

Flights of a Spider
A Play of Architectural Limits

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DOI
[10.1400/279117](https://doi.org/10.1400/279117)

Publication date
2020

Document Version
Final published version

Published in
Villardjournal

Citation (APA)

Kousoulas, S. (2020). Flights of a Spider: A Play of Architectural Limits. *Villardjournal*, 02, 113-126.
<https://doi.org/10.1400/279117>

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publisher

Quodlibet
via Giuseppe e Bartolomeo Mozzi, 23
Macerata (Italy)
www.quodlibet.it

first edition

June 2020
ISBN 978-88-229-0492-8
ISSN 2533-297X

print

Industria Grafica Bieffe, Recanati,
Macerata (Italy)

The villardjournal is issued twice
a year.

This publication has been supported
by Iuav University, Venice (Italy).

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02.020

edited by Luca Di Lorenzo Latini
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villardjournal

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The contributions by Giovanni Corbellini, Luca Galofaro, and Federica Soletta were published here thanks to the invitation of the curators Luca Di Lorenzo Latini and Giulia Menzietti. The contributions by Marianna Charitonidou, Stavros Kousoulas, Linda Matthews, Piero Medici, Leonardo Zuccaro Marchi, Alessandro Panzeri, Mark Sawyer, and Giulio Testori were selected based on a double blind review of the call *Communicate*.

flights of a spider: a play of architectural limits

stavros kousoulas

abstract In this paper, the limits between an already structured individual and its milieu are brought into focus. The significance of the limit lies between the operational potentials of an individual and its milieu: that which is neither structure nor potential yet. In other words, the architectural limit belongs neither to the past nor to the future, but to a constant present, the *a praesenti* of being in becoming and becoming in being. On the limit that constantly shifts and transforms, grows and shrinks, both the past and the future inform each other. Through the disparity of their informational differential, any architectural entity passes through the ongoing unfolding of its individuation. For Simondon, the limit is the here-and-now of individuation. It is where the propagation of information on a yet undetermined milieu occurs; in other words, it is where transduction takes place. Through this paper, architectural transduction will be defined as the process whereby architecture undergoes information, where one architectural individual finds its principle of constitution in another. If the limit is the here-and-now of individuation, then architecture, aiming in the production of new processes of individuation, has to deal with the reciprocal practice of finding new ways to perform a play of limits; a play on what is yet to come.

premise Philosopher Manuel DeLanda argues that our confusion regarding the word ‘meaning’ comes from the fact that ‘meaning’ has two meanings: signification and significance, one referring to semantic context, the other to importance and relevance.¹ It is the second meaning of ‘meaning’ that biologist Jacob van Uexküll has in mind when he develops his biosemiotics: the field of studies that examines how signs are communicated throughout living systems. If there are as many environments, or in his terms *Umwelten*, as there are individuals, then the question is how these infinite *Umwelten* can relate to each other in a meaningful way – in an important, relevant and significant way. As Uexküll points out, ‘[...] meaning in nature’s score, serves as a connecting link, or rather as a bridge, and takes the place of harmony in a musical score; it joins two of nature’s factors.’² Meaning is always generated in a structural coupling. In other words, every individual affords its becoming-other, where other stands for the individual it couples with, and from its affordance, its affectivity to become-what-it-couples-with, meaning is produced. Inspired by Goethe, Uexküll writes that,

If the flower were not bee-like,
and the bee were not flower-like,
the unison could never be successful.³

all is in-formation As philosopher Pascal Chabot notes, information can be approached in three different ways: syntactical, semantic and pragmatic.⁴ Syntactical information deals with issues of information transmissions, and, hence, its concerns are mainly technical: how information is coded, through which channels and how noise can be avoided. From a semantic understanding, information deals with the meaning of symbols and the ways that they can form a message. One of the most important semantic concerns, is to identify the shared conventions between a transmitter and a receiver in order for a message to be mutually comprehended. Finally, and what is of real concern for my argument, is the pragmatic approach to information: how it can *affect* the behaviour of both transmitter and receiver.

