On Modes of Digital Embodiment: Movement and the Digital

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Since the 1980s, there has been a growing fascination with the steady increase of the digital information that surrounds us and the interaction between virtual reality and physical space. Films from the 1980s and 1990s tend to ‘geographically’ and ontologically separate the realms of physical bodies and digital information; however, modern technologies stage a wider range of possible relations between bodies and the digital that blur the difference between these two realms. Embodiment, understood as the capacity of bodies to feel, perceive, and act, can be expanded beyond or limited to the physical body depending on the level of interpenetration between digital information and bodies. To explore the different digitally-enabled modes embodiment can take, this text will focus on two films, Premium Rush (2012) and Ghostcatching (1999), which present radically different approaches to how bodies move within digitally-enhanced environments. Taken together, these two films allow us to problematize and revamp Walter Benjamin’s and Jean Baudrillard’s seminal work on representation and modes of encounter by spatially and temporally situating digital mediation. By contrasting these two films’ approaches, this text aims at offering a positive account of digital embodiment where the full creative potential of bodies and the critical distance of representation are restored.

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From David Cronenberg’s *Videodrome* to the Wachowskis’ *The Matrix*, films in the 1980s and the 1990s demonstrate a special interest in possible forms of virtual reality, as well as in the way alternative spaces would displace the traditional understanding of the body as the privileged, physically delimited site of perception and experience. For instance, *Videodrome* accounts for an understanding of the body as the original prosthesis, i.e., as the alterable vehicle that perception and experience are given by default. In contrast, *The Matrix* depicts the body as a physical limit that can be transcended and expanded. In today’s context, however, the emphasis that these depictions place on technology and the body as influencing one another, while remaining distinct, seems outdated compared to more contemporary accounts where the line between the two is blurred. While real spaces and digital spaces remain ontologically and almost ‘geographically’ separated in *Videodrome* and *The Matrix*, modern technologies tend towards a greater interpenetration of the realm of bodies and the realm of data.

Simulations, video games, fluid interfaces, motion capture technologies, and data visualizations, to name a few, all instantiate different configurations between the physical body, the digitally-mediated environment in which it moves, and the analog nature of its movement in space. While the digital involves discrete units, the analog entails continuous quantities that exceed the digital’s mode of discretization. The fundamental gap between these two modes can be either erased or emphasized by these technologies or media practices. In their seminal works on representation, Jean Baudrillard and before him Walter Benjamin explored how viewers perceive the distance between representation, what is represented, and how this perceived distance, or lack thereof, engage different ways of perceiving and interacting with mediated objects. What ensues from this illusion of immediacy or perceived distance are different ways of sensing through one’s body, of experiencing with a body, and of being a body. Embodiment – understood here as the subjects’ capacity to feel, perceive, and act, as being confined to or expanded beyond the physical body through different modes of mediation – can then take a wide range of forms depending on the level of interpenetration between bodies and digital information. Investigating the tension between these two realms can allow us to better appreciate the different forms that digital embodiment can take based on the digital’s different levels of interpenetration with the physical and the analog.

By giving diverging accounts of the primacy of movement over the digital, two films can be used to explore these different levels of interpenetration while revisiting Baudrillard’s and Benjamin’s work on representation. *Premium Rush* (2012) tells the story of Wilee, a New York City bike messenger carrying a document worth $50,000 and his race across town against a corrupt police officer and other cyclists who attempt to intercept him. Information inhabits the diegetic world of *Premium Rush* just like other physical objects. Wilee’s perception of the city is inseparable from electronic mapping, geo-localization, and data visualization practices, evidenced by the way Wilee bikes alongside GPS-like arrows that show him the way and can foresee the consequences of taking specific paths over others through predictive simulations. *Ghostcatching* (1999) is a short dance film. It stages improvised choreographies, performed by renowned choreographer and dancer Bill T. Jones, which were digitalized through early motion capture technologies. The sensors captured the position and
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The rotation of Jones' body in movement, without preserving the performer's physical body. What is left is a series of ghost-like figures composed of colorful lines gracefully moving in a virtual space.

The first film gravitates around the synchronization of the body with different information within a digitally-enhanced physical environment, as illustrated by Wilee as he follows flows of information to efficiently navigate the city space. The second abstracts embodiment in a way that emphasizes the tension between the continuous, analog nature of movement and the discrete nature of its digital representation. When taken together, these two films articulate a causality between different modes of digital embodiment and the relations that the digital can entertain with the analog. While the first film exemplifies Baudrillard's notion of the hyper-real, the second one challenges Benjamin's account on reproduction and representation, as anchored in the material conditions of older media practices. These two films illustrate how these theoretical frameworks can be reinterpreted and revamped to account for new modes of representation that productively build upon the interpenetration between the digital and the analog and allow for new modes of digital embodiment.

