FROM CONCEPT TO EXHIBITION: ON THE CREATIVE PROCESS OF AN AI-DRIVEN STEREOSCOPIC VIDEO INSTALLATION

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ABSTRACT

This paper explores the creative process surrounding *spectral spaces*, an AI-driven video installation that reinterprets stereoscopic imaging through contemporary digital techniques. By combining generative AI with optical principles, the work challenges conventional visual perception, creating an unstable, fluctuating field of engagement. The installation adopts a structured viewing approach that encourages an individualized interaction, heightening awareness of the act of seeing. Through a juxtaposition of historical apparatuses and algorithmically generated imagery, it examines the evolving relationship between materiality and digital intangibility. Audience responses gathered during its exhibition provided insights into the perceptual dynamics at play, revealing how the interplay of stereoscopy and artificial intelligence fosters sustained exploration and introspection. The findings suggest that this approach not only expands the expressive possibilities of stereoscopic media but also raises critical questions about the mediation of vision through technology, illustrating how reimagined historical techniques can inform and transform contemporary artistic practices.

Keywords: AI-generated imagery; Expanded stereoscopy; Binocular rivalry; Visual perception, Abstraction.

1. INTRODUCTION

The convergence of artificial intelligence (AI) and historical visual technologies has opened new pathways for artistic exploration, particularly in video art and immersive media. The installation *spectral spaces* was conceived within this framework as an anachronistic device that evokes the past through its stereoscopic viewing element, while the act of peering structures the present as an active engagement with the image, and the future—or its conceptual projection—is conveyed through synthetic moving images displayed on a screen inside the device. The visual experience is accompanied by an immersive soundscape that amplifies the perception of temporal fluidity and the viewer's sense of immersion.

The artwork was presented in Lisbon, at the 11th Doctoral Retreat in Digital Media Arts, organized by Universidade Aberta and Universidade do Algarve. The exhibition provided the opportunity to evaluate the work's overall aesthetic and conceptual impact by observing audience reactions and collecting feedback on their experience.

By integrating generative AI and the perceptual phenomenon of binocular rivalry, the installation challenges conventional modes of visual engagement, positioning itself within ongoing discussions on AI's role in creative digital practices. Central to this exploration is the question of how AI-generated imagery can be meaningfully integrated into artistic processes—not merely as a product of generative systems, but as an active element in shaping perceptual and aesthetic experiences.

This inquiry extends into the realm of *expanded stereoscopy* (Hattler, 2019), a term that refers to the experimental creative exploration of stereoscopic principles through techniques that disrupt traditional three-dimensional spatial perception, such as the use of binocular rivalry to create non-realistic depth rather than merely emulating binocular vision. Hattler (2019, p. 84) asserts that expanded stereoscopy has "relatively untapped potential for artistic expression", foregrounding the possibilities of sensory transformation made possible by technological means.

2. THEORETICAL FRAMEWORK

The conceptual foundation of *spectral spaces* is shaped by a dialogue between historical optical technologies and contemporary digital practices, exploring how visual perception is structured and mediated. This section examines three key aspects that inform the installation's artistic strategies. First, it explores historical modes of visual consumption, particularly stereoscopic devices such as the *Kaiserpanorama*, which mediated individual engagement within a communal environment. Second, it considers the act of peering as a controlled viewing condition that enhances the spectator's awareness of perception, drawing from Duchamp's *Étant Donnés*. Lastly, it addresses the return to materiality in digital art, analyzing how tangible interfaces, such as Andy Lomas's *Digital Chemotaxis*, foster embodied interaction.

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2.1 MODES OF VISUAL CONSUMPTION

The evolution of optical devices throughout the 19th century was marked by the increasing refinement of mechanisms designed to structure visual engagement, shaping how images were perceived and experienced. The stereoscope, for instance, revolutionized the way depth was represented in photographic imagery, immersing viewers in an illusionistic perception of space by presenting slightly offset images to each eye (Wade, 2021a). Yet beyond its technical achievements, stereoscopy introduced a new mode of visual consumption, one that fostered an intimate, individualized engagement.

Among the many stereoscopic and pre-cinematic apparatuses developed in this period, August Fuhrmann's *Kaiserpanorama* stands out as a pivotal innovation that bridged the gap between private and collective modes of viewing. Designed as a public entertainment system, it consisted of a large wooden apparatus equipped with multiple eyepieces arranged in a circular fashion, allowing several spectators to engage with the same series of stereoscopic images simultaneously (Crary, 2001). While this configuration positioned the device within a communal setting, each participant's experience remained fundamentally isolated, as the viewing process was restricted to an individualized interaction through separate lenses. This interplay between shared presence and personal fruition was a defining characteristic of the *Kaiserpanorama*, reinforcing the idea that technology can shape not only the content of visual culture but also the spatial arrangement and viewing positions of audiences (Peselmann, 2016).

