

Maria Giulia Dondero\*

# Visual semiotics and automatic analysis of images from the Cultural Analytics Lab: How can quantitative and qualitative analysis be combined?

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**Abstract:** In this article we explore the relationship between semiotic analysis of images and quantitative analysis of vast image corpora, in particular the work produced by Lev Manovich and the Cultural Analytics Lab, called “Media Visualization.” Media Visualization has been chosen as corpus because of its metavisual operation (images are visualized and analyzed by images) and its innovating way of conceiving analysis: by visual instruments. In this paper semiotics is used as an approach to Media Visualization and taken as an object of study as well, especially visual semiotics. In this sense, a comparison between visual semiotics (close reading of small corpora) and quantitative analyses of images (distant reading of vast collections) are conducted from a semiotic point of view. Post-Greimassian semiotics guides this study with respect to the issue of the image-within-an-image and metavisual visualization; Peircean semiotics is employed to explain and develop the notion of diagram.

**Keywords:** visual semiotics, big data, media visualization, quantitative analysis, diagram, metavisual

## 1 Introduction

In this article we intend to explore the relationship between semiotic analysis of images and quantitative analysis of vast image corpora, in particular the work produced by Lev Manovich and the Cultural Analytics Lab in this field since the beginning of the century. The work of Manovich and his team is of great interest to semiotics because these researchers are conducting diachronic analyses on vast collections of images (pictorial and photographic images in particular) by means of their visualizations (Media Visualization).

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**\*Corresponding author: Maria Giulia Dondero**, Langues et Littératures Françaises et Romanes, University of Liège/ National Fund for Scientific Research, 3–5 Place Cockerill, Liège, Wallonie, Belgium, E-mail: [mariagiulia.dondero@uliege.be](mailto:mariagiulia.dondero@uliege.be)  
<https://orcid.org/0000-0003-2320-8130>

In this paper semiotics will be used as an approach to Media Visualization and taken as an object of study as well. In this sense, a comparison between visual semiotics (close reading of small corpora) and quantitative analyses of images (distant reading of vast collections) will be conducted from a semiotic point of view. Post-Greimassian semiotics will guide this study with respect to the issue of the image-within-an-image and metavisual visualization; Peircean semiotics will be employed for specific objectives, especially to explain the notion of diagram.

As far as Media Visualization is concerned, analyses of corpora are obtained by computational and statistical means, yielding what we will term a “visual analysis,” meaning an analysis obtained by classifying and distributing images (dividing them) according to their metadata or plastic features (hue, saturation, etc.) within an aggregate visualization. This aggregate visualization can be one of two types: a montage (Figure 1) or what we call a “diagram of images” (Figure 2).

The metavisual aspect of Manovich’s approach is immediately obvious: Manovich produces image visualizations that are also intended as analyses. The aggregate image (the whole) analyzes the image corpus (the parts) through the two discursive strategies just mentioned: montages and diagrams of images.<sup>1</sup> Media Visualization has been chosen as corpus of this study because of two reasons: its metavisual operation and its innovating way of conceiving analysis: by visual instruments.

After describing Media Visualization devices, montage and diagram of images, we’ll address the comparison between visual semiotics and quantitative approach to images.

## 1.1 Montages

In the first type of visualization (the montage), the aggregate image incorporates the entire image corpus and arranges it according to standard metadata (date of production, author’s name, etc.). The result of this is a visualization of images; it is a framing operation depicting multiple frames. This is a metavisual operation very similar to the one examined (in the field of qualitative methods) by art historian Victor Stoichita in his seminal work *L’instauration du tableau* [The Self-Aware Image].<sup>2</sup> Just as in the early modern paintings Stoichita studied, Manovich places frames inside of frames in his montages of large image corpora,

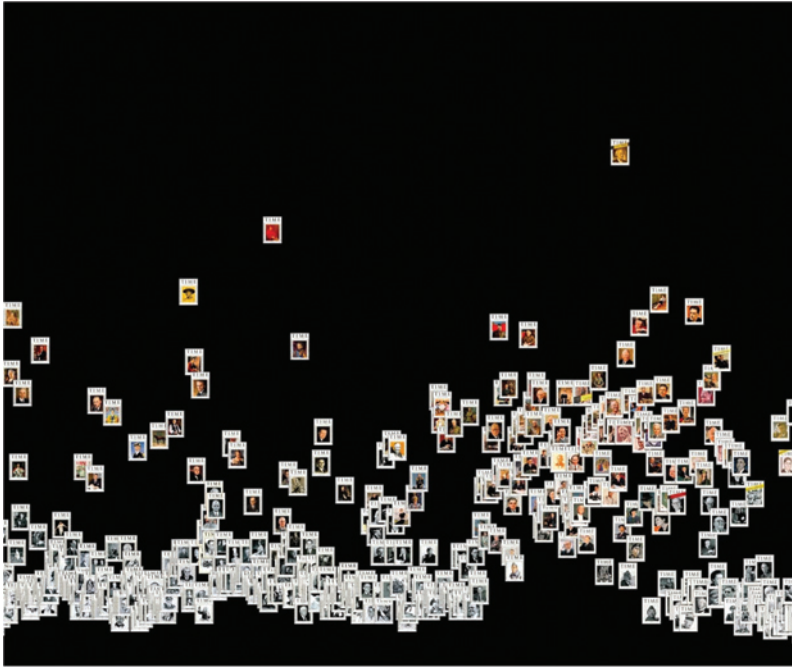
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<sup>1</sup> For a mereological approach to Manovich’s methodology, see Dondero (2017).

