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Reconsidering the substance of digital-video from a Sadrian perspective

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Abstract

The digitisation process is debated as video’s deficiency, where pixels are conceived as isolated fragments without an existential link to the source image. This article explores the ontology of digital-video through Mulla Sadrā’s (1571–1641) theory of Substantial Motion. Sadrā, a Persian-Islamic existentialist, proposed that substance (material/visible and immaterial/invisible) undergoes an internal change. Through imperceptible internal change, intimate connections exist between the smallest parts and the One, visible and invisible. We can think of these dynamic connections in terms of pixels and frames. From the view of Sadrā’s substance, pixels are explored as open to change. The apparent weaknesses of digital materiality become potentials towards understanding its existence in time.

Introduction

In the history of film studies, theorists have raised ontological questions about film, its materiality and representational qualities. While Andre Bazin, C. S. Peirce, Thomas Binkley, David Rodowick appraised the essence of film in its ability to represent and index the real world, Gilles Deleuze, Henry Bergson and Sean Cubitt emphasise on movement as film’s essence. The former considers the “photochemical representation” of film as “an emanation of reality”; an existential link to the object [1]. The latter, instead, ponders on the frame not in isolation with the source object, but in relation to other frames. Motion, an essence of film, differentiates it from other media. [2]

At this digital age, most theorists sustain looking at digital cinema through the lenses of analogue film, in which debates concerning its ontology and lack of an existential link to the source stay central [3]. This article explores the ontology of digital moving-image based on its unique and latent characteristics, such as the fragmented quality of pixels, and through a worldview that promotes understanding the imperceptible/immaterial. Invisible aspects of digital-video’s
materiality (such as pixels and codes) are significant for developing the ontology of digital cinema.

In his theory of Substantial Motion (al-harakat al-jawhariyya), Persian-Islamic philosopher, Sadrā (1571–1641), introduces a new definition of substance (jawhar) that is constituted of the material and immaterial, with an interwoven relation that drives internal and external change. As the simplest element of an entity with invisible and immaterial aspects, substance is linked to the invisible realm of the Divine. For Sadrā, the Divine act of being, as the source of the internal change of substance, originates the external change of an entity. Divine being continuously emanates entities and their material qualities (quiddity). Reality of an entity is measured according to the Divine reality, which is the most simple and imperceptible. The most material is the least real in relation to the Divine. The change of substance intensifies a being and enhances its reality in relation to the Divine reality. Sadrā identifies the process of intensification as movement towards singularity or perfection [4]. Substantial Motion proposes a reciprocal relationship between internal and external transformation that leads towards perfection. Through this process of intensification, more of the invisible becomes actualised. Sadrā’s ontological approach is productive for understanding the digital-image, because intensification is a way to free entities that appear not to be free (like pixels).

While film theorists, such as Rodowick, approach a moving-image and its visuality from the outside, with concern for an image’s relation to the three-dimensional world, my approach is from the inside out. Moving from the seemingly immaterial and invisible (the pixel) to the material and apparent (the image), the frame/pixel relationship is no longer a relatively closed system cut off from the outside world. I will discuss the becoming of a pixel according to Sadrā’s ontology and his notion of change (intensification). Pixels can be considered as the substance of digital-video, open to the invisible (algorithmic) realm as well as the earthly image of the universe. Considering the invisible within the screen draws attention to what is constantly changing, which we do not immediately see.

Furthermore, Deleuze’s argument on the frame as an open system in the process of change assists in opening the digital frame and its pixels. Deleuze’s view of an open system shares similarities with Sadrā’s changing substance, in which interwoven material and immaterial aspects of substance open it to the Divine’s act of being (becoming and change). To explore the potentiality
of digital-video and pixels, Deleuze’s discussion of the frame and Sadrā’s substance come together.

**Sadrā’s substance and Deleuze’s frame**

Despite an apparent tension between transcendence and immanence in Sadrā’s and Deleuze’s worldviews, theistic elements of Sadrā’s universe are open to change. Changes in the interwoven relationships between the visible and invisible aspects of substance allow beings to unite with God’s infinite existence. Sadrā’s open universe is important for the discussion of the open pixel in the process of change.

Unlike classical philosophers, who describe an eternal and closed universe confined by God, Deleuze and other process philosophers attempt to think of the universe as an open system. Deleuze, following Bergson, argues that in a closed universe of classical philosophy, there is no change or creativity. If an all-seeing God knows everything, there is no possibility of ‘new’ creation. This can be contrasted with the open universe that exists in time and is concerned with motion [5]. Deleuze argues that changes within the universe are due to the processes of actualising the virtual on the plane of immanence; they are not due to God.

