RESEARCH ARTICLE

VISUAL COMMUNICATION IN NEW MEDIA NARRATIVES: A COMPUTATIONAL THERMAL DRAMATURGY ANALYSIS OF 'DEATH STRANDING'

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This study complies with research and publication ethics.

Abstract

Digital games, as one of today's most effective new media narrative environments, transform audiences from passive recipients into interactive experiencers. This study examines Hideo Kojima's *Death Stranding* (2019) as a visual communication plane in which cinematic aesthetics are reproduced in a digital environment. The main objective of the study is to reveal how the use of light, colour, and atmosphere in the game structures the emotional messages conveyed to the player. In this context, the game's visual language was examined within the framework of the 'thermal dramaturgy' model proposed and used in the research. Twenty-three key scenes representing the game's narrative flow were analysed using a Python-based image processing library (*OpenCV*), and the RGB colour intensities and visual heat values of the scenes were converted to numerical data. The algorithmic data confirm that cold (blue/grey) colour codes symbolise 'isolation and uncertainty'. In contrast, warm (amber/orange) colour codes symbolise 'connection and hope' as part of a systematic communication strategy. The study reveals that the atmosphere in new media environments is a visual communication tool that can be measured using computational methods.

Keywords: new media, visual communication, *Death Stranding*, thermal dramaturgy, game atmosphere.

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ARAŞTIRMA MAKALESİ

YENİ MEDYA ANLATILARINDA GÖRSEL İLETİŞİM: ‘DEATH STRANDING’DE HESAPLAMALI BİR TERMAL DRAMATURJİ ANALİZİ

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Bu çalışma araştırma ve yayın etiğine uygun olarak gerçekleştirilmiştir.

Öz

Dijital oyunlar, günümüzün en etkili yeni medya anlatı ortamlarından biri olarak, izleyiciyi pasif konumdan çıkarıp etkileşimli bir deneyimciye dönüştürmektedir. Bu çalışma, Hideo Kojima’nın *Death Stranding* (2019) oyununu, sinematik estetiğin dijital ortamda yeniden üretildiği bir görsel iletişim düzlemi olarak ele almaktadır. Çalışmanın temel amacı, oyundaki ışık, renk ve atmosfer kullanımının, oyuncuya iletilen duygusal mesajları nasıl yapılandırdığını ortaya koymaktır. Bu bağlamda, oyunun görsel dili literatüre önerilen ‘termal dramaturji’ modeli çerçevesinde incelenmiştir. Araştırmada hesaplamalı görsel analiz yöntemi kullanılmıştır. Oyunun anlatısal akışını temsil eden 23 anahtar sahne, Python tabanlı bir görüntü işleme algoritması (*OpenCV*) aracılığıyla analiz edilerek, sahnelerin RGB renk yoğunlukları ve görsel ısı değerleri sayısal veriye dönüştürülmüştür. Elde edilen algoritmik veriler, soğuk (mavi/gri) renk kodlarının ‘izolasyon ve belirsizliği’, sıcak (amber/turuncu) renk kodlarının ise ‘bağ kurma ve umudu’ simgeleyen sistematik bir iletişim stratejisi olarak işlediğini doğrulamaktadır. Çalışma, yeni medya ortamlarında atmosferin hesaplamalı yöntemlerle ölçülebilen bir görsel iletişim aracı olduğunu ortaya koymaktadır.

Anahtar Kelimeler: yeni medya, görsel iletişim, *Death Stranding*, termal dramaturji, oyun atmosferi.

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Introduction

The digital age has increasingly blurred the boundaries between different creative fields such as cinema, architecture, and game design. Video games have internalised the visual language of cinema, as Lev Manovich (2001) points out, transforming it from a viewed object into an experienced 'new media' environment (Manovich, 2001). In this transformation, games have evolved from merely interactive entertainment tools into complex design spaces where spatial-experience strategies and visual-communication codes are reproduced. The structure of the game space, which positions the player both as a subject of a narrative and as an active part of the scene, makes it one of today's most dynamic platforms in visual culture. In this context, digital games are now interpreted as design structures that translate the classical cinema concept of 'mise-en-scène' (staging) into an interactive communication model (Bordwell & Thompson, 2013).

This design evolution is clearly observed in Hideo Kojima's *Death Stranding* (2019). Kojima's approach takes the relationship between cinema and games beyond a superficial visual similarity to a deeper level of 'new media aesthetics'. In this production, grounded in Henry Jenkins' (2004) concept of 'narrative architecture,' the game space is not merely a backdrop for events but a fundamental communication tool that conveys the story to the player. *Death Stranding* combines the visual sensitivity of film directing with the interactive nature of game design, transforming topography, atmosphere, and lighting into more than just functional navigation tools; they become narrative 'nonverbal communication codes'. The way rain (timefall) accelerates time. It transforms the environment, or fog limits the player's field of vision, creating ontological uncertainty, demonstrating how the atmosphere is integrated into the story's dramatic structure. This design strategy, parallel to Simon Niedenthal's (2009) distinction regarding game lighting, positions light not only as a visual source of information but also as a sensory play that the player physically feels and as a tool for an 'aesthetic of uncertainty' (patterns of obscurity).

This atmospheric structure is built through the systematic relationship between the elements of space, light, and colour. Game spaces function as digital counterparts to traditional film scene staging practices; however, here the player's position and movement are as decisive as the camera's framing decisions. Thus, *Death Stranding* transforms cinema's watchability-based aesthetic approach into a 'designable and calculable emotional experience space'. The fundamental issue here is how the game's atmospheric design structures the emotional messages conveyed to the player, particularly through light temperature and colour intensity. While the existing literature mainly addresses cinematic influence at the level of narrative or character representation, how atmosphere functions as a 'measurable means of communication' has not been sufficiently clarified. In this context, the ontological position of atmosphere, as stated in Gernot Böhme's (1993) aesthetic theory, is neither solely in the game's source code nor in the player's mind; rather, it is a 'quasi-objective'

phenomenon established and felt in the 'inter-space' between the two.

