In using computer techniques and new visualization methods media pioneer Lev Manovich and his team at the Software Studies laboratory explore patterns in large visual media collections. Gloria Sutton sat down with him to discuss the implications his studies have for art and specifically photography.

interview with

Lev Manovich

by Gloria Sutton

Visualizing the Digital Universe

photograph
by Erik Jepsen

niques were in fact invented in the first part of the 19th century. So the visualization of quantified data has literally been around for 200-250 years in different areas including science and business. What occurs in the 1990s is that people first began to use desktop computers for visualizing data. It became possible to visualize large data sets because computers can process data so quickly. As artists and designers already writing their own code got involved with visualization they began experimenting with inventing new visualization techniques. The result is a new range of expressive and rich ways to visualize information.

Like net art or software art, will we begin to see the institutionalization of artistic visualization as a category for exhibitions, collections and academic programs?

I've been tracking these developments and thinking about this new emerging practice. In fact, back in 2002, I wrote the very first article examining the emerging practice of artistic visualization. In that article I drew connections between the new practice and Romantic art (the idea of the sublime) as well as modernist abstraction. But now I consider another key development of the 2000s. In 2005 we witnessed an explosion of social media: *Flickr, YouTube, MySpace*, and so on. In the summer of 2005 it became possible to include images and video into blogs and suddenly the universe of born digital content exploded in size. So I thought: can we combine this availability of massive amounts of cultural content with the visualization techniques already developed by artists, designers, and scientists? Doing so would allow us to start teaching, researching and exhibiting visual culture in new ways.

Because of my own background in art and Visual and Cultural Studies, I was particularly interested to see if visualization could offer a new paradigm for the study of visual culture more broadly defined. I started to actively pursue this research model and in 2007 we developed the Software Studies laboratory at UC San Diego. We refer to our research and related work by other labs as *cultural analytics*. The idea is to use computer techniques and new visualization methods to explore patterns in visual media collections

After being trained in art, architecture and programming in Moscow, you came to New York in 1981. From 1984, you have consistently worked at the nexus of digital media and visual art as an artist, theorist, computer animator, designer, and programmer. Since 1996 you have been based at University of California San Diego as a professor in the Department of Visual Art where your research helped to establish the theoretical groundwork for the new paradigm in digital humanities that you call *cultural analytics* – applying computer-based techniques for quantitative analysis already employed in the sciences and also the techniques of media art to analyze massive visual data sets. Can you give us a schematic overview of how we arrive at cultural analytics as a new field of study and its implications for contemporary art and photography more specifically?

In the late 1990s artists and designers already working with computers became interested in this new emerging area called information visualization or *infovis*. Infovis uses computers to create visual representations of large data sets. It continues the long tradition of visualizing quantified data. Think of the common types of statistical graphs – bar graphs, scatter plots, and line graphs – that we encounter every day. Most graphing tech-

