

Synthetic Vision in Virtual Reality Documentaries

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Abstract:

Based on a nuanced understanding of immersion and sense of presence (SoP) as two key aesthetic effects that the application of virtual reality (VR) to cinema is believed to innovate, this paper develops the concept of synthetic vision as fundamental to understanding the visual experience of VR media, particularly VR documentaries. The concept contends that viewers' experience in VR is based on two visions that seemingly contradict each other: first, a disembodied vision that transports them to a simulated world, and second, an embodied vision guaranteed by the freedom to control kinesthetic movement and direction of gaze. This serves to advance the idea that immersion and SoP are not unified but rather multifaceted concepts premised on a nuanced understanding of the varying relationships between the technological system of VR, its media content, and its user. For the concept of synthetic vision points to the paradoxical coexistence of viewers' presence in the virtual world and their structural absence from the world that lays the groundwork for their immersive experience. By classifying three generic categories of contemporary VR documentaries (humanitarian and journalism documentaries, documentaries about nature, travel, and museum visits, and documentaries based on the reenactment of conscious or mnemonic realities), and by examining the aesthetic and ethical underpinnings VR brings to each of them, I argue that it hinges upon what kind of cinematic conventions and genres are remediated to determine the effective synthesis of the two visions. The varying effects of synthetic vision in the three subgenres of VR documentary stress that immersion and SoP have different political and ethical consequences of media witnessing. In the conclusion, I recapitulate multiple implications that the concept

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of synthetic vision has in regards to both the studies on VR and the recently flourishing investigation into cinematic VR artifacts.

Keywords: Virtual reality (VR); documentary film; synthetic vision; immersion; sense of presence (SoP); embodiment.

The use of virtual reality (VR) has expanded in various subgenres of cinema, including documentary films, during the past decade. There are two key tropes that have driven many practitioners to venture into VR nonfiction artifacts: the first is immersion, through which participants feel as if submerged into the image space surrounding them; and the second is sense of presence (SoP), which refers to “the perception of [one’s] surroundings as mediated by both automatic and controlled mental processes” (Steuer, 1992, p. 75). These have also been deemed as two experiences of reality and history that VR documentaries excel in offering in comparison to the standardised cinematic apparatus based on the viewer’s stationary frontal position, the frame and the two dimensionalities of the image, and the distance between the viewer and the screen. Chris Milk, an interactive media artist who has played a pivotal role in expanding VR into a new canvas for storytelling, mentioned in his TED talk that “VR feels like truth – you *feel present in the world* [emphasis added] you are inside and present with the people you are inside of it with”, while also establishing it as the “ultimate empathy machine” (2015). Nonny de la Peña et al. have introduced the concept of “immersive journalism” as producing a news form in which people can gain a first-person experience of the event or situation described in the news stories, allowing “the participant... *to actually enter a virtually recreated scenario representing the news story* [emphasis added]” (2010, p. 291).

The hype for immersion and SoP, in which a viewer’s sense of being present in the virtual world is strengthened by its mimetic verisimilitude, enables one to evince VR technologies as approximating the perfect illusion of life and world that André Bazin characterized as “total cinema” (1967, pp. 23–27), an ideal that the technological evolution of cinema encompassing colors, the cinemascope, and 3D cinema would eventually approximate. Moreover, the affordances of VR are understood as establishing the viewer as a surrogate cinematographer, in that the virtual world responds to a viewer’s physical positioning and movements. Raqi Syed argues that “the participant becomes a cameraperson, removing the decision making around camera placement and movement from the filmmaker’s hand” (2019). This argument is premised on

the assumption that VR's capacity to activate viewers' control of their movements and gaze is able to emulate the idea of the documentary camera as "an anthropomorphic extension of the human sensorium... [that] reveals not only the world but its preoccupations, subjectivity, and values" (Nichols, 1991, p. 79). Fueled by the development of lightweight recording devices such as 16 mm/super 8 mm film cameras and video camcorders, the direct cinema and *cinéma vérité* movements contributed to establishing this concept of the camera. Jean Rouch has emblematised it as he characterised the handheld camera as the "living camera": "Today all cameramen who shoot direct cinema know how to walk with their cameras, thus transforming them into 'living cameras' [...] [the cameraman] is thus able to penetrate into the reality, rather than leaving it to unroll itself in front of the observer" (2003, p. 38).

However, VR's optical illusion and its activation of a viewer's sensory response are not sufficient to achieving the tropes of immersion and SoP. This is, first and foremost, not only because immersion and presence as two aesthetic concepts can be applied to non-VR media, such as painting and cinema, but also they remain so contested as to defy their unilateral definition (Rose, 2018a; McRoberts, 2017). As for immersion, several notable studies on the traditions of immersive media from the pre-digital (fresco rooms, 19th-century panoramas, IMAX) to the digital (cyberspace and VR) eras have underlined that it is not unified but two-fold. Janet Murray defines immersion as "the sensation of being surrounded by a completely other reality... that takes over all of our attention, our whole perceptual apparatus" (1997, p. 99). Similarly, Oliver Grau argues that immersion derives from artificial images that "integrate the observer in a 360° space of illusion", on the one hand, and "affect sensory impressions and awareness" (2003, p. 13) on the other. Char Davies, a pioneering artist of VR in media art, aptly recapitulates the intertwinement of the two experiences, namely, viewers being transported to (and surrounded by) image space and their sensory embodiment of its stimuli, as follows: "[Immersive virtual space] can be experienced not only as an artificially constructed symbolic space, but simultaneously (paradoxically) as an actual space, which feels real, in the sense of being three-dimensionally extended and all-surrounding, with navigable stereoscopic spatial depth" (2003). The twofold aspect of the concept of immersion can indeed be found in the way that the concept of SoP has been deliberated in dialogue with the development of VR since the early 1990s. During the nascent stage of VR, Jonathan Steuer defined its user experience as not a "natural" but "mediated perception", more specifically, as "telepresence" that is the "experience of presence in an environment by means of a communication medium" (1992, p. 76, emphasis in original). In his series of studies