Philosopher Gilbert Simondon might have shared what one could call as the ulterior cybernetic ideal, namely to formulate a unified theory of being based on the concept of information. Nonetheless, throughout his work, he directly goes against most of the common and popular accounts of Information Theory. For Simondon, information is the concept that can at once combine both form and action, leading him to state that ‘[...] it is necessary to replace the notion of form with that of information.’⁵ On that account, he criticises cybernetics as a quantitative theory that is fundamentally detached from his main objective: not to examine meaning per se, but rather the experience of meaning.⁶ Here, the lines between Uexküll and Simondon converge. Simondon claims that when meaning is approached as its experiences, then it becomes characteristic of the very becoming of every individual in its affective relations with its milieu, with its *Umwelt*.⁷ Seen in this way, meaning is all but the main object of study of conventional cybernetics. As Simondon says, cybernetics allow,

[...] a correlation between emitter and receiver in cases where this correlation has to exist; but if one plans to transpose it directly into psychological and sociological spheres, it is paradoxical: the narrower the correlation between emitter and receiver, the lower the quantity of information. So, for example, in a fully completed apprenticeship, the operator needs only a very small quantity of information from the emitter, which is to say, from the object he is working on or the machine he is operating. The best form, therefore, would be that which demands the lowest quantity of information. There is something here that does not seem possible.⁸

Put succinctly, cybernetics tend to reduce being into simplified technical schemas. They advance an understanding of being that exists through verbs such as control, command, communicate, move, act and react. It is no surprise that Norbert Wiener, the founder of cybernetics, formulates its principles from a strictly military perspective. The American government commissioned Wiener to develop a device that could automatically aim and fire an anti-aircraft missile during World War II. The main purpose was to produce the first device able to locate its target, and then fire a missile that would hit it later in its trajectory. The initial information of the target, broken in digits of speed and location,

was used by Wiener's device in order to predict the future location of the target. Wiener's 'feed-back' device is probably one of the most straightforward examples of digital logics: analysis and synthesis, always in extensive terms, and always as the breaking down – and putting together – of chunked parts. The cybernetic approach to information reduced it to its mere syntactical and semantic dimensions: each machine reacting to the signs it receives from the previous, each operating in a fully linear way. Essentially, everything was a matter of control and prediction. This early cybernetic attitude spread to various fields, including architecture –especially in its parametricist branches. The parametricist's dream is an architectural practice in which everything that matters ought to '[...] take place in the intimacy of a control room, where the material operators were represented and controlled at a distance.⁹

Architectural theorist Mario Carpo directly connects the digital – mostly understood as a mode of architectural production – with one of the key aspirations of modernity, namely the production of identical copies.¹⁰ He claims that the digital turn in architecture simultaneously ends two crucial paradigms within architectural thinking and doing. Carpo suggests that the digital surpasses both, the Albertian notion of architectural design – understood as that which separates designing an architectural object and then building it as an identical copy of the design –, and the mass production of identical copies that becomes possible through the industrial revolution.¹¹ According to Carpo, the digital is variable, and as such,

[...] digital variability goes counter to all the postulates of identity that have informed the history of Western cultural technologies for the last five centuries. In architecture this means the end of notational limitations, of industrial standardization, and, more generally, of the Albertian and autorial way of building by design.¹²

Carpo's claim that everything that is digital is variable is only partially accurate. What Carpo misses is that the digital is *extensively* variable. For Carpo, what characterises digital architecture is the fact that, essentially, design is no longer the design of an object but rather the design of a sequence of

numbers: a digital file.¹³ Digital files later converge into objects, after a series of steps which might not be even under the control of the initial author of the design, but rather controlled by different agents. Aside from the implication of the input-output logics that such an approach assumes, one comes across another crucial point: control. The language of cybernetics – control, command, communicate, move, act and react – as what supposedly produces architectural variability; it does, but only in terms of an extensive figure and not in terms of an intensive affectivity. Nonetheless, Carpo is right to conceptualize architectural design as a purely informational operation; what is needed, however, is a different understanding of information.

architectural transductions The importance of meaning can only be understood once it is established that signs are produced by difference itself. The Simondonian concept of information will not only substitute its cybernetic misinterpretations, but, importantly, it will relocate the relation between signal and sign within individuation itself. It is difference in-itself that relates heterogeneous series and disparate singularities, that causes sensibility and thought to emerge as a resolution of a difference in potential, an intensive difference. As Simondon explains, information can be located '[...] between two halves of a system in a relation of disparation.¹⁴ Therefore it is easier to understand the extent in which Gilles Deleuze's definition of the signal and sign comes from a thorough reading of Simondon. According to Deleuze,