Deleuze applies the plane of immanence concept to cinema, suggesting that a frame is an open system in time. Drawing from Bergson’s concept of time, he brings our attention to the significance of motion over the image in cinema. Movement, as the production of the new at each instant, is not possible within the complete whole of the frame [6]. The basic unit of cinema is not the frame, instead it is motion in space captured within a certain number of frames. Thus, motion creates relations between the inside and outside parts of the frame.

The analogue frame is “a relatively closed system” that contains every presented element in the image [7]. This frame is a *set* with many *parts*, and each part is a sub-set that can be divided. “The divisibility of content means that the parts belong to various sets, which constantly subdivide into sub-sets or are themselves the sub-set of a larger set and on to infinity” [8]. The elements that appear within the frame, such as characters and story elements, belong to sets outside the frame. For example, Taste-of-Cherry (Ta’m-e-gīlās) (1997), by Abbas Kiarostami, shows the sub-sets of the frame in relation to the sets outside of the perceived frame. For instance, when the camera eventually turns to the film crew, it reveals a bigger set that encloses the sub-sets of the film, such
as the actress and location. The viewer is immediately removed from the stable frame of the story. Instead, s/he becomes aware of bigger sets that embrace the frame and story elements.

The frame separates the inside elements from the outside, but through belonging to a set, it also connects the internal elements to a whole [9]. Always connected to a larger set, the frame contains sub-sets, which are, in turn, frames for another collection of sub-sets. These sets and sub-sets are formed in continuity with their infinite content, moving from molar (mode of being) to molecular (mode of becoming) and vice versa. Motion shows that a frame is not a complete ‘whole’. Instead, it is ‘open’ and relates to an understanding of time that is constituted by changing and moving things/images [10].

Sadrā, on the other hand, proposes a notion of substance that is open to change and is also in direct relation to God, thus ensuring infinite possibilities to generate relationships between all entities. Sadrā himself emphasises this: “The internal space of the imagination” is identified with “the infinite space of the soul”[11]. The universe is also open because it is changing in time. Sadrā locates entities as a part of God’s existence and infinite time of the Divine, but God’s act of being is also present inside each entity and through substance. Sadrā’s concept of Substantial Motion links the unseen and visible. Through the Divine act of being, substance must be open in order to move and cause external changes to matter, which, eventually, affects all other entities, while it is in turn affected by their changes. (Fig. 1)

Fig. 1. Diagram of substance and Substantial Motion in Sadrā’s terms (© Author)
As a process philosopher [12], Sadrā regards the internal change caused by Substantial Motion as part of substance, but it is not the same as substance. Motion does not constitute an entity, but continuously manifests an entity through its substance. Accordingly, changes in the sensible world are caused by the internal motion within substance. This internal motion connects one unit or entity to all other units and entities [13]. Substance contains the past, the present, and the future by dint of its access to the infinite time of the Divine [14]. It is constantly in a process of actualisation. This is similar to Deleuze’s definition of actualisation, which includes the cinematic process of actualisation occurring in the open frame. Substance is open, because it is changing and is in contact with the invisible realm. Stretched between two worlds of materiality and immateriality, Substantial Motion allows an entity to experience the infinite (the Divine). It is as if each entity has access to Divine codes, and through this access forms relations with other entities and the cosmos.

The digital pixel and the analogue frame

Analogue film and digital moving-image are usually conceived as material and immaterial, where the materiality of analogue film makes it a more 'real' system. While this is debatable, it is important to establish some differences between the two (and to be aware of the fact that Deleuze’s writings on cinema refer exclusively to analogue film).

Doane’s investigation of the concept of ‘medium’ is useful for thinking about digital-video, given that scholars, such as Marks, consider that the digital quality of video effaces the concept of medium [15]. A medium is generally considered to be “a material or technical means of aesthetic expression” and holds both possibility and limitation through its materiality [16]. Using a painting as an example, Doane explains how a canvas provides certain possibilities and qualities, but the materiality of its flat surface also provides a form of resistance. It can support certain expressions because it excludes other elements. The reflexive nature of limitations proposed by a medium necessarily prevents a "complete illusion", or complete verisimilitude. That is to say, the qualities of the medium are present within the work: for example, in the way the texture of a brush appears on the canvas.