This article addresses this gap through a hybrid approach that combines computational visual analysis and qualitative semiotic analysis. Using the example of *Death Stranding*, the study proposes that light and colour temperature (Kelvin) are a systematic code that guides the player's emotional journey and discusses this structure within the framework of the 'thermal dramaturgy' model proposed in the literature. Within the context of 'new media aesthetics', the research analyses the game's visual order using algorithmic data, revealing how cinema's spatial narrative tools are transformed into a communication strategy in the digital environment.

The findings show that the atmosphere in digital games is not merely an aesthetic choice; it is an active communication component that generates meaning through a thermal spectrum ranging from cold to hot. In this respect, the study aims to provide a new theoretical and methodological framework, supported by computational methods, at the intersection of cinema aesthetics and game design.

In this context, the study makes three primary contributions to the field of new media studies and game aesthetics. First, it introduces the concept of thermal dramaturgy as a theoretical framework for understanding how atmospheric elements such as light, colour, and spatial composition structure emotional communication in digital games. Second, it demonstrates how computational visual analysis can quantify atmospheric design through RGB-based measurements. Third, by combining algorithmic analysis with qualitative semiotic interpretation, the study proposes a hybrid methodological approach for analysing visual communication in interactive narrative environments.

Research Questions

- RQ1: In the context of new media aesthetics, how does the atmospheric design (space, light, and colour) in the game *Death Stranding* transform the visual codes of cinema into communication strategies?
- RQ2: How does the thermal dramaturgy model proposed in this study conceptualise changes in light and colour temperature (Kelvin) within the game space as a narrative structure?
- RQ3: How do computational visual analysis data validate that atmospheric intensity and colour codes guide the player's emotional experience (isolation/connection)?
- RQ4: How does cinema's traditional understanding of 'mise-en-scène' evolve into an interactive and measurable visual communication language in the digital game environment?

Scope and Limitations

The design relationship between Hideo Kojima's 2019 game *Death Stranding* and cinema has been evaluated within the framework of new media aesthetics and visual communication theories, focusing on the spatial, lighting, and colour components that establish the game's atmosphere. The study focuses not on the game's overall narrative, but rather on how these visual elements translate into a communication strategy within the context of the thermal dramaturgy model proposed in the literature. The colour temperature, light intensity, and compositional elements in scenes where the cinematic effect and atmospheric transitions are most strongly felt have been analysed.

For this purpose, 23 key scenes were selected through purposeful sampling from high-resolution (4K) 'no commentary' gameplay videos available on the *YouTube* channels *MKIceAndFire* and *Shirrako*. The study is limited to a mixed-design approach in which visual data are examined using both qualitative (semiotic) and quantitative (computational) methods. In technical terms, the source code of the game engine (*Decima Engine*) or 3D modelling data were not included in the analysis; however, RGB colour and heat analysis were performed using *Python*-based image processing algorithms (*OpenCV*) to reveal the mathematical equivalent of the visual composition (Bradski & Kaehler, 2008).

Since the research focused solely on a single sample (*Death Stranding*), the generalizability of the findings to other game genres is limited. Furthermore, the study did not employ methods such as surveys, ethnographic observation, or biometric data tracking (e.g., eye-tracking) to measure the psychophysiological effects of the atmosphere on the player. In this context, the aim is to reveal how the cinematic atmosphere design in *Death* Stranding is transformed into visual communication codes from a computational and design perspective.

Method

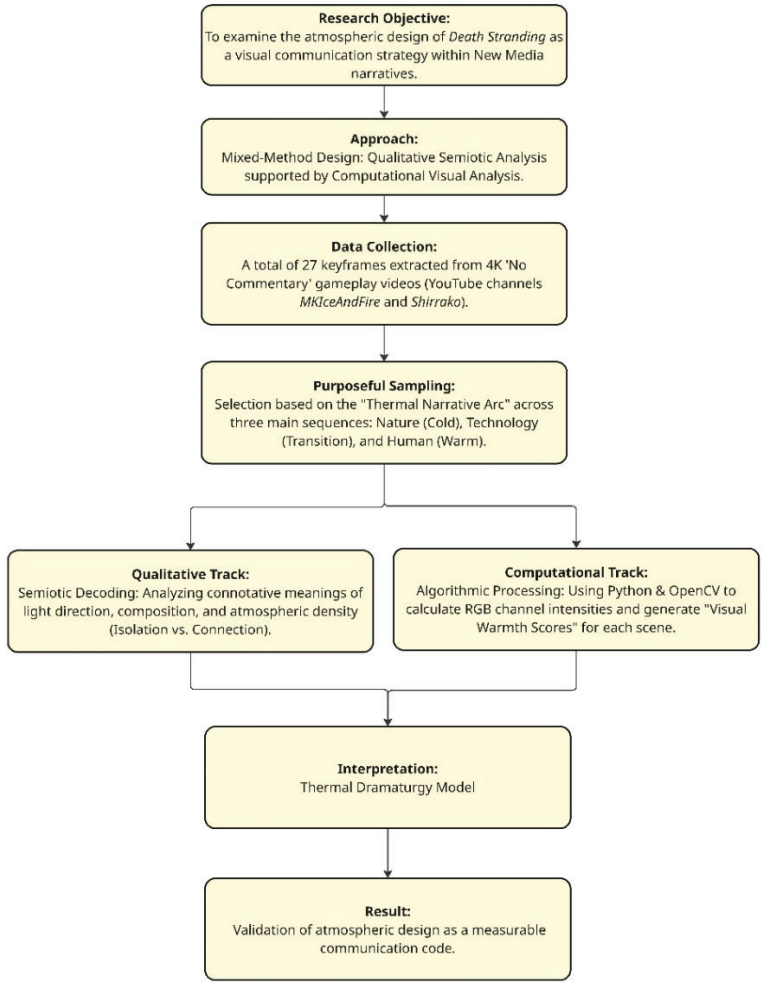
The research framework is built on a hybrid structure that combines qualitative semiotics and computational visual analysis to test the measurability of atmospheric design (*Figure 1*). The dataset consists of 23 key frames representing nature (cold), technology (transition), and human (warm) sequences, determined by the narrative's thermal dramaturgy rather than by a standard sampling approach. In selecting the sample, clean frames with minimal game interface (HUD) elements, or those where cinematic effects were dominant, were preferred to prevent colour data from being contaminated (noisy) by interface graphics.