(Slater et al. 1998; Slater, 1999; Slater, 2003), Mel Slater has advanced the concept of SoP in a nuanced manner, taking into account the interplay of its internal (mental and subjective) and external (technological and objective) determinants, and defining it as logically distinct from – if strongly being coupled with – immersion: that is, presence is a perceptual and mental response to immersion (Slater, 2003, p. 3) and thus not entirely identical to it. In order for the immersive system to trigger the response more convincingly, Slater continues, its simulated world aims to achieve “such a high fidelity that [the world] becomes indistinguishable from reality” on one hand, and to induce users to behave “in a way that is similar to what their behavior would have been in a similar real life situation” (2003, p. 3), on the other. Founded upon Slater’s twofold view, Jamie McRoberts deems it as dependent on the tripartite relationship of media form, media content, and user characteristics, identifying “positionality of the user” (i.e., how “the user is situated within the virtual environment and how its narrative addresses him or her”) “interactivity”, and “narrative agency” (which relates to “the system’s ability to engage the user in a role of co-constructing reality”) as other dimensions of VR content than immersion that influence users’ SoP (2018, p. 5). Again, these four variables of VR content suggest that creating SoP has been achieved not merely with the advancements of its technological system but also “through understanding the complex, dynamic interdependence between” (McRoberts, 2018, pp. 14–15) the system, the content, and the user.

In this context within which both immersion and SoP have been conceptualised as dependent on the negotiation of the multiple factors and components that constitute VR artifacts, I propose in this article the visual experience of VR as synthetic vision, a vision grounded in the negotiation of two visions that are at play in 360-degree videos as the most popular form of VR documentaries in the present stage: an embodied vision marked by viewers’ sensorial acts of responding to the virtual world; and a disembodied vision through which viewers are separated from their phenomenal reality and transported to that world. With this, I argue that the effects of immersion and presence in VR documentaries hinge upon how the disembodied vision constructed by their technical affordances is successfully linked to viewers’ embodied vision that demands their sensory movements and affective responses. This suggests that the application of documentary modes to VR does not immediately lead to the creation of these effects, and that the effects of the presence of viewers in a virtual world with perceptual activities, including turning their head and focusing their eyes, depend on documentary films’ subject matter and the mode of practice that VR’s disembodied vision remediates.

Specifically, the viewers' experience of VR is not to establish them as surrogate cinematographers or subjects that assume the "living camera" as Syed (2019) might insist. It is for this reason that not all subgenres of documentary are successfully adopted to VR.

After elucidating the concept of synthetic vision by interweaving the literature on VR, film theory, and recent documentary studies, I demonstrate this point by discussing three types of VR documentaries: first, nonfiction artifacts based on the observational and participatory modes; second, works that allow for viewers' virtual travel to the world of nature and museums; and finally, projects that offer reenactments of trauma and memory by enriching viewers' subjective, embodied experience.¹ My consideration of the three documentary types also intends to advance Slater's and McRoberts' insights into the concept of SoP as varying according to the intersection of media form and content in the context of VR nonfiction artifacts. From a technological viewpoint, practical and theoretical studies on the application of the VR system to social, scientific, educational, and artistic uses have tended to focus on achieving a greater sense of illusionism as fundamental to immersion and of interactivity as prerequisite for the user's identification of her sensory and psychic experience in the virtual world with her perceptual and emotional responses in real life. However, Slater's twofold conceptualization of SoP as the interplay of media form and media content, as well as McRoberts' emphasis upon "the positionality of the user" and "narrative agency" as constitutive of SoP, suggests that VR's aesthetic and emotional impact cannot be reduced to its technological developments. Insofar as documentary film derives from a set of cinematic modes of practice aimed to not only show life and reality but also to construct a particular viewpoint that invokes the viewer's engagement with the two, taking into account the mode's varying intersections with the VR system is necessary for understanding the user experience of VR documentaries and the political and ethical consequences of immersion and SoP that they are intended to produce. As I summarise before the article's conclusion, the concept of synthetic vision suggests that the consequences rest upon the different negotiations between VR documentaries' media form and content and the types of documentary film that their synthetic vision adopts and recreates.

1 This does not deny that reenactments also exist in non-VR documentary and are often filmed with subjective viewpoints, as I discuss later in this paper.

