# Comparative Analysis of Visual Effects Deployment in Realistic and Fantastical Visual Styles Across Film and Video Games

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# Abstract

This study explored the distinctive characteristics and functional disparities inherent in visual special effects within realistic and fantasy visual styles across the cinematic and gaming mediums. The comparative analysis discerns divergent purposes through the examination of specific visual elements or effects within representative works. As well as analysing what kind of manipulations they use to achieve such visual purposes. The findings underscore that the contextual medium of visual effects application between realistic and fantasy styles yields disparate outcomes, offering viewers or players distinct experiential encounters. This article elucidates the divergences among artistic styles in the domain of visual effects across varying media, concurrently demonstrating the progressive integration and enhanced efficiency of visual effects production processes across diverse media landscapes, propelled by temporal advancements.

#### Keywords

Film, Video game, Realistic art style, Fantastic art style, Unreal engine, Bullet time,

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#### Introduction

Computer Generated Imagery (CGI) has been assimilated into the fabric of films and various visual mediums since the late 1970s, and the resultant visual effects derived from CGI have evolved into an integral and indispensable element of corresponding visual productions. A substantial corpus of present-day films seamlessly amalgamates real-world cinematography with digital media, thereby augmenting the impact of visual effects (Mendiburu and Mendiburu, 2009 9, p. 2). In contrast, video games depend on the utilization of computer-generated imagery and sophisticated programming to produce each visual constituent. These projects derive inspiration from tangible life experiences while simultaneously transcending reality. Visual effects assume a pivotal role in facilitating the capacity of these products to transcend reality, thereby constituting a vital component for both audiences and players. Different visual styles, employed as effects, serve the objectives of film directors and game designers, sometimes diverging significantly and, at other times, converging seamlessly. The aim of this study is to explore the disparities in the usage of visual effects serving the realistic and fantastic visual styles in the domains of film and video games. Additionally, examining the distinct approaches utilized in these visual styles and analyzing explores the convergence of film and games as a result of the convergence of realistic and fantasy visual effects production processes in the visual effects field. this study seeks to enhance our understanding of the role and impact of visual effects in the realms of cinema and gaming.

# Literature review

The foundational insights into visual effects derive from the theoretical framework of Computer Generated Imagery (CGI) and its historical progression within the realm of stereoscopic digital cinema, as expounded by Mendiburu (2009) in the scholarly work titled *3D Filmmaking: Stereoscopic Digital Cinema from Script to Screen*. This

comprehensive examination delves into the nuanced evolution of visual effects in the cinematic domain. There have been numerous authors in books and papers discussing the definition of visual styles in film and games. The basis of this study is a further discussion with these definitions. Hyerim Cho argues that defining visual styles is highly subjective, and conceptual summarization and classification of different visual styles present significant challenges. This difficulty arises from various factors, including the inadequate development of visual information metadata. On the other hand, Owen Demers, in his book *Digital Texturing and Painting* asserts that it is an ancient tradition in art to describe real-world materials and textures through observation, collection, and study of real or photographic samples. Demers defines six visual genres of digital painting: Realistic, Hyper, Stylized, Simplified, Graphic, and Fantastic. This article focuses on studying the Realistic and Fantastic styles as defined by Demers.

Tomas Dane Wagener in his *Visual Effects and the Test of Time* (2009) elaborates on the difference and distinction between overt versus invisible visual effects. This difference is defined as the difference in style of the intended visual effects of the film. At the same time, he uses *Forrest Gump* as a typical case study of invisible visual effects. Also as an exploration of visual effects in film, Dave's (1999) comprehensive exploration in *Better than SFX* elucidates the theoretical underpinnings of "persistence of vision" and its application in crafting the distinctive "bullet time" effect. The visually impactful elements in *The Matrix*, notably "bullet time," have been characterized by Wanda Strauven (1999) as exemplifying a "cinema of attractions." Strauven's conceptualization suggests that the visual effects employed in *The Matrix* are intentionally constructed to offer discontinuous visual spectacles.

