the insights of Andrew Reinhard and Alain Musset, space reveals itself as an important category of the human studies. Since videogames are the current way to produce and symbolize space, it demands a starker epistemic theory to justify research on space in games studies (Günzel, 2008b). This paper holds that geofiction and archaeogaming, based on an interpretation of the hermeneutic circle, can provide this foundation.

Archaeogaming offers researchers a means to unearth layers of historical, cultural, and geographical significance embedded within game worlds. By engaging in digital "excavations," scholars can uncover hidden narratives, explore the evolution of virtual spaces over time, and shed light on the ways in which spatial representations shape player experiences. On the other hand, geofiction serves as a creative and imaginative extension of the hermeneutic circle, enabling researchers to envision and explore alternative spatial realities within the context of video games. Through the act of world-building, geofiction invites scholars to reimagine space, challenge conventional boundaries, and speculate on the possibilities of virtual environments. In this sense, both archaeogaming and geofiction, as hermeneutic adaptations of the hermeneutic circle, could be useful for researchers, who can embark on a journey towards a deeper, more nuanced understanding of space in video games. Investigating space in video games enables exploration of broader socio-cultural themes and phenomena. Some of these topics may be regarded as “superficial” or “dummy,” but this is a matter of meaning at the core of social sciences. According to Musset:

"For the social sciences, no object is a priori more legitimate than another: it is the posed question that gives it meaning. Therefore, it does not matter whether space is real or imaginary, as long as the research allows us to question our analytical tools and initiate a reflection on our civilizations...Virtual spaces often reflect and comment on real-world issues such as urbanization, globalization, environmental degradation, and social inequality. By analyzing

spatial representations within games, scholars can uncover implicit messages, ideologies, and power dynamics embedded within game worlds, thereby shedding light on broader societal discourses and dynamics. (Musset 2009, XXIII)

Moreover, researching space in games facilitates interdisciplinary dialogue and collaboration across fields such as geography, anthropology, architecture, urban studies and even philosophy (Günzel, 2008a). Geofiction and archaeogaming, in particular, offer innovative methodologies for studying virtual spaces, drawing upon principles of world-building, landscape analysis, and historical interpretation. By bridging the gap between digital and physical spaces, these approaches open up new avenues for interdisciplinary research and creative exploration. So, and in conclusion, researching space in games studies, particularly within the frameworks of geofiction and archaeogaming, is of paramount importance in understanding the multifaceted role of space within video games. By delving into the spatial dimensions of game worlds, scholars can uncover rich insights into game design, cultural representation, socio-cultural dynamics, and educational potential, thereby enriching our understanding of both digital and physical spaces in the contemporary digital landscape.

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