VR Documentary's Synthetic Vision and Its (Dis)Contents

My concept of synthetic vision in VR is based on two lines of argument on the user experience of it. For early pioneers on cyberspace such as John Perry Barlow (1990), Howard Rheingold (1991), and Jaron Lanier (2017), the experience of VR is premised on the separation of viewers from their environment and physical presence. Describing his experience of entering the virtual world, Perry Barlow wrote: "In this pulsating new landscape, I've been reduced to a point of view... at least I know where I left my body" (1990). This resonates with Rheingold's definition of telepresence in VR as "a form of out-of-the-body experience", followed by his account: "I began to accept the odd sensation that accompanied the act of transporting my point of view to that of a machine" (1991, p. 255). Interestingly, these pioneers' emphasis on feeling detached from their own body and being reduced to the point of view of the machine has coincided with another line of argument on VR, which centers on its activation of an embodied experience. Brenda Laurel, for instance, associated sensory immersion with remote presence in the early stage of VR technology (1991), and later highlighted VR's affordances for augmenting users' depth perception and tracking their direction of motion as crucial to eschewing their "out of body" experience [that] defeats immersion" (2016). Craig D. Murray and Judith Sixsmith established immersion as an experience fulfilled by an anthropomorphic representation of the viewer's body: they write, "immersion is...predicated on being able to both see a virtual and feel a physical body that closely corresponds, and that, without this close correspondence, a sense of embodied immersion would be disrupted" (1999, p. 326). The two authors' emphasis upon the corporeality of the virtual body corresponds to Mark B. N. Hansen's formulation of VR as comprising "our culture's privileged pathway...for exposing the technical element that lies at the heart of embodiment" (2006, p. 15). Perhaps Anne Balsamo is one of the few pioneering theorists who has perceptively noticed the coexistence of the seemingly two competing user experiences of VR. On the one hand, she describes her own experience of the virtual space as guided by a "a floating - moving - perspective that mimes the movement of a disembodied camera 'eye'" (1995, p. 124). This kind of trip to the virtual space, however, does not necessarily lead to the elimination or repression of the user's phenomenological body if the applications of VR achieve an anthropomorphic representation of the body that projects "a utopian desire for control over the form of personal embodiment" (1995, p. 128), on the other.

Attending to these bifurcated accounts that culminate in Balsamo's ambivalent view, Mandy Rose ascribes the contradictory visions of VR to

its hybridity, marked by the imbrication of the “technologies of seeing” and the “technologies of corporeality”. The “technologies of seeing” refer to VR’s technical affordances that reduce viewers’ fields of vision to an optical viewpoint afforded by its panoramic space that separates them from the phenomenal reality to the point that they feel as if they left their own body. “While the camera lens has been understood as a proxy for the human eye, the unbroken panorama produced by spherical video is that of a machine” (Rose, 2018b). The “technologies of corporeality”, then, operate to offset viewers’ sense of disembodiment in the experience of VR by offering them both a heightened illusion of spherical image space and the modes of sensory engagement with it, so that their sense of presence is amplified with haptic and kinesthetic experiences. Rose’s formulation of the technologies of seeing and corporeality lays the groundwork for the concept of synthetic vision, as it suggests ways in which a disembodied and an embodied vision coexist in VR’s technological affordances, and the viewer experience of its image space. From this perspective, the 360-degree, spherical video as a dominant format adopted by many VR documentaries is not a unified media form. It is a hybrid of the panorama originated from 19th-century visual culture, on the one hand, and a kind of head-mounted display interface, such as the Oculus Rift, Google Cardboard, and Samsung Gear, that guarantee viewers the feeling of being inside the panoramic image space with their sensory responses, on the other. While the interfaces activate viewers’ embodied vision by enabling them to turn their heads and move their bodies, the panoramic 3D image space separates them from phenomenal reality. In other words, the viewers’ feeling of presence rests not simply on their freedom to direct their body and focus, but also on a sort of vision structured by the panoramic image space and strengthened by its mimetic illusion, one that does not originate from their consciousness and bodily sensations.

Rose’s description of this dual aspect, in my view, alludes to a contradiction caused by the coincidence of the embodied and disembodied visions. She elaborates that, “In 360° video then, while the point of view (the place where the camera is set up) is pre-determined, the direction of view is open” (Rose, 2018b). It serves as an antidote to the hype of immersion and SoP that has been looming large over the industrial and cultural promise of VR-based cinematic practices. To be sure, the technological developments of head-mounted display devices, 3D modeling techniques, and the sensors that track the user’s kinetic movements and sensory inputs since the mid-2010s have significantly contributed to the multiplication of VR formats, which include both 3DoF (degrees of freedom) and 6DoF in 360-degree VR films. While 3DoF headsets allow users to track rotational movements around x, y, z axes,

their 6DoF counterparts equipped with additional functionalities (such as hand controllers) add to them translational movements along those axes, such as moving forward or backward, and up and down (Ceuterick, 2021). If one focuses on SoP alone, such headsets as Oculus Rift and HTC Vive on VR that are designed for 6DoF offer the participant a higher degree of the feeling of “being there”, because her embodied behaviours in the virtual world become more similar to those in her phenomenal reality. Despite this heightened sense of presence, however, even 6DoF videos are not exempt from the disembodied gaze that structures the user’s separation from her own world and her absorption into the virtual world, a gaze governed by VR’s machinery that does not belong to her. That is, the experience of immersion presupposes a transport from phenomenal reality to another virtual world, one that positions them within the field of vision whose change remains out of control while the body and gaze are controllable. This also demonstrates why the often-raised allusion of VR to the Bazinian ideal of total cinema is misleading, an allusion that tends to isolate and overemphasize the iconic illusionism of its imaging.

Considering that the technologies of “seeing” and those of “corporeality” are at play in the present-moment applications of VR to documentary, Rose (2018b) summarises the paradoxical nature of immersion and presence as “the optical illusion of *being there* within events depicted while at the same time being fully aware of *not being there*”. Akira Mizuda Lippit and Lev Manovich have highlighted this paradox before Rose’s take on its applications to nonfiction practices. Lippit associates VR with Jean-Louis Baudry’s formulation of the cinematic apparatus: “From one virtual environment, that of the *camera obscura*, to another, the realm of subjectivity, the eye effects a disembodiment of the real” (1994, p. 604). Manovich observes that while allowing spectators “to actually move around the physical space in order to experience the movement in virtual space”, VR also “imprisons [their] body” to the extent that it is reduced to “nothing else... than a giant mouse, or more, precisely, a giant joystick” (2001, p. 135). This reliance on the interface is tantamount to reducing the viewer’s vision to the pure act of seeing as if being identified with what Anne Friedberg has characterized as the “mobilized virtual gaze” (1993), the cinematic vision determined by the interplay of the camera mobility and the viewer’s fixed viewing position, that Manovich originally perceives as distinct from VR’s embodied vision.