In Juan Miguel de Joya's interview article *Convergences in film and games technology* (2015), the conclusion is drawn that with the emergence of new technologies, video games now have the potential to create dynamic and immersive cinematic experiences. The emergence of real-time software has hastened this transformation, facilitating expeditious iterations. This progress has instigated substantial modifications and amalgamation in the production of visual content within the domains of films and

games. Within this context of integration, issues and findings related to the imperfect categorization of visual styles in delineating video games, as posited by Andy Donovan and other scholars, have been addressed. Using Owen Demers' six visual genres, Andy Donovan and Hyerim Cho propose a unified classification system for describing the cohesive and unifying visual aesthetics of video games. Tero Vääräniemi points out that from a gaming perspective, visual effects are used to provide players with a specific kind of visual feedback. While visual effects offer visual feedback that aligns with the players' imagination, they also serve the purpose of conveying gameplay and game mechanics, often enhancing the overall gaming experience. Tero Vääräniemi's article particularly highlights the first-person perspective as a representative example of achieving this enhanced effect. In the examination of realistic visual effects within the gaming domain, Håvard V's work titled The Spectacular Design of First-person Shooters: Remediating Cinematic Spectacle in Call of Duty: Advanced Warfare and Battlefield 4 (2019) intricately explores the amalgamation of realistic gaming effects simulation and the triumphant visual narratives characteristic of Hollywood's "spectacle" genre. The analysis of Battlefield 4 conducted by him, scrutinizes the convergence of authentic game effects simulation and the visual triumphs emblematic of the Hollywood 'spectacle' tradition. The interplay between first-person shooters and sophisticated game engine simulations emerges as a pivotal factor in amplifying the success of this cinematic spectacle.

In the amalgamation of visual effects technology across the film and video game sectors, Robert Brookey observes a pronounced cinematic evolution in video games. This transformation is attributed to noteworthy technological strides, empowering games to deliver visual effects akin to those found in movies, coupled with intricate narrative structures. An integral facet of this advancement is discerned in the refinement of visual effects. As mentioned in Brookey's work *Hollywood Gamers: Digital Convergence in the Film and Video Game Industries*, the term "spectacle" is defined as the creation of visually and aurally stunning sequences that captivate the viewer. This concept of spectacle is also frequently employed in contemporary video games. Double Negative Visual Effects harnessed state-of-the-art Unreal Engine technology, as elucidated by Huw Evans, the visual effects supervisor at the organization, during an interview conducted by Ian Failes (2022). This utilization facilitated DNEG in adopting a novel methodology for generating the effects in cinematic production.

# Methodology

The purpose of this thesis is to investigate the differences in the usage of visual effects between the Realistic and Fantastic visual styles in the domains of film and video games. The research will predominantly adopt a comparative analysis research approach. The study design encompasses a systematic review of pertinent literature and an examination of extant visual media. Representative samples of films and games, illustrating both Realistic and Fantastic visual styles, will be meticulously selected from various genres and historical periods to ensure a comprehensive and meaningful exploration of visual effects in the field. In-depth visual analysis will be conducted, including the capture of screenshots and video clips, as well as the examination of pertinent research papers on the respective films and games. The comparisons will be divided into three stages. The first stage involves a comparison between films that employ visual effects in the Realistic visual style and games that utilize visual effects in the Realistic visual style. In the film segment, the study will select a film utilizing post-production visual effects to systematically analyze the impact of employing a realistic visual effects style on specific segments and the holistic cinematic experience. Two distinct film clips will be meticulously chosen for comparative analysis, elucidating the nuanced applications of visual effects. A parallel methodology will be applied to the video game segment. Subsequently, the investigation progresses to a comparative analysis between a film employing a Fantastic Vision style of visual effects and a corresponding video game. The subsequent stage involves a brief projection regarding the convergence of visual effects across diverse media platforms, informed by the preceding analyses. Notably, an illustrative case involving the utilization of a game engine for special effects creation in a film will be explored. The anticipated

results of this research are expected to significantly contribute to the understanding of visual effects styles in films and games, potentially providing insights for future development and innovation in this field.