[...] by signal we mean a system with orders of disparate size, endowed with elements of dissymmetry; by sign, we mean what happens within such a system, what flashes across the intervals when a communication takes place between dispartes.¹⁵

Deleuze, following Simondon, understands the individual as a signal-sign assemblage. However, the individual itself is always conceptualized as a series of events, as a process of individuation. Hence, Deleuze claims, '[...] every phenomenon flashes in a signal-sign system. [...] Individuals are signal-sign systems. All individuality is intensive [...] comprising and affirming in

itself the differences in intensities by which it is constituted.¹⁶ In other words, a signal is an assemblage composed of intensive differences, of heterogeneous orders of magnitude, that through the disruptive agency of a singular germ, produces an informational effect among the dispartes. A signal, therefore, is itself metastable, since it belongs to a pre-individual milieu, and stands for its affective potentials. Put succinctly, signals are pre-individual, metastable affects: the expressive and action-oriented potentials of an individual, before even the individual is constituted, as formed only by its virtuality. Hence, a sign has nothing to do with signification nor with the recognition of an individual and its so-called qualities. It is an intensity that is produced through the resolution of tensions between signalling dispartes. Moreover, at the moment of its production through sensation and its metastable signals, the sign refers directly to sense while reciprocally redirects it and transforms it. In other words, the sign is immanently analogue – as the process closest to the ontogenetic event – and deals with an immediate sensorial amplification: bootstrapping affective capacities while synchronously individuating them.

Therefore, once having escaped the pre-individual signals, once having crossed the threshold of an intensive difference, signs are the purely sensible intuition of that crossing. That is why they do not deal with signification – or recognition – but can instead only be felt, a reciprocal affective experience that belongs to no one and to everyone at the same time, a non-subjective memory of the pre-individual. They constitute a fourth type of memory: next to genetic, epigenetic and epiphylogenetic, comes the memory of an impersonal individuation, as that which folds and unfolds all the rest through a synchronous experience of both actual and virtual differentials, through the affects an individual has and the ones it could have had, were it to *feel* differently.

It is for this reason, that architecture, through practices of disruption and intuition, can transform sense itself: create new points of view, new signs and novel senses, produce new affects and, eventually, different individuals. This is why Carpo is right when he claims that architecture is an informational operation. However, in the Simondian account I am following

and opposite to Carpo, information is '[...] the signification that suddenly emerges when an operation of individuation will discover the dimension in which two disparate reals can become a system.'¹⁷ Signification is understood as meaning, as that which makes sense for an individual that longs to feel different in order to individuate differently, in order to form new alliances, new encounters that will amplify and empower its affects. The sign is the first step towards an individual worthy of the event, the compass of an ethology that goes beyond binaries. For that reason, Simondon assigns to information two crucial characteristics. In short,

The fundamental condition for there to be information is not a particular state of the emitter, nor is it a property of the message, but a particular state of the receiver, which Simondon qualifies as metastable because it is charged with potentiality so as to make becoming-informed possible. This information as the transmission of the message is nothing but a perpetuated genesis of the receiver – because all information is genesis – and there is a 'first information' in which emitter and receiver do not yet exist. The condition of possibility here is a first metastability which is picked up by the information receiver when information is message transmission.¹⁸

Simondon conceives information as a universal process that concerns all being, and claims that it is, indeed, the formula for individuation. More precisely, information is '[...] the sense according to which a system individuates; information is therefore a primer of individuation, a demand of individuation, it is never something given.'¹⁹ How is it then that an individual emerges from the informational resolution of a disparate tension? Responding to that, Simondon introduces the concept of transduction, able to account for the emergence of both the structural and operational consistency that characterises an individual.

Between an already structured individual and its milieu, between the operational potentials of an individual and its milieu, Simondon recognises the significance of the limit: that which is neither structure nor potential.²⁰ In other words, the limit belongs neither to the past nor to the future, but to a constant present, the *a praesenti* of being in becoming and becoming in being.