<sup>2</sup> See Stoichita (1997). For a new reading of this book and transference of metapictorial devices to contemporary scientific images, see Dondero (2016a).



**Figure 1:** Example of a montage. 4535 *Times Magazine* Covers (1923–2009), Manovich and Douglass (2009). ©All work by Lev Manovich and his team is available under Creative Commons Attribution-NonCommercial-ShareAlike license (CC BY-NC-SA). (<http://lab.culturalanalytics.info>)



**Figure 2:** Example of diagram of images. Close up of 4535 *Times Magazine* Covers (1923–2009) organized by X axis (date of publication) and Y axis (a combination of brightness and color saturation measurements of the cover images).

which constitutes a duplication of the focalization operation (a typical element of any visual enunciation) using the *frame-within-a-frame* device. In the case of the montages, an analysis is made possible by the emergence of patterns. As Manovich states, by studying patterns, one can make hypotheses about trends such as the development of artistic movements, or the characteristics of styles in cinematography. For example, by visualizing the complete works of an artist, one can understand how certain works emerged from others; by visualizing the works of different artists, one can understand the cases where deviations from the norms occurred. In Manovich's work, one can readily see that by analyzing patterns, it is possible not just to follow the general trends, but also to discern the singularities: anything that shows up as exceptional on an overview of a corpus. In fact, the collection montage allows us to see subtle historical changes occurring gradually over tens of thousands of images, find which images are typical and which are unique, and understand the patterns of similarity and difference between multiple sets of images of any size.

In short, the study of patterns according to Manovich informs us *about general trends, but also tells us how a singularity appeared* at a particular time, thus providing impetus to the project of reconstructing an *archaeology of culture* through computational and visual methods (Manovich and Douglass 2009).

## 1.2 Diagram of images

In the second type of visualization we will consider (the “diagram of images”), the metavisual aspect is more central; rather than the frame-within-a-frame, it concerns the issue of metadata. Metadata are usually used to classify and arrange the data of a collection into a graph. In Manovich’s diagrams of images, it is not so much a matter of using standard metadata to arrange the images, as was done in the montage (the date was used), but of using visual descriptors. Visual descriptors are more appropriate than metadata to describe the plastic language of the image (e.g. color data, formal and topological characteristics).<sup>3</sup> These descriptors are thus not concerned with the *contextual information* the analyst normally “adds” to the image to situate it within the collection; they are features unique to the image’s plane of expression, such as saturation, brightness, morphology, types of lines, angles, and so on. These features are not *added* to the image collection, but *extracted* from it.

From this succinct introduction, we can already see the significance of Manovich’s work, particularly the benefits to be had from a semiotic approach to his work: Manovich conducts analyses through his visualizations by using computational and statistical tools that use the features of the planes of expression of thousands of images as their cornerstone. Contrary to what one might initially think, this analysis of the plane of expression *can* be applied to analyses of content; the Russian art historian and computer scientist Manovich does this kind of analysis to resolve problems of classification in art history, to validate or invalidate a theory about the transition from one pictorial style to another (Manovich 2011), to compare political cultures (Manovich and Douglass 2009), or to reinterpret current events (Manovich et al. 2014).

We will present and discuss montages and diagrams of images in more detail by examining them to see how Manovich handled the quantitative/qualitative balance and how semiotics can make use of this work to tackle the question of the genealogy of images, or diachronic analysis – which can be understood from various perspectives, like genre, citation and others.

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<sup>3</sup> In this sense, Manovich is using the plastic categories identified by Greimas (1984) as visual descriptors.

## 2 Qualitative and quantitative aspects of Manovich's Media Visualization

From the time he started working on databases and automatic image analysis (Manovich 2001), Manovich began asking fundamental questions on the relationship between qualitative and quantitative analysis. Media Visualization is a tool for visualizing massive datasets; its distinguishing feature is to visualize the corpus in its entirety. The difference – and the exceptional aspect – in this approach relative to a traditional data visualization (infographics) is that Media Visualization does not produce graphs in which the data are subjected to processes of reduction and abstraction. In an article where Manovich draws a distinction between the Digital Humanities and Media Visualization (Manovich 2013), he explains that in the Digital Humanities, particularly in Computer Graphics, the images and all manner of image corpora, collections, and archives undergo a process of *disembodiment* in order to be visualized, resulting in a loss of ability to visualize the original corpus. According to Manovich, infographics techniques involve some reduction of the corpus in order to reveal patterns; the price of this reduction is not just a loss of visibility and discovery (of *new* patterns), but also, opacity is created, as the *media artifacts* with all their aesthetic richness and detail are far removed from the abstract points, rectangles, lines, and curves that replace them in infographics. While standard information visualization translates pictures into data and then data into visualizations, Media Visualization translates pictures into pictures, and so it contrasts with the usual methods of information visualization, which can only show *information about* the collection, and not the collection itself. New patterns can be revealed effectively by visualizations that show the whole image collection. The advantage of visualizing the entire collection and the structure of its component parts is that it combines a distant overview of the collection with the insights of every artifact.