There is a strong urgency to this discussion, as the interfaces through which people interact with digital information now expand beyond physically delimited screens and are increasingly situated at the level of experience and perception. Augmented reality, the Internet of things, real-time data analytics, and other fluid interfaces are all instances in which digital information is rendered somehow indistinguishable from the way subjects experience and perceive the world. By exploring two films that highlight different ways digital information informs what bodies are and can do in relation to their environment, this text will attempt to highlight how different configurations between bodies and technology can either expand or limit the capacity of bodies to act, experience, and perceive. Digital embodiment, in that context, refers to the influence of digital information and technologies on the way subjects both experience the world through their bodies and experience themselves as bodies.

1.1 Lexicon

This text's argument will rely on a few technical terms that deserve to be clarified. Firstly, the dialectic between the analog and the digital that traverses this paper is anchored in the incompatibility between these two modes of measurement. The digital involves discrete values that can be quantified in units, while the analog functions in terms of continuously variable physical quantities. For instance, while a body's position in space can be expressed digitally, i.e., in terms of discrete spatial coordinates, a body's movement can only be quantified in relation to another movement, i.e., through the analog's logic of variation and comparison. Secondly, individuation is understood here as the process through which disparate features and components are solidified into a unified entity. Thirdly, actualization consists of the process through which a specific possibility or outcome is given primacy over the whole range of other, potential ones. When a body performs a specific movement, it then actualizes one movement among all the other potential movements it could have performed instead. Finally, emergence refers to the new forms and properties that are created when distinct entities come together.
1.2 – From Mechanical Reproduction to Hyper-Reality

In his seminal essay, “The Work of Art in the Age of Mechanical Reproduction” (1968, first published in 1935), Walter Benjamin discusses the failure of modern media to produce the same effect as pre-mechanical artwork such as painting and sculpture. By taking photography as an example of modern art practices, Benjamin argues that however perfect a reproduction might be, it nonetheless “lacks [the original’s] unique existence at the place where it happens to be” (Benjamin 1968, 222). Deprived of their unique presence in space and time, artwork loses its “aura”, which Benjamin defines as “the unique phenomenon of distance, however close [an artwork] may be” (Ibid., 224). Delocalized from any unique, physically delimited form, the reproducible and reproduced artwork comes to the spectator rather than the spectator coming to the piece and in that way the artwork loses the authority to impose the conditions through which it can be viewed and appreciated (Ibid., 225). This paradigm of representation-as-reproduction, which inhibits the very possibility of emulating the almost sacred experience of encountering a pre-mechanical art, goes beyond the realm of art, as any media, object, or artifact can now be located within this broader visual culture of mechanical reproduction.

Almost 50 years later, Jean Baudrillard continues in the same vein as Benjamin with his book Simulations (1983). Baudrillard expands Benjamin’s account of aura beyond the realm of art to include mediation and representation in general. For Baudrillard, representation-as-reproduction creates an illusion of immediacy that erases the “contradiction between the real and the imaginary” (Baudrillard 1983, 142). Representation, consequently, is endowed with “a hallucinatory resemblance of the real with itself,” which excludes the very possibility of encountering reality outside its mediation (Ibid.). In that sense, Baudrillard reappropriates Benjamin’s ideas about distance by channeling them away from materiality and towards epistemology, in a way that folds representation with the objects it represents and makes the latter indistinguishable from the former. While physical and temporal presence creates a distance or a representational depth, lack of presence in space and time denies such a distance and rather creates a sense of illusory immediacy.

Baudrillard calls this representational mode “hyper-real” and explains that this immediacy “arouses a vertigo of reality […] on the limits of representation-for-the-sake-of-representation” (Ibid., 143). Through such an illusory objectivity, representation emerges as alienating its spectator from reality through an aesthetic of representation-as-simulacrum, which denies any form of physical, temporal, or epistemological distance from the reality it represents. Signs are mistaken for what they represent, images are deemed ‘truer’ than objects, representation is given primacy over reality. Baudrillard brings Benjamin’s claim even further by presenting the aesthetic of reproduction as one of representation-qua-representation, where reproduction is its own finality and has the capacity to impose its reality. Such an account denies any physical, temporal, and epistemological distance between reality and its representation and it is precisely under these three terms–space, time, and epistemology–that Premium Rush, Ghostcatching, and their modes of representation will be considered.
2 – Premium Rush & Augmented Reality

