Pixelated View: Investigating the Pixel in Light of Substantial Motion

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Abstract

This paper considers creative approaches engaging the body of digital video in relation to the outside world, drawing on Persian Islamic philosopher Mulla Sadra's (1571–1641) theory of "al-harakat al-jawhariyya" (Substantial Motion). For Sadra, the world is constantly changing in its substance. Substance is not fixed, as other philosophies suggest; rather, it is an act of existence, a process. Resisting fixity, this process emphasizes time and motion. Sadra's theory, alongside Deleuze's approach toward the point of view of non-human subjects, suggests new possibilities for the moving image.

Keywords: Pixel, time, motion,Moving image, Persian-Islamic Philosophy, Mulla Sadra, Substantial Motion, Gilles Deleuze.

Prologue

Sometimes, when a person runs, the camera floats; resisting common human perception, it gives a disjointed glimpse of the subject (Fig.1). As the camera moves, the underlying pixels, which construct the image, struggle to keep up with change and movement outside the frame, and gives a 'pixelated view' of the event. Pixels, which have their own motion and time, and differ from our overall perception of the image, emerge on the surface. Constantly shifting between recognisable and unrecognisable forms, they unsettle the viewer's perception. The inside and the outside of the frame clash, and the exposed pixels suggest different forms of time and motion [1].

Introduction

Classical Persian Islamic philosopher Mulla Sadra Shirazi (1571–1641) developed a sophisticated theory of reality,

Fig. 1. YouTube video, Iran, 2009.

including a relationship between temporal beings and the infinite realm of the Divine. His theory of 'substantial motion' (al-harakat al-jawhariyya) posits movement and transformation within substance. It implies that every entity experiences the universe, and is in constant motion toward perfection – a motion that is not limited to material and temporal aspects of being but, rather, is linked to the invisible realm of the Divine.

The moving image, like a living entity, also has its own perceiving body –yet it functions differently from human bodies. Extending Sadra's theory, pixels can also be seen as experiencing and changing. Considering the body of the digital image in the light of substantial motion, this paper proposes to explore new ways of seeing from a non-human point of view, in relation to the video-frame and the world. The pixels' connections, then, provide forms of change, time and motion. A pixel-centric video is able to transform viewers by freeing them from their fixed point-of-view.

Non-Human Point of View

A film is an act of seeing that makes itself seen, an act of hearing that makes itself heard, an act of physical and reflective movement that makes itself reflexively felt and understood [2].

Like a living entity, a moving image has its own body that perceives the world. This moving image body expresses the world it experiences to viewers in an organised manner: as Vivian Sobchak suggests, the camera uses modes of "embodied existence"; seeing and hearing [3]. Yet the significant difference between the camera's mode of perception and conventional human perception is often overlooked. Gilles Deleuze, too, suggests that the camera's perception enables us to perceive differently. Unlike human perception, the camera has no "centre of anchoring" and no "horizon". This lack of reference creates an alienation from normal perception, enabling us to see what we don't see with the naked eye, such as pixilation in digital video [4]. Deleuze argues that the camera has neither interest nor need; it just perceives, giving rise to a different kind of perception. There can be many points of view – not only the human one [5].

For any profound change to be achieved, a new way of seeing is essential. The camera's non-human point of view can introduce and enhance new ways of seeing. Pixels, like individuals, exist as the smallest units of the overall collective of pixels in a frame. They form the underlying structure of the digital image (a fact that High Definition (HD) videos conceal in favour of a 'realistic image'). If, as Deleuze's reading of Bergson suggests, there are not only many points of view other than the human, but also eyes "in things, in luminous images in themselves" [6]; and if these many points-of-view can unfold the universe; then we may ask what a pixel captures, and what the changing universe is from a pixel's point of view. This privileging of a non-human point of view forms a meeting point between the thoughts of Sadra and Deleuze, and the condition of the pixel [7].

