Information, Data, Lists, Indexes, Pixels

Symbolicity of data as potential for articulation

Miro Roman
FCL Research Module:
Simulation Platform

A list of indexes on indexes, lists, data, information and pixels. What are they and how do they shape the way we think about the world? What to think about them and how to look at them? They are abundant, suggestive, with no meaning; they can engender anything. How to articulate the potential stored the simbolicity of data? If we can think of computation as a new literacy, how to think of alphabets that can express the richness and diversity of articulations?

'Only a chemist would refer to water as H_2O. But I say that it's liquid and transparent, that we drink it and that we can wash ourselves with it. Now you can finally see what I'm talking about. The list is the mark of a highly advanced, cultivated society because a list allows us to question the essential definitions. The essential definition is primitive compared with the list.'

Umberto Eco (2009)

Umberto Eco opens up a question of discussing things and phenomena without fixing them to a point or a specific meaning. Instead, he claims that lists provide a meaningful context. It is the diversity and richness of cultural articulations which cannot be captured by the elegance of essential definition. The indexes that could help us reflect and symbolise multiplicity of expressions of contemporary society and science are scattered around information, data, lists, indexes and their articulations. Information technologies are entering all spheres of society: from the ways in which we organise our everyday life, to the ways in which we think about natural sciences and humanities. Michel Serres takes it a step further by understanding information as an integral part of everything that exists:

Fig. 01 Cultural artifact as a List

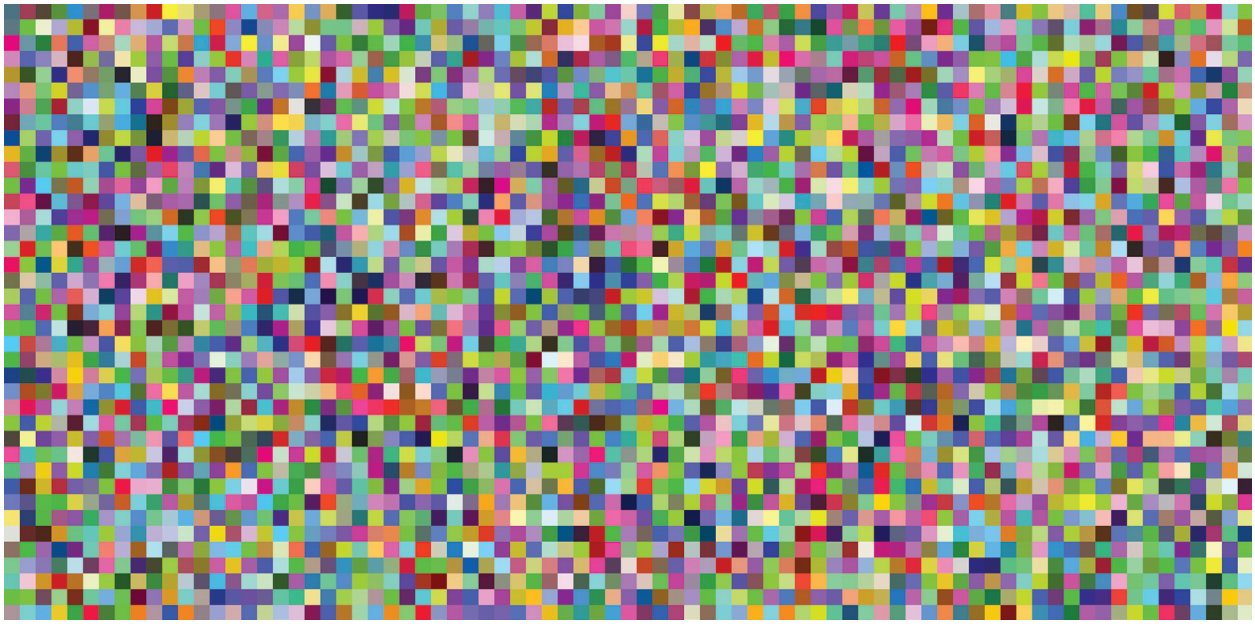

Fig. 02 Pixels of Any picture

'I do not know any living being, cell, tissue, organ, individual, or perhaps even species, of which we cannot say that they store information, that they expand information, that they emit it and they receive information. [...] I know of no object in the world, atom, crystal, mountain, planet, star, galaxy, of which one could not say again that it stores information, it deals with information, they emit and they receive information.'