The mode of embodiment staged in *Premium Rush* is one in which urban experience is inseparable from the digital. The film’s representation of the city works either on the micro or macro level. Space is only seen through either close-ups of bikers that emphasize the city’s heterogeneity and unpredictability (flows of cars, rushing pedestrians, speedy bikers, etc.) or aerial shots that convey the city’s maze-like complexity rather than offering a cognitively graspable map. The viewer alone has access to this macro perspective of the city, but remains helpless in concretely and productively bringing these two levels together. This dynamic is intimately linked to how individual characters perceive the city space. Their immediate experience only conveys the chaos and heterogeneity of the city, but the digital layer of information that surrounds them translates the forces and implicit strictures of the city into comprehensible arrows and lines, allowing Wilee and the other bikers to successfully negotiate the city space. Munster’s work resonates with this idea by the way she writes that, with the écouteur paradigm, “extensive movement has been transformed into mobility [... which] inserts the self, via a new configuration of corporeal movement, into the technological course of information” (2006, 18). Seen in these terms, the difference between movement and mobility seems to depend on the realm in which motion is anchored. Movement belongs to the realm of bodies; one movement always gives rise to another, as the moment when one movement finishes and another begins is always impossible to pinpoint. Mobility for its part belongs to the realm of information. It is a matter of coordinates, of vectors connecting one point to another, of velocity.

This interpenetration of real space with the digital and the ensuing hybridized mode of perception are the basis for the mode of embodiment articulated in *Premium Rush*. In her book *Materializing New Media* (2006), Anna Munster formulates an urban subject whose experience of the city is based on “the rearrangement of aspects of aesthetic or sensory life [...] through the differential hybridizing of body and technology” (18). She refers to the ensuing urban figure as the “écouteur,” which she presents as a figure “contract[ing] the flows of information that are supposed to keep bodies usefully and efficiently moving [...] and turn them into functions of information flows” (Ibid.). This idea is explicitly illustrated by Wilee who, as a bike messenger, not only carries information (e.g., urgent letters, valuable documents, timely messages, etc.), but also negotiates and even competes with other flows of information that inhabit the city (e.g., speeding cars, GPS-like arrows, fellow bike messengers who want to reach Wilee’s destination before him, etc.). In fact, bodies not only negotiate, but also contract and even belong to this logic of flows and speeds, as illustrated by the way Wilee says that with his fixed-gear bike, he “can’t stop, [and does] not want to either” (Koepp 2012, 00:02:16) and that “brakes are death” (Ibid., 00:13:26).

Rather than emphasizing movement or even presence, Wilee’s way of being in space is based solely on his fluid insertion among the city’s flows and speeds. Munster’s work resonates with this idea by the way she writes that, with the écouteur paradigm, “extensive movement has been transformed into mobility [... which] inserts the self, via a new configuration of corporeal movement, into the technological course of information” (2006, 18).
The folding of the digital with the analog staged in *Premium Rush* is concretized precisely by its ambiguous account of movement and mobility. Information flows are given a strong physical presence. They smoothly and gracefully, avoid cars and other obstacles, and project their shadow on the asphalt. Wilee, despite always being in movement and continually pedaling, is never seen sweating or exhausted, as if motion was freed from the material conditions of the physical body. Characters become physically embodied (e.g., bones get broken, legs hurt, sweat starts pouring off one's forehead, etc.) only when they become immobile and fail to keep up with the flows and speeds of information. The physicality of information is given primacy over the physical body and information then emerges as a physical constraint that keeps bodies effective and mobile. In this regard, presence and physicality emerge as lacks or problems that are only actualized when bodies stop serving the purpose of information. The movement of bodies is displaced by the mobility of information and presence therefore emerges, not as a matter of being physically anchored in time and space, but as a function of keeping up with the flows and speeds of information.

Melissa McMahon writes in her text “Beauty: Machinic Repetition in the Age of Art” (2002) that such a flattening account of movement “means that a moving body can be intercepted at ‘any-moment-whatever’ in order to yield information” (6). *Premium Rush* indeed reduces movement to a point in space at a given time through its account of movement-as-mobility. In the way *Premium Rush* jumps between different clock-times to establish the position in the city of different characters, the film supports this understanding by presenting time and space as serving a purely mathematical, function-like relation with one another. Moreover, this flattening of time is supported by the instantaneous epistemological sense that information produces about the world. Information is not distributed through visible screens, phones, or similar media – it simply emanates from the urban landscape itself, in a way that erases the sequential nature of mediation to render it instantaneous. In the film, information feeds back to the characters at the same time as they engage with the world. There is no temporal delay between reality and its representation. Through such temporal simultaneity, reality and its representation become themselves inseparable and the perception of the world becomes aligned with the world’s representation. The film’s augmented reality aesthetic reduces time to a matter of successive temporal instantanieties – understood here as an experience of time emptied out of any form of affective, experiential, or perceptual intensity, depth, or duration – in a way that abolishes sequential time itself.