Developing Rose’s insight into the underlying paradox of VR experience, I also argue that the negotiation of the two – ocular and corporeal, disembodied and embodied – is divergent, according to what kinds of

cinematic conventions and storytelling it recycles and remediates. While the novelty of VR affordances is its activation of viewers' physical sensations that allow them to determine where to look and move, the virtual panoramic space takes on the pre-determined aspects of shots and their viewing positions, both of which are not entirely freed from cinematic conventions. The idea of suture that has long been developed in film and media studies throws new light on a renewed understanding of the disembodied vision in VR, as well as its negotiation with the embodied vision. It is well known that suture refers to the cinematic processes by which spectators are drawn into the narrative illusion, notably through the use of the shot/reverse-shot convention to make them identify the look of the camera with that of the character. This suggests that a film's technical properties, such as the interplay of on-screen and off-screen spaces, and the viewer's limited perspective, always mark the absence of the enunciating subject responsible for the construction of its narrative space, or what Jean-Pierre Oudart refers to as the "Absent One" (1977),² and that the procedures to stitch shots together aim to resolve the viewer's anxiety, caused by the absence, by ensuring the coherence and plenitude of the space.

Certainly, the need to stitch together is a key procedure of panoramic image spaces both in digital and pre-digital ages, as their seamlessness is known to guarantee a viewer's faithful impression of reality. The application of spherical video to cinema, however, necessarily demands more conventions than the photorealistic representation of its space. As Kaja Silverman elucidates, "The classic cinematic organization depends upon the subject's willingness to become absent to itself by permitting a fictional character to "stand in" for it, or by allowing a particular point of view to define what it sees" (1983, p. 205). In this context, the disembodied vision structured by VR produces a similar kind of anxiety for its viewer, although it abolishes the frame and two-dimensional screen that signal the structural absence of the enunciating subject in cinematic space. Viewers' separation from phenomenal reality and their sense of being transported to another world raise the question as to where they are and what their vision is attributed to. Perhaps fictional VR films could resolve viewers' uncanniness easily by grafting the disembodied vision onto a character's point of view in a similar

2 Daniel Dayan neatly paraphrases Oudart's observation of the viewer's anxiety caused by the "Absent One" as follows: "the spectator discovers that his possession of space was only partial, illusory. He feels dispossessed of what he is prevented from seeing. He discovers that he is only authorized to see what happens to be in the axis of the gaze of another spectator, who is ghostly or absent" (1976, 448).



Figure 1. *Clouds over Sidra*.

fashion as traditional narrative films do. Documentary cinema, however, is relatively unfamiliar to that solution, since its gaze tends to be attributed to the documentarian-as-cameraman (as in the cases of autobiographical, first-person documentary), or an invisible director who is not advised to impose a subjective perspective on the camera. The sense of feeling the “Absent One”, despite the heightened perception of the lifelike illusion and being engrossed in what it represents, echoes Sita Popat’s account of the embodied experience in VR as “being both virtual and physical, [and] absent and present” (2016, p. 360). This simultaneity implies that although VR activates the viewers’ bodies, their alienation from their phenomenal world also structurally introduces the gaze of a disembodied Other, which does not necessarily match – or even uncannily confound – their embodied gaze.

The issue of suturing, or synthetizing VR’s disembodied, machine-based vision with its embodied gaze, is particularly raised in its applications to humanitarian documentary. These include the projects sponsored by the United Nations, such as *Clouds over Sidra* (Gabo Arora and Barry Pousman, 2015, Figure 1), a VR film that follows the mundane lives of Syrian refugees at the Za’atari Refugee Camp in Jordan through the account of a 12-year-old girl named Sidra, and *Waves of Grace* (Gabo Arora and Chris Milk, 2015, Figure 2), in which a young woman named Deontee Davis invites the spectator to witness the devastating effects of the Ebola epidemic on a village in West Point, Liberia, as well as the efforts of villagers to survive it. At first glance, the panoramic space of these two



Figure 2. *Waves of Grace*.

projects augments viewers' illusion of spatial presence and their embodied vision. In *Clouds over Sidra*, for instance, the viewer turns their head in accordance with the transition of one scene to another to explore the social spaces within the refugee camp, such as temporary shelters, a school's overcrowded classroom, an ad-hoc PC café, a gym, a wrestling class, a bakery, and Sidra's room. Viewers' sense of social presence is also fostered as the project situates in the midst of a group of people, as evidenced in the scenes where they are placed as though sitting amongst children in the classroom, standing between young male refugees sitting at two opposing rows of the PC café, and between two groups of girls playing dodge ball. Another technique for empowering viewers' immersion in the social space is to create a sense of proximity toward the victim and the surrounding space. Sidra's direct address to the camera strengthens viewers' intimate relationship with her testimony as though sitting in front of her. Similarly, the penultimate scene in *Waves of Grace* shows Deontee Davis standing on a beach looking at the sea. Here, the 360-degree video space allows the viewer to turn their head in all directions: to both observe the sea from Deontee's viewpoint and encounter her emotionally-charged face as though standing next to her. Accordingly, the project attempts to establish the viewer's physical proximity to the social actor and her environment as an immersive experience and to amplify his empathetic relation with her situation. In both works, VR's capacity to achieve a closer proximity to their character is built upon its embodied vision that enhances the viewer's SoP. In the words of Kath Dooley, cinematic VR artifacts' first-person storytelling

founded upon this type of gaze “results in a significantly different emotional journey and relationship with characters and objects than that offered by traditional filmmaking” (2020, p. 82).