To explain this combination of close reading and distant reading achieved in Media Visualization, Manovich uses the case studies in the *Mapping the Republic of Letters* project, which successfully use visualization to examine patterns in correspondence between European Enlightenment thinkers. But he proposes a visualization technique that would show all the Enlightenment letters directly, rather than just information about dates, authors and places – so that we can read any parts of these letters and also see large-scale patterns at the same time. He is convinced that only Media Visualization can combine microscopic and telescopic vision, close reading and distant reading – “reading” the actual artifacts and “reading” larger patterns abstracted from very large sets of these artifacts.

With his mappings of corpora, Manovich succeeds in visualizing *the structure* of the data that make up the collection, meaning *the relations* interwoven into the data, but he also shows the data in their complete form as *material artifacts*. In a nutshell, his methodology reveals the structure formed by the elements *and* the constituent elements themselves. This makes it easy to check the relations between the structure and the elements, because all the elements – the images involved in the analysis – are present, and so is their analysis. However, in infographics, the traditional ways of visualizing data transform a corpus into data, making it difficult to judge the relevance and validity of the visualization and the structure it forms, since the corpus has been transformed, translated, and transposed into digital data.

The impossibility of checking the original corpus from within the resulting visualization raises questions about the visualization’s arbitrariness, and consequently about how to verify the analysis it proposes.

I agree with Festi’s (2019) observation on the arbitrariness of infographics strategies as opposed to scientific analysis: “arbitrariness distinguishes [infographics] from other scientific images that are first and foremost motivated by the mode of production of a specific device, *causing some traces to be maintained in the final picture*” (emphasis added). The idea that traces are maintained through different stages of scientific experiments comes from Latour’s theory of scientific work (1999; see Dondero and Fontanille 2014) as a chain of mediators. In this chain, every act of investigation and every measure are considered as mediators that can be falsified by other mediators. The correctness of the chain depends on the commensurability of the mediators.

As Manovich has stated in various works, in contrast to scientific visualizations, infographic layers are not really modular: unlike the chain of mediators, they cannot be decomposed or split into exportable parts, so they do not feed into any kind of scientific tracing activity/process. In Manovich’s work one does not find the arbitrariness that is typical in infographics: there is a significant *constraint* between the corpus and the visualization parameters selected for its analysis, and a significant constraint between the corpus and the design<sup>4</sup> of the visualization.

The experimental approach is also a mark of the scientific exploration Manovich conducts *via* his corpus visualizations. Multiple visualizations, especially diagrams of images, can be produced from the same corpus. Different visualizations make it possible to “leverage” the corpus, because they present

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4 “Design” must be understood here as the *mise en discours* chosen to present and highlight the relations between the images composing the corpus. Every type of presentation of data emphasizes a motivated way of seeing data.

multiple experiments on the same corpus, each of which *corresponds to the parameters selected as pertinent*. What allows us to assert that Manovich's process is indeed scientific, with more validity than a purely statistical approach, is the fact that the number of combinations of analytical parameters allows us to perform *cross-verifications* – whereas cross-verification has no place in infographics. What's more, the number of parameters used by Manovich to frame and exploit the corpus can be even greater than the number of images in the corpus, yielding a multifaceted and exhaustive comprehension of it. On this point Manovich notes that:

So while, for example, Vincent van Gogh only created about 900 paintings, these paintings can be described on thousands of separate dimensions ... In other words, instead of *long data* we can have *wide data*—very large and potentially *endless number of variables describing a set of cases*. Note that if we have more variables than cases, such representation would go against the common sense of both social science and data science. The latter refers to the process of making a large number of variables more manageable as *dimension reduction*. But for us “wide data” offers an opportunity to rethink fundamental assumptions about what is society and how to study it ... The goal of such “wide data analysis” [... will be to] help us question our common sense view of things, where certain dimensions are taken for granted. (Manovich 2017: 13, emphasis added)

Combining multiple analytic visualizations (that function as “tests”) is the same process Charles Sanders Peirce identified as characteristic of diagrammatic visualization (1931–1958). Diagrammatic visualization is said to lead to an expansion of knowledge when the tests achieve *commensurability*, finally creating a configuration – a “shape” – which stabilizes the phenomenon in question (Chauviré 2008; Stjernfelt 2007). The “wide data” strategy makes it possible not only to compare and combine visualizations from the same corpus, but also, according to Manovich, to go back to the *origins of cultural norms* that have stabilized (certain parameters of artistic judgment, for example), and from there to understand how a style or a work of art emerged from other styles or works.