This lack of movement and time converge towards the third lack – the lack of epistemological distance – which is best exemplified by the “intersection” scenes. A few times during the film, Wilee reaches an intersection with passing cars, bikes, and pedestrians. These scenes are the only ones introduced by shots that, rather than offering an insightful view of the action, emphasize the chaos associated with the convergence of all these information flows within the city space. Time slows down and the camera zooms in on Wilee’s face, signifying the beginning of one of the film’s many temporal instantaneous. At these moments, Wilee is able to project himself into the future, or rather to run simulations evaluating the consequences of taking different routes. If he goes to the left, a cab
hits him; if he goes to the right, he runs into another cyclist, etc. When he finally finds a safe route and takes it, the normal, clock-time unfolding of the narrative resumes. To establish the transitions from the present to the future and back to the present again, the film uses the human face as the medium through which the projections into the future can be accessed. The camera zooms in on Wilee’s face before the simulations start and zooms out when the right path has been found. In his book *Radio Physiognomik* (1939), Theodor W. Adorno argues that cultural theorists and physiognomists share a common interest in the face. In their own ways, both disciplines assume that facial expressions can communicate underlying intentions, truths, and ideas that cannot be spoken or expressed otherwise. Adorno writes that, like the cultural theorist, the “physiognomist tries to establish typical features and expressions of the face not for their own sake but in order to use them as hints for hidden processes behind them, as well as for hints at future behavior to be expected on the basis of analysis of the present expression” (translated and quoted in Buck-Morss 1977, 301). The film indeed shares such an interest in the face as revealing “hidden processes”, but these processes are disembodied forms of perception; they are closer to the digital’s modes of prediction and simulation than any human cognitive or perceptual mechanism.

Wilee’s face is reduced to a simple interface through which the information that is immanent to the world is visually expressed for the viewer to enjoy (e.g., he smiles in delight when an appropriate path is found, he looks stupefied when all options lead him to being hit by a car, etc.). In that sense, both Wilee’s body and perception become functions of the broader information network that Wilee inhabits. His physical body is reduced to an information flow among others, his face emerges as a simple interface that visually expresses information, and perception itself becomes inseparable from the digital’s possibilistic account of the future. The mediation of the world becomes precisely how Wilee perceives the world, giving primacy to digitally-enabled modes of prediction and simulation over prehension and human cognition as the privileged means of making sense of the world. The augmented reality trope staged by the film emerges as not only belonging to the realm of aesthetics, but also and above all to the realm of epistemology.

2.2 – The Body in the Age of the Digital

Through such an extreme immediacy, reality becomes inseparable from its representation and perception becomes a function of the digital. *Premium Rush* appears as a concretization of Baudrillard’s notion of hyper-reality. In hyper-reality, Baudrillard argues that the real “is not only what can be reproduced, but that which is always already reproduced” (1983, 146). This idea is at the heart of the whole metaphysics of the *Premium Rush* world: “objectivity,” or rather the illusion of it, is situated outside any object and is rather located at the level of the feedback loop that links objects and subjects together. It is positioned as what frames the subject’s perception of the world at the same time as it encounters and navigates the world. Wilee, for instance, barely looks around him and blindly follows the arrows that show him where to go. Representation displaces reality by framing the subject’s encounter with reality on information’s own terms.

The epistemological status given to digital information renders cause and effect indistinguishable from one another. Physical, temporal, and epistemological
immediacy do not emerge as presences, but as lacks, very similar to the ones discussed by Benjamin. For him, such an immediacy leaves no room for critical encounter as “[n]o sooner has the eye grasped a scene that it is already changed” (Benjamin 1968, 240). Accordingly, as soon as Wilee is confronted to different possibilities, the best option is immediately highlighted, allowing his race across the city to continue without any interruption. This lack of a direct, physical, and temporal encounter with surrounding objects, combined with the digital’s illusion of objectivity, fuels the subject’s lack of epistemological and critical engagement with its environment. Consequently, the film’s account of embodiment is not anchored in the environmental metaphysics of the world, but in the representation of the world. Through its simulations, constant feedback, and binary alternatives, the film establishes a vision of the digital as a web that rises above and has primacy over the metaphysics of the world it encompasses.