This principle of individual engagement within a shared exhibition environment forms a key foundation of *spectral spaces*. Like the *Kaiserpanorama*, the installation fosters a solitary, introspective experience within a public setting, highlighting how technology can mediate the relationship between collective presence and individual perception by establishing a constrained viewing frame.

While both devices regulate how spectators engage and appeal to their interest in novel forms of visual engagement, the approaches to visual content differ significantly. Whereas the *Kaiserpanorama* relied on representational accuracy to transport viewers to distant, exotic locations, *spectral spaces* guides them through sequences of enigmatic structures and spaces, employing AI-generated abstract imagery that enhances the illusion of depth and the phenomenon of binocular rivalry.

Despite these differences in visual representation, both devices share an important characteristic: the invisibility of the underlying mechanism. In each, the technology responsible for sequencing and displaying images is obscured within the wooden structure, preventing viewers from directly perceiving the logic governing the evolving imagery. This deliberate concealment reinforces the illusionistic effect, encouraging viewers to engage with the perceptual phenomena.

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2.2 THE ACT OF PEERING

A central element in *spectral spaces*, the act of peering functions not only as a medium through which the spectator navigates the distinct temporal dimensions embedded in the work—past, present, and a speculative future—but also as a catalyst for visual interaction. This concept draws from Marcel Duchamp's *Étant Donnés*, a three-dimensional tableau concealed behind an old wooden door, visible only from a single, fixed vantage point (Tomkins, 1996). By requiring spectators to look through peepholes—restricting access to a single viewer—Duchamp controls the conditions under which the artwork is experienced, exerting a subtle yet profound influence over perception. The viewer is therefore compelled to recognize that seeing is not a passive act but actively constructed through both the observer and the conditions of observation. In this enforced one-on-one interaction, the subjectivity of perception is emphasized, as the impact of the piece resides in the very act of viewing (d'Harnoncourt & Hopps, 1969).

When conceiving *spectral spaces*, the authors sought ways to engage the audience and stimulate visual interaction while rejecting a purely passive contemplative stance. This was achieved by enclosing the imagery within the lens-based, captivating and enigmatic device shown in Figure 1, which was deliberately crafted to provoke curiosity. Such a design choice, rooted in Duchamp's work, not only intensifies an aura of intrigue but also generates a sense of expectation and a need for discovery, drawing the viewers into an intimate, active process of engagement, now transformed into a deliberate act of interpretation, as they attempt to make sense of the visual composition.

Figure 1. Frontal view of the device installed in the exhibition space. © Authors

Forcing a controlled, private mode of viewing, creates a quasi-isolation state—one of near-total immersion—that fosters an intensely personal interaction. This stands in clear opposition to the communal nature of traditional art viewing, which is typically open and shared with multiple spectators and, as a result, interpretation may be subtly influenced by

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the presence of others. This restricted mode of engagement, as seen in Duchamp's *Étant Donées*, triggers an introspective state that leads the spectators into a moment of self-awareness (Cotter, 2009), in which they focus on their own perception and comprehension of the visual experience, emphasizing their awareness of the active role they play in the meaning-making process and, consequently, their participation in constructing the work's significance.

2.3 THE RETURN TO MATERIALITY

When reflecting on the aesthetic experience of the spectator, particular attention was given to how the images should be presented, recognizing the importance of integrating something tangible to complement the visuals. To explore this concept, Andy Lomas's *Digital Chemotaxis* — an interactive installation presented at Goldsmiths College (Lomas, 2023) — was used as a reference. Its central element is a 19th-century multiview stereoscope positioned on a table, and although there is no indication of the video element being three-dimensional, fully experiencing the artwork requires the spectator to sit and lean forward to peer through the lenses.

To establish a more direct, personal connection with the installation, Lomas repurposed a historical viewing device to mediate contemporary digital content, making it the sole means of accessing the visual composition. When recontextualized, old technologies can offer a tactile engagement with digital imagery, countering the intangibility of most screen-based experiences, often displayed on flat screens and experienced at a distance.

This installation reintroduces materiality through its physical stereoscopic structure, adding sensory depth and complexity that might otherwise be diminished or lost. Its configuration imposes specific bodily and sensory constraints, distinguishing it from more passive modes of engagement: in addition to observing the object, the viewer also actively experiences it, reinforcing the constitutive role of this interaction in fully recognizing the aesthetic value of the work.

Lomas's installation was pivotal in shaping the concept of *spectral spaces*, which adopts a similar strategy by using a wooden stereoscopic viewer that serves both as a functional device—providing the artifact with its interactive nature and serving as a mediator to the digital artwork—and a conceptual bridge between past and future media practices, grounded in its historical significance. This duality positions the viewer within a continuum of technological development, marked by the transition from the analog, mechanical nature of the stereoscope to the intangible, non-material forms of contemporary media art, while simultaneously challenging the spectator to reconcile the tactile, material qualities of the device with the immateriality of digital processes.