Thinking about the relation between quantitative and qualitative analysis, we can see that one of the goals of this sort of quantitative analysis is to fine-tune our perceptual and classification categories, which were stabilized via traditional art history methods – a purely “qualitative” goal, if we may say so. Moreover, it is clear, as Manovich points out, that “hundreds of plastic features and parameters are combined together in the hope of creating a unique “signature” for every image” (Manovich 2013). While qualitative analysis, and especially visual semiotic analysis, aspires to describe and explain the workings of this unique signature that each image represents, we must not forget that Manovich's analysis targets the emergence of this signature from within a study

collection where a very large number of images has been selected, with which this unique image shares some relation (chronological, auctorial, stylistic, or other). What distinguishes Manovich's work from that of semiotics is that it is *the connection to the other images* that makes it possible to characterize an image's singularity and specificity.

To conclude this point, we can see that using cross-parameterization to analyze the same corpus from many angles is a strategy that can ultimately produce a *qualitative characterization* of the images in the study collection. The quantitative method has proven useful for studying the unique and singular text, providing multiple characterizations by recombining analytical results – which are in fact obtainable only by computational and statistical strategies. In a word, with Manovich's method one can obtain *qualitatively relevant results* through variations on the repetition of *quantitative experiments*.

## 2.1 Case 1: Time Magazine Covers (1923–2009)

Although I have studied art image corpora in other articles (Dondero 2016a, Dondero 2017), I want to discuss other kinds of corpora here, including advertising images (*Time Magazine* Covers) and images from coverage of current events (to be specific, the photographs shared on Instagram during the 2014 Maidan revolution in Kiev). These two corpora can provide a way to revisit the workings of the image montage (the *Time Magazine* covers) in greater detail, along with its analytical strategies for examining patterns, and also review how diagrams of images work (the photos from Kiev) and the process of cross-verification.

The montage of *Time Magazine* Covers (1923–2009) is a very good example to show the usefulness of distant viewing (Figure 1).

This image montage depicts 4535 *Time Magazine* covers, so that the viewer can see the design and style changes occurring over the seven decades of the corpus.

The ordering rule has been obtained from standard metadata: by year and by order of appearance in the sequence of the publication. The syntax is typical of verbal texts, which are arranged in lines to be read from left to right and from top to bottom.

This montage, which shows us the work of a publisher “from a distance,” offers a very different perspective from that of the designers themselves or of the audience of their time. The montage gives us the ability to see the totality of a publisher's cover art *all at once*, thereby contextualizing all the *gradual* variations that were introduced, whereas the designers' vision at the time was necessarily limited, and focused on each unique work. As Basso Fossali has observed

(personal communication), the artist's or designer's attention is always focused on strategies of *language* and *form*, whereas in statistical visualizations of complete collections, what is presented is an overview of the *material substance* of the work – which reveals a program or progression that the artists/designers may have followed unconsciously. Statistical visualizations can show us tendencies that were not necessarily mastered in advance by the producers, which are visible only from a comprehensive and distant perspective of their entire works. In some ways, the choices are *revealed after the fact*, when one is confronted with his artwork as a holistic entity that has taken (another) form over time.

We can also zoom in and obtain a view of a short period, namely, a micro-view, which is still always in relation with the patterns that emerge over the long term (Figure 3).



Figure 3: Close-up of Figure 1.

It should be reiterated that the montage does not produce stabilized aggregates that are set in stone, since the observer can perform actions on the images, and go back to the visualization's source documents. This means that the mode of existence of the corpus images comprised in the visualization can shift (between

actualization, realization, virtualization, and potentialization).<sup>5</sup> This means that there can be times of instability in the relation between local (the images as parts) and global (the montage). The original images comprising the collection can be observed in detail by zooming in; when this is done, the montage becomes *potentialized* in a sense. However, once one views the collection as a montage, thereby *actualizing* the whole, then patterns take shape within this whole and a shift occurs in the interactions between the modes of existence: the shapes of the patterns (say, a curve, a peak, a concentration, a sudden variation in density, etc.) *overshadow* the images of the corpus. The pattern shapes are integrative with respect to the original parts; they emerge and become *realized*, while the original images are *virtualized*.

One might say that in the montage there is an initial whole entity formed by the chronology of the collection, and at the same time, there are parts (the individual images of the collection) composing the montage that are still accessible and explorable. What spans this whole entity and its parts are the patterns, in fact, which build a new whole entity, namely, a new shape which, according to Manovich, enables us to discover something new compared to the understanding we can gain from each part of the collection seen separately.<sup>6</sup>