The consequence of such a digital interpenetration, in which objects are inseparable from their representation, is the reduction of the body and embodiment to a very limited and static form of being. The information web surrounding the body encloses all objects and frames the way they are encountered. Interactions between bodies and objects are pre-established in a way that the body is itself disciplined to act in certain ways through the framing tendency of augmented reality. In his book Parables for the Virtual (2002), Brian Massumi refers to such a reduction of potentiality by writing that “[t]he medium of the digital is possibility, not virtuality, and not even potential. […] Digital coding per se is possibilistic to the limit” (137). In Premium Rush, where prehension is displaced by the digital’s possibilistic mode of encounter, actions are then situated within a tree structure-like logic of pre-set possibilities, and movement and time are reduced to a flat on/off logic. Movement and its expressivity are dissolved into the productivity-oriented and expressionless notion of mobility. Time (i.e., linear, clock-time) and its intensity (i.e., the way that time can be experienced through varying levels of heightened or weakened sensitivity, receptivity, or consciousness) are reduced to undifferentiated variables.

In that context, there is neither room for interpretation and expression, nor use for engagement, in the way that, through such a possibilistic reading of being, all possible beings emerge as already pre-given. Subjects are free to actualize one specific mode of being over others, but this illusion of choice remains limited to the digital’s logic of pre-set possibilities. Massumi writes that “[t]he playing out of [potential] requires an unfolding in three-dimensional space and linear time–extension as actualization; actualization as expression” (Ibid., 35). Potentiality, or the whole range of predictable and unpredictable forms that a specific subject, object, or relationship can take, is inhibited by the process of actualization–as-expression highlighted by Massumi, and cannot take place within the strict limits of the digital’s binary structure. With actualization being restricted to the realm of the given, there is no room for becoming, and being appears as an unalterable state. Premium Rush then illustrates how the digital colonizes both embodiment and the analog through the flattening of any form of intensity and continuity.

2.3 – Augmented & Mixed Reality

The embodiment paradigm articulated by Premium Rush is quite representative of an augmented reality aesthetic that plays an increasingly predominant role in today’s
visual culture. Furthermore, it illustrates an ongoing dissolution of epistemological distance that connects together Benjamin’s account of the loss of aura in artwork, Baudrillard’s notion of the hyper-real in representation, and the new modes of embodiment fostered by the digital. However, the paradigm of embodiment staged by the film – one anchored in the asymmetric interpenetration between the physical and the digital, between objects and their representation – is not the only form that digital embodiment can take. In Bodies in Code (2006), Mark B.N Hansen introduces the notion of mixed reality, which he defines as “a space full of information that can be activated, revealed, reorganized and recombined, added to, and transformed as the user navigates real space” (2). Augmented reality is indeed encompassed by this notion, but is just one of its possible forms. Mixed reality also accounts for a more dialectical understanding of media-enhanced environments through the possibility of reorganizing, recombining, and transforming the digital’s input. It is precisely in such terms that Ghostcatching emerges as an alternative to the mode of digital embodiment put forward by Premium Rush. In contrast to the latter, Ghostcatching emphasizes the fundamental incompatibility between the digital and the analog and addresses the relationship between the two as a question of interaction and differentiation rather than one of pre-given, already individuated entities. It is precisely through this difference that Ghostcatching can articulate an alternative account of embodiment that expands rather than constricts the potentiality of bodies.

3 – Ghostcatching & Abstraction

Ghostcatching stages dancing, ghost-like figures whose movements are based on digitalized choreographies performed by Bill T. Jones. The emphasis put on the act of mediation in Ghostcatching marks its fundamental difference from Premium Rush. While Premium Rush instantiates media practices that inhibit any unitary identification between a media and its physical support, Ghostcatching exploits the digital’s self-reflexivity in order to abstract movement in a way that, in default of restoring whatever physical support, gives concreteness to both the body and its digital representation. In Moving Without a Body (2013), Stamatia Portanova theorizes such an account of the productive tension between embodiment and abstraction by arguing that “[a]bstraction […] is objectification; that is, the activity of abstraction from our experiences produces ideal objects” (Portanova 2013, 107). In that vein, Ghostcatching uses the digital to free movement from the limits of the physical body. The digital remains unable to fully account for the continuous nature of movement, but simultaneously highlights that the physical body also entertains a similarly excessive relationship – understood here as a relationship where one element fails to fully contain or account for magnitude or force of the other – with movement. Walls can be traversed, floating lines walked upon, and dancers passed through; everything converges towards an exploration of unbounded movement that would be impossible to perform with a physical body.

The lack of recognizable visual cues or measurable space presents a vision of movement as an absolute that cannot be considered in relation to anything except itself. However, the creation of such idealized movements should not be interpreted as a disembodiment of movement or a reduction of the body’s potential and capacity for actualization. Rather, Ghostcatching stages the body as both immediately abstract and
material. The body’s expressive potential extends beyond the realm of its immediate physicality while its brute physical force actualizes the body’s underlying potential.

