Philosophical perspectives on realism in virtual production (VP) and extended reality (XR) in contemporary Film and TV production

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Abstract

This research contributes to a deeper comprehension of the fusion of real and virtual in virtual production (VP) and extended reality (XR), emphasizing their role as one of the ways to preserve the continuity of dramatic space in film and TV production. It explores the blending of real and virtual elements on the virtual production set, focusing on cinematic concepts such as mise-en-scene, plan sequence, and in-camera effects like rear projection. The research aims to bridge the gap between technology, philosophy, and film studies by providing multidisciplinary analysis and enhancing our understanding of contemporary media production practices. Key inquiries include the influences on perspectives and definitions of reality, the distortion and merging of reality in hyperreality, and the use of simulacra to challenge the authenticity of the medium. By departing from traditional theoretical frameworks such as Plato's worldview and Cartesian dichotomy, the research provides nuanced insights into the "realism of the movie set," where simulacra represent truth. Drawing on Baudrillard's taxonomy of representation, it demonstrates how modern virtual production techniques, as seen in Jon Favreau's work on The Mandalorian (2021), empower creative autonomy, and replicate real-world processes.

Keywords — Realism, Virtual Production, Extended Reality, Media Practice, Film and TV, Cinematography, in-camera effects

I. Introduction

The study explores the relationship between real and virtual technologies in contemporary film and TV production practice, particularly on the reality of the film body. Insights from scholars such as Sobchack, Zizek, and Baudrillard are used to delve into the complex structure of the social construction of reality.

II. Methods

A. Literature Review and secondary data analysis

The researcher explored industry-related literature and data. Additionally, film case studies were undertaken to grasp industry practice and to form preliminary insight on "the tools used under the collective name of virtual production (VP)" [1]. For example, Mandalorian (2021) according to Walker [2] marked a milestone in the scale of application of Virtual Production this is why it is a good example for discussing the pros and cons of the fusion of real and virtual in film production. The research involves analyzing secondary data and exploring philosophical perspectives on Realism to provide a foundational understanding of realism, formalism, and reality in cinema, virtual production, and extended reality.

B. Understanding Reality

Understanding Reality is a widely discussed philosophical enquiry yet draws few conclusions. According to Putman, "more and more philosophers are talking about realism these days, but very little is said about what realism is" [3]. For example, classical Platonic Realism claimed that ideas are more accurate than material things and that mathematical-logical objects are not products of the human mind, for ideas such as numbers are real far-off mundanity [4]. Putman further discusses that the Realist refers to the corresponding 'Theory to the Truth', which can be seen as the initial definition behind science's success in making valid predictions and opposing idealism, for example, Positivism and Operationalism. However, if realism is an explanation of the fact, it becomes an empirical hypothesis and materialistic scientifical Realism, not an actual Realism. For example, following that definition, Boyd tries to spell out Realism as an empirical hypothesis that scientists describe as a mature science. This strategy works if we assume that the laws of a theory belonging to a mature science are typically approximately true [5]. Based on these assumptions, Empiricism is described as sensory perception, while Rationalism refers to reason and the human mind, both offering a very fragmented notion of Reality. In response to these constraints, Existentialism focuses on the limitations of the human mind and knowledge [6]. There are noticeable clashes between how humans perceive and construct reality because it is not just pure perception but also a deconstructive process. According to Derrida, deconstruction does not aim to provide answers, unlike scientific Realism. It does not seek to prove an objective truth or to support any one claim to justice over another [7].

C. Theory to the Truth (Knowledge)

Unlike most other 'scientific philosophers' Kotarbiński [8] as a critical epistemological realist was able to apply classical correspondence 'Theory to the Truth' and combine ontological realism (by defending a form of physicalism and nominalism) with semantical realism (by defending the classical correspondence 'Theory of the Truth'). Further, despite his reductionism of cutting terms apparently referring to abstract entities, he accepted theories as statements with truth values and theoretical entities if they can be understood as physical bodies