This return to materiality reinforces the idea that perception is shaped not only by digital mediation but also by physical constraints, and that the act of positioning oneself to engage with a viewer fosters an embodied experience—one that encourages prolonged interaction and

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deeper visual exploration, in contrast to the ephemeral, fast-paced nature of contemporary digital consumption.

3. INSTALLATION DESIGN AND IMPLEMENTATION

The design and execution of the *spectral spaces* installation were informed by a careful balance between conceptual intent and technical feasibility. The following sections outline the key design decisions and their practical implementation, detailing how stereoscopy was adapted and expanded, how binocular rivalry was incorporated as a deliberate visual strategy, and how AI-generated imagery was selected and refined to support these perceptual effects. Together, these elements form an intricate visual system where perception is continuously negotiated rather than stabilized, encouraging an active engagement with an immersive yet oscillating perceptual field.

3.1 STEREOSCOPY

Stereoscopy is a visual technique that harnesses binocular vision to create an illusion of depth that mirrors the biological processes of human vision (Pickering, 2014). It operates by presenting two slightly disparate perspectives to each eye and relies on the brain's ability to process the differences and construct a sense of three-dimensionality. This method allows visual representations to transcend their two-dimensional constraints, enabling viewers to perceive images with a sense of volume, mimicking real-world depth perception (Flores, 2016a). When precisely aligned, this dual-image configuration produces a compelling effect, wherein certain elements appear to autonomously emerge, surpassing the boundaries of the surface or seemingly projecting outward into the viewer’s space.

Stereoscopy has an inherent intimacy that is further accentuated by the design of the viewer, which, through its optical apparatus, isolates the spectator’s gaze from the surrounding environment, eliminating peripheral vision and external visual references. This enclosed viewing space fosters a sense of voyeurism, as the observer becomes fully absorbed in the self-contained perceptual experience of the device (Flores, 2016b). Peering through the lenses requires a mental construction that invites more prolonged periods of sustained attention and deeper engagement, as focus shifts entirely toward the internal dynamics (Reis, 2016). Rather than being an incidental consequence of the machine’s design, this immersive nature is deliberately structured to direct visual processing exclusively toward the stereoscopic images, intensifying the illusion of depth and making the three-dimensional effect more pronounced and convincing. In essence, stereoscopy employs strategies of illusionism and immersion (Flores, 2016a) that draw the spectators’ attention not only to what is being seen but also to the act of seeing itself, emphasizing how visual perception is structured and mediated through technology.

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The *spectral spaces* installation leverages these principles and strategies, integrating them into a physical structure designed to evoke the experience of 19th-century stereoscopic viewers. The device's wooden structure was crafted incorporating the optical elements from an antique stereoscopic box, similar to the one shown in Figure 2, ensuring the proper functioning of the mechanism by preserving the original focal distances, which enable two images, positioned side by side in diptychs, to be viewed simultaneously through the device.

Figure 2. Portable stereoscopic viewer from the late 19th to early 20th century. © Wikimedia commons

Diverging from conventional stereoscopy, this artwork subverts the spatial coherence of traditional depth perception, pursuing the notion of expanded stereoscopy, as proposed by Max Hattler (2020), to offer new perceptions and aesthetics. Through the deliberate misalignment of abstract AI-generated moving images, it triggers binocular rivalry, producing "improbable, paradoxical stereoscopic spaces" (Hattler, 2019, p. 76).

3.2 BINOCULAR RIVALRY

Binocular rivalry arises when two distinct images are presented separately to each eye, resulting in a fluctuating and unstable visual experience, made possible by the use of stereoscopic lenses, which create the necessary conditions for its occurrence (Blake & O'Shea, 2017). Unlike traditional depth illusions—such as those in conventional stereoscopy—that rely on the brain's ability to merge slightly different perspectives into a unified spatial representation, binocular rivalry resists stabilization, producing a constantly evolving interplay between competing stimuli.

Despite extensive research on the subject, the precise mechanisms governing binocular rivalry remain only partially elucidated (Brascamp et al., 2015). According to experimental studies conducted by Carmel et al. (2010), when confronted with disparate visual information, the brain

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does not synthesize it into a blended perception but instead oscillates, periodically prioritizing one image while the other fades from prominence. This process involves alternating periods of dominance, when one image is clearly visible, and suppression, when the other image is pushed into the background, with each phase lasting for a variable duration. However, suppression is rarely absolute, allowing traces of the suppressed image to persist in conscious awareness and giving rise to mixed perceptual states where elements of both remain partially visible (Carmel et al., 2010). These transitional phases lend the experience a sense of dynamism, ensuring that perception remains in flux rather than resolving into a static configuration. Such inherent instability exemplifies the possibilities binocular rivalry offers as an aesthetic and conceptual tool that artists can actively explore and manipulate within their experimental visual practices (Wade, 2021b).