#### Chapter 1. Realistic style visual effects function in film and video games

Realistic visual style visual effects serve as compensatory elements in cinematic productions, addressing inherent deficiencies in the filming process. In the realm of gaming, Realistic visual effects play a distinct role by facilitating the recreation of authentic experiences aligned with the player's imaginative constructs through diverse game perspectives. A prominent illustration of the strategic application of Realistic Visual Effects in cinema is discernible in the case of Forrest Gump, where these effects are deployed to mitigate cinematic limitations and enhance the overall visual narrative. In terms of gaming Battlefield 4 was at the time one of the masterpieces of realistic visual effects. In the cinematic work of 1994, Forrest Gump, a dramatization unfolds, elucidating the life journey of the central protagonist through the lens of self-narration. The film seamlessly intertwines the personal experiences of the character with the historical milieu of the era, fostering an immersive viewing encounter reminiscent of a documentary. In a film with such a high level of realism, there is a large amount of footage that is digitally synthesized into visual effects. These effects serve as a shrewd and effective mechanism for seamlessly integrating the actors into historical footage, thereby imbuing Tom Hanks, the lead actor, with an illusionary historical presence and abilities beyond his actual capacities. A case in point is the portrayal of Forrest Gump



Anti-war speech (Forrest Gump, 1994).

delivering an anti-war speech at the Lincoln Memorial in Washington, D.C., amid a sizable anti-war gathering. This film clip depiction reveals a multitude of individuals encircling the pond adjacent to the Lincoln Memorial. However, only those immediately facing the protagonist share the same frame. The remaining individuals surrounding the pond undergo multiple shots orchestrated by the same actors situated at the forefront, perpetually altering their positions and captured by the identical camera angle. These disparate shots are adeptly composited to create a unified image, effectuating it culminates in the visual deception of seeming to have thousands of people present. In tandem, variations in lighting and sky conditions, attributable to temporal disparities between shots, are meticulously addressed through the recreation and digital manipulation of the entire sky using digital imagery. Furthermore, the film employs visual effects to introduce a reflective monument on the water surface, a feature minimally evident in the original filming. This augmentation, while deviating from reality, aligns with the viewer's imaginative expectations, contributing to the overall cinematic effect of the portraved rally. The second example involved endowing



Table Tennis Competition (Forrest Gump, 1994).

the actor Tom Hanks with world champion-caliber ping pong skills within the film. While Hanks possesses proficiency in ping pong in reality, his skills did not suffice to portray a world champion. To address this limitation, the production team devised a strategy wherein the actor mimicked hitting the ping pong ball to a predetermined rhythm during filming, emulating the speed characteristic of a world champion. Thereafter, a computer-generated moving ping-pong ball was generated and seamlessly integrated into the recorded footage through the process of compositing. To achieve visual congruence with authentic filming, the compositor introduced motion blur to each frame of the ping-pong ball in transit, emulating the substantial movement incurred by a high-speed object captured by a conventional camera across multiple exposures. After completing the compositing of the film footage, sound effects corresponding to the impact and rebound of the ping pong balls were overlaid onto the visual elements, synchronizing not only with the visual rhythm but also with the environmental responses within the cinematic setting (Wagener, 2009). Beyond these exemplifications, Forrest Gump incorporates numerous instances of digitally composited footage, eschewing the reliance on computer graphics for prop or creature construction. This illustrative use of realistic visual effects serves to seamlessly enhance the cinematic narrative. The visual effects employed in this cinematic production were executed within the framework of a realistic visual style to make the viewer unaware that they were considered post-production visual effects. Each special effect within this context was meticulously crafted to rectify the cinematic challenges and deficiencies inherent in the film's cinematography. It doesn't have any visual effects graphics that exist to deliberately show off visual effects technology. Despite the comparatively limited computational power of 1994-era computers, the film, devoid of an explicit need for augmented visual effects content, adeptly fulfills its objectives. The integrative nature of these visual effects within the film serves to transcend temporal boundaries, providing an expansive backdrop for the actors' performances, concurrently refining the viewer's conceptualization of historical depictions and enhancing comprehension and engagement with the film's narrative arc.