Michael Serres (2007)

The abundance of data, lists and indexes, richness of accompanying narratives, and the plurality of meanings contextualising information, are destabilising unambiguous and fixed truths. Symbolic potential of data has a profound influence on the way we think of the world. The idea offered by Claude Shannon, namely that *information does not itself carry meaning but transmits messages* (Shannon, 1948), has become rather a liberating one in the academic discourse: information offers unlimited freedom of manipulation by carrying no meaning. Later on, Norbert Wiener was one of the first to give an essential definition of information, similar to the definition of water as H_2O. He was one of the first to suggest the inadequacy of understanding human environments in predominantly material terms and physical relations between energy and matter; in order to create a more comprehensive world view, the analysis had to take into consideration information as a quasi-material category:

'Information is information, not matter or energy. No materialism which does not admit this can survive at the present day.'

Norbert Wiener (1965)

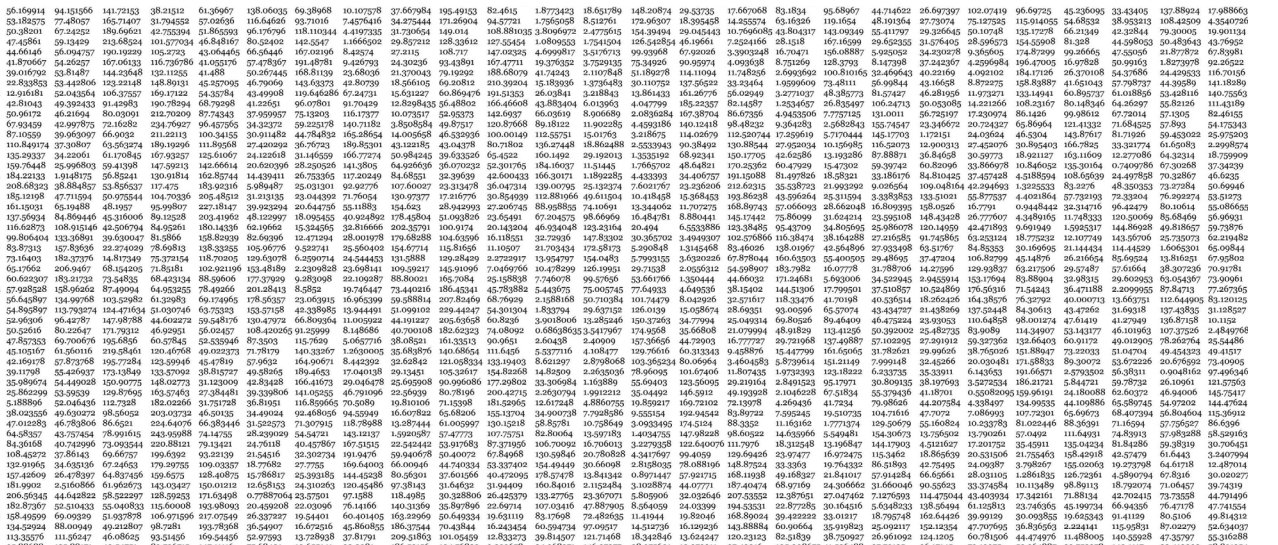

Fig. 03 Vector of an EigenChair

This was the beginning of the development of Systems Theory, Cybernetics and Complexity Theory, which are systemic approaches to the increasingly complex world. Wikipedia states that the 'complexity science attempts to understand the nature of complex systems' ('Cybernetics', 2014), which is a paradox by itself seen from the position of Serres or Eco. Problems are reduced to a series of functions, statistics and numerical ratios simplifying the setup without taking into account the interdependence and the immensity of factors. Solutions are mainly reduced to optimisation – be it infrastructure, environment or control, all of these are unilateral solutions that ultimately result in the *Generic.*

'3.3 The Generic City is fractal, an endless repetition of the same simple structural module; it is possible to reconstruct it from its smallest entity, a desktop computer, maybe even a diskette.'