In the case of the film medium, an image results from the contact of light with the chemical material of the film. A digital-image, by contrast, has no apparent indexical link with the object. The digitisation process involves translating continuous signals into discrete packets of information, thus attenuating the connection between the image and the filmed object [17]. The
lack of photochemical representation is conceived as an absence of true medium in a digital-image.

However, Doane suggests that “[I]t is ultimately impossible either to reduce the concept of medium to materiality or to disengage it from that notion” [18]. Digital-video is a medium that has limitations and possibilities. If a medium holds both possibility and limitation in its creation of aesthetic expression, then the possibilities of digital-video are in their very nature located in the apparent lack of connection to the filmed object. The disconnection that seems to concern film theorists can be recognised as a significant potential of digital-video, which can give us access to the apparently immaterial aspects of its being, as well as the manifested aspects of the filmed object. Immateriality here is a relative term since digital-video relies on some very material facts. For instance, the resolution of the image results from the number of pixels, which in turn results from the amount of video storage assigned to each video frame. In this respect, invisible is not the same as immaterial.

Differences between the materiality of analogue and digital media determine distinctions between analogue and digital frames. In analogue film, a frame is one of many images that constitute a moving-image, and Cubitt considers it to be the minimal part of film. Cubitt follows Deleuze by making a call to reframe contemporary understandings of the cinematic in terms of a digital present so that it is possible to identify a frame as a temporal pixel. This pixel/frame is the fundamental unit of the moving-image [19]. The analogue film frame rate of 24 frames per second is necessary to create an effect of smooth motion and duration. A convention of digital-video technology and editing software is to imitate film frames, even though in digital-video, unlike analogue film, frames no longer pass sequentially in a horizontal line. Instead, images are constantly replaced within a single frame where the contents of the frame (pixels) appear and disappear. In contrast to analogue film, it is the pixel and not the frame that is the minimal part of digital-video and the pixel is changing within itself because of its relationship to the algorithm and the differing percentage of received codes.

Within the context of Deleuze’s open frame, Cubitt reads the frame as a matter of duration, in which the present is registered in the frame. Cubitt distinguishes between the frame and the “frameline”, where the latter differentiates and separates the frame from other frames, and the past from the future [20]. While the frame as an image is visible, the frameline disappears in the projection of the image. As viewers, we are concerned with the frame (as motion) and not the

passing framelines (creating movement). Cubitt follows Deleuze’s claim that the image is at once past and present [21]. The present is the origin of the past and distinguishes the past from the present. The present can never be grasped as it is always passing. Hence, we only experience a “recollection of the present” [22]. The past, present and future of analogue film time comes to be known through “the cinematic present”, that is through the frame or the “pixel” [23]. Yet this very present is the most absent in our experience because of the passing frameline. Insofar as the frame is the most present element in the film, it constitutes the origin of time (it is open) and is the most fundamental unit of the moving-image.

**Open pixel**

With an understanding of the differences between the analogue and digital frame, this section applies Sadrā’s and Deleuze’s open universe to the pixels of digital-video.

The word *pixel* goes back to the early 1960s, derived from the term “picture element” [24]. The Oxford English Dictionary defines pixel as “a minute area of illumination on a display screen, one of many from which an image is composed” [25]. It is also a sample unit on the camera sensor that is usually invisible. The pixel is a little square of light with a numerical value. As minimal parts, pixels constitute the whole of an image and, by their own change, provide change for the image. Like Sadrā’s Substances, pixels change and contain both visible (e.g. colours) and invisible qualities (algorithm). Because of these qualities, pixels are of interest for understanding digital media through Substantial Motion.

In digital-video, a pixel resembles Deleuze’s frame and Cubitt’s frame as “pixel”. Cubitt compares the frame (and by implication the pixel) to the number zero: “like the point of origin of graphs” they “can be given a number: zero” [26]. Zero, as the origin of all numbers, is present (and yet not present) in all other numbers. Through its relation to all other numbers, zero acts on the cardinal numbers, just as the frame acts temporally in relation to other frames. Importantly, Cubitt’s frame/pixel is not isolated but (following Deleuze) is an open element that unites movement with and within the image. The pixel of digital-video has similar capacities.