Unlike traditional stereoscopic techniques, which rely on object recognition to reinforce depth perception, binocular rivalry is particularly suited to abstraction (Wade, 2021b), as it prioritizes form, contrast, and spatial relationships over the identification of representational elements. The installation *spectral spaces* leverages this phenomenon by structuring the visual material as a composition of abstract moving images, introducing gradual transitions and subtle movements that further complexify the viewing experience. The slow, evolving nature of the sequences allows for the rivalry effect to unfold at a natural pace, adding another layer of visual tension. By integrating binocular rivalry as a key perceptual mechanism, the artwork departs from conventional stereoscopy, which typically seeks to replicate real perspectival space with precision, highlighting the potential of stereoscopy for expanded uses that transcend the mere imitation of human binocular vision (Hattler, 2019). Rather than guiding the observer toward a singular, resolved perception, it introduces a state of ambiguity, where images exist in constant competition, and the act of seeing becomes an active process of negotiation. This approach not only expands the possibilities of stereoscopic imaging but also invites reflection on the nature of visual perception itself, emphasizing its fluid, unstable, and inherently subjective characteristics.

Because of individual differences in visual processing, the "spontaneous, unpredictable fluctuations in visual awareness" (Blake, 2022, p. 1) generated by binocular rivalry unfold uniquely for each observer and are not easily described in precise terms (Wade, 2021b). This variability reinforces one of the core conceptual aims of the installation: to create a personal and individual experience that underscores the contingent nature of the visual experience, where meaning and interpretation arise not from the image alone but from the interaction between the viewer's cognitive processing and the stimuli presented.

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3.3 AI-GENERATED IMAGING

The visual elements used in the production of this artwork are part of a broader study (Amorim & Mendes da Silva, 2025) that examines how generative AI models such as Midjourney interpret and process natural language instructions that express subjective intersections between abstraction and video art. This was realized through an extensive phase of exploratory experimentation on the AI platform, involving the testing of different parameters and fine-tuning text-based instructions to guide the model's generative capabilities toward producing images aligned with the study's focus on abstract visuality in relation to moving images. These stages were fundamental in refining the selection of AI-generated images, not only enabling a more precise engagement with the generative process but also opening new avenues for visual complexity, expanding the possibilities of what could be visually constructed within this research context.

Although AI systems do not inherently account for depth perception in the way human vision does, some of the outputs generated by Midjourney exhibited characteristics that suggested an illusion of depth— examples of which are shown in Figure 3 — an aspect that proved decisive in defining the mode of visualization and instrumental in the integration of stereoscopic principles into the conceptualization of the viewing system for this work.

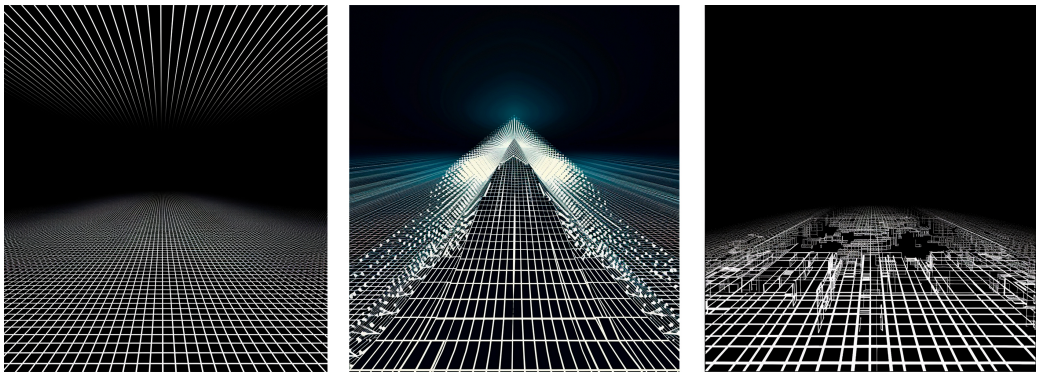

Figure 3. Selection of abstract images generated with Midjourney, showing an illusion of depth. © Authors

Given that AI models generate large quantities of images, and recognizing the need to refine them, a preliminary elimination process was necessary to identify those with a visual structure potentially suited for a stereoscopic experience. This initial selection followed an intuitive approach, prioritizing images that appeared to convey perceptual depth and merited further evaluation. Rather than relying on rigid technical criteria, this process was informed by a sensitivity to how the AI-generated forms could align with the perceptual conditions required by the conceptual intentions of the project.