Substantial Motion

Sadra's theory of Substantial Motion (*al-harakat al-jawhariyya*) can help us understand pixels and digital videos. In this theory, a gradual, invisible transformation takes place in the inner structure of entities. Sadra calls Substantial Motion "the flow of being", which is not "a motion affecting substances with extrinsic modifications but a transformative motion that affects their substantiality itself" [8]. Accordingly, the world is constantly changing in its substance (*jawhar*), and existence is ontologically in motion [9]. 'To be' is to be in motion, and movement shows the eternal world as continually unfolding.

In its historical context, Sadra's notion of a changing universe challenged the substantialist view that dominated Greek and Islamic philosophy. Aristotle (384–322 BC) and Ibn Sina (c.980–1037), for instance, argued that an entity cannot change substantially without losing its singularity and unity as a whole. The term 'substance' relates to the Greek "*ousia*, which means 'being'", and to the "Latin *substantia"*, meaning "something that stands under or grounds things" [10]. Substance, as constituting matter primarily, is not subject to change; as *ousia* it cannot be more or less, because "it has no opposite, and intensity requires opposition and contrariness" [11]. Movement and time are considered external to matter. The experience of change results from our perception, which creates unity and movement from disjointed parts and events.

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Page numbering begins at 1 at the start of the paper.

However, for Sadra, 'substance' is not primordial to being [12], but is itself "a process of becoming and unfolding of being" [13]. That is to say, all substance must undergo modification, because it is subject to being. Sadra equates 'being' with God or 'the act of being', and defines a 'substance' as an "independent existent which is existent by its essence and ipseity; it is necessary for itself without being attached to any other thing" [14]. In its being, substance links to God as the most perfect, in an internal motion that causes an external motion and a change in attributes, expressing God's "independent existence" [15]. Substance (*jawhar*) is constituted of both divine being (invisible/ immaterial) and matter (visible/ material). Thus, existing entities, with their intertwining aspects of existence and matter, dwell in the sensible world *and* in an immaterial/ invisible world that links to divine stability and simplicity [16].

For Sadra, God is the simplest being, with no attributes or properties. Yet in processes of becoming, entities constantly manifest within his simplicity. In Sadra's view, "[t]he most manifest is also the most difficult to perceive" [17]. The more apparent to senses a thing is, therefore, the less simple and also less real: the sensible world is the least real. Entities continue to exist in the sensible world because the Divine constantly intervenes through substances. Each entity is intangibly attached to the Divine, as though by an umbilical cord. Substances, as links to the unmoving Divine manifest in God's act of being, are the simplest aspects of entities [18]. Their position, in between the two worlds, provides connection and transmission of Divine codes to beings. But they also conceal the Divine.

The constant exchange between two diverse worlds is the origin of both internal *and* external changes of substance as manifestations of God's invisible act of being. For Sadra, "everything in existence is a proof and a sign of what is in the invisible. [The divine Name] 'Self-Subsisting' corresponds to substance" [19]. Since movement or transformation within the material context is caused by internal motion, and each individual entity consists of both material and immaterial aspects, materiality can reveal the invisible. In the constant transformation of the universe, the ultimate goal is to reach the unchanging Divine that dwells inside each being [20]. The more simple a being becomes, the more real and more perfect.

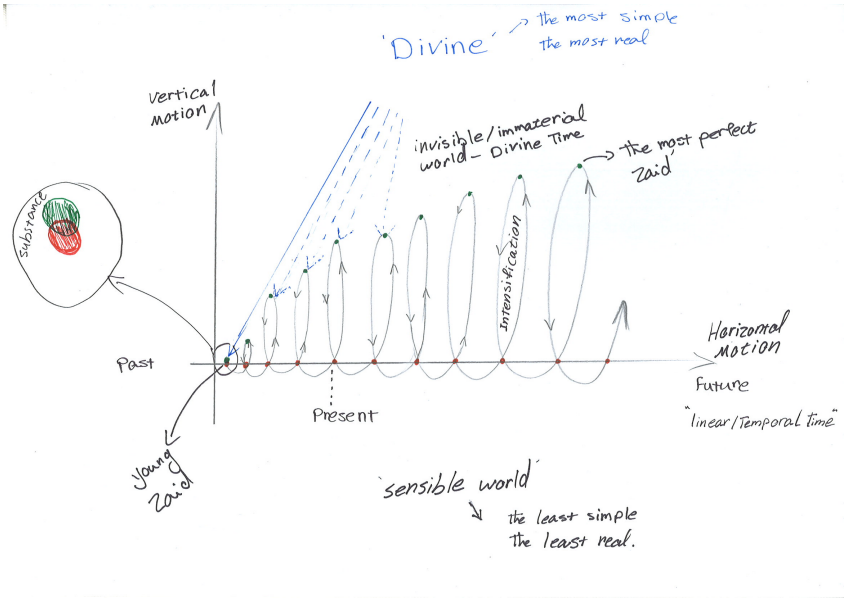
The species entails the fixity of particulars, whereas concrete singularity liberates them, by inflecting a movement that traverses them and modifies them in the direction of a greater potency of acting and knowing [21].

