

Moving Image + Data Visualization = Connection Visualization

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Abstract

Data visualization takes on different dimensions when analyzed from the categories of digital production of the moving image. This typology of image not only presents information, but also allows us to visualize data in both rational and emotional way. Contemporary examples provide scenarios where a total viewer can flow as a vector through a navigable, interactive space. Furthermore, this type of work becomes interactive when the viewer/participant is able to alter the piece and build his/her narrative that creates a unique and sensitive experience. When moving image is used to create data visualizations, we fit into a fissure in the visual landscape, which have the potential to enhance the human experience related with data reception and cognition.

Keywords

Data visualization, Moving Image, Navigable Space, Interactive Space, Sensitive Experience.

Introduction

The emergence of large volumes of data poses a major challenge for the analysis of information. The problem has transcended the collection of the same to be located in the field of selection and forms of visualization for data to make sense. This has traditionally been supported by two-dimensional fixed graphics. In the last decade, however, different people and research groups have contributed tools that allow the visualization of data with the help of interfaces that allow controlling more than two dimensions and in some cases provide the possibility of generating graphs that are modified in real time and even allow for the generation of videos that facilitate the study of this data to be realized in the 4th dimension of time.

However, in almost all cases the use of data is given as an input to generate statistical reports or analysis, without taking into account the interactive, sensitive exercise of working with the data.

Scenario and Facts

“If the interface between man and computer is an interface to computer data, and a book is an interface to the text, you can think of the cinema as an interface to facts that are developed in a space in three dimensions.” (Manovich, 2006, p.403). With this statement, which Manovich launches near the end of his book *The Language of New Media*, a different view is taken on the role of cinema beyond the twentieth century: it is a proposal that is interesting for us because it makes us think that the metaphor of cinema is not yet exhausted, but is hardly subverting the established order. From the outset, we could assume that, despite being immersed in electronic media, we continue to work with data from the territory of text. That is, although we use the computer as an interface to access computer data, it seems that this data is worked on more from the logic of the text than from the logic of cinema. Now, why should data be thought about from the logic of cinema?

The first thing we want to discover in Manovich’s statement is why cinema should be assumed as a 3-dimensional space, if it is in its essence, in its characteristic feature, two-dimensional: it just so happens to exist within a three-dimensional space. What we stop to reflect on is what we perceive, the projection of the moving image, which lacks volume. Its tri-dimensionality is, like everything related to the moving image, a mere illusion (Rivera, 2015, p.1). Manovich not only places it as a real three-dimensional space, but also puts it in conversation with some “facts” that happen there.

Let us then ask ourselves, what are these facts? Does it refer to stage actions, which respond to a script that is predetermined by a director? In the context of Manovich, we could deduce that the facts refer to all the elements that compose a cinematographic image and add visual complexity or conceptual complexity and affect its narration.

In the section of his book on *The Forms of New Media*, Manovich identifies two main principles: 1) the database; and 2) virtual and interactive 3D space (Manovich, 2006, p.279). In this chapter, the author broadens his idea of how interactive 3D spaces are ideal scenarios for navigating a database. Manovich's interest in this exploration focuses on how databases have generated a tension between narration and description, of which he makes an extensive analysis. He makes reference to Vertov, the great Russian filmmaker founder of film language, who states: "Vertov is able to achieve something that designers and artists of the new media still have to learn: how to integrate the database and narration in a new way" (Manovich, 2006, 311).

The database is a fundamental pillar of the new media for Manovich, to the point that it studies it as a new cultural form, a new way of structuring the experience of ourselves and the world (Manovich, 2006, 284). However, lonely, without intervention, it does not allow further progress: "the database can admit the narration, but there is nothing in the very logic of the medium that encourages the creation of a story." In fact, it profusely illustrates how different types of artists, directors and filmmakers try to generate possible paths in their interactive pieces (artistic DVD's, videogames, physical installations), with the aim of achieving hyperrnarration.