The analysis process deepened traditional film reading by adding an algorithmic layer implemented in *Python* and *OpenCV* (Bradski & Kaehler, 2008). In the qualitative phase, the semantic correspondence between light and com-

position along the isolation-connection axis was analysed; in the quantitative phase, Visual Temperature Scores were generated by calculating the RGB channel intensities for each scene. In this calculation, the 'Normalised Difference Index' (NDI) was used to measure the thermal dominance between the Red (R) and Blue (B) channels of the images, independent of lighting intensity (brightness). The formula used is as follows:

Here, e represents the pixel intensity of the blue channel. The raw data obtained from this process, ranging from -1 (Fully Cold/Blue) to +1 (Fully Warm/Red), was linearly transformed to a 0-100 scale to make it easier for the reader to understand. Because Kelvin requires calibrated physical measurements, this study defines visual temperature as the perceived warmth estimated from the RGB channel dominance (R–B) via the NDI.

Figure 1. Research method flow



Theoretical Framework

In the visual history of digital games, cinematic realism was initially attempted through Full Motion Video (FMV) technology, i.e., integrating pre-recorded images into the game. However, this method remained limited by its static nature, which placed the player in a passive viewing position (King & Krzywinska, 2002). Today, this understanding has given way to a dynamic aesthetic, namely the post-FMV aesthetic, shaped by the power of game engines. With this transformation, digital game aesthetics have evolved from an external interface that mimics cinema to an internal structure where cinematographic codes are processed algorithmically. In this context, games, as indicated by Bolter and Grusin's (1999) concept of 'remediation', reproduce cinema not only as a visual source but also as a 'design-based mode of thinking' dissolved within its own digital ontology. Lev Manovich (2001) defines this situation as cinema becoming a cultural interface in the digital environment, removing the camera from its role as a physical recording device and turning it into an algorithmic viewpoint. This transformation forms the basis for understanding synthetic realism evident in productions such as *Death Stranding* (2019); cinematography is a dynamic process constructed in real time by the game engine's physics rules, lighting simulations, and player interaction. In this dynamic structure, the game space becomes more than a passive backdrop for the action; it transforms into the primary narrator of the story within the narrative architecture conceptualised by Henry Jenkins (2004). Game spaces, as seen in *Death Stranding's* desolate topography and atmospheric design, replace cinema's concept of 'mise-en-scène' with environmental storytelling. The player's experience of the cinematic atmosphere can be grounded in Espen Aarseth's (1997) concept of 'ergodic literature': an active construction that requires 'non-trivial effort' to consume. Alexander Galloway (2006) and Mark J. P. Wolf (2002) discuss this participation in the context of interactive cinema, where the camera is a cybernetic eye sensitive to the player's movements, and the player and the algorithm co-write cinematography. This theoretical grounding underpins the thermal dramaturgy analysis at the heart of the work, which aims to understand the game's emotional codes.

Computational Aesthetics and Data-Driven Visual Analysis in New Media Studies

Computational aesthetics plays a critical role as an interdisciplinary field that bridges science and design, going beyond traditional aesthetic readings to consider the complex structure of visual culture and the immense volume of multimedia data on new media platforms (Bo et al., 2018). This field focuses on algorithmic approaches that enable computers to make human-like aesthetic decisions (Valenzise et al., 2021). Computational aesthetics focuses on the measurement and quantification of aesthetics; this process has evolved from hand-crafted features such as colourfulness and visual complex-

ity (Peng, 2022) to modern methods supported by large, labelled datasets and deep learning approaches (Valenzise et al., 2021; Brachmann & Redies, 2017). These tools are becoming accessible to social scientists; for example, the *Python* library *Athec* can be used to analyse visual message qualities, such as amateurism and originality, in political communication (Peng, 2022), and to understand the antecedents and consequences of aesthetics beyond the content of visual media. Within the context of Computational Media Aesthetics (CMA) (Adams, 2003), which addresses the need to manage large volumes of multimedia data, the Computational Visual Analysis method applied in this study legitimises the quantification of *Death Stranding's* thermal dramaturgy by treating atmosphere as a measurable communication code. The fundamental challenges facing the field are dealing with the inherent subjectivity of aesthetic scores and providing explainable aesthetic predictions (Valenzise et al., 2021). Therefore, combining computational analyses with qualitative approaches from experimental aesthetics (perception, cognition, and emotion) (Brachmann & Redies, 2017) in such studies allows for an integrated understanding of the underlying rules of visual communication.

Literature Review

The evolution of cinematic experience: From video to game engine

The pursuit of cinematic narrative in video games began historically in the 1980s with techniques that integrated pre-recorded footage (FMV) into game design (Perron, 2012). Therrien, Poremba, and Ray (2020) assess this period as an experimental process aimed at resolving the tension between cinema and games. However, Lev Manovich (2001) criticised this structure, stating that static video blocks could not keep pace with the dynamic nature of games (emergent gameplay). With the overcoming of technical limitations, the gaming industry in the post-FMV era shifted towards providing narrative through 3D graphics generated in real time by the game engine rather than video (Browning, 2016). *Death Stranding* (2019) embraces the concept of synthetic realism as a contemporary example of this evolution; cinematography is no longer the director's unilateral editing, but a dynamic process instantly constructed by the game engine's physics rules and light simulations.