The role of AI in this creative process is not limited to image generation but extends to defining aesthetic and perceptual dimensions of the work by establishing its visual foundation. The system produces raw material based on textual descriptions and, through iterative engagement it evolves into a co-creative agent (Amorim & Mendes da Silva, 2025)

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within the artistic creation, where human decision-making and algorithmic unpredictability operate in dialogue. This dynamic plays a key role in the conceptual framework of this installation, underscoring how technological processes can mediate the conditions of visual experience. Yet, human intervention remains essential in maintaining artistic coherence, reinforcing the necessity of curation as an active process undertaken to translate the authors' vision into a cohesive visual form.

3.4 CURATION PROCESS

The integration of the AI-generated images into the artwork was not merely a post-production stage but a carefully curated process that actively shaped the aesthetic and perceptual dynamics of the final installation, making it an essential part of the creative process. This curation involved a meticulous selection and sequencing phase, guided by a combination of artistic intuition and perceptual testing within an iterative experimental approach. Oppenlaender (2022) likens such a process to a photographer's editing workflow, in which multiple steps are undertaken to ensure the final series aligns with a specific creative vision.

Given the nature of *spectral spaces*, the selection adhered to strict criteria not only to ensure compatibility with stereoscopic vision and binocular rivalry, but also to establish a compelling visual structure that encourages sustained engagement and exploration, as well as to align it with the conceptual framework of the installation.

The first consideration was the illusion of depth, as only images that conveyed a sense of spatial differentiation were deemed suitable for stereoscopic viewing; flat or overly uniform compositions were discarded in favor of those that reinforced a three-dimensional appearance. Additionally, binocular rivalry optimization played a crucial role in the selection process: image diptychs were evaluated for their ability to produce incomplete suppression, a phenomenon in which elements from both images persist in awareness rather than one completely overriding the other. Combinations that led to the dominance of a single image and disrupted the intended visual outcome were deemed unsuitable and excluded. In contrast, visual elements with shared structural characteristics, as exemplified in Figure 4, proved more effective in sustaining visual ambiguity, enabling variations to emerge through the continuous interplay of competing images.

While selecting individual images was crucial, achieving coherence within a sequence was equally important, requiring careful attention to the formal relationships between visual elements. Some degree of structural similarity proved essential in facilitating smoother transitions and ensuring consistency in movement and composition across frames, yet still allowing for perceptual variation. This logic guided the organization of the visual work, which materialized as a video composed of seven sequences, each comprising two to four stereoscopic pairs—resulting in a total of seventeen diptychs—deliberately arranged to strike a balance between continuity

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and disruption, enabling visual shifts to occur fluidly while preserving the dynamic instability central to the viewing experience.

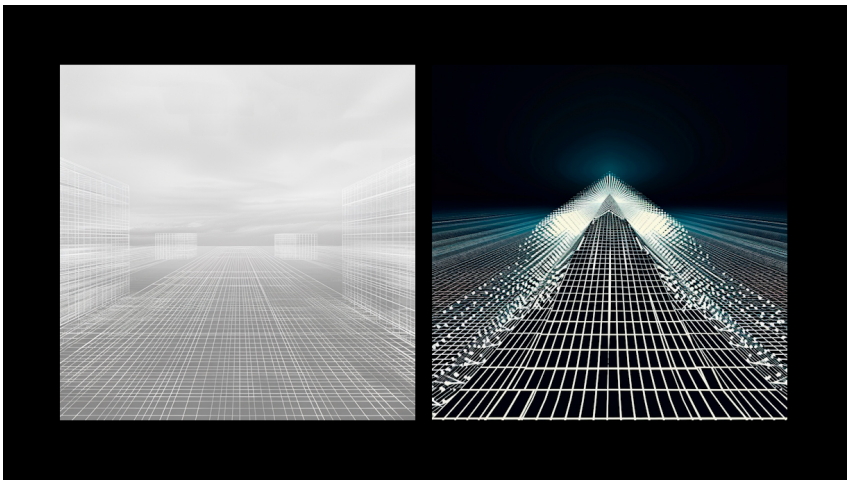

Figure 4. Stereoscopic diptych composed to leverage binocular rivalry. © Authors

Beyond image selection, the curation process extended to the temporal composition and the sound elements of the work. To enhance the perceptual effect, the images were organized into a set of sequences over a total duration of approximately eleven and a half minutes, throughout which the diptychs morph into one another—Figure 5 captures one of these moments—by means of almost imperceptible transitions, whose subtle variations become noticeable only over time. This slow-paced progression allows the rivalry effect to unfold gradually, creating a visual rhythm that avoids abrupt shifts, which could disrupt the viewing experience by depriving the brain of the necessary time to process perceived depth and visual instability. Modulating the rhythm of transitions ensures a sense of fluidity, allowing perceptual alternations to emerge naturally, whereas excessive dynamism could overwhelm the viewer and diminish sustained engagement with the imagery. Similarly, the accompanying soundscape was not merely a background element but an integral component of the installation's immersive environment. Designed to enrich the sensory experience, sustain attention and reinforce the sensation of layered temporality, this audio layer sought to foster a more prolonged engagement with the work.