Sadra's model of motion considers the intensification of being via its material origin (Fig. 2). For this, the change of matter is important, even though the goal is to transcend it. While God's constant command to exist, and his togetherness with being, impel a substance to move in itself, the change of matter in the sensible world propels the inner motion toward spiritual perfection, too. The change of matter is "horizontal motion" in the material world (for example, a child/ young "Zaid" growing old [22]), whereas the movement toward Divine perfection is "vertical motion". Any horizontal motion goes back to a vertical motion (from the sensible world to the higher world) that is linked to the Divine. In Sadra's terms, simplicity and individuation result from changing substance, and from its contact with both sensible and insensible worlds (see Fig. 2) [23].

Similar to Sadra's concept of intensification, Henri Bergson and other process philosophers (such as Alfred North Whitehead) suggest that the more we perceive and experience the world, the more we individuate. Bergson's diagram of the "recollection image" (Fig. 3) [24], suggests that potential for creating anew lies in the gap between the perception image and the movement image – the longer the interval, the more one perceives. This gap, Deleuze notes, brings one closer to an "essential singularity" [25]. For Sadra, too, singularity is graded in intensity and perfection, and moves toward a "greater potency".

For Sadra, time is a coordinate of being [26]. It is neither linear nor temporal (as in past, present and future), nor is it external to matter. Unlike the major philosophers in the tradition following Aristotle and Ibn Sina, Sadra allows for "temporal time", but only in accordance with each particular entity. The only "present" is Divine time, of which "temporal time" is a fragment; accordingly,

Fig. 2. Diagram showing substance and Substantial Motion in Sadra's terms (© Azadeh Emadi)



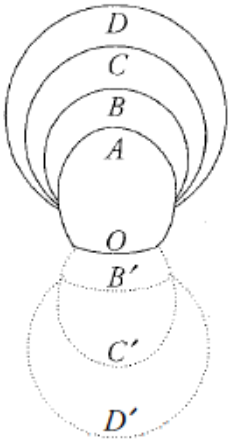


Fig. 3. Bergson's diagram of "Recollection Image" in Deleuze's Cinema 2

there is no actual beginning or end, as the experience of events as 'before' and 'after' results from our perception of linear time [27]. In each moment, something dies and is born. However, the new is not completely new, because the becoming at the level of substance is ongoing; "Zaid" remains "Zaid", even though he passes through different events [28]. The butterfly both is and is not the caterpillar. This, the unchanging aspect of substance, is part of Divine time. Time affects each entity differently, since it is linked to the qualities of being. Each entity, as a process, is part of the unique movement of the universe. The entire universe and its units individuate in each instance, shaping and reshaping. Becoming - that is, God's act of being - unifies infinitely changing entities into a stable whole in time [29].