referring to the concept of reism as a form of a pansomatism [9]. Alternatively, Husserl called the character of being of a mathematical-logical object "Ideality" and stated as follows: "Ideal objects […] exist genuinely. (…) we also have insight into certain categorical truths that relate to such ideal objects. If these truths are valid, everything that their validity objectively presupposes must have a 'being'" [10]. This statement, however, beyond an epistemological meaning, clearly suggests Husserl's Realism in the ontological dimension. He believed, following Plato, that Ideal objects such as numbers exist independently from subjectivity. As Alfred Schutz says, Husserl has shown that there are ideal objects of knowledge as independent of the subject as real objects are. Edmund Husserl added a meta-perspective by referring to Realism as a pseudo-problem, for "we are always already outside in this world, creating phenomenological brackets" [11]. Kolakowski was sceptical of Husserl's investigations; in his opinion "It blurred the basic distinction between doxa and episteme, between opinion and knowledge. In giving up the tradition of German idealism, philosophy has its independence from the sciences. It started regarding itself either as a synthesis of the sciences or as a psychological analysis" [12]. According to Husserl [13], scientific knowledge will be arbitrary if the Ideal is not there as the norm of fact. He believed that, in truth all people always see Ideas. Similarly, Parsons thought that, in Truth, all people always act toward the ideal because the ideal element is necessarily found through the logical framework of sociology [14]. Hence, he maintained that the Ideal element that gives a normative orientation to actions is fundamental, though analytical, as far as the social order is established. Talcott Parson's analytical Realism is confrontational to another spectrum of subjective Realism expressed in phenomenology. Parsons positively referred to Husserl's logical investigations regarding the lack of a specific basis in modern science, and Parsons felt that there was no standard theory to establish sociology as a science. Thus, both criticized the factual sciences of positivism (positivistic empiricism) and showed a solid orientation to the general theory. For this, they both depended on Conceptual Realism (Platonic Realism).

D. Realist Movement

"Until quite recently, - according to Harman (representative of the Realist Movement) - almost no philosopher who was continentally trained saw anything of value in a realistic position" [15]. He noted, however, that Bertrand Russell was a realist reactionary against the neo-Hegelian Idealism of Bradley and anti-realists. There are various definitions of reality, with a positive naturalist concept at one end of the spectrum and an extreme perspective of Christopher Hyatt at the opposite end, stating, "Almost everything people believe in as grown-ups consist of lies, they were told as children. Culture is nothing more than agreed-upon lies" [16]. He was implying that the structure of reality is, in fact, one big lie. According to Hyatt [17], our concept of reality is artificial, and culture bonded. Reality is nothing more than a projection of self-identities formed by social contracts. In his opinion, one of the false assumptions is that reality is logical and rational. This illusion is sustained against everyday experiences, which suggest other ways. The investigation led the researcher to focus on the meta-perspective, where each theory represents just one subjective viewpoint. The phenomenological approach raises metatheoretical questions regarding ontology and epistemology, which are dependent on human consciousness. Ontology pertains to the nature of social reality and whether it exists independently of human interpretation, including the concept of shared reality versus context-specific realities. There are three distinct ontological positions: realism, idealism, and materialism [18]. Realism asserts that external reality exists independently of human perception, while idealism argues that reality is only understood through the human mind and socially constructed meanings. Materialism acknowledges the real world but considers only the material or physical realm authentic. Phenomena, like beliefs and experiences, arise from the material world but do not shape it. Epistemology, focusing on understanding social reality, encompasses positivism and interpretivism. The terms constructivism and "naturalistic" are often used interchangeably with interpretivism in literature, albeit inconsistently. [19]. The term constructivism is helpful because it identifies the fundamental principle that reality is socially constructed, a relativist position that holds the view that there is no external reality independent of human consciousness [20].