Rem Koolhaas et al. (1995)

In the fields of Urban planning, Architectural theory and Design we encounter a similar situation. *The New Science of Cities* which is 'peeling back layer after layer of complexity until we alight upon what we might consider fundamental ideas and techniques' (Batty, 2013), *Parametricism* as Style, with a Manifesto (Schumacher, 2008), or *Shape grammars* as design of non-representational, geometric art (Stiny and Gips, 1971) all rely on an analytically defined set of input parameters and rules aimed either to model nature of things, or to optimise and differentiate specific properties of things.

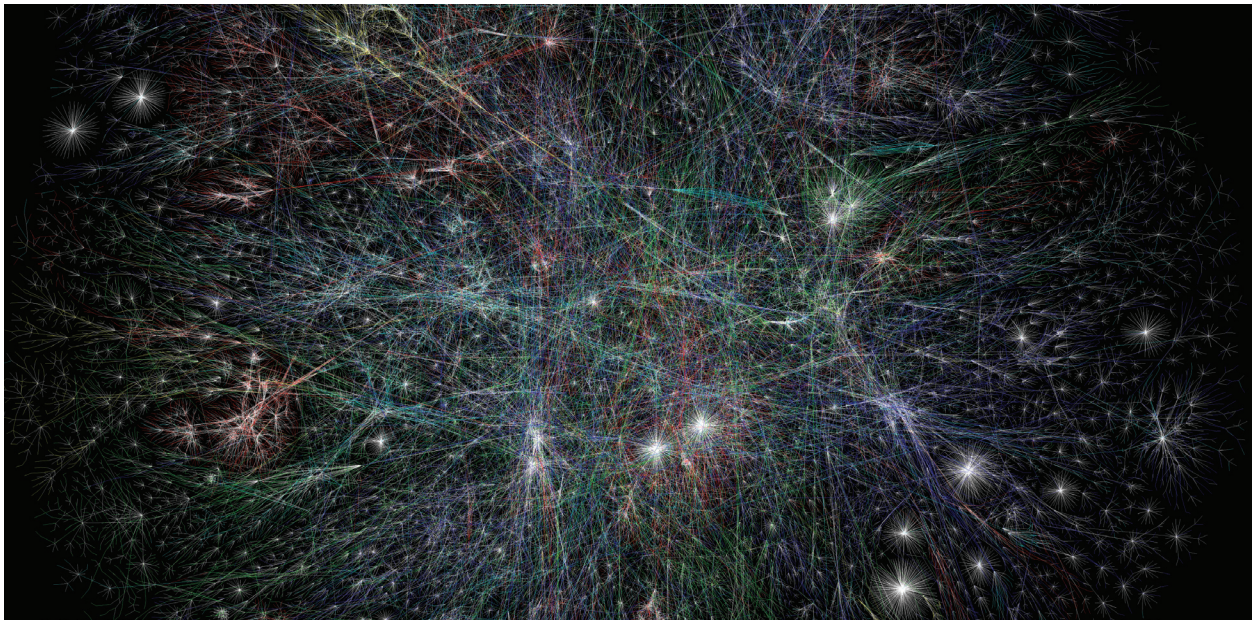

Fig. 04 Rendering of Internet

Articulating indexes

'... we're doomed to complex theories that will never have the elegance of physics equations. But if that's so, we should stop acting as if our goal is to author extremely elegant theories, and instead embrace complexity and make use of the best ally we have: the unreasonable effectiveness of data.'

Alon Halevy et al. (2009)

There is a constitutive difference in how Eco and Halevy, Norvig, Pereira are articulating their notions of lists and data. Eco is working with the infinity of lists, while Halevy, Norvig and Pereira are trying to capture the infinity of a complex system in the infinite list. 'The unreasonable effectiveness of data' implies a natural force embedded in data. A complex system becomes like a natural system; one is *data driven,* the other is *wind driven* or *coal driven.* What was before represented by a physics function, Norvig is representing by data. Umberto Eco is offering an inversion from knowing to learning, from a fixed definition to a list. He describes cultural artifacts as lists. Knowledge and information are not fixed anymore – they are relative to the way we look at them. Like in quantum physics, 'when electrons (or light) are measured using one kind of apparatus, they are waves; if they are measured in a complementary way, they are particles' (Barad, 2012). Contradicting pictures don't exclude one another; on the contrary, they complement each other and develop a different picture. To articulate this kind of positions we need storytelling, a genealogy instead of history. With lists we are learning, we are constructing our own relative answers, our own universe. The question is what and how to ask, how to surf in a sea of information, how to have a personal approach, and how to articulate it?