Concurrently, it is worth noting that viewers’ embodied senses of presence and proximity are premised on the disembodied vision of spherical video space that separates them from their physical surroundings. The scenes in *Clouds over Sidra* and *Waves of Grace* change without the viewers’ will. Therefore, they have to adjust the direction of gaze to a new scene and the people inhabiting it. They become identified with the VR interface’s field of vision that predetermines what they look at, therefore wondering whose point of view it is. This subjective yet disembodied perspective is due to the “perceptual transfer” in VR, an effect that viewers “feel like they have left their reality and have entered another one that can be explored via head movements” (Nicolae, 2018, p. 172). Perceptual transfer, which is indeed identical to what I call separation from phenomenal reality, suggests that the embodied act of seeing in all directions of the spherical video is guided by the “Absent One”, whose source remains unknown. What this lack of suturing fosters is that the refugee camp and the village affected by the Ebola virus depicted in both humanitarian VR documentaries are perceived less as social spaces extended from the viewers’ phenomenal reality than as simulated spaces in which they are immersed, or to put it differently, as other spaces in which they feel ultimately absent despite the sense of presence. The failure to negotiate VR’s disembodied gaze with the viewer’s embodied vision corresponds to what Kate Nash appropriately articulates as the “inherent tension between attention to the other and the experience of transportation” (2018, p. 128). Taking as examples *Clouds over Sidra* and *Waves of Grace*, Nash argues that this tension of VR carries the moral risk of “improper distance”, a concept that Lille Chouliaraki proposes to indicate how media witnessing subordinates non-Western victims and their painful reality to the distant eyes of the Western viewers, while also depriving the viewers of their privileged position (2006). In Nash’s words, the viewers’ enhanced sense of presence and proximity in the humanitarian VR documentaries “prioritizes [their] own experience of transportation and exploration... over engagement with the testimony of the other” (2018, p. 125). As Sasha Crawford-Holland also observes, viewers in *Clouds over Sidra* and *Waves of Grace* are reduced to “spectral voyeurs” that temporarily occupy the visual field of the VR affordances: “There can be ethical value to this endearment – but we are no closer to understanding how they feel. We are merely spectral voyeurs inhabiting the body of an alien camera” (2018, p. 27). In *Clouds over Sidra*, the viewer is ultimately unable to interact with Sidra, however proximate the viewer’s

haptic vision is, and however powerful the perceptual realism of the refugee camp is. The viewer does not exchange looks with Sidra, and instead the gaze roams around the spherically simulated spaces without reciprocally interacting with those of other refugees.

The tension between transportation and exploration, or between the disembodied and the embodied visions, is also emphasized in “immersive journalism” documentaries, such as *VICE VR News: Millions March* (Chris Milk and Spike Jonze, 2015), a project that documents the coverage of a street protest against police violence and racial profiling in New York City on 13–14 December 2014, and *Vigils in Paris* (New York Times, 2015, Figure 3), in which a group of residents and visitors, including those holding a candlelight vigil at night, gathered at the center of Paris to mourn the victims of the terror attack that took place on 13 November 2015. In these projects, the viewer experiences immersion and presence as though standing in the midst of the social action. *Millions March*, in particular, includes a couple of scenes in which the VR’s disembodied vision binds with the gaze of an imaginary cameraperson: First, viewers encounter a group of African-American men who furiously speak about racism in America; and second, they are guided to follow Vice News correspondent Alice Spieri reporting from the street, and interviewing a black female protestor. In the rest of the scenes, however, the viewer has difficulty in locating the moving eyes within the gaze of the cameraperson. This creates the impression that the protest is happening *elsewhere*, rather than enabling the viewer to connect its simulated scenes with the social reality that they refer to. The viewer’s sense of disorientation caused by the automated transition of scenes is more evident in *Vigils in Paris*. In this project comprising eight scenes, the viewer is either located in front of the pile of floral tributes to the terror victims or surrounded by the participants in the acts of mourning, such as singing hymns and shouting slogans. While the viewers have the liberty to move their eyes in all directions, the haptic sense of being (that is, their embodied vision) present in the scenes is marred by the question of whose point of view it is able to identify with: Is the VR’s pre-determined vision restored to an unidentified citizen or the cameraman? The project leaves this question unanswered. Consequently, the viewers’ experience of it is divided into presence and absence, proximity and distance.

Effective Synthesis of Visions in Two VR Documentary Subgenres

Given this limitation of the applications of VR to the observational and participatory modes, I argue that the effective suturing or synthesis of the disembodied vision pre-determined by VR’s spherical video space with the viewers’ embodied sensory experience occurs in nonfiction practices



Figure 3. Vigils in Paris.

other than the humanitarian and “immersive journalism” VR documentaries. In these practices, the disembodied vision’s separation of viewers from their phenomenal reality is so culturally justified that their immersive presence in the image space is perceived as being transported to a distant world. In this condition, the viewers’ embodied perspective is identified with the position of a visitor to the world or a social actor that occupies it, so that the uncanny sense of feeling the gaze of the “Absent One” is alleviated.