At this point we could use the clues that Manovich gives us to extract a first idea: *three-dimensional space could be a form of scenario for the data of a database, which when being navigated a certain way could, in part, constitute into the facts that generate a narration.*

In this chapter about Forms, Manovich ends by recovering Augé's distinction between modernity and supermodernity. If we did a correspondence of theoretical categories, these would look like this:

- Modernity | "Supermodernity";
- Narration | Database, hypermedia and network;
- Target space | Navigable space;
- Static architecture | «Liquid architecture»; and
- Geometry and topology as theoretical models for cultural and social analysis | Trajectory, vector and flow (Manovich, 2006, p.356).

According to what is discussed to arrive at the first idea, this table allows us to generate a second idea: *navigable spaces, based on liquid architecture and constructed from databases, allow trajectories as vectors that generate hypermedia narratives.*

From Cyber-ecology and Interactive Spaces to Immersion

We will now investigate the possibilities within these navigable spaces. The first approximation that we will do comes from the ecology, but understood from the perspective of artists.

Already by the end of the 60's, there was an important consciousness related to ecology among artists in the United States. "Ecology is defined as the totality or pattern of relations between organisms and their environment. Thus the act of creation for the new artist is not so much the invention of new objects as the revelation of previously unrecognized relationships between existing phenomena, both physical and metaphysical" (Youngblood, 1970, p. 346).

Youngblood documented the evolution of the cinema and the new forms of cinema of the time in his book *Expanded Cinema*. Within this compilation he dedicated a complete chapter to "The artist as an ecologist", and he shaped some concepts with the ideas that we have already developed. In this regard, we want to highlight this fragment of the creation manifesto of the Intermediate Systemas Corporation group during the 1960s: "Meaning is communicated not by coding ideas into abstract literary language, but by creating an emotionally real experience through the use of audio visual technology. Originally conceived in the realm of art rather than in science or engineering, the principles on which intermedia is based are grounded in the fields of psychology, information theory, and communication engineering."

Here we get a new input: we can construct interactive spaces to visualize data, but especially focusing on creating a "true emotional experience". At this point it is worth asking: when we navigate the graphs of a database in Excel, or when we interact with complex information systems that show us data, or even when we visualize sets of data in multiple dimensions, are we living true emotional experiences? For the Intermedia group, the scenario was clear: "The term "light show" must now be expanded virtually to include the aurora borealis, since hemispherical lumia displays are possible in the creation of artificial plasma clouds in space (see color plates), the launching of rockets to generate atmospherical events, or urban environmental generators such as Nicholas Schöffer's monumental Cybernetic Light Tower, which transforms the skies of Paris into panoramic fantasias of color."

But as the great world of entertainment evolved, another underworld emerged: that of virtual reality and its metaphor of the world condensed into a computer-helmet. It is when “subjectivization in digital media” occurs and we explore *immersion*, that singular mode “in which the subject ‘enters’ or ‘dips’ into the images and virtual sounds generated by the computer.” (Machado, 2009, p. 147). Machado identifies how to live within the images is perhaps the greatest dream of the whole cinematic adventure (Machado, 2009, p. 148) and shows how assemblies were made in the 18th century and experiences were designed to finally arrive at this.

Total Cinema and Cinematic Experiences

Barjavel, even before Bazin, had anticipated these technologies and had referred them as, those in which the images would come with smells and the characters would leave the screens and the darkness of the rooms to walk around our houses, achieving the perfect state, *total cinema* (La Ferla, 2009, p.44). However, total cinema is only realized in the total immobility of the spectator. Only in this way can you guarantee your total concentration in the dark room, so that you can see the moving images of reality that are projected as intended on a vast screen, planned, assembled and displayed. But if a total spectator arises (La Ferla, 2009, p 124), that is able to move, to look around, to think the images, to feel them, to reflect on them, to touch them, to react because of them and to interact with other total spectators like him/her, then we are no longer in the cinema, much less in the total cinema.