The algorithmic operations on a simple nonfigurative unit make the pixel a vortex of events, constantly shaped and reshaped between the inside and outside of the frame/image. The pixel’s square form is determined by the overall grid of the camera and screen, creating a field through which the seemingly isolated pixels are interconnected, enabling them to work together. The
square shape and process of algorithmic change are interwoven and dependent on each other in the creation of a moving-image. As in Sadrā’s substance, the algorithms define a pixel’s visible and invisible qualities, which change through a series of complex processes. In the constant regeneration of pixels, time and motion keep unfolding sequentially. The distinctiveness of the video pixel is its connection to the non-temporal presence of the infinite realm.

Cubitt’s discussion of zero (holding all other numbers), and the present (containing past and future), can be linked to Sadrā’s discussion of unit and unity. In this instance, all entities emanate from the One, without endangering the unity of One. The latter is invisibly present and a part of all other beings through an act of becoming where “being and nonbeing are reciprocal terms; one ceaselessly pass[ing] into the other” [27]. In this movement, each part “entails the nothingness of another part”, and motion “is indissolubly disappearance, one thing after another, and reduction of being, one thing after another” [28]. Nothingness, in this instance, like Cubitt’s zero, is not really nothingness, but an invisibility that is both ontological and perceptual. It is an apparent absence that encourages internal change. This absence takes us back to the Sadrian sense of emanated entities that are driven back towards unity and the One through intensification.

Similarly, each pixel is differentiating itself without losing its singularity as one, like a becoming-substance in the process of intensification. Becoming-pixel involves internal change in each pixel, triggered by codes that are activated through connections with the world outside of the frame. The neutral state of a pixel, a zero state of potentiality, affords the differentiation of pixels. A pixel (both virtual and actual, absent and present, visible and invisible) is continuously folding from one state to another. Here, the virtual (or the zero state) is pregnant with the actual, and the actual is pregnant with the virtual, each state awaiting involution. Upon involution, the actual contains parts of the previous state of the virtual, and similarly the virtual contains parts of the actual. This internal motion is a constant renewal leading to intensification, rather than something altogether new. A helpful figure is Sadrā’s analogy of a man putting on different layers of clothing, where the man himself stays the same through the process.

We only become aware of change at the level of pixels. This is a different experience from that of motion as a whole, when the motion is varied between adjacent pixels inside a frame. In digital-video, movement is directed not from point A to point B, but from the potentiality of point A to the actuality of that very same point A, but in a new instant. If we were to use an analogy from physics, this is a similar kind of motion to that occurring in boiling water, which is a contained
movement where particles are internally transformed. Each single pixel contains different levels of potentiality. The actualisation of each pixel’s potential is not (as in analogue film) directly related to the next or previous frame, but rather to invisible codes. It is an internal actualisation of the virtual: a point A that becomes more intense and singular as it actualises into a new point A at a different instant. [29]

As an example of the becoming-pixel that is constantly actualising within itself is shown in my experimental video, Through a Dot (fig. 2). It contains three images of the pixel: the video frame as a whole where pixels cannot be perceived individually; a pixel masked out from the right video frame; a magnification of the pixel from middle image that shows the internal changes of the pixel. Here, potentiality constantly transforms into actuality within the same pixel. It then shifts back to a new potentiality, linking to a movement that was initially informed by an event external to the frame. A pixel is all – past, present and future. It is duration, and the present. It is one.

For Deleuze, following Bergson, the present is the actual image, while the past is virtual, and the present needs to pass for the “new present” to become [30]. For Sadrā, duration as past and future is inseparable from the Divine present. Past and future, as linear or passing fragments of time, are grasped from the infinite present. This present is also a part of being in the process of becoming. Time is separated as passing, linear time (that, in Bergson's terms, splits the passing present and the preserved past into two distinct passages of time) only according to the nature of the connection of an entity with the Divine present. Each entity, based on its being, experiences time differently. Internal time, as part of divine time, informs the temporal expression of an entity as linear time.

Extending this distinction between Sadrā’s notion of Divine presence and the linear experience of time, we can think of the video image as existing in linear time, while the pixel relates to the Divine or a non-temporal source of transformation. In analogue film, time is mostly experienced
as instances between frames. By contrast, our perception of time in digital-video results from the coexistence of different times within the same frame (each pixel on a screen undergoes certain internal changes). The rate of change depends on the digital codes that link the frame to an outside subject matter. Each changing pixel, with its own time, provides a single experience of time through the image as a whole. Returning to Deleuze, in terms of pixels, we experience the movement of time in digital-video (as distinct from time and movement considered to be separate) not as an “indirect representation”, or as an understanding of the frame as a unit, but as an indivisible block of time [31]. This is more truthful to the reality of existence where beings change through their substances. From Sadrā’s perspective, “time does not let us remain ourselves” [32], nor does time let a pixel remain itself. Through the interruptive nature of constant change, a temporal life is burst open. Time is formed by life itself: not externally, but as a “consequence of the intensity of our substantial motion” [33]. Rather than being “in time”, time is part of our ontological existence as part of the Divine.