It is possible to classify the two subgenres of VR documentary that enable the effective synthesis of the embodied and disembodied visions. First, there has been the proliferation of VR documentaries that recreate the experience of traveling to the natural world, visiting the museum, and embarking on an architectural journey. These include *The North Space: Nepal* (Jaunt, 2015), *Everest VR* (Sólfar Studios, 2016), *-22.7°C: The Far North Musical Experience* (Jan Kounen, 2017), and virtual tour platforms installed by numerous museums and galleries. The VR documentaries or platforms refashion the cultural genealogy of the convergence between travel, mobility, and an array of visual media technologies since the 19th century that encompass panoramas, stereoscopy, Cinerama, and IMAX. Anne Friedberg and Alison Griffiths demonstrate that spectators’ multi-perspectival gaze in the traditional panorama evolved into cinema’s mobilized virtual gaze, operated by montage and camera movement, which allows the spectators to have a sensation of movement and to take up different vantage points. In this genealogy, Cinerama and

IMAX increased the viewers' touristic experience by connecting cinema's mobilized virtual gaze to expanded visual fields that subsume their physical position (Griffith, 2008, pp. 79–113; Acland, 1998). Film's reconfiguration of the space of the city, as well as of its buildings and museums, with its capacity to engender the viewer's visual and kinesthetic mobility has established the affinity between the experience of travel and film spectatorship, exemplified by Giuliana Bruno's assumption that "the film 'viewer' is a practitioner of viewing space – a tourist" (2002, p. 62).

The VR documentaries that update the convergence of spatial journey, mobility, the traditions of panorama, and cinema position their spectators as tourists or visitors, with their 360-degree views allowing them to look around and navigate. Here, VR's disembodied vision amplifies viewers' experience of being transported to another world, and the automated placing of them in a central position of each shot solicits the embodied exploration of its space. According to Alfio Leotta and Miriam Ross, VR travel documentaries "allow viewers to move... into a fully immersive, multisensorial engagement with representation" by creating "virtual experiences that the tourist-viewer accepts as substitute for physical visitation to inaccessible sites" (2018, p. 150). This account demonstrates that the "Absent One" of the disembodied vision is firmly tied to VR's embodied vision as the point of view (POV) of the viewer-visitor in those documentaries. The immersive experience of the viewer-visitor is amplified as some of those documentaries present a dynamic transition from the physical space to the space of dream or fantasy. For instance, *-22.7°C* (Figure 4) guides the viewer towards the exploration of the Arctic. The viewers' journey through its glacial spaces commences with a boat ride, in which they are positioned as its passengers. Their first-person POV is dramatically highlighted as they experience the boat sinking. Subsequently, the viewers are surrounded by the darkened underwater space rendered in computer-generated imagery, in which they experience vertiginous disorientation as though falling into the earth while passing along several mantle-like shapes until they are again positioned on a sledge running by a group of sled dogs through a vast stretch of frozen plain. Similarly, *The Scream VR* (Sandra Paugam and Charles Ayats, 2019) begins with a gallery room in which Edvard Munch's expressionist painting *The Scream* (1893) is displayed. The viewer's observation in the mode of the gallery visitor changes into an immersive experience as a series of surreal events take place: First, the undulating red lines of the sky depicted in the painting pour outside its frame and flow across the gallery wall; second, a white hand appears in front of the viewer as part of the avatar; and finally, the red lines dye the whole



Figure 4. *-22.7°C: The Far North Musical Experience.*

360-degree plane of the room and a volcano erupts until the color turns into black. In these two works, the 3D computer-generated imagery and the dynamic transition of shots strengthen the viewer's separation from phenomenal reality, achieving the marriage of the disembodied vision with the visceral and affective first-person experience of presence in another world.

The examples of *-22.7°C* and *The Scream VR* suggest that the second subgenre of VR documentaries that testifies to the effective synthesis of disembodied and embodied visions is based on the reenactment of conscious or mnemonic realities. Studies on 19th-century panoramas have demonstrated that as a mass medium of the time, their composite views depicted not only natural landscapes, artificial monuments, and exotic colonial locales, but also historical events of the past, including victories at battlefields (Oettermann, 1997; Huhtamo, 2013). As Griffiths observes from the latter case, the immersive mode of spectatorship in the 19th-century panoramas fulfilled the didactic function of reenactment “in both subject matter and in their rhetorical claim to improve upon one’s memory of viewing the real thing by providing a more comprehensive, all-embracing view” (2013, p. 72). In the current applications of spherical video to documentaries, the subjects of reenactment go beyond spectacular historical events, encompassing traumatic histories, personal

experiences of disenfranchised social actors, and the collective feelings and memories whose filmic record is unavailable. Therefore, these VR projects are in tandem with the wide spectrum of reenactment-based nonfiction moving image practices across theatrical and television documentaries, experimental film and video, and media installations, which raise or explore various issues compiled by Jonathan Kahana:

[T]he place of memory, testimony, and narrative construction in historical knowledge... the imaginary and fantasmatic aspects of character and performance in documentary film and media, and the role of documentary in the construction of social fantasy; the therapeutic value of reenactment; [and] the uses of embodiment in various kinds of learning and pedagogy. (2009, p. 50)

Nichols's formulation of reenactment as a set of fantasmatic styles that foreground the embodied restaging of memory and knowledge alludes to the reason that VR documentaries have increasingly adopted and reworked it: "reenactments, like other poetic and rhetorical tropes, bring desire itself into being and with it the fantasmatic domain wherein the temporality of lived experience... find[s] embodiment" (2008, p. 86). Here, the "fantasmatic domain" is what the VR's disembodied vision convincingly offers with its capacity to transport the viewer. The viewer's embodied vision is linked to the lived experience of the social actor associated with the memory or account of an event depicted in the virtual space. Considering these two effects, reenactment-based VR documentaries are seen as remediating the performative mode of documentary that "underscores the complexity of our knowledge of the world by emphasising its subjective and affective dimensions" (Nichols, 2001, p. 131). VR's embodied vision serves that purpose of performative documentary as it facilitates the viewer's empathetic identification with the perspective and bodily experience of others, which in turn resolves the anxiety of the "Absent One".