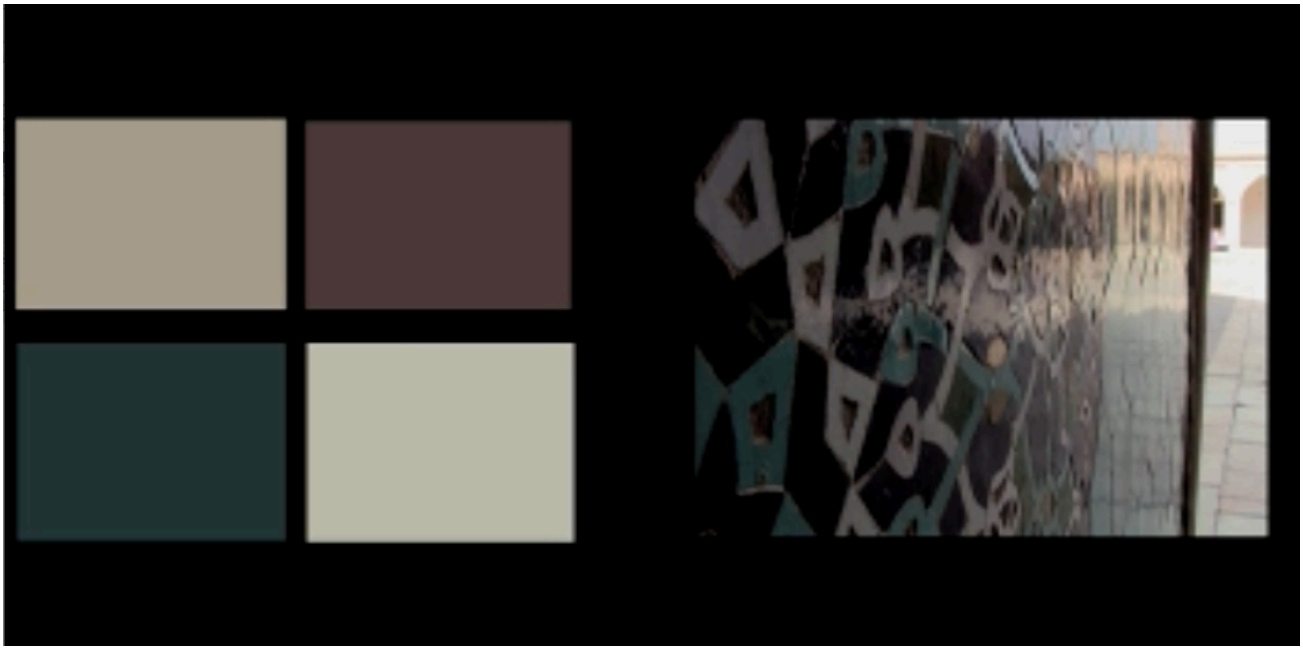
In a similar way, insofar as motion and change are deemed not external factors but inherent to being, Deleuze (following Bergson) does not regard movement as separate and independent from matter, arguing that "each change or becoming has its own duration" [30]. He posits the universe as a flow of movement, articulating itself in distinct ways [31]. Time depends neither on the event nor on matter. It is not a container in which events take place, and which then becomes a measure of movement [32]. However, Deleuze's change is essentially a material form of becoming (a horizontal motion, in Sadra's terms), whereas, for Sadra, change is not limited to material, but also involves the divine aspect of substance, *jawhar*.

Digital video as a Metaphor for Sadra's Universe

Digital video closely approximates Sadra's philosophy, in that it suggests becoming at the level of pixels, and via motion that remains invisible. The notion of Substantial Motion runs counter to established views of film as undisrupted, illusionistic movement created by an even and horizontal passage of frames and units of time. Further, while the frames in analogue film act as borders of consecutive images, in digital film the frame is a platform to structure pixels. A pixel (a small unit of illumination, and the most simple entity inside the frame) mediates an exchange between the inside of the frame and the outside world. Appearing and disappearing pixels allude to the continuous movement of the frame as a whole. When our perception of changing frames (collected pixels) is interrupted, our experience of movement is troubled. This interruption encourages ambiguity and a movement from a representational to a sensational experience of the image. If pixels collectively refuse to appear and disappear, then, using Deleuze's term, an expanded "interval" between the movement image and the perceived image becomes a new point of becoming [33]. The transformation of pixels inside the frame is due to an initial contact, provided by the camera's body, with the world outside of the digital. Although independent from each other, pixels influence one another in our perception of movement through their collective changes. Resembling Sadra's 'substances', each pixel has its own connection to the outside of the screen. Still and stationary, the pixel yet affords an experience of motion.