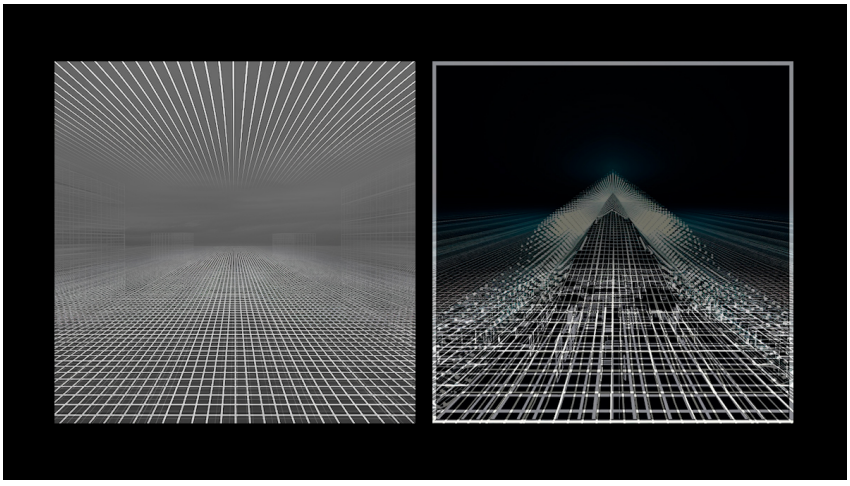

Figure 5. Still from the video showing the stereoscopic diptych in morphing sequence. © Authors

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4. AUDIENCE FEEDBACK

Considering that artworks are central to artistic practice and operate within a context—be it social, political, economic, or cultural—and that the recognition of their aesthetic value cannot be fully realized without audience interaction and engagement, it is essential to incorporate ethnographic tools to assess the feedback loops generated among all participants in the creative process (Leavy, 2015).

In this study, feedback was collected during the opening of the aforementioned exhibition. The hybrid approach used, which combines non-participant observation and unstructured interviews, provides a clearer understanding of how viewers respond to the artifact. These methods are particularly valuable because art is inherently interpretative, with different observers attributing varying meanings to the same work (Leavy, 2015). By capturing this multitude of interpretations, ethnographic tools serve as complementary research instruments, fostering opportunities for the evolution of artifacts through diverse perspectives. In this sense, the dialogue between artwork and audience not only evaluates the current piece but also informs future iterations, thereby reinforcing the collaborative nature of creative practice. As Duchamp (1957/1975, p. 140) asserts, “the creative act is not performed by the artist alone”; rather, it relies on the spectator, whose interpretation shapes and reconfigures meaning, situating the artwork within a broader context where interaction is not passive reception but an active and dynamic process that contributes to defining its aesthetic qualities.

4.1 NON-PARTICIPANT OBSERVATION

Non-participant observation (Creswell, 2009) in an exhibition space allows the researcher to document audience behavior and reactions without interfering with or intervening in the viewing experience. Maintaining an unobtrusive role facilitates the collection of data—such as time spent with the artifact, repeated engagement, or physical interaction—that reflect natural, unprompted responses and can help determine whether the intended qualities of the artwork are effectively perceived and experienced by spectators. In this study, over the course of the observation period—which took place mainly during the exhibition’s opening day—approximately 25 individuals were involved in what can be considered sustained interaction with the piece, not merely glancing at it but spending extended time exploring it in depth.

Analysis of the collected information highlighted the influence of *spectral spaces*’ unique stereoscopic setup and AI-generated visuals on viewer response. Observations revealed that most spectators engaged with the piece for longer than anticipated, with some returning multiple times—drawn both by the apparatus and the dynamic transformations of the imaging. This prolonged attention can be attributed, in part, to the artifact’s design, particularly its stereoscopic configuration, which isolates the visual field by removing peripheral context. By requiring the viewer

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to look through the lenses, the device narrows perception to a confined space, heightening detachment from external surroundings and, thereby, inducing a form of sensory isolation—as illustrated in Figure 6, where an overhead view shows an individual leaning into the device—which allows for extended periods of focus and contemplation. This effect is further reinforced by the audio component: speakers positioned at ear level envelop the spectator in sound, enhancing the immersive experience by deepening the disconnection from the external environment and reinforcing engagement with the artwork.