E. Post-structuralism and Postmodernism

Jean Baudrillard [21], associated with post-structuralism and postmodernism, claimed that the notion of reality is, in some way or another, an illusion or subjective experience that refers to the meaning and significance we give to things – the "social reality" of the culture or rather, various social realities. Baudrillard's perspective differs from the classical Platonic worldview focusing on counterculture aspects expressed in Theory of Simulation [22]. Eco had been skeptical about adequacy of the term in many of its usages he even opened his Does the Counterculture exist (1977) with the strong statement "Counterculture is an inflationary term" [23]. Eco's Theory explores civilizations shaped by signs, blending structuralist and post-structuralist approaches. Berger and Luckmann (1966) introduced the concept of "social construction of reality," emphasizing everyday knowledge within societies. John Searle's work builds on this idea, focusing on how self-identity and identification by others influence consciousness and self-awareness. Following John Locke [25], consciousness is the form of perception, and the enquiry refers to subjectivity "Can another man perceive that I am conscious of anything when I perceive it not myself? No man's knowledge here can go beyond his experience" [26]. Once we begin to consciously perceive that "reality" can be deconstructed into parts – argues Jean Baudrillard – and once we deny reality's unchanging nature, only then can we think of the fact that reality can be re-made and constructed according to pre-existing cultural and linguistic structures [27]. Danser (2005) examines the social construction of reality through narrative fragments and symbolism, arguing that it shapes subjective Realism. Žižek suggests reality is inherently ideological, structured by ideological fantasy. His statement, "If you have a good theory, forget about reality," aligns with Hayatt's view that the search for meaning is a logical illusion. Žižek emphasizes the inseparability of reality and fantasy, challenging notions of a reality beyond ideology [28]. As such, all reality is ideological. In the end, following van Mannen "(…) even the supposed relativism, of, for example, social constructivism or the absolutism of new speculative materialism seems to lead to imperatives that are hard to shake. Like Pygmalion, we fall in love with our own fabrications even if we know these are also edified and only "real" in a certain metaphysical sense" [29]. Realism in film and virtual production draws from philosophical perspectives, viewing realism as both

an artistic method and a stance toward reality. Williams distinguishes between ontological and epistemological dimensions of realism, providing context for exploring Realism in Film and Virtual Production [30].

III. Realism in Film

A. Reality vs Real

One of Žižek's key arguments regarding Realism in films concerns this: that it is only by way of fantasy that we can come to experience reality in the first place [31]. According to Žižek films do not occupy a domain of fantasy that can be straightforwardly distinguished from reality. Further, screen does not provide audiences with fantasy escapes from reality and films do not provide us with illusions of reality. Rather, if films are fantastic, then they are fantastic in the same way that reality itself is fantastic. Following Žižek's perspective, Realism in films is about creating an illusion of reality. Reality is something quite distinct from the Real. "We know and can prove that the phenomenal universe is not a reality in itself, that there is something beyond but neither Reason … nor Intuition … can provide access to this beyond" [32]. Yet, Lacan's Theory of the mirror stage, which Žižek uses frequently to support his own statements, refers to the imaginary constructive rather than delusional as Žižek claims. According to Lacan, the subject can gain access to reality by developing an imaginary relation to it [33].

B. Realism of Artefiece

Bordwell's claims that film is free from ideological imperatives [34]. Cinema's attempt to capture the presence of reality in time is undermined by its temporal and materialistic dimension, which means that every image is already an image of the past and that what has been captured is also irreversibly lost. In this supposition, film's reality can be approached from the esthetic and visual perspective. "Reality is not art, but realist art can create an integral aesthetic of reality. Nevertheless, Realism in the art can only be achieved in one way through artifice" [35]. According to Douglas Smith, Bazin argues here "the intrinsic Realism of cinema on two grounds: first, the ontological reality of the photographic trace as an objective record of the real, and second, the cinematic reproduction of the phenomenological conditions of perception of the real by deep-focus photography and the long take. An acute consciousness of loss and absence accompanies this Realism of plenitude" [36]. In short, films should aim to reproduce the conditions of natural perception and, as a result, films will correspond with reality. Bazin writes, "[T]he essence of film from the very start … has been the realism of the image. One could say that this realism is implied by the automatic genesis of the cinematographic image and that it aims at giving this image the greatest number of characteristics in common with natural perception" [37].

In art, formalism emphasizes visual elements over narrative. For instance, in painting, it focuses on technical aspects like color, brushwork, form, line, and composition. Bazin advocated for contextualized realism, valuing in-camera effects and natural lighting. This differs from Arnheim's use of Gestalt theory in formalism to explore optical perception, which takes a dualistic stance from an epistemological perspective [38]. Concerning epistemological dualism, the central premise of Critical Realism emphasizes "the clear distinction between the transphenomenal world and the phenomenal world, where the trans-phenomenal world encompasses the macrocosm of the physical world and all physical objects and physical organisms which are embedded therein" [39]. In this preposition, humans cannot access directly either the world or reality that can be only interpreted based on data obtained with phenomenal means, theoretical constructions and models. Their data and results constitute the 'critical-phenomenal worldview' [40] in contrast to the 'naïve-phenomenal world' of our everyday life experience.