The constitution of a moving image resembles Sadra's moving universe, where simple entities known as substances have their own time and motion as part of a bigger motion of the universe. In an analogy to the relationship between temporal and divine, the video image exists in "temporal" 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 different times within the same frame: each pixel on a screen undergoes certain internal changes. The rate of change depends on the digital (I/O) codes that link the frame to some outside subject matter. We become aware of change at the level of pixels when the motion between adjacent pixels inside a frame varies. Our experience of motion as a whole is different from that of motion at the level of pixels. In digital video, movement is not from point A to point B, but from the potentiality of point A to the actuality of that very same point A, in a new instant. Using an analogy from physics, this is a

Fig. 4. Still from the video Lightened Tiles, 2013 (© Azadeh Emadi)



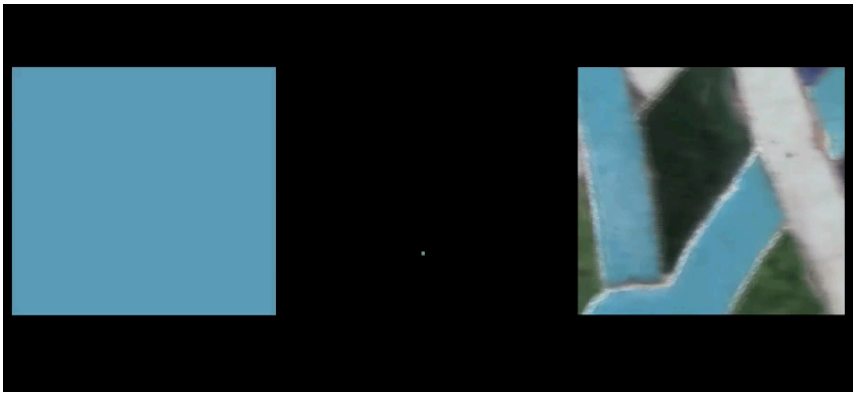


Fig. 5. Still from the video Through a Dot, 2013 (© Azadeh Emadi)

similar motion to boiling water; a contained movement that transforms particles from within.

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The aspects of Sadra's philosophy discussed above, which informed my thinking on digital video and the pixel's becoming as an entity, influenced the production of two videos, *Through a Dot* and *Lighted Tiles*. *Lighted Tiles* (Fig.4) demonstrates that our perception of continuous movement as a whole is formed by a collection of events that take place inside the frame and between pixels. Four pixels, taken from different parts of the video on the right, show diverse kinds of motion within the existing frame. Each pixel undergoes different changes depending on changes outside the frame. Their rate of change, too, differs from the time and motion that is perceived in the frame as a whole. Nevertheless, their collective changes produce a perception of unified movement.

Through a Dot (Fig. 5), by contrast, observes the becoming of a single pixel [34]. The video consists of three images of the pixel; the right-hand image shows the video frame as a whole, in which no individual pixels can be perceived; the middle image shows a single pixel masked out from the right image; and the left image exposes internal changes of the pixel on a large scale. In this image, potentiality constantly transforms into an actuality in the same pixel, and back to a new potentiality, linking to a movement initially informed by an event external to the frame. A pixel is all – past, present and future. It is the duration as a whole, *and* the present [35].

To Conclude

The universe is "flowing matter" [36], an ever-changing relationship between parts and wholes. Each unit, as Sadra suggested, is a continuously changing event, connected to both horizontal and vertical motion. All units, individually and as a collective whole, shape and reshape each other, in each instance due to their Substantial Motion. Pixels taken from an image, and then returned to it, can bring about new points of view and experiences; each point can unfold new aspects of human perception, and open up new ways of seeing. Digital video, in the light of Substantial Motion, and the pixel as a link to both material and immaterial realms, can provide new potentials for understanding and generating contemporary digital media works that energise the relationship between minimal parts (pixels, in the case of digital media) and the whole (screen, audience and beyond). A pixel-centric video can liberate viewers from a fixed point of view. Moving beyond the surface of the image can reveal the imperceptible, and connect us to other experiences, time and motion.