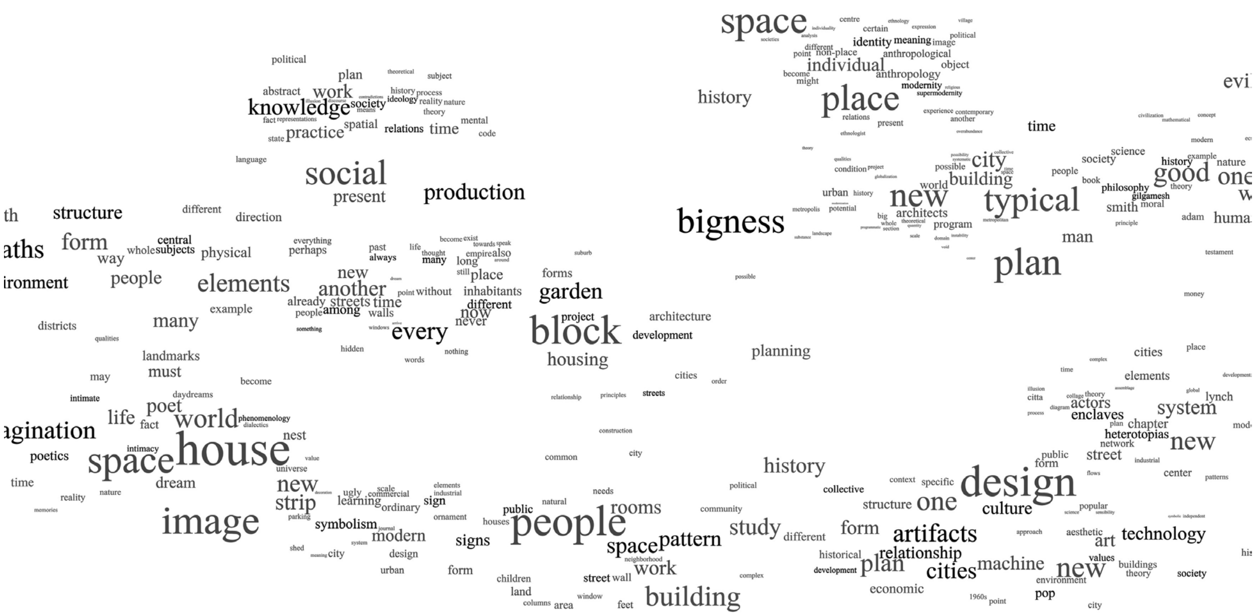

Fig. 05 Indexes of Cityness

Data and information are not new. They have always been there. In scientific communities of today data is predominantly used for justification of mathematical models, observation and visualisation of complex natural phenomena or big data analytics. This is a part of the analytical and systemic worldview. One is trying to find a function which describes the data in the best possible way; this is a generalisation which eliminates all the exceptions as shown in the "Limits to growth", 1972 book on modelling of exponential economics and population growth with five variables that are trying to explain the world behaviour (Meadows et al., 1972). On the other hand, if we put all our hope in 'the unreasonable effectiveness of data' we are playing the same game without trying to articulate it. What Louis Hjelmslev proposed in his 'Prolegomena to a Theory of Language' is a purely formal and operative approach, in his case to language – 'an algebra of language' (Hjelmslev, 1969). It is an operational stance on Eco's lists; a double articulation between a process and a system or language and text, or algebraic equation and simbolicity of data. There is a crucial distinction between an analytical function and algebraic equation. Whereas a function represents a fixed relation between a set of outputs and inputs, an algebraic equation represents a continuous articulation around an equal sign. What Hjelmslev offers is an abstraction from analytical functions to algebraic articulations. He is embracing all the exceptions and exploring multiplicities of articulations within symbolic capacities of data/language. In light of these premises, how to explore the streaming availability of data and challenge the roles of models, simulations and design. How to learn from specific potentials of the Internet and social media?