Figure 6. Overhead view showing interaction with the stereoscopic device. © Authors

As external stimuli fade from awareness, spectators physically adjust to the constrained visual and audio focus, leaning in, steadying themselves on the device, and pausing before withdrawing—body language that suggests deep absorption in the images and emphasizes the immersive quality of the experience. By restricting peripheral distractions, the artifact directs the viewer's full attention to the images, potentially heightening engagement and extending the capacity to sustain attention within a controlled viewing frame.

Another recurrent behavioral pattern was physical repositioning: some viewers stepped back, engaged in discussion with a fellow visitor, and then returned to peer again. This suggests that either uncertainty or curiosity about the dynamic images prompted them to re-examine what they had just seen, not merely as an attempt to confirm perception but as part of an ongoing process of visual negotiation. The interplay between stereoscopic illusions, binocular rivalry, and AI-generated abstract visuals illustrated in Figure 7, presents a perceptual challenge, as the images remain unstable and resistant to immediate resolution. In response, viewers engaged in iterative viewing, actively seeking to reconcile the shifting, ambiguous qualities of the visual composition.

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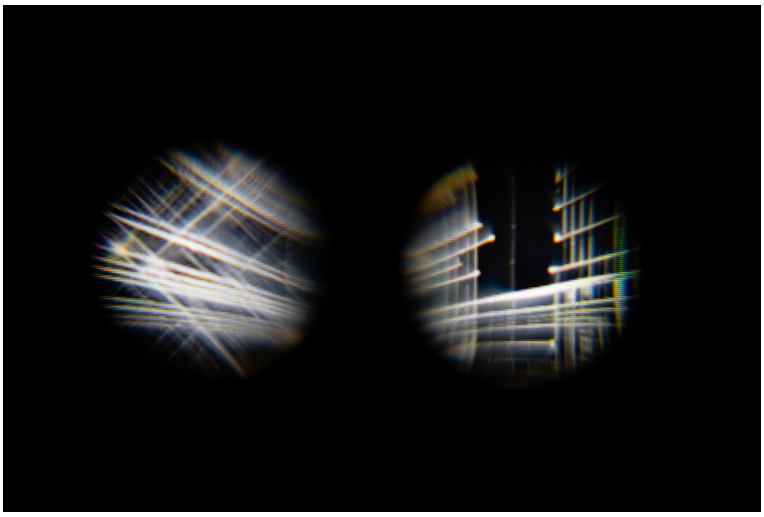

Figure 7.View of the video as seen through the lenses of the stereoscopic device. © Authors

The phenomenon of binocular rivalry itself elicited varied responses, observable through visitors' facial expressions and spontaneous verbal reactions. Many momentarily paused to refocus, blink rapidly, or alternate between eyes, indicating perceptual adjustments to the competing visual inputs the artifact created. While some viewers found the effect captivating, others experienced brief disorientation, reflecting differences in how individuals process conflicting visual stimuli.

4.2 UNSTRUCTURED INTERVIEWS

While observation documents people's actions, unstructured interviews can reveal their motivations and interpretations of the experience (Creswell, 2009). By maintaining an open and flexible format, these predominantly informal conversations offer an environment in which viewers can spontaneously express their thoughts and perceptions, allowing for the emergence of personal narratives and interpretive frameworks. This process deepens the understanding of audience reactions and interactions in ways that structured questionnaires might overlook, generating complementary data that enriches observational notes and may contribute to refining both the conceptual and technical dimensions of the artwork.

To complement the observational findings, informal conversations were initiated, allowing for spontaneous and dialogical exchanges in which participants could articulate their experiences in their own terms. Altogether, approximately 12 individuals contributed reflections that offered a rich spectrum of perspectives, most of which were shared within the exhibition context, while others emerged during the final stages of the project's development. By facilitating open-ended discussion, these exchanges not only helped contextualize observed behaviors but also shed light on the reasoning and subjective interpretations underlying them.

Upon encountering the piece, many participants reported an immediate sense of intrigue, triggered by the unexpected contrast between its traditional wooden stereoscope exterior and the AI-generated

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digital imagery displayed within. Several noted that the artifact's physical interaction mechanism elicited both curiosity and surprise—an attitude exemplified in Figure 8 — identifying it as the primary factor in sustaining their engagement. While most emphasized that the experience extended beyond a fleeting glance, requiring closer examination and encouraging prolonged interaction, some did not immediately perceive the dynamic visuals, leading them to return after realizing that the images were in motion. This suggests that engagement with the artifact unfolds in stages rather than as an instantaneous visual encounter, highlighting its ability to sustain attention over time, as viewers transition from an initial moment of curiosity to a more deliberate process of exploration. These varying levels of engagement illustrate how the installation resonates differently with each viewer, reinforcing the subjective nature of perception. While some immediately grasp the fluctuating imagery, others require an extended interaction before fully registering its effects, revealing how individual cognitive and perceptual differences shape the way the artwork is experienced.