Notes on Blindness: Into Darkness (Arnaud Colinart and Amaury La Burthe, 2016, Figure 5), available in either 3DoF and 6DoF, is a VR documentary based on the reenactment of theologian John M. Hull's testimonies recorded in the 1980s about his experience of losing his eyesight. As its directors have clearly remarked, the project aims to offer viewers an imaginary reconstruction of the "emotions and sensations [Mr. Hull] went through", stimulating viewers' "immersion in a completely different world of perception" (quoted in Wissot, 2016). Upon activating the project, the viewer is engulfed within the 360-degree space of darkness in which it is challenging to distinguish figure and ground. The



Figure 5. Notes on Blindness: Into Darkness.

only visible thing is a digitally-generated flow of white particles resembling a river. In concert with the apparent lack of various colors that prevent the world from being endowed with the illusory resemblance to physical reality, the overall darkness functions as a visual equivalent of the imagination about what being blind is like, while also transporting viewers to the world that Mr. Hull perceived. Engulfed by the darkness, their embodied vision is open to all directions, but the opacity of the spherical video space leaves the impression that they have been thrown into a field of vision that is unfamiliar to the habitual perception of the visible world or dissociated from the embodied being-in-the-world. To put it differently, the darkness of this project marks the extent to which the viewer's identification with VR's disembodied vision means to be transported to another world that might be responsive to the sensory input but is beyond one's control. The sense of absence caused by this vision is thus offset by the viewers' identification with Mr. Hull who exists in the form of his voice-over. A series of objects and natural phenomena are presented in all directions, such as a stream of water, trees, a wind chime, a swing set, birds, a pot, or a cup. Steven F. Anderson states that the figures "appear as vague moving shapes that appear to be lighted from within by flickers of bluish light... [and] resist being fully resolved in the eye of the viewer" (2017, p. 212). The triangulation of data-driven figures, the darkened spherical video space, and Mr. Hull's emotionally



Figure 6. *Ayahuasca (Kosmik Journey)*.

wrenching voice creates a highly evocative immersive experience in which the viewer's embodied, multidirectional gaze is not fully subsumed within her intentional perception of seeing but rather driven to identify with – or, to be sutured into – the “subjective and affective dimensions” of Mr. Hull's blinded vision.

VR documentaries' reenactment of the ethereal experience is also evident in Kounen's award-winning VR documentary *Ayahuasca (Kosmik Journey)* (2019, Figure 6). The project initially positions its viewers within an unknown dim-lit jungle in the Amazon, where the voice of an indigenous South American shaman, invisible in the scene, invites them to take Ayahuasca, a strong drug in South America that is used for spiritual purposes. For the next ten minutes, the viewers can be described as floating through the tunnel. As Michelle Lhooq, a participant of this project vividly describes:

For the next ten minutes, I drifted through various hallucinatory landscapes while the shaman's whispery chants filled my ears. If you've seen *Enter the Void* (Gaspar Noé, 2009) or other cult psychonaut movies, you're probably familiar with these types of trippy visuals of swirling geometric fractals, streaks of ghostly light trails, technicolor textures (2019).

Lhooq's allusion of the drifting experience of *Ayahuasca (Kosmik Journey)* to watching *Enter the Void* is convincing initially because the film employs a variety of kaleidoscopic abstract images and vivid colors to describe the

transcendent world of being addicted to the drug. However, it is worth noting that the film is famous for its innovative, non-anthropocentric camera operation that moves against gravitation and floats across and above the ground. Here, it becomes obvious that the senses of presence and immersion are the viewers' out-of-body experiences, in that all the changes in the scenes and directions of movement remain out of control. All the changes are made in ways that are given by an unknown force, in this case, the shaman. The heightened sense of falling and flying, therefore, is mediated by VR's vision that moves after being liberated from the principle of everyday human perception.

Carne Y Arena (Flesh and Sand, 2017), a project built upon the 6DoF format, exemplifies VR's successful remediation of documentary reenactment as it transforms the testimonies about the ordeals of refugees on the US-Mexico border into a visceral illusionist experience following their arrest by border securities. After taking off shoes and socks in a cold waiting room that evokes refugees' experience of being detained, the viewers are invited to put on VR gear, standing on the heated ground covered with sand, and surrounded by a large desert space illuminated by sunsets. The viewers are then positioned "as both a visitor and a participant" (Raessens, 2019, p. 638) upon noticing several children and old people approaching from one direction, and the lights of a helicopter from another with its immense noise. As a group of border patrol agents get out of the car and shout at the refugees to kneel on the ground, the viewers are forced to join them in following the order. Accordingly, the viewers' first-person, embodied perspective is identified firstly with both VR's disembodied vision that governs the dynamic changes in the situation of the space and the direction of gaze, and then with the viewpoint of the refugees. That is, the viewers hover between the first-person viewpoint and the gaze of the "Absent One" that is constructed by the installation's pre-rendered design, sometimes binding the two together. This synthesis or suturing of the vision achieves Alejandro González Iñárritu's idea of claiming VR's spherical video space "to *allow the visitor to go through a direct experience walking in the immigrants' feet, under their skin, and into their hearts* [emphasis added]" (2017). The viewers' immersive experience of the migrants' condition is later extended into empathetic viewing, marked by their ineluctable distance from the migrants, as they crawl over to another area of the desert and stand up watching the police interrogating them. This empathy is strengthened when a magical-realist dream world is suddenly conjured up: A dinner table is set up, around which the refugees sit together; then a small boat filled with another group of people makes its way across the table, reminding the viewers of the life-risking exodus of migrants across the

Mediterranean. Here, it becomes obvious that the viewers' multisensory immersion in the diegetic space, augmented by the interplay of sight, sound, touch (of the sand), and heat, is grounded in the fantasmatic aspect of reenactment. Upon getting out of the VR space that has turned black, and passing through a long hallway where a series of video screens line up on its both side, the viewers finally recognize that the reenactment's emphasis on the affective and subjective dimensions of the experience of the characters references the embodied memories and testimonies of real immigrants: Each screen presents a portrait of the immigrants, with their true stories written across it.