4535 Time magazine covers, 1923-2009
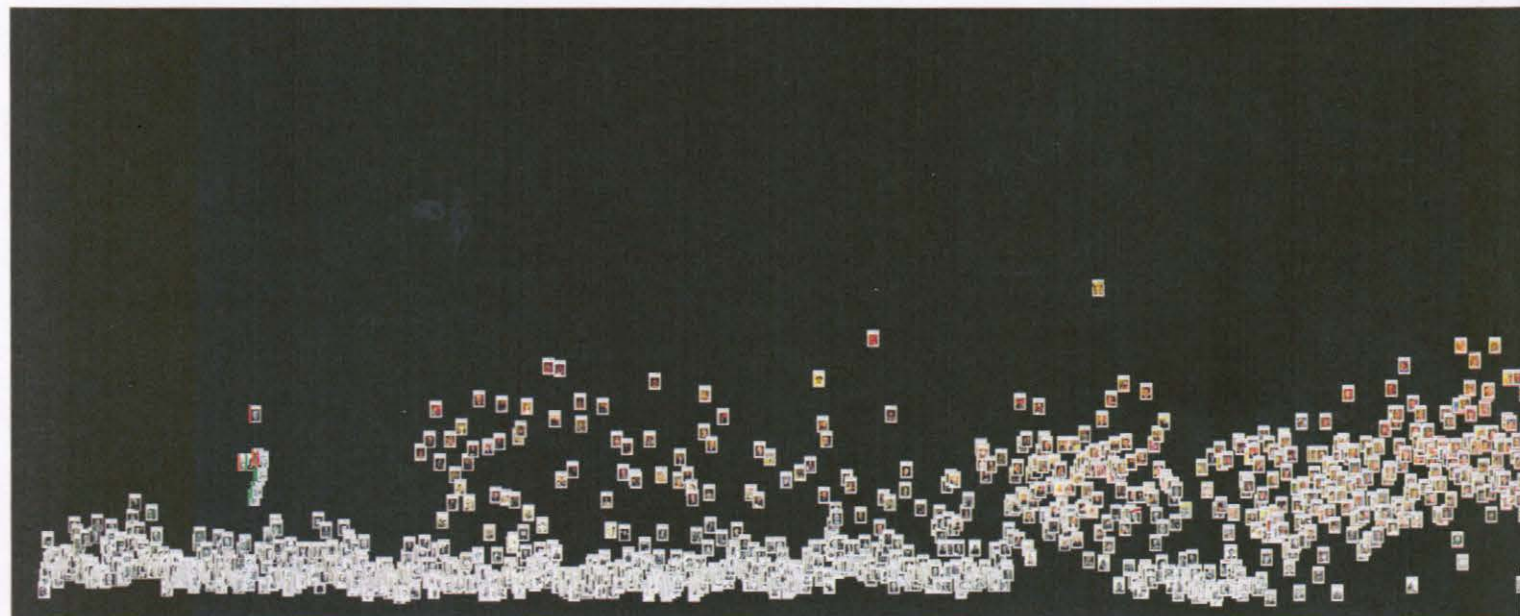
Media visualizations methods give us new ways to understand the history of photography.

of any size – be they work of a particular artist, every painting made in the twentieth century, the billions of photos on *Flickr*, or all feature films ever made. Interestingly, we received grants from both humanities and science foundations, and have also shown our visualizations in galleries, and design museums. We were also approached by Magnum Photos, the Getty Research Institute and other institutions interested to see how our methods could be applied to their collections and databases. At the moment we are working on a visualization of patterns in all of van Gogh's paintings.

Can you speak to what Software Studies and cultural analytics have to offer the field of contemporary art in terms of critical discourse?

Cultural analytics allow us to quickly explore patterns in large sets of images and video by using new types of visualizations. Instead of creating new representations from numbers, you're creating new representations out of visual artefacts themselves. For example, we can take all 4535 covers of *Time* magazine from the beginning of the magazine publication in 1923 to 2009, and automatically arrange them in a grid based on their dates. What we are doing is systematically applying these and similar techniques (we refer to them as *mediavis*) to various sets of images and video from different cultural fields.

Appropriation, remixing, and sampling all come to mind as viable predecessors. Basically, from the beginning of industrial media, artists have been rearranging existing media objects (photographs, films, audio recordings, TV programs) by taking their parts and putting these parts in new configurations to produce new statements with a variety of purposes ranging from aesthetic effects to political critique. It is therefore important to point out that we can borrow techniques not just from the computer sciences, but also from modern and contemporary art (including media art and digital art).