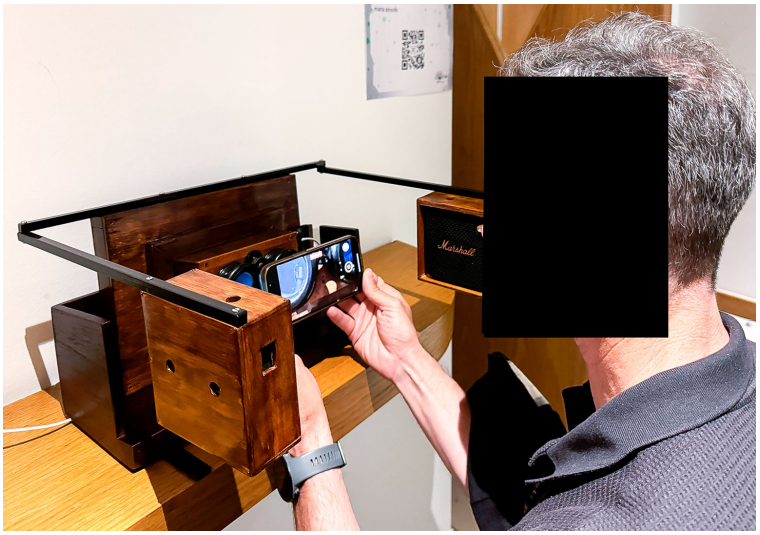

Figure 8. Viewer exploring the device, driven by curiosity about its visual mechanism. © Authors

This variation in perceptual experience became even more evident as participants actively engaged with the device, attempting to make sense of its visual complexity. As they peered into the lenses, many reported a sense of strangeness, which they attributed to two key factors: the nature of the images themselves and the challenges posed by the visualization process. Participants described the visuals as "floating" or "flickering" in space, hinting at a pervasive sense of instability—a phenomenon they all struggled to articulate. They appeared intrigued by the shifting relationships between overlapping forms, which prevented a fixed, singular reading of the image. The idea of perceptual ambiguity was further supported by descriptions of certain elements appearing to detach from the pictorial surface, creating the illusion of depth and spatial displacement. This instability, however, was not experienced uniformly: as anticipated, although most participants reported changes in visual perception, some encountered greater difficulty in viewing the "spectral" images. This variability aligns with the expectation that visual

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capacity plays a determining role in shaping the individualized interaction the artwork is designed to provide. These accounts illustrate the dynamic visual interplay at work, where fluctuating spatial relationships and competing visual layers contribute to an experience that challenges the viewer's ability to form a stable and unified image.

Beyond its formal and optical effects, the artwork provoked deeper intellectual curiosity, also serving as a catalyst for critical reflection on digital tools in contemporary creative practices. Discussions about generative AI emerged naturally, particularly regarding its role and implications in artistic production. Viewers were especially drawn to the contrast between the stereoscope's historical function as an analog optical instrument and the presence of the algorithmically generated images. This juxtaposition led several participants to question the technological processes behind the piece, suggesting that curiosity could also be triggered by the tension between historical and contemporary modes of image production. Their reflections further demonstrated an awareness that the artifact was not merely a visual spectacle but a technologically mediated experience.

5. FINAL REMARKS

By incorporating stereoscopy, binocular rivalry, and AI-generated abstraction, the installation *spectral spaces* challenges the stability of vision, transforming the act of seeing into an active, fluctuating process rather than a passive reception of images. The optical device generates artificial and enhanced perspectives beyond ordinary human perception, establishing specific conditions that direct the viewer's gaze in a controlled manner. This process encourages reflection on how the senses—particularly sight—and our understanding of reality are mediated by technological apparatuses, reinforcing the idea that perception is not a fixed, universal experience but a dynamic negotiation shaped by both technology and individual cognitive differences.

The feedback gathered from audience interaction underscores the effectiveness of the strategies employed. The findings suggest that expanded stereoscopic techniques, when integrated with AI-generated imaging, can function not only as aesthetic tools but also as conceptual mechanisms for interrogating the role of vision, technology, and materiality in contemporary media art. Moreover, the contrast between the analog stereoscopic device and the digital, algorithmically generated imagery raises critical questions regarding the intersections of historical media and contemporary computational aesthetics. By framing AI not as a mere tool but as an active participant in the creative process, *spectral spaces* contributes to broader discussions about the evolving role of generative systems in artistic production, particularly in how they mediate and transform human-machine collaboration.

Ultimately, this exploration demonstrates that by revisiting and expanding pre-digital visual technologies, it is possible to develop new artistic methodologies that challenge established perceptual paradigms.

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The combination of materiality, illusion, and computational abstraction in *spectral spaces* opens new possibilities for both video art and expanded stereoscopy, reinforcing the idea that technological affordances represent creative opportunities that can shape new ways of seeing in a digital age.

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