C. Film as semiological object

Barthes noticed that Christian Metz's perspective differentiates from Arnheim and Bazin's by focusing on symbolic aspects of the film narration. According to Barthes, Metz claimed that "There are two ways of subverting the legality of knowledge (inscribed in the institution): either to disperse it or to give it. Metz chooses to give; the way in which he treats a problem of language and/or of cinema is always generous: not by the invocation of 'human' ideas, but by his incessant solicitude for the reader, patiently anticipating his demand for enlightenment, which Metz knows is always a demand for love" [41]. Metz developed a structuralist (or its derivative, semiological) theory of film in the 1960s and inaugurated a groundbreaking theory and method of analysis that transformed the film into a semiological object, "in which film's specificity was no longer perceived in terms of surface sensory properties or a conscious aesthetic experience" [42]. Instead, Metz reconceived filmic specificity, "this most sensory of objects, as a type of signification—as the manifestation of a more fundamental, non-observable, underlying finite abstract system of codes" [43]. However, the Poststructuralism of Gilles Deleuze gives a different angle to understanding an image as already consciousness, and consciousness as already image. Deleuze focuses on a materialist identity of the brain and screen. It is a new form of material monism, going beyond phenomenology into an "extended mind", a mind as part of the world (cinema), shaping the Deleuzian notion that "the brain is the screen" [44]. According to Vivien Sobachck, Classical film theory, including André Bazin's discussion of the photographic image's ontology and Siegfried Kracauer's Theory of Film, grounds cinema in real existence, even in its fictional mode, redeeming the world's physical reality [45]. "The fiction film also has a history of compositing 'irreal' fictional characters and real historical figures into the same narrative space so as to blur (but again not obliterate) the line between two ontologically different modes of existence while, in fact, constructing hermeneutic play between two different sets of epistemological criteria" [46].

IV. Perspective on Virtual Production and Extended Reality

A. The convergence of Real and Virtual Fusions in Extended Reality (XR)

The study of reality and realism in film is a complex and multifaceted area, encompassing technical, aesthetic, and theoretical dimensions. Rushton (2010) argues that films are part of reality against the idea that films are abstracted from reality and can thus only offer a deficient mode of reality. "I instead try to see films as part of the reality we typically inhabit, as part of the world we live in, as part of our lives. I argue that films help us to shape what we call 'reality'. It is this attempt to acknowledge the reality of film that I call filmic reality" [47]. The distinction between reality and illusion in the cinema relies

on a logic of representation affecting films as a deficient and secondary mode of reality. Žižek suggests that mistaken identifications in this imaginary realm can lead to ideological self-delusion, contrasting with the perspective of Christian Metz, who focuses on the formalistic aspects of film associated with the technical and visual side of film production [48]. Rushton argues that "if the task for film scholars is to clarify what should be accepted as real in the cinema and to warn against what is illusory or non-real, then such arguments can be made only based on judgements about truth and adequacy. Such 'truths' about cinematic experiences in the final instance must be made on account of any film's strategies of representation and can ultimately only be guided by the question of whether such and such a film is representing the 'real world' truthfully or adequately" focusing not only on the quality of the narration but aesthetical and visual elements [49]. From the beginning of the medium, there has been noticeable interest in improving the visual experience of film, with visual and special effects often used to symbolize intense emotions. According to Sobchack "While we are invited to wonder at what we see, the film strives primarily for our belief, not our suspension of disbelief" [50]. The development of visual and special effects generally aims to symbolise the "irrational warmth of intense grandiose emotions" [51]. Virtual technologies, including Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR), collectively referred to as Extended Reality (XR), aim to blend or replicate the physical world with digital environments, allowing users to interact with and immerse themselves in augmented realities. According to Foucault, resemblance operates with a "model" or original element that organizes and hierarchizes increasingly less faithful copies. Similitude facilitates repetition, circulating the simulacrum as an indefinite and reversible relation of the similar [52]. Baudrillard (1981) further claims that the moment we can no longer distinguish between reality and mere representations of reality we enter hyperreality following complex process of signs and symbols. The interactivity of AR, VR, and MR forms the basis of the XR metaverse, a shared virtual realm. XR technologies, including VP, have bridged the gap between virtual and physical worlds, especially during the COVID-19 pandemic, meeting the increased demand for productivity in various industries, such as film. The pandemic's restrictions spurred the development of new collaborative work methods, leading to the concept of the Fusion Universe, as proposed by Zhang [53]. Unlike the digitally focused Metaverse, the Fusion Universe (MR) seamlessly integrates the physical world into a digital environment, blurring the lines between physical, cognitive, and digital realms. Advancements in virtual technologies, particularly VR, are challenging the distinction between reality and illusion in film. Virtual-real fusion, a significant research direction, aims to blend virtual and real worlds, enhancing audience participation and impacting Film and TV production.