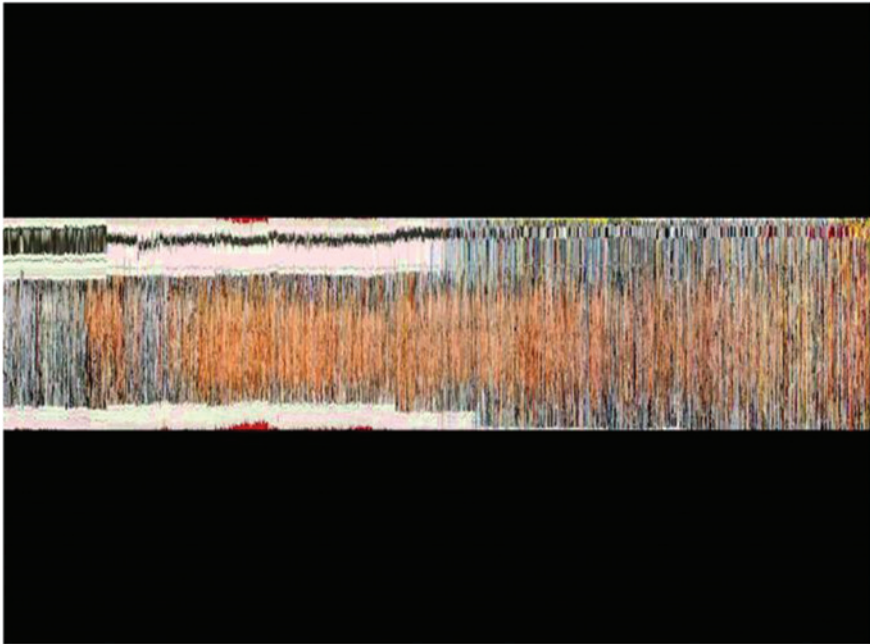
In addition, the same images in the collection can be visualized in different ways, for instance, in slices (Figure 4; “slice visualization” is Manovich’s term for this). Each cover is represented by a single vertical line drawn through its center.

In other visualizations (Figure 5) where the image corpus is classified and grouped by brightness and saturation parameters, we can readily see that the *visualization coincides with the analysis*, namely, with operations carried out on the corpus: *division*, *classification*, and *grouping/clustering*. These are what we call diagrams of images.

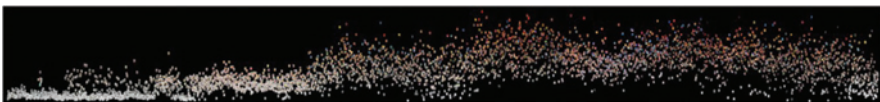
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5 In Greimassian semiotics actualization, realization, virtualization, and potentialization are called “modes of existence.” They deal with “presence gradients” on a scale between system and performance. Actualization concerns the process of commitment to action, realization the implementation of action, potentialization a process of delaying some significations that can be thereafter virtualized and become systematic. In the present case, modes of existence affect regulation of vision and presence gradients of singular images (local view) within the aggregate image (global view). Modes of existence are useful to describe the various *foci* of visualizations: on the particular, on the whole, on the patterns that are transverse, etc. The process of potentialization highlights the fact that every type of focus is a strategy of hiding as well.

6 For more on the emergence of shapes as a grounds for expanding knowledge in mathematics and art, see: Batt (2004), Chauviré (2008), Dondero (2012), Giardino and Piazza (2008).



**Figure 4:** Slice Visualization. Slice of 4,535 covers of *Times magazine* organized by publication date (from 1923 to 2009, left to right; Manovich and Douglass 2009). Every one-pixel wide vertical column is a sampled from a corresponding cover.



**Figure 5:** 4535 *Times Magazine* Covers (1923–2009) organized by X axis (date of publication) and Y axis (a combination of brightness and color saturation measurements of the cover images). For a close-up, see Figure 2.

While the montages sequence the images by metadata (the date), the diagrams of images use plastic parameters to classify and group the corpus, which already constitutes an analysis process (division). Thus we can hypothesize that these cluster visualizations are metavisual in the sense that the image corpus is arranged on axes (abscissa and ordinate) according to visual parameters that are not dependent on standard metadata.

The idea that visualization can analyze images is not new; Warburg had already visualized groups of images in the *Mnemosyne Atlas* (Warburg 2000) to

gain a better understanding of their mutual relations, their kinship, and their genealogy. But although the idea is not new, and although images have already been studied as a means of analysis, there is something innovative in Manovich's work, which is that *visualization of images coincides with a quantitative analysis* arrived at by statistical and computational means on *vast corpora* that are difficult to study "manually" by close reading.

The close-ups (Figure 2) of these diagrams show clearly what can be gleaned from analysis using mereological operations of division, grouping/clustering, superposition, etc., computed through spatial types of classifications.

The images that share the same features are visualized in the same areas of the diagram; the ones that don't share those features are located in opposite areas of the diagram. This is another reason we call these types of visualizations "diagrams of images": they are not just experiments designed to produce a signature of the image, but in addition, by generating multiple visualizations one can draw the image corpus into a network of relations. The position of each image within a group offers a precise characterization of its relatively unique qualities, and places it in relation to the qualities of other groups. The whole arrangement is governed by horizontal and vertical axes quantifying the intensity of each parameter studied in each image of the collection.

This type of analysis allows us to study images *through* their plastic characteristics, namely, their color, eidetic, and topological categories. During the analysis, the image is in some sense *broken down into its qualities*, which are all *separated* from one another in the digital environment. In fact, digital or digitized images cannot be considered as *stabilized products*; they must be viewed as *areas/spaces* for manipulating the plastic *variables* that compose them. These variables have an autonomous existence, which enables us to "blow apart" the image, so to speak, into its plastic components and analyze it by parameters such as saturation or brightness, parameters which can be manipulated separately for each image in the study.