On the limit that constantly shifts and transforms, grows and shrinks, both the past and the future inform each other. Through the disparity of their informational differential, the individual passes through the ongoing unfolding of its individuation. For Simondon, the limit is the here-and-now of individuation. It is where the propagation of information on a yet undetermined milieu occurs; in other words, it is where transduction takes place. In simple terms, transduction may be defined as the process whereby a domain undergoes information, where one individual finds its principle of constitution in another. Simondon will define transduction as,

[...] a physical, biological, mental or social operation, through which an activity propagates from point to point within a domain, while grounding this propagation in the structuration of the domain, which is operated from place to place: each region of the constituted structure serves as a principle of constitution for the next region.²¹

Simondon conceptualizes transduction as composed by two reciprocal processes which complement informational propagation: *allagmatics* and modulation. Let me first examine the second, before focusing on *allagmatics* and returning to transduction. The first transductive principle, where an individual finds its principle of constitution in another, brings forth the binary opposition between matter and form. Simondon, argues against the traditional hylomorphic schema that separates matter and form, claiming that essentially, any such separation entails the distinction between structure and operation, while at the same moment, it turns thought towards representation.²² On the contrary, he proposes that in order to study individuation one must leave the hylomorphic binary behind and be situated not only in the temporal middle – *a praesenti* – but also in a relational middle ground – *au milieu*, in the *Umwelt* itself.

fly as a spider Let's examine the example that Simondon uses to break the matter-form binary and introduce the concept of modulation: the process of moulding. Moulding, as the hylomorphic schema would have it, consists in the imprint of an ideal form – the mould – upon a passive and inert matter

–the clay. Simondon's first point is that, simply put, clay itself is neither passive nor inert, since it has its own capacities, its own affects – in terms of its plasticity for example – and based on these affective capacities, it has already received an initial preparation from the craftsman.²³ Next to that, the mould is not an abstract and ideal form, but rather a specific material frame, that actualizes its material composition, as structured in its shape, onto another material assemblage. What occurs between the clay and the mould before they both produce a third individual? As Simondon claims, there occurs a reciprocal assumption of form, an information, between the clay and the mould, which he terms modulation: a continuous and thus temporal moulding.²⁴ Clay and mould constitute the pre-individual milieu of the brick, the different orders of magnitude needed to individuate, with all the efforts of the artisan – such as the raise in temperature or the applied pressure – being the singular seeds, the germs, that catalyse the resolution of the clay-mould tension. The form of the brick lies as a signal, a fully contingent virtuality that depends on the affective technicities that engender it, while the gradual actualization of the brick involves a constant exchange of signs between clay, mould, artisan and all the other individuals that enter in relations of intensive difference. It is for this reason that Deleuze claims that modulation '[...] is the operation of the Real.'²⁵ Each new individuation modulates an individual – even one that has undergone multiple individuations already, even if this individuation is not its *own* – through novel disruptions which produce new tensions in the milieu. It modulates the individual precisely because it demands it to reorganise its limits and consequently, to alter both its structure and its operation. As Simondon puts it,

[...] the principle of individuation of the brick is not the clay nor the mould: this heap of clay and this mould will leave other bricks than this one, each one having its own *haecceity*, but it is the operation by which the clay, at a given time, in an energy system which included the finest details of the mould as the smallest components of this wet dirt took form. [...] The principle of individuation is the common *allagmatic* operation of the matter and form through the actualization of potential energy. This energy is energy of a system; it can produce effects in all the points of the system in an equal way, it is available and is communicated.²⁶

Therefore, Simondon, defines *allagmatics* as the theory of operations. More accurately, *allagmatics* is the theory of operations that modulate structures through the transductive propagation of information in a milieu. Simondon considers most positive sciences to be sciences of generic structures. Hence, he proposes that *allagmatics* can stand as a science of *genetic operations*, since it is the operation which makes a structure appear or which modifies a structure.²⁷ It is not that Simondon favours operations. Rather, he wishes to speak of operations and structures as one common process of reciprocal modulation. Put succinctly, for Simondon an operation is the conversion of a structure into another structure. In that sense, no operation can be determined outside a structure: any operation is always immanent to the structure that undergoes it. Hence, to define an operation '[...]' comes back to defining a certain convertibility of operation into structure and of structure into operation.²⁸ *Allagmatics* deal with a reciprocal operation that has both modulational and informational aspects. They bind together the transformation of a structure to another through an operation, as well as the transformation of an operation to another through the constraints imposed by a structure. Understood as such, *allagmatics* assign simultaneously structure and operation to the actual and the virtual. There are virtual structures (the pre-individual milieu) that undergo actual operations (the resolution of tensions) and virtual operations (transduction) that transform actual structures (modulation through information). Returning to transduction, we can now understand it as a dynamic relation, which based on the affective capacities of the individuals that form a milieu, determines at once their structural and operational potentials. The determination of their potentials is essentially what provides any sense of unity, of shared *meaning*, within the milieu. It is shared, precisely because it drives their trans-individuation, and *means* something, precisely because it is informational: signs that in their perception assist in the further individuation of the milieu. The milieu itself, in that sense, is metastable since both the energetic regimes and the structural states are convertible