The interaction dilemma and the integration of cinematic narrative

The fundamental tension at the intersection of cinema and games lies in the imbalance between the 'watching' (passive) and 'playing' (active) modes. Early cinematic experiments were criticised for reducing the player to a passive viewer of pre-scripted images. Lev Manovich (2001) views this situation as a contradiction of the principles of 'modularity' and 'automation' in new media: fixed, unchangeable video blocks cannot keep pace with the dynamic nature of the game (emergent gameplay). This structural incompatibility has also

been discussed in ludology literature; theorists such as Espen Aarseth (1997) have argued that linear cinematic narratives are contrary to the essence of the game. However, Rune Klevjer (2002) softens this stark distinction, noting that when properly constructed, cinematic elements can serve as a 'reward mechanism' that balances the game's rhythm. According to Klevjer, the problem is not the presence of cinema, but its inability to integrate with player action. This debate laid the groundwork for the contemporary 'playable cinema' aesthetic by arguing that narrative must break free from static video and dissolve into the game engine. From this perspective, Manovich's concept of the language of new media highlights the modular and algorithmic structure of digital environments. In contrast, Aarseth's concept of ergodic literature emphasises the player's active role in constructing narrative meaning through interaction. These perspectives reveal a structural tension between cinematic linearity and gameplay interactivity. Klevjer's approach, however, offers a mediating position by suggesting that cinematic sequences can function as rhythmic narrative punctuation rather than passive interruptions. When properly integrated into gameplay structures, cinematic elements regulate the tempo of player experience rather than limiting agency.

The game engine revolution and cinematic integration

With the overcoming of technical limitations, the gaming industry began to deliver cinematic narrative not through video, but through 3D graphics generated in real time by the game engine and in this period, also known as post-FMV, pioneering titles such as *Half-Life* (1998) and *Metal Gear Solid* (1998) aimed to deliver a cinematic flow without interrupting interaction by structuring storytelling through in-game scripted events (Browning, 2016). In a technological context, the development of motion capture and photorealistic rendering technologies, as seen in productions such as *The Last of Us*, has ensured that cinematic aesthetics have evolved from being a 'patch' added to the game into an organic structure integrated with game mechanics. As Jamie Russell (2012) puts it, the visual standards envisioned for video games in the 1990s are now rendered in real time by game engines *(Figure 2*).

Figure 2. Historical evolution of cinematic integration in digital games. Examples from Half-Life (1998), Metal Gear Solid (1998), and The Last of Us (2013) illustrate different approaches to embedding cinematic storytelling within interactive gameplay environments.

'Death Stranding': Atmospheric Construction and Synthetic Realism

Hideo Kojima's *Death Stranding* (2019) stands as one of the most mature examples of this evolution, redefining the boundaries between cinematic narrative and interactive game mechanics. In this work, cinematic realism is achieved not through video blocks but through the game engine's real-time processing capabilities (*Decima Engine*). The performances of actors such as Norman Reedus and Mads Mikkelsen were transferred to the digital environment using high-resolution photogrammetry, thereby blurring the ontological distinction

between 'player' and 'avatar'. This technical infrastructure ensures a seamless transition from cut scenes to gameplay, creating a continuous flow that aligns with Lev Manovich's definition of synthetic realism.

The game's narrative structure is based on themes of isolation and connection, which Kojima defines as a 'Strand Game'. The post-apocalyptic story is told not only through dialogue but also through atmospheric design. The use of wide-angle cameras, a hazy/desaturated colour palette, and melancholic music allows the player to experience 'loneliness' directly through the environment. Henry Jenkins' concept of narrative architecture is embodied here; the rugged topography and dynamic weather conditions the player struggles with function as part of the scenario. In a critical context, *Death Stranding* adapts the long-take aesthetic from cinema into game mechanics, inviting the player into a meditative experience. This is an ergonomic process that makes the player physically feel the weight of the atmosphere, rather than pushing them into a passive spectator role (Aarseth, 1997). In this context, *Death Stranding* not only presents an example of playable cinema, where cinematic narrative is integrated with the game engine, but also establishes an intense visual dramaturgy in which light, colour palette, and atmosphere are synchronised with themes of isolation and connection. The foggy, low-saturation landscapes the player encounters, along with the occasional warm, amber-toned scenes, produce an emotional rhythm organised around the narrative tension's ups and downs. This study aims to objectify this visual rhythm within the framework of the thermal dramaturgy model by computationally extracting the thermal colour profiles of the scenes, thereby demonstrating how atmospheric design functions as a measurable visual communication channel in new media narratives.

Findings

This section of the research analyses the atmospheric design of *Death Stranding* within the framework of the thermal dramaturgy model outlined in the 'Method' section. The analysis process presents a two-layered structure consisting of a visual breakdown of 23 keyframes selected through purposive sampling, qualitative semiotic readings, and computational 'Visual Warmth Scores' (VWS). The data obtained has been categorised into three primary sequences that follow the game's narrative thread: Nature (Cold/Blue), Technology (Transition/Neutral), and Human (Warm/Gold) (*Table 1*). This hybrid approach aims to present the game's cinematographic atmosphere not merely as an aesthetic choice but as a measurable, systematic communication code that guides the player's emotional experience (affect).

Table 1. Cinematic and atmospheric analysis of scenes in Death Stranding

Visual	Category	Visual Features	Cinematic Effect
	Atmosphere-Light	Soft, diffused natural light (sun behind clouds). Cool blue-grey tone palette. Low contrast, humid air. Fog and particle density in the background. Rocks serve as a natural frame.	Uncertainty
	Location Lighting	Mountain silhouette in the background, dark shadows in the foreground. The cave interior is almost black; the exterior is hazy grey tones. High contrast, light source comes from outside. Composition is frame-effective (the cave mouth serves as a natural frame).	Transition
	Atmosphere Emotional Intensity	Cold blue-grey tones dominate. Rain (Timefall) brightens surfaces; contrast is low. The background is foggy, the depth is low. The light source is not direct, but diffuse. The figure and the ground are in the same tones, creating a silhouette effect.	Mourning