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References and Notes

1. This video was filmed by ordinary people, during the demonstrations following the elections in Iran in 2008. Anonymous (2009), < http://www.youtube.com/results?nfpr=1&search_query=Iran+after+election+2009 >, Accessed 20 April 2010.

2. Vivian Sobchack, *The Address of the Eye: A Phenomenology of Film Experience* (Princeton, New Jersey: Princeton University Press, 1991. p. 3).

3. Sobchack [2] pp. 3-8.

4. Gilles Deleuze, *Cinema 1; The movement – image*, Tomlinson and Habberjam, trans. (Minneapolis: The University of Minnesota Press, 1986, p. 58).

5. Deleuze [4] pp. 56-66.

6. Deleuze [4] p. 60.

7. Laura U. Marks, *Enfoldment and Infinity; An Islamic Genealogy of New Media Art* (Cambridge, U.S.A.: MIT Press, 2010). This book provides a precedent for bringing together Islamic philosophy and Deleuze to think about digital media; especially chapter 7, 'Baghdad, 1000: Origin of the Pixel'.

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10. Howard Robinson, 'Substance', *The Stanford Encyclopedia of Philosophy* (Summer 2013 Edition), Edward N. Zalta (ed.), URL = http://plato.stanford.edu/archives/sum2013/entries/substance/, Accessed 9 March 2011.

11. Rizvi [8] p. 111.

12. Sadra's definition of substance, which is a minor tradition, is influenced by the Platonic view.

13. Rizvi [8] p. 131.

14. Mulla Sadra Shirazi, *On the Hermeneutics of the Light Verse of the Qur'an (Tafsir Ayat al-Nilr)*, L.P. Peerwani, Trans. (London, U.K.: ICAS Press, 2004, p. 50).

15. Sadra Shirazi [13].

16. Rizvi [8] pp. 90-95.

17. Jambet [7] p. 160.

18. Jambet [7].

19. Sadra Shirazi [13] p. 100.

20. Muhammad Kamal, *Mulla Sadra's Transcendent Philosophy* (London, U.K.: Ashgate, 2006).

21. Jambet [7] p. 96.

22. 'Zaid' is a name Islamic philosophers often used to designate an individual.

23. Please see Jambet [7] and Rizvi [8].

24. Gilles Deleuze, *Cinema 2: The time-image*, H.Tomlinson & R. Galeta, Trans. (Minneapolis: The University of Minnesota Press, 1989, p. 289).

25. "[I]t will be seen that the progress of attention results in creating anew not only the object perceived, but also the ever widening systems with which it may be bound up; so that in the measure in which the circles B, C, D represent a higher expansion of memory, their reflection attains in B', C', D' deeper strata of reality". Deleuze [22] pp. 44-47.

26. Rizvi [8].

27. Ibrahim Kalin, 'Between Physics and Metaphysics: Mulla Sadra on Nature and Motion,' *Islam & Science Vol 1*. Center for Islam & Science (2003) <http://www.highbeam.com>.

28. There are paralles with Deleuze's view on changing objects: "[I]nstead of an addition of distinct objects on the same plane, we see the object remaining the same, but passing through different planes". Deleuze [22] p. 44.

29. Rizvi [8].

30. Cliff Stagoll, 'Becoming'. In A. Parr Ed., *The Deleuze Dictionary* (Edinburgh: Edinburgh University Press, 2005, pp. 21-23).

31. Deleuze [4] pp. 56-60.

32. Deleuze [22] p. 34.

33. Deleuze [4] pp. 33-55.

34. The idea for this video arose from a discussion with Laura Marks about a drawing of a changing pixel.

35. Similar to Sadra, Deleuze, following Bergson, pursues a discussion on the image constantly divided between past and present. Deleuze [22].

36. Using Bergson's term.