Lev Manovich

Emotion Machines and Database Imagination

Computerization of culture brings with it a number of new cultural themes: politics of digitization, dialectics between online and off-line identity, connections between a physical and a virtual space, or between interactivity and democracy. Many of these themes have already been extensively addressed by artists and theoreticians, but there are two which are still waiting to be discussed.

The first of these themes is communication of emotion. Recently, there has been a lot of interest among computer researchers in using communication of emotion as a part of a human-computer interface. On the one hand, some researchers want to teach a computer to recognize the emotions of its user and to adopt its actions accordingly. The primary mechanism for emotion recognition being proposed is a video camera continuously monitoring user's face. On the other hand, in view of growing popularity of avatars and virtual actors (whether they used as extras in films, as characters in computer animated films, as front-end interfaces for different applications, or as a population of online virtual worlds), researchers are working on software tools to enable automatic generation of emotions (again, most frequently being reduced to appropriate facial expressions) in actors and avatars. Here again, facial expressions are taken to be the key mechanism in communication of emotion. Thus, one of the goal of this research is to arrive at virtual actors which will express proper emotions when acting out a script.

The second theme is what I will call database imagination. So far, computer culture appears to favors a database (the words collection, catalog and library are also appropriate here) over a narrative. Most Web sites and CD-ROMs, from individual artistic works to multimedia encyclopedias, are more collections of individual items, grouped together using some (or sometimes none) principle, rather than coherent narratives. Web sites, which continuously grow with new links being added to already existent material, is a particularly good example of this logic. In the case of many artists' CD-ROMs as well, the tendency is to fill all the available storage space with different material: documentation, related texts, previous works and so on. In this case, the identity of a CD-ROM (or of DVD-ROM -- or of a digital computer in general as it is used today) as a storage media is projected onto a higher plane, becoming a cultural form of its own. If I am correct in postulating he existence of this database imagination, some questions need to be asked. What are the historical precedents of this database imagination? Is it possible to combine a database with a narrative? Why computer favors this form over others?

Chameleon, an interactive computer installation by Olga Kisseleva (1994-1995), brings both of these themes into focus. Rich in its cultural and historical references, the installation offers us a perfect opportunity to discuss these themes in more detail.

According to the artist herself, Chameleon has evolved out of the observation that the world of Chekhov's short stories has a remarkable consistency: same characters, same settings, same situations keep appearing from story to story, although the details and names are different from story to story. We can imagine Chekhov's world as a of database of characters, places and narrative situations, with each story being a particular sample of this database.

Chameleon's database consists from 41 short video segments: scenes of life in Western and Eastern Europe, recordings from TV shows and TV news. In short, a deliberately fragmented picture of contemporary life; a set of subjective and somewhat random choices (the artist capturing this street in this city because she happened to be there; but it could have been another street in another city), which together create an objective description of modern life, as objective as any other.

In an installation the user is confronting a video screen, or rather, the screen is confronting the user, for Chameleon brings into the open the aggression inherent to any interactive interface, its uncanny similarity to Pavlov's laboratory. The user is shown first video segment; meanwhile, a video camera reads user's facial expression, attempting to determine whether she or he reacts to the segment positively, negatively or with indifference. Depending on the reading, computer chooses another video segment. This is repeated four times. So, all in all, the user is shown four segments -- a small sample from the overall database of 41 segments, which itself already represents a tiny sample from all the possible images which the artist could have recorded in our world today. The artist acts as a filter between the user and a world, with user's emotions acting as an another filter. The result is a story consisting from four episodes -- a short narrative created from Chameleon's database.

Communication of Emotion

In Chameleon user's emotional responses drives the story. Thus, although in a limited context, this work already realizes the dream of computer scientists to make interface invisible and to fully use "emotional bandwidth" so important in human-to-human communication.