B. Defining VIRTUAL PRODUCTION

The common thing about films is that they use cameras and are usually shot at a given location. There is a tendency to use the natural environments following the principles of Bazin's Realism or involve pre-existing structures as the background [54]. Movies are often filmed on constructed sets inside a studio due to the flexibility and greater control over the lighting, noise, and background at the expense of Bazin's in-camera-realism. The history of in-camera is a broad topic starting from one of the earliest set-expanding techniques, the double exposure effect, in which an image is exposed multiple times to layer different elements from each exposure. George Méliès famously pioneered the double exposure effect in A Trip to the Moon (1902). Contemporary LED volumes used on the sets of modern virtual production pipelines traditionally evolved from rear projection, in which the footage pre-recorded by a secondary film unit was projected on a wall, screen, or translucent pane and re-recorded with the principal actors in the foreground. It was adopted in the late 1920s and 1930s to accommodate the changing production practices that accompanied the sound picture's development [55]. On-location shots, on the other hand, can provide a more naturalistic or realistic environment at the expense of greater creative control and formalism. The literature indicates that most technical filmmaking advancements have been attempts to combine the control of studio space with the Realism of on-location shooting. There are more elements included in virtual production and the most accurate definition describes it as a set of tools used under the collective name of virtual production [56]. In broad terms, virtual production is a way of making film and television which harnesses computer-generated content allowing real-time visualisation and control of the digital environment in which you are shooting. Importantly, virtual environments are captured 'in camera' rather than added in post-production. For example, Deloitte's studies on "The Future of Content Creation: Virtual Production" noted that every director and visual effects (VFX) professional will define virtual production slightly differently, but at its core, virtual production is modern content creation: It is an agile process characterized by starting VFX earlier and leveraging technology throughout the entire production lifecycle to enhance the way content is created [57]. Epic Games, the company that launched the Unreal Engine, which became one of the key elements of the pipeline, defines Virtual Production as a range of computer-aided production and visual filmmaking methods production. According to research on Virtual Production conducted by a team led by Yang (2023) the term Virtual Production is inaccurate and misleading. It is often perceived as literally making a film in Virtual Environment that for example requires wearing a Virtual Headset. Interestingly enough it can also be perceived as a hybrid type of remote workflow on the movie production that started emerging during the Covid-19 pandemic [58]. However, the working definition of Virtual, that the researcher suggests, is that it is the form of the digital simulation of things that appear to exist but do not exist in the physical world. While Production refers to manufacturing a product which has value to an end-user or customer. Hence, Virtual Production is the creative platform between physical and virtual words to deliver objects and actions that are generated by a computer and technical innovations to simulate real objects and activities by creating the illusion for the intended purpose. In other words, Virtual Production is the hybrid space for simulation that blurs visual perception to distinguish reality from simulation of reality, especially in technologically advanced environment of film and TV production.