Political and Ethical Consequences of Synthetic Vision

The varying effects of synthetic vision in the three subgenres of VR documentary suggest that immersion and SoP have different political and ethical consequences of media witnessing. The examples of *Clouds over Sidra*, *Waves of Grace*, and *Millions March*, etc. suggest that in humanitarian and "immersive journalism" VR documentaries VR's disembodied vision is not seamlessly sutured into the user's embodied perception as their spherical video rehearses either the observational mode based on "recording life as it exists in front of the camera" (Winston, 1995, p. 207) or the participatory mode in which documentary filmmakers "live among others and speak about or represent what they experience" (Nichols, 2001, p. 116). By bracketing the presence of the filmmaker or camera-person at the scene of recording, VR's affordances and panoramic video space contradict the "living camera" model on which both modes of documentary practice are built. As Rose aptly points out, "a media technology being heralded for its prosocial potential should efface the social engagement between producer and subject that has historically been at the heart of documentary filming" (2018b). This contradiction implies that viewers' sensory immersion in the virtual environment and her embodied presence in it do not significantly contribute to amplifying the meaningful witnessing of social reality and their profound engagement with its actors, both of which have been two key political and ethical effects of theatre-based observational and participatory documentaries. Rather, VR's machine-mediated field of vision tends to neutralise the encounter of the filmmaker and the social subject that has been encouraged in the documentary's political and ethical commitment to reality, since it renders its image space to be another simulated world in which the observer's viewing experience is liable to be alienated. Kate Nash's attention to the problematic aspect of the user's proximate presence in events created by the humanitarian VR documentaries significantly raises the ethical problem of media witnessing. To bring a

slight twist to Nash's insight, I would argue that in those VR projects, their disembodied vision diminishes viewers' capacity to associate their simulated spaces as connected to social reality, and that their embodied presence in the spaces paradoxically reinforces the ineluctable distance from the victims inhabiting them, because they cannot locate themselves within the position of the human viewer, i.e., the documentarian or cameraperson. This further suggests that the viewers' enhanced haptic visuality alone is not sufficient to amplify ethical engagement with the social reality depicted in the panoramic video space.

The issue of the political and ethical consequences of immersion and SoP in the experience of cinematic VR artifacts can be said of the two subgenres of VR documentary that take on the more effective synthesis of the disembodied and embodied visions. The viewer's identification with the first-person perspective of an explorer or a social actor in the reenacted scenes of memory allows the two subgenres to avoid the problem of improper distance. However, the effective suturing of the disembodied gaze with the embodied gaze in the two subgenres of VR documentary also raises the question on what political and ethical uses immersion and SoP are put to. The VR documentaries that remediate nature and travel nonfiction films in the traditions of pre-digital immersive media might risk aesthetically strengthening the objectification of other cultures and non-human entities as the spectacle that awaits to be consumed, if their synthetic vision serves only to reinforce the perspective of a distance observer. However, the VR documentaries that I have discussed in this paper seem to avoid this problem through acknowledging the disembodied vision that decentralises the participant's anthropocentric vision while also achieving immersion and SoP. The VR documentary based on the reenactment of conscious or mnemonic realities is perhaps the most significant arena for further scrutinising the political and ethical consequences of synthetic vision, as well as immersion and SoP. For the vision's operation of suturing the disembodied vision opens up multiple avenues for having an emphatic relationship with the subjective reality of a social actor, inasmuch as the vision functions to position the participant within the reality seen from the actor's perspective.

The concept of synthetic vision that I have developed in this paper has multiple implications in regards to both the rich tradition of the studies on VR and the recently flourishing investigation into cinematic VR artifacts. First, in opposition to the pervasive assumption on the relationship between immersion and SoP as mutually serving each other for the efficacy of VR in the domains of technological and practical studies on its affordances and its applications to the various uses, the concept

suggests that these two are ontologically distinct (that is, immersion is premised on VR's disembodied vision whereas SoP is activated through its embodied vision) and that they have different degrees of correspondence. Second, it indicates that immersion and SoP as VR's most desirable effects should be conceptualised less as inherent properties of its technical capacity than as socially and culturally situated aesthetic experiences anchored in VR's multilayered negotiations with the rich traditions of immersive media and with the cinematic genres and conventions that it recycles and transforms. And finally, my overview of the three subgenres of VR documentary in terms of the operation of their synthetic vision suggests that its production of a heightened awareness of empathy and engagement is not sufficiently achieved only through the development of its technological system, but rather through the interplay of the system, its content (that is, the subgenres of documentary film and their corresponding subjects), and its user. For as I demonstrate in this article, the positionality of the user and the narrative agency are different in the three subgenres of VR documentary, and the difference deeply influences how VR's disembodied and embodied gazes efficiently negotiate with each other.

While it is undeniable that VR plays the powerful role of expanding the viewer's visual experience of documentary film by facilitating sensory and emphatic engagement with the real, it is premised not on the immediate equation between the documentary film's anthropomorphic camera and its technical affordances, but on how its spherical video space and its machine-mediated gaze are applied to the existing modes of documentary practice. This further suggests that VR cinema is not a unified construct of a new film totally distinct from the traditional film based on the normative cinematic apparatus, but a diverse array of artifacts that produce different aesthetic, cultural, and spectatorial effects that have significant political and ethical consequences.

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