*Ghostcatching* then appears as staging a form of embodied abstraction that uproots movement from the physical body, while expanding and unleashing its expressive and performative potential. By situating the actualization of movement in the liminal space between the body and the digital, the film emphasizes the friction between the body and the digital. Bodies and information entertain a perfectly fluid relationship in *Premium Rush*, but they clash and oppose one another in *Ghostcatching*, in ways that would be impossible for a physical or simulated body. Movement’s presence – both temporally and physically – is redeemed as an excessive relationship to its modes of representation.

### 3.1 – Becoming in Space & Time

In *Ghostcatching*, the physicality of movement is emphasized by the failures of its digital representation. Be it through lagging limbs, small glitches, or jerky movements, the viewer is constantly reminded of the limits of the digital in relation to the continuous nature of movement. In the book *Matter and Memory* (1896), Henri Bergson explains that “[e]very movement, inasmuch as it is a passage from rest to rest, is absolutely indivisible” (188), and movement thereby emerges as sharing analog’s indivisibility and excessiveness in relation to the digital. By highlighting the loss between the original performance and digital representation, the film amplifies the feeling of subjective embodiment and emphasizes the impossibility to represent movement without something being lost. For example, the film makes use of continuous movements as divided into discrete spatial coordinates; the animated movements that are then simulated based on these coordinates are themselves cut into a given number of images per second. The dualistic relation between movement and the digital that ensues leaves the continuous nature of movement unactualized whilst fully acknowledging its indivisibility in relation to the digital’s discrete nature.

The film’s representational failures give rise to a more performative understanding of embodiment, as the incompleteness of each digitalized movement refers to some original, continuous movement that was once performed in space and time. Representation no longer appears as the perfect image of the performative, but rather as its trace. This epistemological gap between movement and its representation re-establishes an indexical relationship between the performative and the representational, which acknowledges the process of mediation that brings the two together. *Ghostcatching*’s emphasis on the unactualized then rebukes the displacement of movement by mobility staged throughout *Premium Rush*. Movement can no longer be mobilized by information; it rather emerges as an expressive-event whose presence remains inassimilable, yet palpable, within the realm of the digital. In this regard, the unactualized dimension behind each digitalized movement establishes a representational lack, or a distance, between the original movement and its representation. This translates movement’s physicality in space and time into an expanded sense of spatiality in the digital realm.

This spatiality of movement is also formally played out in *Ghostcatching* through the traces that the ghost-like dancers leave behind as they perform. A circular hand movement leaves sinuous lines in mid-air, while a sudden kick gives rise to a pyramidal
form that follows the trajectory of the foot. These colorful lines testify to a movement that once was, but do not play a normative role like the arrows in *Premium Rush*. Rather than guiding movement, they present each movement’s past states as part of an ongoing movement. Massumi writes that the analog’s ongoing-ness involves a deactualization, which he defines “as a processual excess over the actual. They are not deactualizations in the sense that they erase or replace the actual. Rather, they double and redouble it: augment it” (2002, 136). It is interesting to consider this account of movement in relation to the aforementioned problem of representing its indivisibility. Trying to 'pin down' movement in a sequence requires it to be both unfolding and immobilized. In the context of a film, a motion capture, or a simulation, the experiencing of a movement in time and space relies on a sequence's capacity to simulate its unfolding. However, the perception and interpretation of microgestures or isolated elements require dividing it in stills and static poses, highlighting the inherent opacity of movement based on its indivisibility.

It is precisely through deactualization that *Ghostcatching* resolves this tension. Each movement is folded upon itself by the traces it leaves. In the air or on the floor, the movements materialize the invisible forces exerted by the body in space, as well as in time. Through the traces archiving the body’s past states, movement emerges as having a continuity, as being a process in time. Each movement becomes inseparable from both its past and future states by the way each moment stands for a certain indetermination regarding the future actualization of movement’s potential. Whether taken as a sequence or a still, each position is associated with the ongoing process that gave rise to it, and movement’s indivisibility is therefore represented through its ongoing-ness. In *Ghostcatching* for instance, this aspect is illustrated by a scene where the traces left by a dancer’s hectic movements end up filling up the space and hiding the dancer completely. The ongoing-ness of movement then becomes the only thing visible to the viewer. Through this emphasis on movement’s continuity, *Ghostcatching* presents time as a qualitative variable punctuated by fluctuating feelings of duration and futurity. Movement is then endowed with an inalienable presence in time, which is experienced through its fluctuating ongoing-ness.