Your premise of cultural remixing was crucial to your pivotal study, *The Language of New Media*, published in 2001. One of the most provocative assessments you
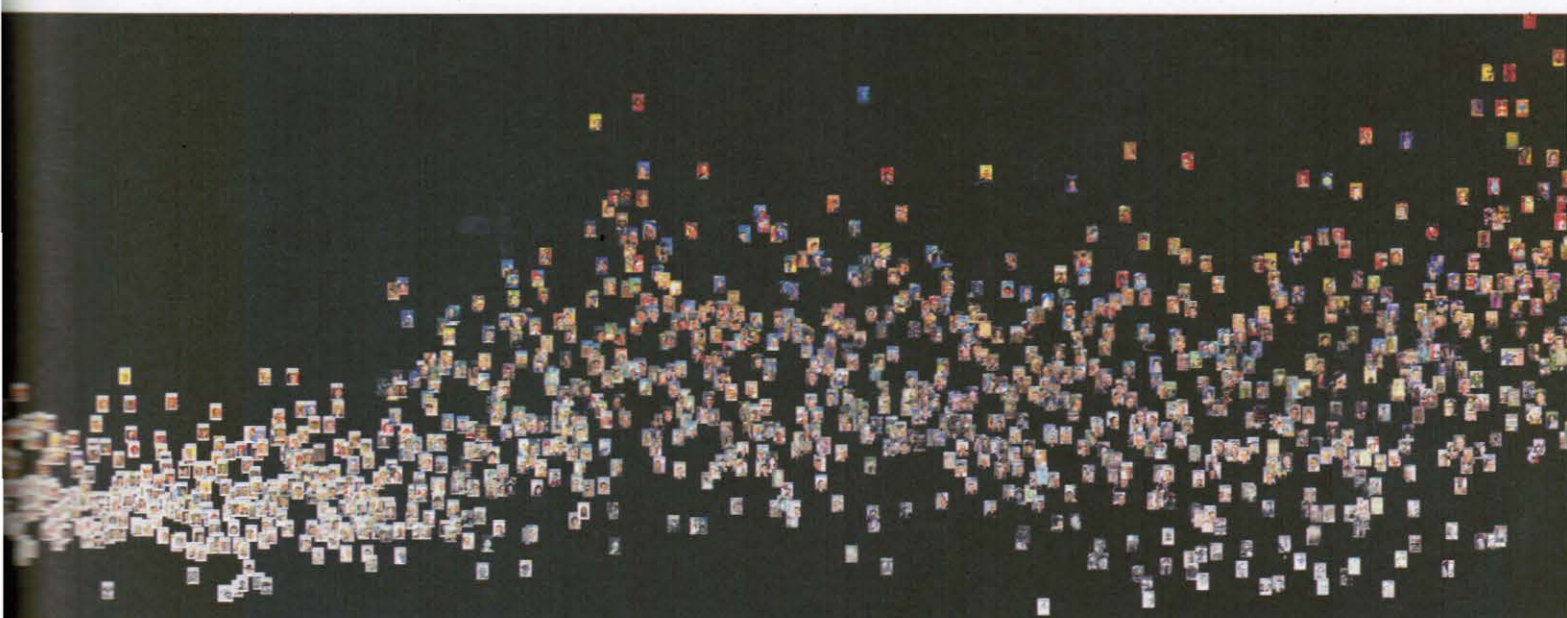
make in the book, for me at least, was the summation that by the end of the twentieth century the paradigm within cultural production was no longer creating new media objects such as an image, but that the issue had become how to find an object that already exists somewhere. What happens in terms of the exponential growth of new media objects, whether those housed in an orderly archive or other less formal networks for uploading and sharing images? Can you speak to the shifts in this idea since the book's release over ten years ago now?

The ubiquity of technologies for sampling and remixing, combined with the availability of an even larger universe of user-generated content have changed the role of professional artists. Of course, I'm not the only person who has spoken about this over the last ten years. It became a hot topic in the contemporary art world – think of the discussions started by curator Nicolas Bourriaud's writing about post-production. In Bourriaud's formulation the artist becomes a kind of re-mixer who does not produce new objects but rearranges what exists. But in the end the artist still creates single remixes or reconfigurations out of existing objects. That activity pre-dates Bourriaud. We only have to think about Marcel Duchamp who was basically taking objects from one context (existing industrial objects) and shifting them into a context of art. However, although we can trace this idea to an earlier moment, it really moves into the foreground because the explosion of media over the last ten years. So what we're seeing now is maybe just a new version of that historical development. However, besides remixing, we also see the emergence of a new paradigm of working with information – data mining. Data mining is the use of computers to find patterns in massive data sets.