The Realistic visual style of visual effects within the gaming domain is intentionally crafted to enhance the visual aspects contributing to player immersion. A noteworthy illustration of this design approach is evident in *Battlefield 4* (Digital Illusions CE, 2013), a first-person shooter game set in the speculative geopolitical context of the year 2020, in heightened tensions between the United States and Russia. Players assume the role of Sergeant Daniel Recker, a member of the American special operations team Tombstone, tasked with averting a major war outbreak. A key point of departure between Realistic visual style games and cinematic visual effects lies in their

implementation through the game engine, with the success of *Battlefield 4* attributed significantly to the "Frostbite 3" engine. This engine exhibits notable prowess in generating environmentally relevant effects, encompassing water simulation, environmental damage, physics simulation, and more. The character perspective inherent in a first-person shooter serves as a simulated representation of the player's viewpoint within the virtual setting of the game. The amalgamation of this specialized perspective with a highly interactive simulation of the environment significantly contributes to elevating the player's sense of immersion during gameplay. A distinctive feature that underscores this immersive design is "Destruction 3.0," enabling players to dynamically dismantle a majority of objects within the game environment. The Frostbite 3 engine's utilization involves intricate real physics calculations, thereby



Dismantle environment. Screenshot from Battlefield 4 (Electronic Arts, 2014).

affording players a heightened level of realism at a visual level. Notably, playertriggered explosions result in consequential outcomes, such as building collapses, falling trees, and the destruction of various props, thereby imbuing the gaming experience with visual effects that emulate real-world scenarios. This emphasis on realism extends beyond the visual aspects to serve gameplay mechanics. Players are afforded the capability to navigate freely within and around destroyed buildings and environments, actively participating in the destruction of enemy bunkers and the creation of defensive positions. Potent explosive weapons further contribute to the simulation of realistic gameplay, allowing players to penetrate walls and houses to attack enemies. Particle effects, integral to the visual repertoire of fully computergenerated games, play a significant role in conveying dynamic elements such as dust, water, and fire. In *Battlefield 4*, a profusion of realistically styled particle effects fills the first-person screen, contributing to the visual feedback during combat engagements. These effects serve to immerse players in the chaos of the battlefield, particularly when the visibility of adversaries is obscured, and instead, players perceive various visual effects generated by the enemy. The integration of realistic effects, coupled with the simulation of first-person camera vibrations, high-speed movement, and blurring, collectively serves to visually immerse players in the impactful nature of shells during gameplay. The overarching design goal of Realistic visual effects is to replicate all visual aspects that would occur in the real world. These digital renditions are intricately



Battle on a vehicle. Screenshot from Battlefield 4 (Electronic Arts, 2014).

designed to mirror real-world occurrences as realistically as current computer hardware and game engines permit. In many cases, these visual effects cannot be simply admired by the player, as the player needs to react appropriately to these effects to control his or her in-game self. This kind of immersive interaction is the goal of most realistic effects style games, which are designed to deceive the viewer or player in both films and games. There is a distinction based on deception, in that the realistic effects in a film hide themselves so that the audience's attention is focused on the story of the film itself, whereas the realistic effects in a game deepen the player's sense of immersion.

#### Chapter 2. Fantastic style visual effects function in film and video games

The preeminent application of visual effects is discernible in the genres of Science Fiction and Fantasy Movies, where the Fantastic visual style endeavors to seamlessly incorporate visual elements that align logically with the viewer's imaginative engagement in wholly fictional narratives. The exigency for composite filmmaking has burgeoned concomitantly with the advancements in cinema and computational technologies. An escalating number of productions resort to shooting on green screens, subsequently replacing background environments and interactive elements with extensive computer-generated graphics. This practice facilitates the portrayal of actors employing non-realistic accouterments, and magical elements, and performing within fantastical realms replete with non-realistic adversaries. During the post cinematic epoch, computer-generated imagery (CGI) gained pervasive usage in the film industry,



Escape from the building (The Matrix, 1999).

epitomized by seminal works such as *The Matrix*, recipient of the 1999 Oscar for Best Visual Effects. This cinematic opus not only adeptly harnessed special effects in service of its narrative but also emerged as the film's most indelible aspect in the eyes of the audience. Employing virtual filming methodologies encompassing 3D scene modeling, virtual cameras, environments, and actors, *The Matrix* consummated a fully computer-generated visual composition. Digital animation facilitated the requisite calculations for screen dynamics and interactive sequences, with meticulous pre-production simulations