into each other through the becoming of the whole. However, in order to become with the milieu, every individual needs to be able to dislocate itself from itself. From that perspective, transduction also implies the structure and the operation of a continuous dislocation, a constant 'becoming-imperceptible.' Through architecture, a niche emerges, where both virtual and actual structures and operations can be informed by propagating information on the milieu that affords them. The moment that an architect *produces* architecture (whatever that might be), she dislocates herself, affording the potential of intuiting a novel sign, a different sense in-formation, that can assist in modulating novel structures that can change the very operational affects of a space that has yet to be actualised. No individual alone is capable of transduction, converting an operation to a structure and a structure to an operation. Nonetheless, and now we meet Uexküll again, if an individual is considered as inseparable from its *Umwelt* – what Simondon calls associated milieu – then it becomes capable to transductively become-other. An individual is '[...]' neither absolute nor illusory but relative; it has the reality of the relational act.²⁹

As such, a 'pure' architect is a pioneer; its existence is a bridge because it abandons all the habits that would just maintain its stability, that would merely assist in its gradual enclosure, and instead opts for opening to its milieu.³⁰ In doing so, though, it invents novel milieus. As Simondon claims, the 'pure' individual '[...]' does not belong to a colony but inserts itself between two colonies without being integrated into either, and its beginning and end are in equilibrium, in that it comes from one community but engenders another; it is a relation.³¹ A relation that continuously invents itself through the ways that it informs itself. A relation that can make a spider fly. As Uexküll puts it,

[...] the spider's web is certainly formed in a 'fly-like' manner, because the spider itself is 'fly-like.' To be 'fly-like' means that the body structure of the spider has taken on certain of the fly's characteristics – not from a specific fly, but rather from the fly's archetype. To express it more accurately, the spider's 'fly-likeness' comes about when its body structure has adopted certain themes from the fly's melody.³²

The archetype of the fly, its melody, is the shared transductions between it and the spider; the shared trans-individuation that they both undergo through an informational propagation within their milieu, which they modulate and which, in turn, modulates them. The fact that the spider can become a fly, means that it can produce signs that are meaningful for the fly; and to produce such signs, it means that it can inform itself from the disparate signals that produced the fly. The spider anticipates the flight of the fly, spinning its web in a dimension that the flight cannot perceive. It produces a novel dimension, a resolution of dispartes that lures the fly straight into it. The spider can adopt the point of view of the insect, hence becoming a fly itself; from the discreteness of two separate entities, to the immanently analog flight that makes them become literally one: parts of the same ontogenetic melody. The spider web, an individual in its own right, produced by the spider's technicities, in a manner that differs only in degree with any architectural technicity, '[...] implies that there are sequences of the fly's own code in the spider's code; it is as though the spider had a fly in its head, a fly "motif," a fly "refrain."³³ Therefore, the fly within the spider and the spider within the fly, in their melodic coming together formulate a new plane that will produce new points of view, belonging neither to the spider nor to the fly, but nevertheless being eternally indebted to both. With each new point of view, a new individual is *about* to emerge. This *aboutness*, this not-yet-here-and-now, which nonetheless has always been here-and-now, is architecture's greatest potential. If Simondon thought of the limit as the here-and-now of individuation, then architecture, aiming in the production of new processes of individuation, has to deal with the reciprocal practice of finding new ways to perform a play of limits; a play on what is yet to come, unable to be communicated but able to inform a new world.

notes

¹ Manuel DeLanda, *A New Philosophy of Society* (London: Continuum, 2006), p. 22.

² Jacob van Uexküll, 'The Theory of Meaning,' *Semiotica*, 1 (1982), p. 64.

³ *Ibid.*, p. 65.

⁴ Pascal Chabot, *The Philosophy of Simondon*, transl. by Aliza Krefetz (London: Bloomsbury, 2013), p. 79.