Do the attempts to formalize and automate communication of emotion begin with computers? In the 1870s a French professor of art, Charles Blanc, developed a theory of the intrinsic psychological significance of vertical, straight, and oblique lines. Blanc popularized the ideas of the Dutch painter and theorist Humbert de Superville who around 1830 first claimed that simple lines conveyed emotions by having an inherent psychological response. In the 1880s, Charles Henry further advanced Blanc's ideas, developing the "aesthetic protractor" to measure the harmony of line angles. Henry's device was designed to measure "whether the angles between lines radiating in different directions from a single point are harmonious."

It is significant that the first laboratory research on the aesthetics of simple forms was conducted in 1876 by Gustav Fechner -- the founder of mathematical methods for the measurement of sensations which became the basis for experimental psychology. Later, at the turn of the century, many proto-Gestalt psychologists started to investigate the aesthetics of simple forms, isolating preferences for squares, rectangles, ellipses, and triangles as well as different lines. Their publications became filled with "abstract" pictures consisting of simple forms.

This psychological research into the effects of simple forms influenced Seurat, Signac, Wassily Kandinsky, Paul Klee, and Piet Mondrian, among others. For instance, Seurat, who was familiar with the works of Blanc and Henry, advanced a similar theory of the intrinsic psychological effects of lines of different orientation. In another example, Kandinsky, in Point and Line to Plane, advocated "microscopic" analysis of three basic elements of form (point, line, and plane) claiming that there exists reliable emotional responses to simple visual configurations. Equally telling of Kandinsky's program are the titles of the articles he published in 1919: "Small Articles About Big Questions. I. About Point," and "II. About Line."

At first, artists would embed simple lines or forms in their otherwise representational compositions. A typical case is Seurat who based the orientations of lines in his major paintings, such as Le Cirque (1890-91) and La Parade (1887-88), on the theory which he derived from Blanc: "Gaiety...of line, lines above the horizontal; calmness...the horizontal...Sadness...of line, downward directions." Gradually, however, artists gave up representation altogether and began to compose works which would consist solely of the simple elements already studied by psychologists. It is, therefore, not accidental that the paintings of Mondrian, Klee, and Kandinsky look remarkably similar to the visual stimuli already widely used by psychologists in previous decades. They are also experiments, a result of a systematic investigation into what Kandinsky called "the science of art," the science which would allow the reliable communication of any emotional experience.

In the early twentieth century the research into the elemental units of visual communication acquires a new purpose -- the need to optimize the process of mass communication. This new purpose became crystallized at the moment when modernist artists claimed the position of designers of mass propaganda in Soviet Russia in the 1920s. At this moment the two lines of inquiry -- artistic exploration of the visual elements and research in experimental psychology -- explicitly converge in Soviet discourses and institutions. During the 1920s many Left artists collaborated with experimental psychologists to investigate the effectiveness of visual elements and their combinations.

The psychological studies of viewers' responses to visual forms were actively conducted in the central art institutes. In 1926 GAKhN (State Academy of Artistic Sciences, Moscow 1921-30) created a psychophysiology laboratory, a psychophysics department, and laboratories for experimental aesthetics and art theory. In order to arrive at the general laws of the effectiveness of visual forms the investigators have systematically analyzed the basic dimensions of volume, line, color, and texture. It was hoped that the results of the analysis would put visual communication on a scientific basis. Jack Chen, a Communist British artist trained in the Soviet Union during the 1920s, wrote about this program of art production based on psychological research:

"Art must be a science, an industry. Pictures and sculptures should be constructed according to exact scientific principles after colors and forms had been classified according to their human reaction values...A picture according to the Left was really nothing but a "machine" for generating certain predetermined human reactions. Artists should be engineers of form and color."

How does the recent interest in modeling emotion on the part of computer graphics community, prompted by the wider interest in avatars and virtual actors, fits within this history? It represents a new episode in modernity's long struggle to formalize -- and thus control -- representation of emotion in visual communication. From this historical perspective, this latest episode appears to be somewhat naive -- a step backward rather than forward. What computer graphics researchers are trying to do is to formalize emotion expressions in simulated human faces. In contrast, earlier work have focused on trying to control emotions of the viewer through the means of a visual image. The strong program of emotion control is replaced by a weak program of emotion simulation. The visual language of abstract forms and pure colors thought to directly induce emotions in a viewer is replaced by a more archaic and more dependable language -- human facial expression.