In the diagrams of images, the collection is arranged, as described previously, not exclusively by the metadata, but by using what computer scientists call "plastic characteristics" *extracted from the images themselves* (known as feature extraction; Nixon and Aguado 2012). The value of extracting plastic qualities can be understood in these terms:

a digital image consists of a number of *separate* layers, each layer containing particular visual elements ... Throughout the production process, artists and designers *manipulate* each layer separately; they also delete layers and add new ones. Keeping each element as a separate layer allows the content and the composition of an image to be changed at any point. (Manovich 2001: 202, emphasis added)

The same manipulation can also be done by an analyst breaking down the image into its plastic characteristics in order to compare it with the rest of the study collection, using the same parameter. As Manovich explains in many of his studies (Manovich 2013, Manovich 2015), traditional indexation strategies using metadata *add* external features to the images, whereas *extracting* plastic characteristics from the images is a process that remains true to the composition of the images themselves, without resorting to verbal descriptors of the image's features. This is what allows us to say that diagrams of images can be rightly understood as metavisual analyses.

## 2.2 Case 2: “144 hours in Kiev”

Now we move on to the corpus of news coverage images, that is, the visualizations created by Manovich and his team to analyze the corpus of photographs shared on Instagram during the February 2014 revolution in Kiev, known as the Maidan Revolution.

In their article “The Exceptional and the Everyday: 144 Hours in Kiev,” Manovich and his colleagues in art history and computer science (Manovich et al. 2014) note two fundamental characteristics of historical journalism: (1) the events are presented from a distant view and (2) this view of the events is usually assembled and interpreted by a single scholar. What our authors propose is to separate themselves from this approach and instead use social media sites such as Instagram so as to present and compare many thousands of individual experiences of these events. In some ways, they are offering a *distant view of individual views*, in other words, a distant view of what was unique to each personal experience. This is also a way of *combining* distant viewing with close viewing. There is a second advantage in their approach, as well: it makes it possible to show the contrast between representations of exceptional events and representations of daily life, something that is not assured in coverage by a single journalist or researcher.

In order to collect all of the photographs shared on Instagram during the Maidan Revolution, Manovich and his colleagues used the Instagram API, namely, a set of software libraries, as data access tools. They collected 13,208 geo-coded images shared by 6165 Instagram users in the central part of Kiev spanning February 17–22, 2014. They used their own custom software tools to analyze the images along with upload dates and times, geolocations, and tags, and visualize them in different ways.

The images had been tagged with 5845 single tags. In order to reveal the unique character of these days of the revolution, the researchers also downloaded images from normal time periods, from February 24 to mid-May 2014.

In their article, they explain that the information on Kiev's Maidan Revolution reported by the international media usually showed only what was happening on Independence Square, whereas the authors chose the whole downtown area as the relevant locus for their investigation; this includes Independence Square, naturally, but does not exclude other streets and squares. For that matter, the photos of the events themselves (car and building fires, for instance, and the protest demonstrations) are accompanied by photos of normal moments and places from daily life (selfies and parties, in particular), which explains the project's title, *The Exceptional and the Everyday*. The presence of the photos unrelated to the events convinced the investigators of the value of this project, with the hope of being able to chronicle, with the photos and experiences of thousands of Instagram users, how the everyday and the exceptional can coexist.

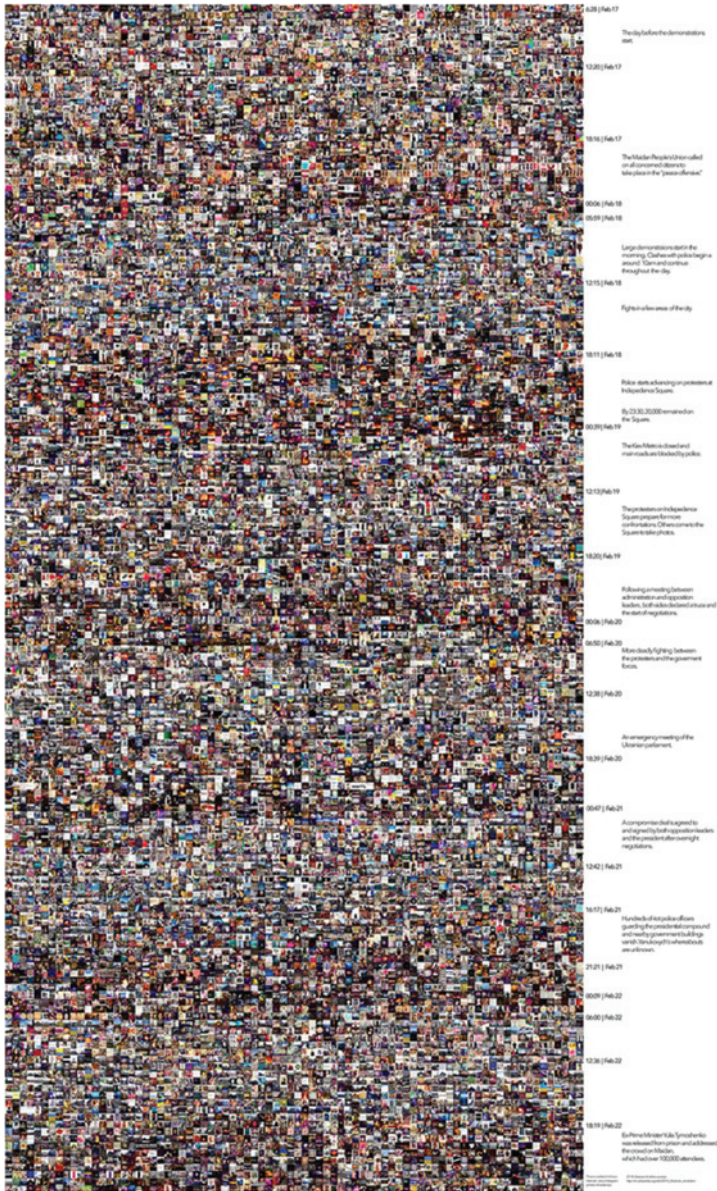
The montage of all the photos reveals six "waves" of alternation between photos taken at night and those taken during the day (Figure 6).