⁵ Gilbert Simondon, *L'individuation et sa genèse physico-biologique*, (Grenoble: Millon, 1995 [1964]), p. 211, cited in *ibid.*, p. 80.

⁶ Jean-Hugues Barthélémy, *Life and Technology*, transl. by Barnaby Norman (Lüneburg: Meson Press, 2015), p. 32.

⁷ *Ibid.*, p. 32.

⁸ Gilbert Simondon, *L'individuation Psychique et Collective* (Paris: Aubier, 1989), p. 51, cited in *ibid.*, pp. 32-33.

⁹ Chabot, *The Philosophy of Simondon*, p. 53.

¹⁰ Mario Carpo, *The Alphabet and the Algorithm*, (Cambridge, Mass.: The MIT Press, 2011), p. IX.

¹¹ *Ibid.*, p. X.

¹² *Ibid.*

¹³ *Ibid.*, p. 5.

¹⁴ Simondon, *L'individuation Psychique et Collective*, p. 29, cited in Anne Sauvagnargues, *Artmachines*,

transl. by Suzanne Verderber and Eugene W. Holland (Edinburgh: Edinburgh Univ. Press, 2016), p. 65.

¹⁵ Gilles Deleuze, *Difference and Repetition*, transl. by Paul Patton, (London: Continuum, 2001 [1968]), p. 20.

¹⁶ *Ibid.*, pp. 222-246.

¹⁷ Simondon, *L'individuation et sa genèse physico-biologique*, p. 29, cited in Sauvagnargues, *Artmachines*, p. 65.

¹⁸ Barthélémy, *Life and Technology*, p. 36.

¹⁹ Simondon, *L'individuation et sa genèse physico-biologique*, p. 29, cited in Sauvagnargues, *Artmachines*, p. 65.

²⁰ Chabot, *The Philosophy of Simondon*, p. 85.

²¹ Simondon, *L'individuation et sa genèse physico-biologique*, p. 32, cited in Muriel Combes, *Gilbert Simondon and the Philosophy of the Transindividual*, transl. by Thomas LaMarre, (Cambridge, Mass.: The MIT Press, 2012), p. 58.

²² Sauvagnargues, *Artmachines*, p. 69.

²³ *Ibid.*

²⁴ *Ibid.*

²⁵ Gilles Deleuze, *Cinema 2*, transl. by Hugh Tomlinson and Robert Galeta, (Minneapolis: Univ. of Minnesota Press, 1989 [1985]), p. 28.

²⁶ Simondon, *L'individuation et sa genèse physico-biologique*, p. 44, cited in Taylor Adkins, 'A

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²⁷ Barthélémy, *Life and Technology*, p. 204.

²⁸ Simondon, *L'individuation et sa genèse physico-biologique*, p. 559, cited in Combes, *Gilbert Simondon and the Philosophy of the Transindividual*, p. 14.

²⁹ *Ibid.*, p. 21.

³⁰ Chabot, *The Philosophy of Simondon*, p. 93.

³¹ Simondon, *L'individuation et sa genèse physico-biologique*, p. 167, cited in *ibid.*, p. 93.

³² Uexküll, 'The Theory of Meaning,' p. 66.

³³ Gilles Deleuze and Felix Guattari, *A Thousand Plateaus*, transl. by Brian Massumi (Minneapolis: Univ. of Minnesota Press, 1987 [1980]), p. 314.

from image data to material form: new drawing techniques for the digital city

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abstract With urban space under the ubiquitous scrutiny of digital visioning technologies, the representation of the 'viewed' city is now organised according to a grid of pixel adjacencies containing ephemeral, qualitative data. Supplanting traditional modes of analogue representation, the algorithm-based functioning of this technology demands a new approach, both to the documentation of the city, and to the production of new formal techniques that utilise this data as the principal mechanism of spatial depth. Using a range of transdisciplinary software to access digital image data, the paper reveals a new relationship between representation and materiality in contemporary 'envisioned' urban space.

Using open-source software as a means of accessing digital image data, the paper presents new drawing techniques. These reveal how the numeric data-based nature of the pixel instigates a new relationship between representation and materiality that can be employed within a context of contemporary 'envisioned' urban space. The new techniques foreground the qualitative properties of the city, presenting the discipline with a completely new formal language and revealing how the reinstatement of architectural agency can occur within the digital frame.