Visual	Category	Visual Features	Cinematic Effect
	Light Colour – (Technological Glow)	Warm amber-toned light, a central object (baby capsule) glowing on a dark ground. Glass surface reflections and a semi-transparent liquid allow the light to scatter diffusely. The depth of field is narrow, with the focus on the baby's face. The background is in cool blue tones.	Connection
	Atmosphere – Dark / Rain	Low-contrast composition dominated by grey tones. Heavy fog and rain particles. Darkened silhouettes and figures drawn to the ground in the background; limited movement of the foreground character. Weak sense of direction in the image, light source unclear.	Fear
	Space – Time / Destruction	Gray-white tones dominate; fragmented objects are frozen in midair. The figure is in the middle of the frame, drawn to the centre of the composition along with flying debris and fog particles around it. The movement is frozen, creating a sense of a frozen moment in a high-speed scene. Depth is lost, the space is undefined.	Uncertainty

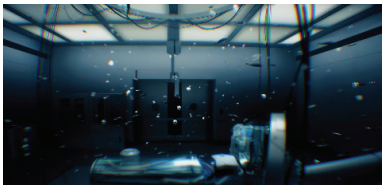
Visual	Category	Visual Features	Cinematic Effect
	Atmosphere–Colour / Contrast	A dense grey cloud texture, smoke, and dust particles create a dark war atmosphere. The rainbow spectrum is inverted (red at the bottom, purple at the top). This supernatural light effect contrasts with the dark composition. Aeroplanes in the background, a soldier figure with bony facial features in the foreground. High contrast, low saturation.	Contradiction
	Symbol – Object / Texture	Cold grey-green tones, low contrast. The focus is on a dirty, worn-out toy doll surrounded by barbed wire coiled in a spiral. The background is shallow, and the light source is above, creating a soft yet threatening illumination. A cyclical structure (the conflict of imprisonment and birth) is at the centre of the composition.	Captivity

Visual	Category	Visual Features	Cinematic Effect
	Atmosphere – Space and Light	A mist-covered, low-contrast gray-blue tone palette. Directionless and diffuse light obscures the shadows. The figures melt into the background tones; individual boundaries are blurred. A vertical rock formation in the background forms the focal point of the composition. The directionless arrangement of the figures increases the spatial uncertainty. The ground is wet and reflective; the distinction between sky and earth is weak.	Solitude / Collective Disconnection
	Atmosphere – Light and Movement	Blue-gray tones dominate under heavy rain (Timefall). The light is directionless; the sky and water surface merge in nearly identical tones. The massive tar creature (BT) occupies most of the frame, disrupting the sense of scale. Surface reflections and particle effects create a digital “hyper-realism” feel. The character rises from the water with limited mobility; the camera angles up from low to amplify the threat.	Chaos / Weight

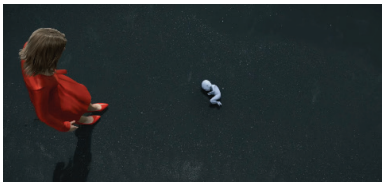
Visual	Category	Visual Features	Cinematic Effect
	Space – Time and Destruction	A wide shot of a sunken city; only the roofs of buildings remain above the water surface. The rain is heavy, the horizon line obscured by fog. Cold blue-gray tones dominate. The perspective is from a high angle, highlighting the character's unsteady gait. The waves on the surface give the impression of swallowing the buildings; the movement of the water and particle effects create a chaotic depth.	Despair / Loss
	Space – Color and Symbolism	In a foggy, cold atmosphere of gray tones, the bodies of giant whales and dolphins lie on the surface of the sea. In the background, mountain silhouettes are covered in fog; the light is soft, directionless, almost a sacred whiteness. At the center of the composition, a woman in a red dress walks; the color contrast dramatically defines the scene's focal point. The black cords stretching across the water in " " symbolize the connection between life and death.	Lost / Sacred Solitude

Visual	Category	Visual Features	Cinematic Effect
	Atmosphere – Alienation and Threat	Gray-blue tones dominate, with amorphous, tar-like masses floating in the sky under heavy fog and rain. Black extensions hanging down from each create both an organic and mechanical impression. The sense of depth is obscured by fog; the perspective is upward, and rhythmically repeating forms render spatial measurement ambiguous. The light is diffuse, its source invisible; the absence of sound and movement renders the scene static.	Apocalypse / Cosmic Alienation
	Space – Scale and Light	A massive tar figure shot from a low angle. The composition is oriented upward; the sky is foggy, and the light source is positioned behind. Golden glints and reflected particles on the surface of the giant figure; the material has an organic, liquid-like texture. Parts of the surrounding structure are suspended in the air; the sense of mass and gravity in the space is distorted. The camera uses a “divine angle” that elevates the threatening figure.	Fear

Visual	Category	Visual Features	Cinematic Effect
	Space – Atmosphere / Dimension	Low saturation gray tones dominate. At the center of the composition is a black void that seems to tear through the clouds, with thin lines (crack- or string-like forms) extending outward from it. The sea surface is motionless, with little reflection. The perspective is central; the viewer's gaze is drawn to the tear's focus. The light source is diffuse, with low dramatic contrast.	Absence
	Space – Composition / Perspective	Wide frame, low contrast, light gray tones dominate. The figure is positioned in the center with its back turned; the horizon line is at shoulder height. The transition between the sky and the ground is almost imperceptible. The figures suspended in the distance emphasize spatial depth while creating a metaphysical atmosphere. The balance is horizontal; there is no movement, giving the impression of frozen time.	Solitude

Visual	Category	Visual Features	Cinematic Effect
	Space – Architecture/ Nature Relationship	A tall vertical structure rises alone in the middle of the natural landscape. The background is pale and hazy, while the foreground is vivid green. The light source resembles morning/ evening light, creating long shadows. The composition is a central perspective, with the structure positioned at the center of the line of sight. The human figure is small, creating a clear contrast in scale with the surroundings.	Sublimity
	Space – Technology / Isolation	A blue-grey colour palette; a high-contrast, sterile interior. Fluorescent lights from above create harsh, directionless illumination. Particles suspended in the air create an underwater feeling—a motionless figure or a mechanical arm at the centre, with cables and metal surfaces around it. The composition is balanced, with a frozen-moment effect at its centre.	Coldness