I think that *mediavis* methods allow us to see patterns in large sets of photographs, or video collections and are one way to democratize data mining. While traditional data mining requires knowledge of statistics and computer science, these visualizations methods are fairly easy to use. And as I think our projects demonstrate, if you have the right data set and you

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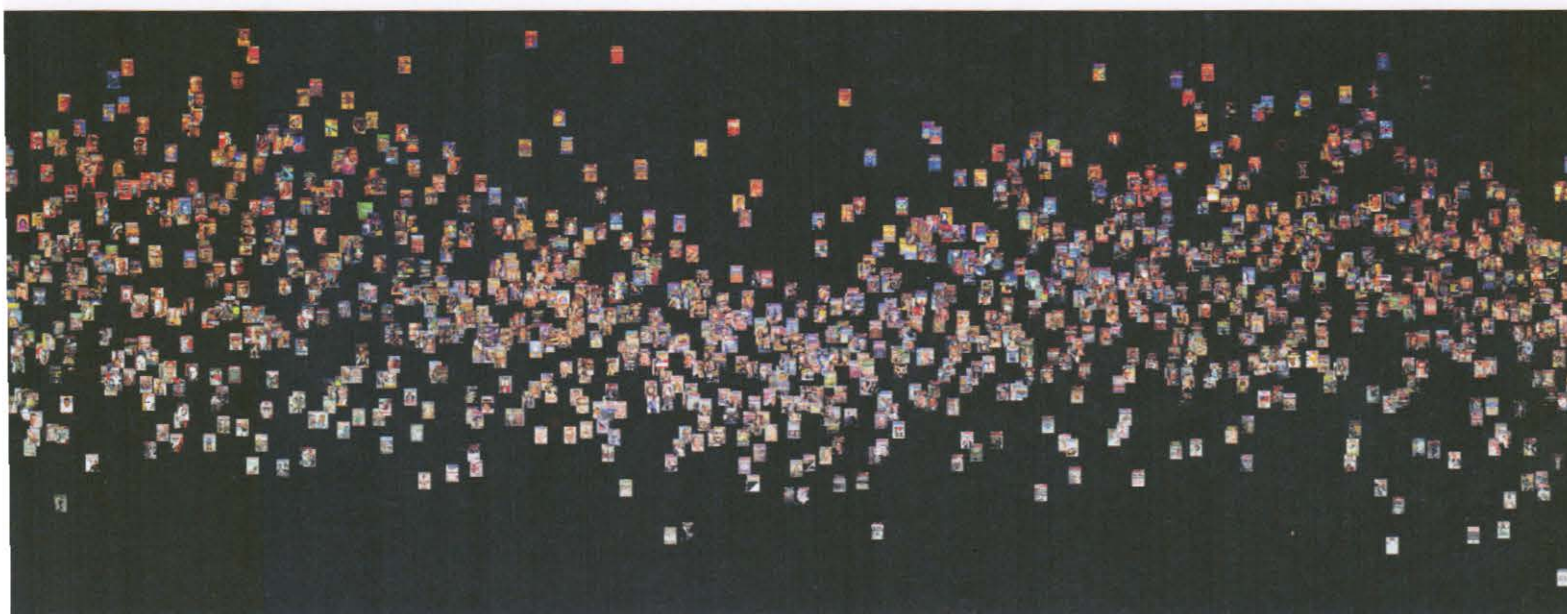
apply the right tool, you can actually start to see some very interesting patterns without having any knowledge of computer science. For instance, in the case of our visualization of all 4535 covers of *Time* magazine arranged in a grid by publication dates, you can see how the saturation of covers gradually increases from 1930s reaching its peak in the middle of the 1960s; how the covers' content gradually changes from portraits of political leaders and other important figures to featuring a broader range of topics (science, culture, health, etc.), and so on. Media visualization of massive image sets allows people to see patterns across the growing universe of image content, as opposed to just being able to look for particular artefacts, which is what a search does. So in a way, media visualization is a critique of the popular search paradigm. Maybe it is a new kind of media critique for the age of big data.