"...our challenge is to learn the articulation of quantities from the unsettled, unrated potential stored within the symbolicity of data."

Ludger Hovestadt and Vera Bühlmann (2013)

An abstract object

Data, Lists, Indexes and Pixels, we become aware of the ability of algebraic articulations to open up new and broad perspectives for a different conception of abstract objects and architecture. One should think of algebraic articulations as a way of learning which differs from the functional definitions of technical objects. One of the new questions that might be raised in this context is how to computationally articulate abstract objects, which could encapsulate cultural and symbolic richness and still be operational?

Generic design methods drive us to create and modify rules and systems in such a way that we generate abstract machines: the products are not items of a set, but instances of a population that are one of a kind – that of an abstract object. What the generic brought to architectural design is a reflection of a systemic setup, without engaging into the paradoxical invention of "ideal objects" which have to be original and specific. The emphasis is moving from designing ideal objects to designing the ideality of real objects – the ideality in reference to which an object can be designed as *one of a kind* and *generic* instead of *original* and *specific.* Generic simulacrum is expressing a different environment populated by differences which are not copies of a model. This differentiated instances do not merely represent, they have lives of their own.

With the abundance of data and the availability of data streams, architecture should be well equipped to seek ways of thinking and conceptualising as well as articulating abstract objects. With computers and information technologies, a specific machine has become any machine. Le Corbusier's house as a machine for living in has become a house as any machine. How could one formulate such an understanding of a house on the next level of abstraction regarding Le Corbusier's house?

If we think of computation as a new form of literacy, what are the architectural alphabets capable to articulate the generic in a productive setup that can encapsulate 'complexity' and cultural references by abstraction, while still being operational? How to articulate Architecture (an abstract object) in the world of data?

References

'Cybernetics' (2014). *Wikipedia, the free encyclopedia.*

Barad, Karen (2012). *What Is the Measure of Nothingness: Infinity, Virtuality, Justice: 100 Notes, 100 Thoughts: Documenta Series 099.* Ostfildern: Hatje Cantz.

Batty, Michael (2013). *The New Science of Cities.* MIT Press.

Eco, Umberto (2009). *The Infinity of Lists: An Illustrated Essay,* trans. Alastair McEwen. New York: Rizzoli.

Halevy, Alon, Peter Norvig and Fernando Pereira (2009). 'The Unreasonable Effectiveness of Data', *Intelligent Systems, IEEE* 24(2): 8–12.

Hjelmslev, Louis (1969). *Prolegomena to a Theory of Language.* University of Wisconsin Press.

Hovestadt, Ludger and Vera Bühlmann (2013). *SHEAVES: When Things Are Whatever Can Be the Case.* Wien: Ambra.

Koolhaas, Rem, Bruce Mau and Office for Metropolitan Architecture (1995). 'Generic City', in *S, M, L, XL,* 1238–70. The Monacelli Press.

Meadows, Donella H., Club of Rome and Potomac Associates (1972). *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind.* Universe Books.

Schumacher, Patrik (2008). 'Parametricism as Style-Parametricist Manifesto', *11th Architecture Biennale, Venice:* 17–20.

Serres, Michel (2007). 'Revolution Cognitive et Culturelle (engl. Translation)'. *monas oikos nomos.*

Shannon, C.E. (1948). 'A Mathematical Theory of Communication', *Bell System Technical Journal, The* 27(3): 379–423.

Stiny, George and James Gips (1971). 'Shape Grammars and the Generative Specification of Painting and Sculpture.', in *IFIP Congress (2),* 1460–1465.

Wiener, Norbert (1965). *Cybernetics Or Control and Communication in the Animal and the Machine.* MIT Press.

Image Credits

Fig. 01, 05: Diana Alvarez Marin, Miro Roman.

Fig. 02, 03: Miro Roman.

Fig. 04: Barrett Lyon, Opte Project.