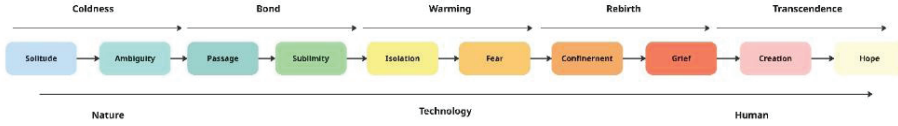
Visual	Category	Visual Features	Cinematic Effect
	Space – Light / Human–Technology Relationship	A narrow, perspective corridor; cold white lights. The figure is centred, with a capsule (BB) glowing yellow-orange in the foreground. The colour contrast is strong: a neutral grey background – a warm focal point. Lens distortion (slight chromatic aberration) lends the scene an artificial sense of reality. The direction of movement is forward; the space is linear and claustrophobic.	Connection
	Light – Emotional Intensity / Death Theme	A dark, dimly lit laboratory environment. Blood splatters on the floor; the figure is motionless and pale. The BB capsule still emits a warm orange glow—the scene's only light. The colour contrast is dramatic: orange–black. The frame is horizontal, shot from a low perspective. Stillness prevails.	Mourning

Visual	Category	Visual Features	Cinematic Effect
	Human – Intimacy / Life Cycle	Soft, warm lighting; orange and beige tones dominate—close-up shot, focused on physical contact. The metal bracelet and gloves symbolise the organic–mechanical contrast. The baby at the centre of the frame creates a protective frame effect, surrounded by hands. Low contrast emphasises emotional calm.	Hope
	Composition – Top View / Meaning Layer	Bird's-eye camera angle; dark background, minimal figures. Woman in red dress, baby in white – symbolic colour contrast (life and death, human and divine). Space dominates the centre of the composition; the distance between the figures carries meaning. Light is neutral, shadows are soft.	Creation
	Space – Light / Scale and Solitude	Spacious interior; industrial window structure, high ceiling. Intense white-green light from behind creates a hazy atmosphere. The figure is silhouetted and appears small relative to the space—cool colour palette (grey, greenish blue). Perspective lines direct the figure to the centre.	Loneliness

Emotional and semantic flow in Death Stranding: Constructing visual heat spectrums through thermal dramaturgy

In-game environments, light, colour temperature, and atmosphere are not only elements of visual composition but also tools for emotional guidance. In *Death Stranding*, this guidance can be defined as a thermal transition progressing along the axis of 'coldness–connection–warming–rebirth.' This article proposes the concept of 'thermal dramaturgy' to define this sensory continuity in which the colour temperature and atmospheric intensity of light acquire a narrative function (*Figure 3*).

Figure 3. Emotional and semantic flow in Death Stranding



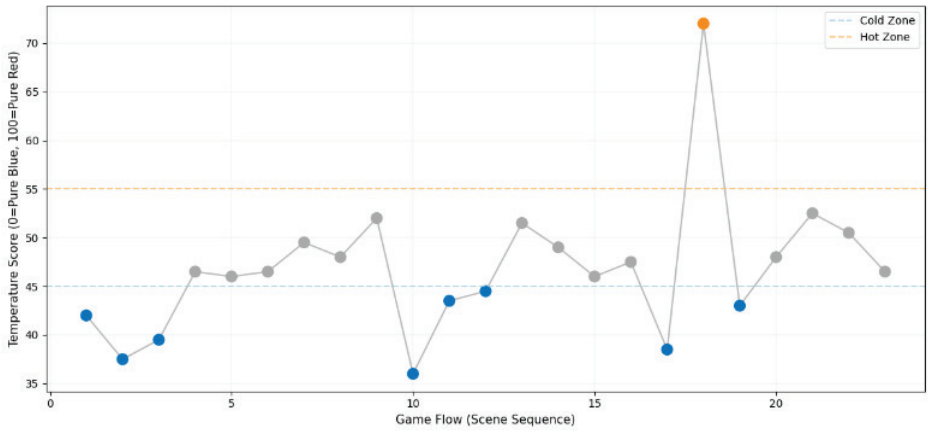
In the literature, dramaturgy has generally been addressed in terms of staging, action rhythm, and character motivations (Carlson, 1994; Galloway, 2006). Thermal dramaturgy, however, expands this tradition by focusing on the affective order-establishing role of visual heat values (warm/cool tone transitions, fog density, diffuse light, colour contrast). Patti Bellantoni's (2005) observations on the power of colour in visual narrative align with this study's findings: the blue spectrum induces physiological slowing and introversion (isolation), while amber and warm tones evoke a sense of temporal expansion and trust (bonding). In particular, the isolation and uncertainty evoked by cold, blue-grey tones and the sense of belonging and protection produced by warm tones determine the game's narrative transformation line.

Table 2. Computational visual warmth analysis and thermal categorisation of Death Stranding scenes[1]

Scene No.	Image Ref.	Warmth Score (0-100)	Dominant Channel	Thermal Category
Scene 1	Image 1	41.91	Blue (Cold)	Nature (Isolation)
Scene 2	Image 2	44.60	Blue (Cold)	Nature (Isolation)
Scene 3	Image 3	38.47	Blue (Cold)	Nature (Isolation)
Scene 4	Image 4	71.73	Red (Intense)	Human (Connection)
Scene 5	Image 5	43.08	Blue (Cold)	Nature (Isolation)
Scene 6	Image 6	47.80	Balanced	Neutral (Transition)
Scene 7	Image 7	52.59	Balanced	Neutral (Transition)
Scene 8	Image 8	50.48	Balanced	Neutral (Transition)
Scene 9	Image 9	46.63	Balanced	Neutral (Transition)
Scene 10	Image 10	37.38	Blue (Cold)	Nature (Peak Cold)
Scene 11	Image 11	39.42	Blue (Cold)	Nature (Isolation)
Scene 12	Image 12	46.48	Balanced	Neutral (Transition)
Scene 13	Image 13	46.11	Balanced	Neutral (Transition)
Scene 14	Image 14	46.36	Balanced	Neutral (Transition)
Scene 15	Image 15	49.45	Balanced	Neutral (Transition)
Scene 16	Image 16	47.88	Balanced	Neutral (Transition)
Scene 17	Image 17	51.83	Balanced	Neutral (Transition)
Scene 18	Image 18	35.91	Blue (Intense)	Nature (Peak Cold)
Scene 19	Image 19	43.58	Blue (Cold)	Nature (Isolation)
Scene 20	Image 20	51.26	Balanced	Neutral (Transition)
Scene 21	Image 21	48.72	Balanced	Neutral (Transition)
Scene 22	Image 22	46.08	Balanced	Neutral (Transition)
Scene 23	Image 23	47.33	Balanced	Neutral (Transition)

[1] Data obtained via Python and OpenCV-based image processing algorithms. Scores are normalized between 0 (Full Blue/Cold) and 100 (Full Red/Warm).