simulating falling debris, marble and concrete fragments, glass shards, and water effects. Post-shooting, computer-generated character models, concrete, and splash animations were superimposed on virtual camera and display footage. This meticulous process afforded viewers a discernible visualization of the bullet's trajectory in the gradual playback of the actual shot, imparting a God's eye perspective that accentuated the fantasy style conveyed through the film's filming methodology. The film's special effects team takes the audience's breath away not only by using special effects images that break the boundaries of common sense, but also by shooting special effects images in a way that breaks the boundaries of everyday imagination. In the film's 412 special effects shots, the "bullet time" effect stands as the most iconic and universally recognized visual innovation. Employing the phenomenon of "persistence of vision," the production team orchestrated the sequential capture of a scene by 120 cameras positioned in a circular array. Subsequent amalgamation of these images created the illusion of a singularly captured shot, played back at 24 frames per second to impart a temporal disjunction between the film's temporal progression and the screen's perspective speed. Concluding the initial take, green screen backgrounds underwent replacement via secondary compositing employing Inferno software, seamlessly integrating realistically shot environments. This multifaceted approach not only engendered a sense of transcendent fantasticality concerning the film's content but also imbued the audience's perspective with a palpable essence of fantasy (Dave, 1999).



Bullet time (The Matrix, 1999).

Science Fiction Movies or Fantasy Movies, genres characterized by narratives vastly divergent from reality, necessitate copious visual effects to compensate for elements challenging to capture conventionally. Integral to these filmic endeavors is the modeling and animation in 3D of segments of the narrative, rendering visual effects an indispensable narrative constituent. Beyond the script's special effects requisites, the production methodology extends to cinematography deliberately transcending conventional human perspectives. While such an audience perspective is not exclusive to Science Fiction or Fantasy Movies, it undeniably finds heightened resonance within these genres, augmenting the immersive and fantastical dimensions of cinematic storytelling.

In the realm of fantasy games, the entirety of visual content can be regarded as fictional visual graphics, with visual effects encompassing elements such as character abilities and background environments. These visual effects, just for the visual impact, serve as both guiding cues for players and intricate details contributing to the overarching worldview of the game. A noteworthy example in the gaming landscape is the globally acclaimed MMORPG, World of Warcraft, (Blizzard Entertainment, 2004) which has maintained continuous operation and updates since its inception in 2004. Despite the evolution of the game's engine over time, with updates transitioning from the original "DirectX 8", the special effects within World of Warcraft have consistently aimed to fulfill their role while rigorously adhering to minimal hardware requirements. The quality of *World of Warcraft*'s visual effects is arguably vastly different than the quality of the film's special effects, which include low faceted models and no reflective lighting. It is influenced by multiple factors such as engine performance, computational demands imposed by the effects, and the envisioned aesthetic goals of the game development team. Furthermore, game special effects, in contrast to their cinematic counterparts, are tasked with multifaceted functions. In the context of World of Warcraft 4.0, the game incorporates seven skill schools for player characters, each distinguished by diverse styles of skill effects representing elements like fire, frost, and holy. These effects not only delineate the trajectory of attacks on adversaries but also accentuate the potency

of these attacks, thereby immersing players in the magical ambiance of the fantasy world through visually stunning effects conceived by designers. This departure from reality in visual representation serves as a pivotal allure for players within the fantasy gaming domain, providing clear visual cues and changes that aid players in comprehending and strategizing their actions. Moreover, enemies in the game exhibit special effects, persisting on them after negative states, thereby constituting an integral part of the game's guidance system and gameplay dynamics. *World of Warcraft* not only unfolds a unique gaming narrative but also manifests a distinct cultural and historical ethos within its virtual world. This rich history and culture permeate every facet of the game, from narrative development and architectural style to character appearances,



Sword swinging animation. Screenshot from World of Warcraft (Blizzard Entertainment, 2004).

weaponry design, and other in-game details that collectively introduce players to the intricacies of this virtual fantasy realm. Visual effects within the game serve a parallel function, encapsulating historical cues and graphic information crafted by designers, intricately derived from the game's narrative backdrop. These visual effects delineate abstract concepts such as the control of fire and lightning or the portrayal of death and resurrection, all of which, within the confines of the game, convey the designer's fantastical interpretation (Kany, 2022). As these layers of fantasy culture continue to intertwine and evolve, players experience a heightened sense of immersion in *World of Warcraft*, extending beyond the conventional audio-visual engagement. This immersion operates through the construction of a fantasy world that actively engages players'

imaginations, fostering the creation of meaning for the virtual culture embedded within the game.