C. VIRTUAL PRODUCTION basic workflow

With software-based tools like Unreal Engine (UE), Unity and other technology, virtual production can integrate the traditional four stages of filmmaking: development, preparation, production, and post-production into a parallel process, combining AI, VR, AR, CGI, LED walls, and other technologies to build shooting space within stand rendering and instant feedback. Not all Virtual Production workflows include LED

walls: “Many film and TV productions utilise green or blue screen backdrops that allow CGI environments to be added in post-production.” [59]. For decades, green or blue screen compositing was the standard for creating fantastical environments for virtual TV studios and Film making. In virtual production, blue or green screens enable real-time rendering of virtual worlds during studio filming, eliminating the need for extensive post-production work. The Jungle Book (2016) exemplified this approach, with live action filmed on blue screen stages and computer-generated environments seamlessly integrated with physical sets using chroma-key technique, motion capture, and VFX. Before shooting with actors, block animation for Mowgli and other characters was created along with a virtual environment. This allowed the filmmakers to prepare for shooting in pre-visualised environments. Characters could then be played back in real-time, allowing cast and crew to see the combination of virtual worlds and human performers on monitors. Description in the depth of all Virtual Production elements requires more space and it includes a highly technical presentation of the tools used in various stages of the production, for example, software for generating environments, storyboarding, animatics and preproduction, as well as the types of real-time engines, motion tracking and camera tracking which are used on set.

Initial investigations and literature review indicates that Virtual Production appears to blur the border between fantasy and reality following Baudrillard. “And so, art is everywhere since artifice is at the very heart of reality. And so, art is dead, not only because its critical transcendence is gone, but because reality itself, entirely impregnated by an aesthetic which is inseparable from its structure, has been confused with its image. Reality no longer has the time to take on the appearance of reality. It no longer even surpasses fiction: it captures every dream even before it takes on the appearance of a dream” [60].

D. IN-CAMERA EFFECTS AND VIRTUAL PRODUCTION

The film goes beyond photography and cinematic techniques developed, according to Kracauer “films increasingly drew on camera mobility and editing devices to deliver the messages. Although their strength still lay in the rendering of movements inaccessible to other media these movements were no longer necessarily objective” [61]. Green or blue screen compositing with static projections is a standard part of virtual TV studios and broadcasting. The Jungle Book (2016) was a significant step forward in testing and expanding these technologies. The virtual world was combined using chromakeying with live action, physical sets, motion capture, and virtual effects (VFX) to create what we see on screen. Due to technical improvements, the filmmakers can achieve some of these old-school film effects such as rear projection in a new way. For example, in Mandalorian (2019) Favreau took another step forward and introduced Stage Craft, an on-set virtual production visual effects technology, which consists of a massive LED video wall designed by Industrial Light & Magic (ILM), creating realistic environments on the bigger scale than traditional in-camera “Plate”.

“Although the technology of the cinematic is grounded, in part, in the technology of the photographic - Sobchack writes in Carnal Thoughts - we need to again remember that “the essence of technology is nothing technological.” The fact that the technology of the cinematic necessarily depends on the discrete and still photographic frame moving intermittently (rather than continuously) through the shutters of both camera and projector does not sufficiently account for the materiality of the cinematic as we experience it.” [62]. Virtual production (VP) as one of the in-camera tools is particularly useful when creating and rendering frame by frame real-time fantastical environments using gaming engines such unreal or unity, as it allows for the fusion of real and virtual elements at first as representation by depicting and incorporating of real elements into digital virtual space and then as a projection into the real world via LED volumes. “One may ask (...) whether reality can be staged so accurately that the camera-eye will not detect any difference between the original and the copy” [63]. Blaise Cendrars after conducting his experiment shooting the scene on the Mount Blanc and another staged in the studio came to conclusion that there is certain “emanations, luminous or otherwise, which worked on the film and given it a soul” as man-made or natural environments resist duplication. On the other hand, Kracauer claims that narrative elements “overshadow that of the raw material of nature used for their implementation” [64] and the use of the tools including Virtual Production relies on storytelling, yet tool selection often hinges on budget and technological familiarity. Perceptual technologies like photography, motion pictures, television, video, and computers inform us twice: first, through latent sensory engagement, and then through conscious representational function, as described by philosopher Don Ihde [65]. However, critics of postphenomenology and Don Ihde argue that by turning to particularities and emphasizing that technologies are always open to different uses and interpretations, postphenomenology becomes unable to realize how profoundly technology determines our being in the world. Postphenomenology perceives technology not as an abstract category but rather as an actual artefact and focuses on the way it interacts with us. For example, the LED volume and the camera play significant roles in preserving the continuity of dramatic space in film production by giving more directorial freedom and because this technique, if correctly applied, blurs the line between real and virtual elements on the virtual production set. It gives options for smooth transition between 3D and 2D via camera. On-set, the physical camera serves as the bridge between the real world and the CGI 3D environment, linked via camera tracking and a virtual camera. This integration, facilitated by software like Disguise, recreates the production environment to synchronize the physical and virtual cameras and project images onto LED volumes. The physical camera, akin to a Virtual Reality Headset, merges displayed images with the mise-en-scene, encompassing actors, physical elements, and lighting in rear projection. All these aid narrative elements, mood, sense of time and space. Following Sobchack “Neither abstract nor static, the cinematic brings the existential activity of vision into visibility in what is phenomenologically experienced as an intentional stream of moving images—its continuous and autonomous visual production and meaningful organization of these images testifying not only to the objective world but also, and more radically, to an anonymous, mobile, embodied, and ethically invested subject of worldly space [66].