Figure 4. Death Stranding: Thermal dramaturgy analysis (Visual Temperature Score).



This conceptualisation offers a unique theoretical framework for understanding the player's visual and emotional experience within the context of new media aesthetics. The atmospheric transitions in *Death Stranding*, unlike those in classical cinema dramaturgy, can be interpreted as a dynamic, 'thermal' staging form that shifts in sync with the player's actions.

The model presented in *Figure 4* illustrates the parallelism between the game's spatial and atmospheric transitions and its emotional layers. The narrative flow follows a transformation along the 'Nature-Technology-Human' axis. While themes of coldness, loneliness, and uncertainty dominate in the initial stages, human qualities such as bonding, warming up, and rebirth come to the fore in the later sequences.

In this sense, the game's narrative symbolises an emotional evolution that intensifies as it moves from nature to humanity. The player traverses an experiential path stretching from loneliness to hope and from alienation to creation. The colour transitions in the diagram, shifting from cold blue tones to a warm spectrum of yellow and red, are both a visual and a semantic reflection of this transformation. This thermal change signifies both an increase in visual warmth and narrative hope, emphasising the direct interaction between atmospheric design and emotional experience (*Figure 4*).

Discussion

The findings show that the light–space–atmosphere triad in Death Stranding functions not only as background aesthetics but also as a narrative architecture that structures the player experience. The flow proposed in *Figure 3*, 'Coldness → Bond →Warming → Rebirth → Transcendence', is isomorphic with the clusters of affects observed in visual categories (loneliness, uncertainty, transition, grandeur, isolation, fear, captivity, mourning, creation,

hope). This result is consistent with Jenkins' approach, which positions space as the carrier of the narrative: the regime and atmosphere of light determine not only where the actor is in each scene, but also what they should feel.

On the nature axis (loneliness–uncertainty–transition–sublimity), as supported by the data in *Table 2*, diffuse natural light and dominant blue channel intensity produce an epic scale of isolation. Particularly in scenes 1, 2, and 3, which form the play's opening sequences, the Visual Warmth Scores (VWS) remain low at 41.91, 44.60, and 38.47, respectively. The dominant channel is identified as 'Blue/Cold' (Blue-Cold), confirming the player's narrative isolation on a numerical level. In outdoor transitions, natural frames, such as cave mouths, create a 'threshold' effect, while the fog and low saturation in the background slow the flow of time. This construction supports Manovich's thesis that the game's narrative can be explained by the logic of 'spatial journey'. As the player progresses within the frame, they are transported from one emotional stop to another through micro-changes in the light and colour palette.

The atmosphere becomes noticeably harsher when the focus shifts to the technology axis. Overhead fluorescent lighting in sterile interiors, high contrast, and a cold blue-grey palette make isolation the norm. Indeed, scenes 10 and 18 in *Table 2*, representing technological isolation, were identified as the lowest-temperature (Peak Cold) points in the data set, with VWS values of 37.38 and 35.91, respectively. This data proves that the feeling of 'coldness' created by technological spaces in the player is not random. However, in stark contrast to this coldness, the warm amber light islands concentrated around the 'BB capsule' produce a strong emotional focus. For example, Scene 4, with a VWS value of 71.73 and a dominant 'Red Intense' channel, creates the statistically warmest moment in the game. This mathematically demonstrates how powerful a contrast a connection heat of 71.73 is within an ambient coldness of 35.91. Here, a tension emerges that operates through Galloway's conceptualisation of the 'diegetic machine act': even as the player's action continues, the lighting, framing, and colour scheme render the machine's cinematic gesture visible.

On the human axis (grief–creation–hope), warm lighting and close-up shots come to the fore. Contrary to the balanced transition scenes, which generally range from 46-50 throughout the play, the score rises to 52.59 during moments of human contact (e.g., Scene 7), and the neutral balance shifts toward warmth, supporting the visual construction of the theme of hope. Colour contrasts work symbolically in the creation and hope categories. Leaving the capsule's orange glow as the sole light source in mourning scenes creates a feeling of a spark of life wrapped in darkness. From a theoretical perspective, the findings suggest that atmospheric design in digital games serves not only as an aesthetic backdrop but also as a structured communication system that guides players' perception and emotional experience. The thermal

transitions identified in the analysis demonstrate that visual parameters such as colour temperature, light diffusion, and spatial contrast operate as narrative regulators. In this sense, the thermal dramaturgy model proposed in this study expands existing discussions in game studies by showing that cinematic atmosphere can operate as a computationally traceable narrative layer in interactive media environments.

Answering the research questions

The study answers the following questions to test the functionality of the thermal dramaturgy model:

1. In the context of new media aesthetics, how does the atmospheric design (space, light, and colour) in the game *Death Stranding* transform cinema's visual codes into communication strategies?

The game's environment design reproduces the principles of cinema's 'mise-en-scène' through in-engine cinematography: framing, lighting direction, colour temperature, and depth arrangement are constructed in sync with gameplay. In outdoor environments, diffuse natural light, low saturation, and fog/particle density establish feelings of "sublimity" and contemplative solitude. In contrast, indoor environments with overhead, cold, and harsh lighting with high contrast reinforce the aesthetics of isolation. Thus, the environment functions not merely as a backdrop, but as a narrative architecture that governs affect.

2. How does the thermal dramaturgy model proposed in the study conceptualise changes in light and colour temperature (Kelvin) in the play space as a narrative structure?