It is when the concept of cinematic experiences is configured, in which the digitally produced moving image far exceeds the concept of traditional cinema (Rivera, 2013, p.2), which leads us to develop a third idea, which we will concatenate with the previous two:

The total spectator is the one who can flow as a vector through a navigable, interactive space, and alter it to construct his own unique and sensitive experience and his own narration.

Total Spectator

Let us now assume that navigable space is constructed from data coming from a database. Under that premise, what could a total viewer do with the data presented to him/her? He/she could only navigate the data, or in Manovich’s words, “instead of thinking about the games in terms of narration and description it might be better if

we did so in terms of narrative actions and exploration.” (Manovich, 2016). That is to say, the total viewer would be ready to carry out *narrative actions*, which could be translated as generating unique, non-predetermined relations between two or more data of the underlying database.

Returning to the cinematic image, let us now imagine a three-dimensional space to which we have access, where an innumerable quantity of data floats and is part of a logical structure (for example, the results of a field investigation that included nutritional, ophthalmological, social, photographic, visual, literary and genetic data, among others were collected in the same indigenous community in a same period of time). We are navigating this data, which as we have said is offered from a database and suddenly we see an image floating in the air that strikes us, a genetic result that is interesting and a variable age that is disturbing. What would happen if at that very moment, by mere investigative curiosity, but also mediated by the sensitive experience that we are living in the midst of the data, we as total spectators take a *narrative action* and find relationships that might unite the data? If the result of the relation does not satisfy us, we would be able to modify the algorithm that generates the parametric relation between data in real time. In this scenario we would also be subverting the hypermedia narrative, which has predetermined a path, which we will not follow. This seems to be the scenario that we could point to, to generate a new relationship with the data from the sensitive experience.

The Ordering of Data and Multi-agents

Finally, we have to ask ourselves about the nature of the ordering of the data. In the scenario we have discussed above, what would happen if data were presented in an autonomous way, regardless of the creator and that this data environment interacted to the stimuli that we as total viewers are sending?

The application of the theory of multi-agent systems, where there are reactive, proactive and social agents, would open another wide spectrum to the visualization of data in the midst of immersive experiences based on the sensitive experience of the total viewer. In some ways, these agents act as living beings: they recognize, group, divide tasks and can recombine their activity according to how they want to respond to external stimuli. A multi-agent system resembles, for example, an anthill, a colony of bees or flocking birds. While

the concept of mutation or evolution, or reproduction is still debatable in these systems, its functioning is that of living being(s). Through artificial intelligence, generative algorithms of a multi-agent system can, for example, simulate the behavior of a guide (a bot) that takes us through the data maremagnum and suggests data to relate to.

The day that this happens will be the day that we can state, as Youngblood did in the 70's: "The limits of our language mean the limits of our world. A new meaning is equivalent to a new word. A new word is the beginning of a new language. A new language is the seed of a new world. We are making a new world by making new language" (Youngblood, 1970, p. 419). A language spoken by machines and people, in interactive environments, where the freedom to flow corresponds to the possibility of generating relationships. That is the result of the digitally produced moving image based on the display of data that exists with its own logics.

Conclusion

We have highlighted some ways in which the field of data visualization might find fertile ground in cinematic experiences and expand to provide emotional and interactive experiences. The hypothesis explored in this article is a speculative armature about how moving image can impact and enrich data visualizations, to enhance the human experience related with data reception and cognition.

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Author Biography

Ricardo Rivera is an independent researcher from Colombia, South America. He has graduate studies of Social Communication from Universidad Javeriana and postgraduates studies in Digital Video from MECAD Barcelona, University of Cordoba Argentina and Universidad de Caldas, and a Master degree in Design and Interactive Creation from Universidad de Caldas. Rivera is focusing right now on the research of how digital moving image affects the nature of the cinema and the nature of data visualization. His main interest on make cinema using digital technologies has been turned on in a theoretic interest about how to produce continuous image, how to make interactive narratives and how to understand the digital moving image as a new kind of image. Rivera belongs the Roster of Experts in Electronic Government form PNUD in the areas of Data Visualization and Information Architecture.