### 3.2 – On Digital Individuation & Potentiality

Be it through movement’s excessive presence in space or intensive unfolding in time, *Ghostcatching* denies any immediacy between movement and its digital representation. In both cases, there is an interval between movement and its actualization. As a performance-event, movement exceeds its representation through the unactualized and as an expressive-event, movement’s different durations and intensities remain inassimilable by the digital’s linear notion of time. Portanova puts a great emphasis on the concept of the interval as “the moment of indetermination or resonation when the potentiality of an affection is being realized in the apparition of a moving-body image” (Portanova 2013, 31) and this notion appears as illuminating the individuating dimension of the gap between movement and its representation. The interval appears as pushing movement towards its ongoing actualization while emphasizing its very potentiality. As a given movement takes place, its potentiality for divergence diminishes. However, the interval foregrounds the continuity of movement and movement’s full potentiality.
Applied to *Ghostcatching*, this idea illustrates how movement’s indivisible and inassimilable nature highlights its unbounded potentiality, which is constantly actualized by the digital’s discrete nature. Thereby, *Ghostcatching* establishes a binary structure that is completely different from *Premium Rush’s*. While the latter gravitates around the fixed binary structure of the digital and a static account of being, *Ghostcatching* relies on the binary structure of the interval to emphasize the processual movement in-between, as well as the dialectic between potentiality and actualization that assures the ongoing individuation of movement. This mode of digital embodiment is expanded by the binary structure of the digital, as it establishes a vision of being and embodiment that exceeds any mode of representation while highlighting the capacity of the digital to testify to what has been lost in the mediation process.

To this processual account, Portanova adds a relational understanding of being by writing that “[a] subject […] is not already there to perceive a world of already present objects-images: they both form and transform themselves along their mutual participation” (2013, 31). Such an account doesn’t only stand for the relational dimension of individuation, but also for its active nature by the way the external integrates the body and the body self-inserts itself into the external. In that context, the external is understood as everything that is situated beyond the boundaries of the physical body, including space, objects, and other bodies. This idea is especially interesting when it comes to considering the emergent properties that ensue from the interpenetration between the digital and the body, or even the digital and the analog in general. As discussed earlier, the analog and its continuous nature stand for movement’s unbounded potentiality while the digital and its discrete units appear as actualizing this potentiality. This tension indeed supports the idea that the body is always in excess in relation to the digital that pushes it towards its becoming, but also that such a dialectic implicates a coupling of the body with an external domain.

This reading resonates with Hansen’s notion of the body in code, which he defines as “a body submitted to and constituted by an unavoidable and empowering technical deterritorialization—a body whose embodiment is realized, and can only be realized, in conjunction with technics” (2006, 20). The digital abstraction staged in *Ghostcatching* emerges as displacing the traditional boundaries of the body by an active remapping and coupling of the body and the external. The black box in which *Ghostcatching’s* dancers perform is quickly filled by traces of their past movement and the distinction between the bodies of the dancers and the external realm, in which they perform, becomes increasingly blurred. Bodies become spatialized, while space becomes performative. This active self-insertion of bodies within the external is made explicit by the digital means that archive and visualize the development of movement in space and time and the digital then emerges as the force that allows the body to reaffirm its agency.

Digital individuation highlights the emergence of an internal dynamic ensuing from the coupling between the body and the external. Paraphrasing Gilbert Simondon, Hansen presents the notion of internal resonance as “correspond[ing] to a living system’s capacity to bring disparate orders of magnitude into communication and this to maintain the metastability” (Ibid., 197). Embodied abstraction takes place through a self-insertion of the body into the external, in a way that their coupling is attained through the emergence of an internal resonance.
between their different magnitudes. At the beginning of each scene, the space is empty, static, and dark, while the dancers are colorful, unpredictable, and lively. As the performance unfolds and gains in intensity, the space is filled up with lines and colors. The dancers, for their part, do not seem so clearly delimited and self-contained now that their movements have left traces all around the space. What initially seemed like two completely different realms or systems—static space and moving bodies—quickly reach equilibrium. Internal resonance emerges as the dynamic of co-development and co-evolution between two different realities, and displaces being as a static, pre-given state by a process of becoming that always pushes being towards new states and forms. The emerging properties that ensure reveal these two realities’ ongoing transformation, as well as their coming together as a unified system.