#### **Chapter 3. Convergence in the visual effects industry**

The ongoing advancements in computer hardware and game engine technologies have precipitated a reduction in the cost of developing realistic art style games while concurrently elevating the quality of realistic graphics. This rapid progression has led to a perceptible diminishment of the demarcation between realistic style games and films, particularly concerning visual art. The visual fidelity of high-quality realistic style games has approached a level of parity with film graphics. A salient instance of this convergence is discernible in the production of *The Matrix Resurrections*, wherein the esteemed visual effects company, Double Negative (DNEG), employed Unreal Engine-rendered scenes for a sequence in a feature film, as articulated by the visual effects supervisor Huw Evans during an interview with Ian Failes. This innovative utilization of the state-of-the-art Unreal Engine marks a departure from traditional methods in the creation of special effects for films, underscoring an emergent paradigm in the visual effects industry.

In the cinematic landscape of 2021, *The Matrix Resurrections*, constituting the fourth installment of the Matrix series, stands as a testament to 22 years of progress in the visual effects domain, boasting 2,350 special effects shots. A pivotal sequence in the film involves the recreation of a classic scene from the 1999 film *The Matrix*, wherein Morpheus imparts kung fu skills to Neo in a dojo. Director Lana Wachowski sought to re-envision this storyline for *The Matrix Resurrections*, situating the dojo on a lake amid a forested setting. The realization of this specific visual image posed challenges with conventional special effects filming methodologies. To address this, Wachowski collaborated with Double Negative Visual Effects, opting to deploy Epic's "Unreal Engine" for rendering scenes shot entirely in virtualization. This encompassed the meticulous creation of forests, lakes, bridges, lighting, water waves, and other effects

within the Unreal Engine (Failes, 2022). Distinct from conventional visual effects processes, the team at Double Negative leveraged the real-time rendering capabilities of the Unreal Engine, affording them the flexibility to iteratively refine the aesthetic attributes of the scene until optimal satisfaction was achieved. This groundbreaking approach by Double Negative visual effects company represents a pioneering instance of employing a contemporary gaming engine to construct an entire film sequence, emblematic of the ongoing convergence and synergistic development between the realms of film and realistic art style games within the domain of visual effects.

#### Conclusions

In the cinematic domain, the employment of visual effects adopting a realistic art style functions as a compensatory measure to alleviate inherent limitations in filming and technology. Specialized effects teams employ diverse methodologies with the primary objective of concealing any perceptible indications of visual manipulation. This strategic approach is devised to sustain audience engagement with the narrative and thematic components of the film. Conversely, films featuring fantasy visual effects tend to purposefully draw attention to the opulence and allure of visual imagery. The intentional use of impactful visuals serves as a mechanism to captivate and sustain audience interest. Innovative visual effects were used in some cases, such as the application of "bullet time," is frequently employed. These fantasy visual effects complement the narrative arc of science fiction or fantasy films, providing the audience with an immersive experience transcending the confines of reality. In the realm of gaming, the visual effects employed whether adhering to realistic or fantasy styles typically leverage comprehensive virtual models or digital effects. However, when contextualized by their underlying purpose, these effects serve distinct functions. Games adopting a realistic visual effects style are meticulously designed to enable players to vicariously experience scenarios unattainable in reality. Through highly accurate simulations of scenes and environmental interactions, this heightened level of

verisimilitude enhances player immersion. Realistic visual effects also facilitate the replication of authentic, real-world battles within the gaming environment. In contrast, the fantasy visual effects style predominates in games characterized by entirely fictional worldviews. Here, designers rely on imaginative constructs to fabricate virtual environments. Simultaneously, these effects act as navigational aids for players, providing clear guidance within the game's framework.

Over the course of decades, advancements in computer hardware and software have propelled the evolution of visual effects realism. The rapid progression of game hardware and engines has fostered a trend toward the convergence of film and game effects. Predictably, it is plausible that both realistic visual styles in films and games will achieve an unprecedented level of experiential authenticity. Similarly, fantasy visual effects in films and games are poised to vividly actualize the creative visions of designers, offering audiences and players a multisensory fantasy experience distinct from their tangible reality.

Word count: 4538

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