Manovich presents other visualizations of the photos that are not montages assembled by the date they were shared, but by hashtags used on Twitter, such as: #майдан, #maidan, #euromaidan, #євромайдан, #евромайдан, #euromaydan, #Euromaidan (Euromaidan is the name of the revolutionary movement).

The montage arranged by Twitter hashtags shows an interesting result, in that many images using the hashtags linked to the revolutionary movement do not show revolutionary events. According to Manovich, this should not be viewed as insignificant, given how the revolution's vision is understood. These new montages also reveal the reverse trend, namely, that many images not tagged in connection with the revolution show events on Independence Square (Figure 7).

Many photos are referenced with multiple tags, which magnifies their meaning, because they become imageable as a series. This visualization (Figure 8) shows that if an image has two tags, e.g. euromaidan in English and in Ukrainian, it is visualized twice; its signification is clearly different from an image tagged exclusively with euromaidan in Ukrainian, which is present as a single image in the overall visualization.

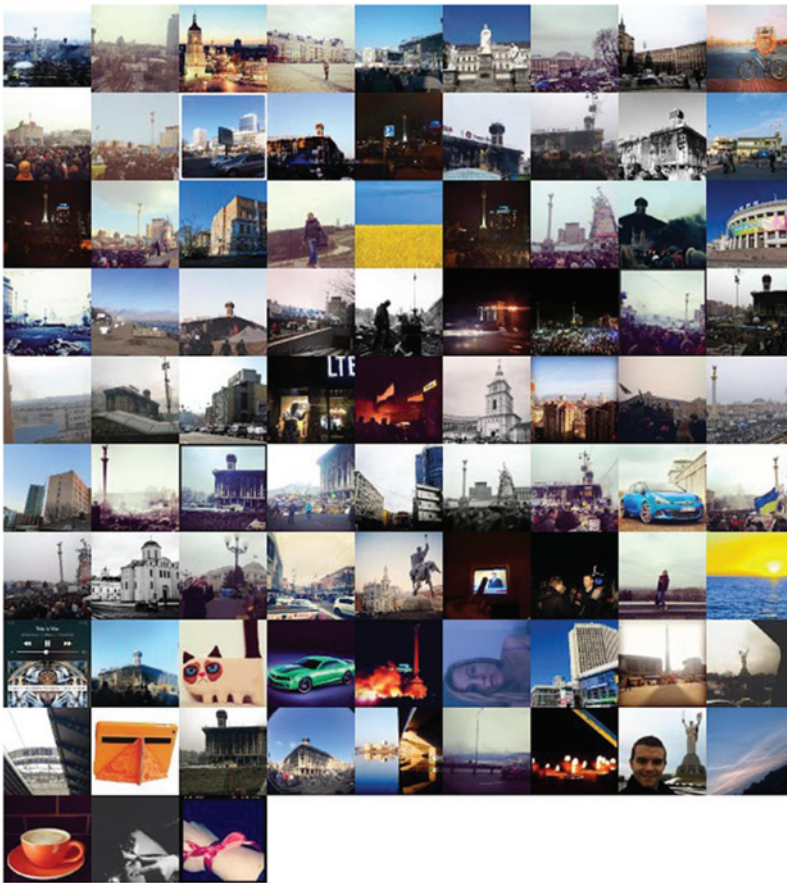
This observation raises a question: what is the reason that some images are addressed to multiple linguistic communities and other images to only one? This is where a semiotic analysis can contribute, notably in order to answer a more specific question: are there some images that are more straightforward than others, that can be more easily understood by the international community than others? How can a figurative and plastic analysis explain this difference between images that have local impact (in the Ukraine) and images with a global impact (addressed to the English-speaking community)?



**Figure 6:** Montage of all 13,208 images shared by 6,165 Instagram users in central part of Kyiv during February 17–22, 2014. The images are organized by shared date/time (top to bottom and left to right). A brief summary of the events of the 2014 Ukrainian Revolution is added in the right part of the figure.



Manovich and his colleagues do not restrict themselves to image visualizations using standard metadata and hashtags, though. They also produce visualizations based solely on plastic parameters, which led them to a radical rearrangement of the image archive. For example, when their software searches are targeted at cluster identification (cluster analysis), they find a group of photographs characterized by a light area and a darker area. From Figure 9 they learned that some landscape photos had been filtered, making the colors closer to those of the Ukrainian flag, and revealing that the images one might think are unrelated to the revolution are in fact related (Figure 9).