It is precisely with this notion of internal resonance in mind that it becomes relevant to come back to Benjamin. His essay indeed engages with the question of representation, but more fundamentally with the being of artworks and media. Benjamin anchors the artwork’s being in its presence, in space and time, and describes aura as the way the artwork remains inassimilable by its environment, while exerting a power of attraction on what surrounds it. However, the aforementioned processual and relational account of becoming challenges not only Benjamin’s notion of presence as one anchored in older media practices, but also its static account of being. Ghostcatching’s portrayal of digital abstraction lacks a presence in space and time, but they redeem this idea in terms of a representational, physical, and temporal excesses that reframe presence as an internal resonance. Benjamin’s aura-as-a-distance, which itself relies on the inassimilable nature of temporal and spatial qualities, is replaced by an internal resonance which re-establishes distance through the representational, physical, and temporal gap between an object and its representation. Distance, in that context, appears as the quality through which being, as a static state, is replaced by becoming, an ever-evolving state, as the privileged mode of individuation. This processual and relational understanding of the being of bodies based on internal resonance emerges as applicable to bodies and systems alike by the way it expands Benjamin’s vision beyond the realm of art. In this regard, the excess of movement staged in the film appears as an emergent property related not only to embodiment itself, but also to the film’s engagement with the digital and the analog. Ghostcatching thereby accounts for a vision of embodiment based on an active remapping and self-insertion of the body through its coupling with the digital. Rather than flattening all realities to the same level as the digital’s, Ghostcatching highlights a vision of embodiment where the body and its expressive, affective, and perceptual capacities can be expanded through its coupling with other systems through the digital. Representation and performance become one and the same, as representation expands the potentiality of what bodies can do, while performance gives a physical, embodied form to the digital realm.

4 – Conclusion

The way embodiment is engaged with in this text is not oriented at restoring the subject in a traditional humanist sense. Rather, it aims at foregrounding the fundamental potential of the body to develop different relations with an increasingly mediated reality.
Interestingly, the modes of embodiment featured in the two films seem to root their difference in the types of relationships the digital and the analog can entertain. In *Premium Rush*, augmented reality’s dominance stages a digital landscape where bodies are reduced to static, pre-defined entities whose interactions with their surrounding are framed in terms of pre-established possibilities. This framing takes form through an illusory immediacy between the physical and its representation, as well as a mode of embodiment that situates individuation before being. Not only does this approach rebuke a relational and processual understanding of being, it also encompasses every form of embodiment under one universalized notion of digital embodiment that transforms bodies into function-like flows actualized through their negotiation of other information flows, speeds, and rhythms.

*Ghostcatching* shares *Premium Rush’s* notion of mixed reality, but in a way that the dialectic between the digital and the analog re-establishes the body’s agency through a productive interpenetration with digital aesthetic. The body’s excess is made explicit by the incompatibility between the two systems and fuels the body’s ongoing individuation. The mode of embodiment staged in *Ghostcatching* highlights how internal resonance and the tension between the digital and the analog allow for the maintenance of an optimal level of creativity. Rather than undermining the body’s potentiality as in *Premium Rush*, the digital emerges in *Ghostcatching* as the stable, actualizing background allowing the opening up of the body to a new sphere of potentiality. In short, *Ghostcatching’s* mode of digital embodiment implies a processual and relational understanding of being that not only acknowledges the body’s potential, but also expands it. In that sense, the earlier dream of perfect simulation is displaced by a more open-ended and emergence-triggering interpenetration of the digital and the analog whose process of individuation relies on the degree of embodied abstraction they trigger.

The implications of these considerations are manifold, with potential applications at both the level of theory (e.g., digital media studies, performance studies, etc.) and practice (e.g., interface design, interaction design, etc.). Yet, these considerations’ most pressing aspect concern the key role that popular culture plays in giving primacy to certain technological paradigms and narratives over others. The modes of digital embodiment instantiated by *Premium Rush* and *Ghostcatching* rely on somewhat similar technological practices. For instance, improving the technologies used to produce *Ghostcatching* to the point where they could make a universe like *Premium Rush’s* possible wouldn’t require radical, disruptive transformations, but fairly straightforward incremental innovations. In that sense, technology appears as malleable and its consequences seem more closely linked to the way a given technology is solidified into a specific tool, medium, or infrastructure than to the technology itself. Popular culture products such as *Premium Rush* might then play a key role in normalizing certain technological paradigms regarding, in that specific case, the coming together of bodies and digital information. In contrast, avant-garde projects like *Ghostcatching* highlight alternatives to the dominant technological narratives of their time. Popular culture and the avant-garde then actively contribute to shaping the expectations and attitudes of users, consumers, and engineers regarding what technology can and should do. Analytical endeavors focusing on how culture and media artefacts normalize specific technological paradigms might then
be a fruitful method to investigate the cross-pollination between technology and culture.
Bibliography