The current research to use this language as an interface (Chameleon being an outstanding example) also has important predecessors in the 1920s. In fact, Chameleon's system where user's facial expression drive forward a cinematic narrative -- which, as it unfolds, seems to lead the user to a

certain interpretation of contemporary life, with different video segments acting as points in an argument -- can be directly connected to ideas of Sergei Eisenstein.

Eisenstein, as many other Soviet artists of the 1920s, relied heavily on the psychological theories of the day. It is possible to discern two distinct trends in how psychology was used. In the first trend, autonomy was granted to the human psyche. The second trend privileged physiology, considering the mind a neurological organ not different from the rest of the organism. This trend was represented by such influential scientists as Bekhterev and Pavlov, with their studies of physiology, reflexology, and conditioning.

Contemporary psychologists -- the supporters of Pavlov and Bekhterev on the one hand, and younger psychologists such as Vygotsky and A. Luria on the other hand, argued over whether the mind could be reduced to the laws of physiology. Similarly, the artists in theory and in practice drew on these two alternative psychological models. Sergei Eisenstein's attempts to ground his filmmaking methods in different psychological theories epitomizes the two models.

In one of his latest written works Eisenstein summed up his work in film:

"I never intended to "reflect" the existing reality. I had one task -- using the means of its influence -- to affect the feelings and thoughts, to influence the psyche and to shape the consciousness of the viewer in the desired, required, and chosen direction."

Although Eisenstein's goal remained the same, the means of achieving the desired effect were conceived of differently throughout his life.

On the one hand, Eisenstein developed the concept of "intellectual montage," privileging a purely intellectual response. The goal of cinema, in this view, was thought to induce dialectical reasoning. The structure of the film itself was conceived of as dialectical thinking in visual form with montage being the means of representing the dialectical process through the contrast and juxtaposition of images. This preoccupation of Eisenstein with cinema as the visualization of the work of the intellect culminated in his project to create a screen adaptation of Marx's Capital.

On the other hand, Eisenstein's second important concept developed in the Montage of Attractions takes the viewers' physiological reaction as a point of departure. Eisenstein based his concept on the psychological theories of Ludwig Klages and William James. According to Klages, in a human being emotional states are expressed through bodily movements. Klages also insisted that human expressivity is characterized by a unique quality -- the muscular contractions of one person are involuntarily repeated by the observer. James' theory was related to Klages' but causally reversed. He postulated that emotions were the effect of muscular contractions -- one does not cry because he is sad, but one becomes sad due to crying. Eisenstein combined the two theories: the emotional state of the actor translates into his muscular movements; these movements are involuntarily repeated by the viewer causing him to experience similar emotions. The important issue, then, was the training of actors in simulating precise gestures and facial expressions in order to produce a desired emotional response in the viewer. Eisenstein proposes to develop a collection of emotional stimuli which would be strung together in a film -- "montage of attractions." The film becomes a script of the emotional responses of viewers.

Chameleon can be interpreted as a combination of the two approaches of Eisenstein: dialectical montage and a script of emotion. User's emotions provoked by images are responsible for the choice of the next episode. The resulting film is a proposition about reality, its intellectual interpretation. Dialectical montage and a script of emotions meet on a computer screen.

Of course it is also crucial that the two approaches are combined through an interactive technology. The result is a new kind of communication logic where controller and controlled repeatedly change places. Master - slave dialectics becomes a loop. Computer shows a segment, which provokes an emotion in a user, which instructs the computer to select a new segment, which creates a new emotion...Reason and emotion, computer and a user drive each other in a new kind of montage which takes cinema in a new dimension.

Database Imagination

The result of this loop is a narrative created out of the database. Records drawn from a database and arranged in a particular order become a picture of modern life -- but simultaneously an argument about this life, an interpretation of what these images, which we encounter every day, every second, actually mean. Chameleon becomes a machine for visual epistemology. To go through the records in a particular order is to construct a particular argument (recall Kuleshov's effect).