Findings show that the light–colour–atmosphere structure produces a distinct typology of emotion: The combination of cold diffuse light and fog dampens perceptual depth, triggering loneliness and uncertainty. In contrast, the juxtaposition of a warm focus (BB capsule) and a cold surrounding palette centres on feelings of connection and protection. In this arrangement, light functions as a thermal dramaturgy moving from cold to warm; colour as a semantic emphasis that clarifies layers of meaning; and atmospheric conditions as the narrative's rhythm regulator.

3. How do computational visual analysis data validate the player's emotional experience through atmospheric intensity and colour codes?

The quantitative data presented in *Table 2* and *Figure 3* demonstrate that the game's visual temperature scores align with the narrative flow. The game uses a broad thermal spectrum ranging from 35.91 (maximum cold) to 71.73 (maximum warm). Low-temperature scores (cold/blue) in the 30-45 range in the initial nature scenes rise to the 70 range (warm/amber) at specific points

as the story progresses and bonds are formed. This data confirms that the feelings of 'isolation' and 'connection' created by the atmosphere for the player are not random but are instead algorithmically constructed and measurable design strategies.

4. How does cinema's traditional understanding of 'mise-en-scène' evolve into an interactive visual communication language in the digital gaming environment?

The game establishes a 'navigable frame' rather than a fixed one. Natural framing (cave mouth), perspective axes, and focus management (hot spot/cold background) combine classic staging tools with controlled player agency. The equivalent of camera gestures is environmental cues and movement choreography that direct the gaze. Thus, 'mise-en-scène' becomes an experiential stage economy shaped by the player's participation, rather than a passive viewing-based arrangement.

Evaluation of Findings Within the Theoretical Framework

The findings show that the light-space-atmosphere structure in *Death* Stranding functions not as a passive background but as an active component of the narrative architecture. This spatial-emotional order is directly compatible with Jenkins' "narrative architecture" approach, which underpins the idea that space carries the narrative. The player's gaze and movement become an act of framing equivalent to camera decisions; thus, *mise-en-scène* ceases to be a staged scene and becomes an experienced scene economy.

In the context of Manovich's "new media language," the identified thermal dramaturgy (oscillation from cold, diffuse lighting to warm focal points) and colour-meaning correspondences demonstrate that cinema-derived visual codes are rewritten in a modular, parametric manner within the digital environment. The contrast between the warm focus (BB capsule) and the cold surroundings centralises the feeling of connection/protection, while anomalies such as the inverse spectrum, smoke, and particle density trigger feelings of ethical conflict and cosmic alienation.

In future studies, the visual categories presented in this article can be cross-validated multimodally with temporal measures (contrast change per frame) and psychophysiological indicators (GSR/HRV). Furthermore, testing the proposed Thermal Dramaturgy model across other atmospheric narratives, such as The Last of Us or Red Dead Redemption 2, would increase its generalizability.

Conclusion

The findings, which analyse *Death Stranding*'s cinematic spatial design, reveal

the structural and emotional continuity between the game's new-media aesthetics and cinema's 'mise-en-scène' (staging) approach through the thermal dramaturgy model.

The findings show that the game does not merely imitate cinema's visual codes in its use of space, light, and atmosphere, but transforms them into a computational and interactive communication strategy. While traditional cinematic approaches use light and colour as fixed narrative tools under the director's monopoly, *Death Stranding*, thanks to in-engine cinematography, has turned these elements into a dynamic field of experience that responds to the player's actions. This transformation ensures that the player is not merely a spectator but becomes a subject involved in the atmospheric setup process and experiences the emotional tone (from cold to hot).

The core output of the research, the 'nature – technology – human' axis, demonstrates that the game's narrative structure progresses in sync with visual temperature values (Kelvin/RGB). The initial cold, diffuse, and blue-dominated nature scenes code 'isolation and uncertainty'; while the transition to themes of humanity and connection uses warm, amber, and focused lighting to symbolise 'hope and rebirth'. Thus, the cinematic narrative becomes a thermal journey shaped by the player's movement, unlike the fixed frame in film; light, colour, and atmospheric elements become tools for affective guidance. The game not only reproduces cinema's visual aesthetics in a digital environment but also proposes an original model that expands it through a measurable spatial experience design.

In this context, thermal dramaturgy is proposed not only as a descriptive conceptualisation specific to *Death Stranding* but also as a generalizable analytical method adaptable to diverse digital games and visual narrative environments. The model consists of the following steps: (1) selecting key scenes representing narrative breaking points, (2) extracting colour/light/heat profiles of these scenes through computational visual analysis, (3) contextualizing the obtained values through specific thematic axes (e.g., Nature–Technology–Human, loneliness–connection, threat–security) and (4) contextualizing them through qualitative scene reading. This enhances the method's reproducibility and adaptability for comparative studies across different games. In this context, Thermal Dramaturgy is not only a theoretical framework but also a practical tool that makes atmosphere design a measurable, comparable, and developable design parameter for game designers and visual communication researchers.

Future research could deepen the thermal dramaturgy model proposed in this study along different axes. First, the cognitive and emotional effects of light, atmosphere, and spatial perception on the player experience could be measured beyond visual analysis using psychophysiological (GSR, pulse, etc.) and experimental methods. Furthermore, this study can be expanded to include other productions with strong atmospheric narratives, such as *Con-*

trol (Remedy, 2019), *Alan Wake II* (Remedy, 2023), or *Hellblade: Senua's Saga* (Ninja Theory, 2024), using comparative analysis methods to test the model's cross-genre validity.

Technologically, advanced lighting simulation systems (such as Lumen) and spatial atmosphere generation tools offered by next-generation game engines like *Unreal Engine 5* have the potential to redefine the concept of 'digital mise-en-scène'. In this context, future research on computational atmosphere design may integrate methods such as eye-tracking, affect measurement, and spatial interaction analysis to understand better how players experience cinematic subjectification within interactive environments. Such approaches could contribute to developing a multi-layered research agenda capable of quantitatively revealing the aesthetic, thermal, and psychological effects of game environments.

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