**Figure 9:** One among 60 clusters identified by cluster analysis of Manovich image set.

### 3 Montage and diagrams of images in comparison

In this article we have examined pattern-based analyses (montages) and analyses based on image distribution and clustering (diagrams) carried out by Manovich and his team. These two analytical strategies – the montage and the diagram – are implemented using visual means, in that the classification parameters, especially in diagram of images, are plastic and the results of these classifications are visualizations. Diagrams open up the possibility that new combinations, differences, and unprecedented relationships between images of the same collection may be discovered, as Peirce's theory of diagrammatic logic predicts. In the overviews of these montages, other shapes appear than those formed by the frames of the images in the collection. These other shapes are created by the patterns, and they provide a *view through and across* the montage and its constituent parts; in effect, these shapes constitute a new dimension transverse to/intersecting the montage and the images. In the example here, the analysis is conducted via an operation of division followed by a process of recomposition that gradually filters in among the images/parts of the collection. These transverse shapes are the result of an oscillation between the general overview and the particular view – to be clearer, the image collection flips between one mode of existence and another.<sup>7</sup> This back-and-forth between generalization and particularization is what enables the transverse view provided by the patterns.

The diagram of images accomplishes the same job of analyzing the collection, but rather than creating transverse shapes, it produces clusters of images, and within the clusters, the images can be placed at varying distances, or be partly superimposed.

While cross-parameterization can successfully characterize the signature of a unique image (allowing us to specify the intensity and the extent of each plastic category contained in that image), we cannot expect to produce an analysis of the image with the intention of revealing its signification, as in the semi-symbolic analyses<sup>8</sup> produced in semiotics for the last few decades, for example. While semi-symbolism can still play some part in quantitative approaches to analyzing vast corpora, this connection between expression and content cannot be confined to a relation that occurs in one single image or a

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<sup>7</sup> For a fuller development of modes of existence in Media Visualization, see Dondero (2017).

<sup>8</sup> Semi-symbolism is a relationship between an opposition on the plane of expression and an opposition on the plane of content. For example: up vs down = celestial vs earthly. See Floch (1985, 1986).

small group of images, such as Floch's analyses show,<sup>9</sup> or Pierluigi Basso Fossali's much more advanced analyses on a corpus of photographs by Denis Roche (See Basso and Dondero 2011). Semi-symbolism in our context would be more along the lines of studying a group of images that share the same brightness and the same color saturation, on the plane of expression, along with another group that has the opposite features. Relating this to the plane of content, we would be examining oppositions based not on general categories (such as life/death or nature/culture), but on categories specific to the world of images (the genre, the type of perspective and enunciation, and others). In this sense, these visual analyses are metavisual.

## 4 Conclusions

We will conclude by reiterating the main ideas of our study: the relationship between qualitative and quantitative analysis of images and the metavisual operations carried out in Media Visualizations.

The objective of Media Visualization, especially with the diagrams, is above all to provide a map of the territory of image production for each set of images selected for analysis. This map should be seen as an extension through which it becomes possible to identify contrasting areas, opposite areas, or superposing of images on the plane of expression. Then tests should be run to see whether these oppositions reflect any figurative or generic constants on the plane of content: that is the contribution of a semiotic approach to Manovich's work. From a semiotic point of view, we can see and understand whether images that share the same characteristics on the plane of expression are more or less homogeneous on the plane of content and whether they are consistently generated by the same issues, studies and experiments. In this sense, quantitative analysis of visual categories on the plane of expression is preparatory to qualitative signification analysis. In answer to the criticisms one could make about Manovich's lack of content analysis, i.e. the critique that he confines his work to exploring quantifiable, superficial qualities of images, it seems to me that he supplies a structuralist defense. Even when Manovich wants to obtain the signature of one image, his objective is not to impose a semantic reading of the image on us, whose signification is doomed to abstraction, anyway, if the

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<sup>9</sup> Floch is one of Greimas' disciples who best highlighted the usefulness of semi-symbolic analyses, which dispense with iconology and the traditional dependence in image analysis on verbal explanations and referential resemblance.

image is isolated from its collection; instead he wants to show the place of the image in the context of a time period, a study, a corporate ad campaign, or a testimony. With this approach, we gain a diagrammatic exploration of a vast image collection where wide arrays of parameters intersect, bringing out the singularities rather than bringing about the semantic stabilization of an image. It is then the task of semiotic analysis to stabilize the meaning of an image, this image having been chosen through corpus analysis.

To that end, the type of signification one might be able to extract is part of a thought process contained entirely within the world of images, and thus part of a metavisual signification. We can conclude that Media Visualization is a metavisual device operating not only on small corpora of images, like the analyses of Stoichita (1997) and of visual semiotics (Dondero 2016b), but on vast collections of images as well.

There are at least four reasons to consider Media Visualization as a metavisual device: (1) these visualizations are images of images; (2) the parameters used to arrange them are visual; (3) the automatic distribution of the images is visualized spatially in a presentation governed by abscissas and ordinates; (4) the content analysis enabled by Media Visualization remains within the realm of images (filiation, tradition, citation, genre, etc.) and not the abstract realm of verbal description.

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