The Lighted Tiles video (fig. 3) demonstrates that our experience of movement as a whole in a moving-image results from a collection of events taking place inside the frame and between pixels. Four pixels extracted from the right-hand video, show that diverse kinds of motion exist within a single frame. Each pixel undergoes different processes of change depending on changes of the filmed object/subject outside the frame. Their individual rates of change differ from the time and motion that are perceived through the frame as a whole. In this holistic form, a collective change occurs that produces a perception of unified movement. The intensification of parts determines the intensification of the whole. In this respect, all beings inside and outside of the frame contribute to the becoming of a whole. The pixel is related to all other entities in a mutual process of change through this concept of internal motion. In this sub-set of digital-video, pixels
are held together by motion and duration, their collective change forms our perception of movement and figuration of the image.

The more that internal motion is present within an entity, the more singular an entity becomes as a whole, or one. According to the theory of Substantial Motion, each of us is “a multiplicity of continuous forms, unified by the essential movement itself” [34]. Using an analogy, the particular qualities of liquid water or solid ice are due to molecular and atomic movements. These movements of particles generally give water and ice a certain stability, which in turn provides an identifiable form. For Sadrā, the unity of an entity is not dependent on its stability, but rather on its integrated multiplicity at the substantial level, achieved through the process of becoming. “The simple is prior to the composite, the part to the whole” [35]. This process of becoming-substance involves a multiplicity of continuous forms. Change, at the substantial level, is the process of actualisation resulting in a form to which we attribute quiddity, to “allow for the identification of specific entities” [36].

To make an analogy between apparent wholeness, and the unity of things that are due to the changing of internal parts, I suggest that the still frame of analogue film may not be the one image to which film theorists refer. Rather, it is one only in our perception. The image’s perceived stability is an abstraction, given that its pixels and their underlying codes are always in a process of change and renewal. Motion connects all pixels into a whole in the form of a moving-image. Here, pixels expand and condense, form and de-form, moving between different states of intensity that are induced by the numbers of the code. Yet, we only perceive the moving-image as a whole with a stable frame.

**Conclusion**

According to Deleuze, although the image can be molar, it is also built on the molecular level of pixels (the process of becoming). In the Sadrian view, stability and form arise from motion (becoming, for Deleuze). Rather than many unmoved single frames appearing and disappearing to create a moving-image (as with analogue film), with digital-video there is only one image moving and changing as a whole. These changes are due to the internal elements of the digital-image, pixels. They occur in relation to the outside insofar as the code that is informed by the filmed external object, which moves and changes the related elements of the digital frame. Like people, pixels have “a destination that recapitulates all the destinations of the universe”. As microcosms,
they envelop “the seminal reasons of the macrocosm”, and their “substantial renewal both fulfils and encapsulates the renewal of all natures and all souls” [37]. Seen from the perspective of Substantial Motion, digital-video has the potential to render the reality of existence more truthfully because its pixels, as a unified internal multiplicity, are changing and moving in infinite time as well as forming a perceptual unit of moving-image.

On the other hand, the analogue frame, as an identifiable entity, gives an identity to the image as an image, which seems representational. We separate our world and ourselves from the image. From this perspective, the frame becomes a window to look at but not to look into. To look at something is to close it, and to interpret it. Instead, to look into something is to open it, to experience it, and, eventually, to discover the potentiality of its relation to other sets, beings, and images. From this view, digital-video challenges the perceived stability of an identified image. Our perception creates the division between entities in the world, which includes the distinction between an image as representation and the represented object that is associated with it.

References and notes


28. Ibid.


33. Ibid.


36. This attribution disregards the underlying process of formation and reformation, in which motion gives form and un-forms both the whole and its parts. Yet the mind assigns actual and stable forms to the whole. Rizvi [12] p. 128.


**Biography:**
Dr. Azadeh Emadi, a Screen Production lecturer and video-maker at the University of Glasgow, is interested in cross-cultural investigations and developing alternative approaches to image making, technologies of perception, and understanding digital materiality and virtual reality.