What are the residual effects of media visualization on the medium of photography if photographs are no longer viewed as discrete objects but as data to populate larger sets? I don't want to trot out the old chestnut about the death of photography. Instead, what if we think about the aesthetics of photography as a distinct medium with its own particular conditions?

You have two questions here. In relation to the first question: media visualizations methods give us new ways to understand the history of photography, to compare content and aesthetics of millions of photographs being created today both by professional and non-professional users. On a practical level, we started working with 500,000 photographs at Magnum Photos, and soon we will be looking at photograms and other artworks created by one million members of the popular deviantart.com.

The second question, if I understand it correctly, is about how the digital revolution changed the identity of photography. In the 1990s creatives working in all areas of culture industry started using application software as the essential tools in their work. How does this shift affect our concept of media? This is

a very big question; in fact it is the topic of my book, *Software Takes Command* that I have been working on since 2008. The whole book is a response to this question. The point is to understand how the particular structures and interfaces of popular applications such as Photoshop, Aperture, Flash, and so on change 'media' conceptually and practically. This is different from the typical discussions of the 1990s that focused on the differences between analogue and digital.

So if we want to think about photography today, we should consider both its new condition as a data organized in data structures and data bases, and the interfaces and the logic of popular software used to access, edit, and distribute this data. Today we have new types of 'universal' tools which can be applied to various operations across different media types as long as these media have been digitized (or born digital), stored in common file formats, and embedded within common software platforms such as a desktop, a tablet, a phone, or the web. For example, I can search for photographs, songs, text, maps, etc. So all media now share the condition of 'searchability'. The degree of searchability depends on the type and amount of metadata stored with the objects.

Another new property of all media objects is something we can call 'remixability'. The degree of remixability – how easy it is to isolate parts of the objects and combine them with other objects – also depends on various conditions. Digital photographs have a pretty high degree of remixability for two reasons. First, all web browsers allow you to select and save an image embedded into a web page. Second, all image viewers and editors, from Preview and iPhoto (on a Mac) to Photoshop have built-in tools to crop and copy parts of digital photographs. Of course, we are talking about photographs in their digital forms (i.e. computer files). There remains an obvious value in working with traditional cameras and various nineteenth-century photographic techniques. However, when photographers want to circulate their images to general public, collectors, curators, agencies, and so on, they digitize them and put them online. This is required today, since the web serves as kind of universal interface required for being able to communicate, or to have economic relationship with others regardless of how you actually created the objects.

When the quality of moving images – high definition video for example – becomes indistinguishable from still photography what happens to the relationship between still and moving images within the domain of digital media? Thinking beyond the issue of pixels or resolution, is there a new relationship you see between video stills or frame grabs and still photographs?

Currently, there is still a significant difference in the quality between photographs captured by cheap digital camera, and professional dSLRs coupled with expensive lenses – but we may expect this difference to disappear relatively soon. Digital video currently is in the same situation. However, the economics of media capture is just one side of this. With the arrival of cinema in the end of the nineteenth century, moving images gradually came to occupy a large place in visual culture. Television and video recording and playback continued that trend. More recently, interactive media increased the role of moving images even more. We are seeing many situations where
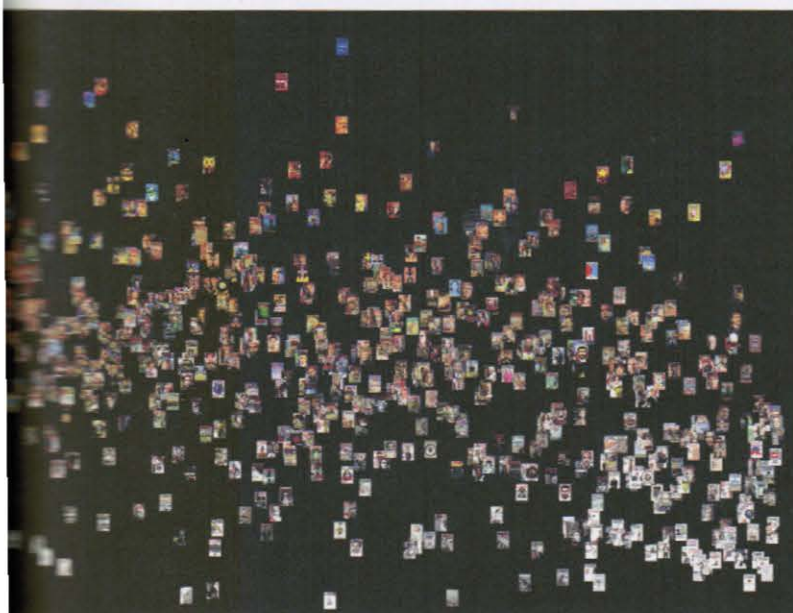
still images are being replaced by moving images. Textbooks used to only have photographs or illustrations. As publishers aggressively move textbooks to digital platforms, such as the iPad, there's a logical desire to have more animations, interactive visualizations and video. So what will happens to the still image in this century? What is its long-term future? This is one of the questions that continues to fascinate me.