F. FUTURE OF VIRTUAL PRODUCTION

The Virtual Production film set highlights the blending of reality and hyperreality, yet improvements are needed for greater efficiency. For instance, camera tracking could be aided by not only lower latency but also by using forms of Visual Odometry (VO) and Artificial Intelligence (AI) that can be built

into a single camera unit. Furthermore, there is scope for more automation within the systems that merge the unreal with the physical world, such as Disguise. By minimizing the number of steps required for configuring the physical and virtual worlds and increasing automation, the speed of production can be improved, and the margin for error can be reduced. The refinement of time coding is necessary to avoid compromising the parallax effect and glitches in the volumes. Research is being conducted to enhance colour management within the Unreal Engine, camera, and across systems to maintain consistency in the final log footage. Additionally, the companies make efforts to enhance LED projectors to optimise their performance. Currently, these projectors are limited to a maximum illumination of 2000 lumens, which is significantly lower than the natural sunlight's potential of reaching up to 100,000 lumens. T The challenge of using LED projectors on movie sets and crew comprehension of Virtual Production lighting underscores the importance of sustainability and energy-efficient solutions. Virtual-real fusion combines motion tracking, haptics simulations, and more for realistic interaction, but it's still in early development and faces limitations. Utilising XR technologies to replace physical hardware with virtual tools could enhance Virtual Production workflows in studios.

V. Conclusions

Žižek contends that the Real opposes Being, calling for a theory of the subject to understand reality. He characterizes the Real as the Void, critiquing science's attempt to escape reductionist scientific terms and confront Nothingness. The question for Žižek becomes “How do phenomena themselves arise within the flat stupidity of reality which just is; how does reality redouble itself and start to appear to itself? (…) For this, we need a theory of the subject which involves neither transcendental subjectivity nor a reduction of the subject to a part of objective reality; such a theory also enables us to formulate in a new way what Meillassoux calls the problem of correlationism” [67]. Edward Goren Craig (Knopf, 1968), on the other hand, postulated against the reproduction of reality and “envisaged scenic environments as designed to appeal to emotion through visual suggestion, evocation and symbolist aesthetics” [68]. When we look at overall human history, there is a tendency for self-expression and communication using storytelling and visual actions. Yet, reality as a complex network of signs and symbols given to us by the media depicts an imitation of the real world, not reality itself. According to Baudrillard (1981) simulation disconnects us from reality and products of the media mix and becomes part of culture and reality as hyperreality. In other words, fantasy entangles with reality blurring the borders and extending far beyond reality and the contemporary film and TV production workflow is the space for the convergence of real and virtual fusion and becomes the platform for blending hyperreality. Virtual Production has found application in creating fantastical environments and increased directorial autonomy but still faces challenges such as camera tracking, colour management, and synchronizations between servers, camera, LED volumes, and the set's light. Despite these challenges, Virtual Production has become one of many tools in film production and is the subject of André Bazin's discussion of the ontology of the photographic image.

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