What happens to formal issues like seriality or sequencing, when artists present photographs in a fixed order as opposed to thinking about them as a variable data set that you describe? Will the fixed formal attributes associated with analogue photography and film retain their significance? For example, does 16mm film's 16 frames per second no longer function as a reference for time within the conditions of digital seamlessness that you have articulated? What then become the mnemonic devices for time?

You raise a very important question. Now we have a born digital generation that never saw analogue cameras but still uses software applications to simulate the look of earlier analogue technologies. How long this will continue? This brings us back to the question of what is 'media.' For instance, what is photography's medium? Is this a valuable concept? Given all the scholarship on photography that traces its history from the 1830s till today, many people obviously think so. However, I find that highly problematic. I don't think we ever had a single medium of photography. Think about the very first daguerreotypes which required eight hours to capture an image and had a relatively low level of detail – and contemporary colour photographs shot with various lenses at high speed at a resolution in the dozens of megapixels. Add to this all digital manipulations, which can be done with software. Think also of HDR and other techniques of computational photography, which rely on algorithms (as opposed to the manual use of image applications.) The resulting possibilities, image uses and aesthetics are so different that it is hard for me to accept that daguerreotypes and contemporary photography belong to the same medium. Perhaps there was never such a thing as photography. It was just a series of different media lumped together. •

Lev Manovich (1960, Russia) is the author of *Software Takes Command* (released under CC license, 2008), *Soft Cinema: Navigating the Database* (The MIT Press, 2005), and *The Language of New Media* (The MIT Press, 2001), described as 'the most suggestive and broad-ranging media history since Marshall McLuhan.' Manovich is a professor in the Visual Arts Department of the University of California, San Diego, a director of the Software Studies Initiative, and a professor at the European Graduate School (EGS). He lectures around the world and has given 500 lectures, seminars and workshops in the last ten years. Since 2005 Manovich has focused on developing analytical and visualization tools for the analysis of patterns within large sets of images and video, leading to the formation of the Software Studies Initiative in 2007 in partnership with the California Institute for Telecommunications and Information Technology (Calit2). Over the last few years, his lab has collaborated with the Getty Museum, the Austrian Film Museum, Magnum Photos, the Netherlands Institute for Sound and Image, San Diego Museum of Contemporary Art and other institutions interested in applying cultural analytics methodology to their vast media collections.

Gloria Sutton (1972, USA) is Assistant Professor of Contemporary Art History and New Media in the Art + Design Department at Northeastern University in Boston. She acts also as advisory board member of Contemporary Culture Index (www.ccindex.info). Her writing on the history of media art is included in *Mainframe Experimentalism: Early Digital Computing and the Experimental Arts* (forthcoming from UC Press).

Erik Jepsen (1988, USA) currently works as a photographer and web developer in the publications office at the University of California San Diego, the hosting institution of Lev Manovich's Software Studies Initiative. Jepsen has won numerous collegiate press awards and his photography has been featured in print and online publications such as *National Geographic*, *The Washington Post*, *CNET News*, *WIRED* and *Popular Science*.