Here I want to mention another of Kisseleva`s project which directly preceeded Chameleon and which also deals with database -- narrative reversability. An In-depth Study into the Foundemental Elements of Existence is based on the personal diary of Daniil Harms. Somewhere in this diary -- which is a mixture of never realised creative ideas, aphorisms and hopes -- Harms talks about the theme of World’s Trinity. Harms reenterpretes the triad of Son -- Father -- Holly Spirit as Creation -- Action -- Dissapearance, but he does not develope this idea any further.

In An In-depth Study Kisseleva has turned Harms' notes into a database, in fact reconstructing his own ontology scattered throughout his diary. Each of three terms of Harms's triad creation -- action -- dissapearance are defined through seven words. Each of them in its own turn is provided through definition taken from Harms. Finally, each word is illustrated by a contemporary photograph.

The presence of contemporary photographs reveals that our own world is as absurd as the universe which inspired -- and eventually killed -- Harms. However, what is really important is that Kisseleva has created the database out of Harms' narrative. In short, if in Chameleon narrative is created out of the database, in An In-depth Study the reverse takes place.

This problematic of narrative and a database and the transformation of one into another for the the purpose of visual epistemology (something zhich is particularly important for Chameleon), also has a direct predecessor in the work on another important Soviet filmmaker -- Dziga Vertov.

Dziga Vertov's A Man with a Moving Camera (1929) is an important, perhaps the key example of database imagination in modern media art. In one of the key shots repeated few times throughout the film we are shown an editing room with a number of shelves used to keep and organize the shot material. The shelves are marked "machines," "club," "the movement of a city," "physical exercise," "an illusionist" and so on. This is the database of the recorded material. The editor -- Vertov's wife -- is seen working with this database: retrieving some reels, returning used reels, adding new ones, and so on.

The comparison between working on a film and re-ordering a database is not accidental to A Man with a Moving Camera. Its subject is filmmaker's struggle to reveal (social) structure among the multitude of the observed phenomena. Its project is a brave attempt at empirical epistemology which only has one tool -- perception. The goal is to decode the world purely through its surfaces visible to the eye (of course, its natural sight enhanced by a movie camera). This is how film co-author Mikhail Kaufman describes it: "An ordinary person finds himself in some sort of environment, gets lost amidst the zillions of phenomena, and observes these phenomena from a bad vantage point. He registers one phenomenon very well, registers a second and a third, but has no idea of where they may lead... But the man with a movie camera is infused with the particular thought that he is actually seeing the world for other people. Do you understand? He joins these phenomena with others, from elsewhere, which may not even have been filmed by him. Like a kind of scholar he is able to gather empirical observations in one place and then in another. And that is actually the way in which the world has come to be understood." Therefore, in contrast to standard film editing which consists in selection and ordering of previously shot material according to preexistent script, here the process of relating shots to each other, ordering and reordering them in order to discover the hidden order constitutes the film's method.

Was this brave attempt successful? The completed film reads nothing else and nothing more than almost a linear printout, so to speak, of its database: a number of shots showing machines, followed by a number of shots showing work activities, followed by different shots of leisure, and so on. Put differently, the film takes to its extreme Roman notion that a work of art projects a paradigm into a syntagm. (Only a very basic montage keeps it from being a simple list of paradigm's elements). The result is banal, mechanical catalog of subjects which one can expect to find in the city of the 1920s: running trams, city beach, movie theaters, factories...

What does make the film still look so fresh are not its subjects and the associations Vertov tries to establish between them to impose "the communist decoding of the world" but that it is also a most amazing catalog of another kind: that of film techniques. Fades and superimpositions, freeze-frame, acceleration, split screen, various types of rhythm and intercutting -- what Annette Michelson called "a summation of the resources and techniques of the silent cinema" -- and of course, a multitude of unusual, "constructivist" points of view are stringed together with such density that the film can't be simply labeled avant-garde. If a "normal" avant-garde film still proposes a coherent language different from the language of mainstream cinema, i.e. a small set of techniques which are repeated, A Man with a Moving Camera never arrives at anything like a completed language. Rather, it proposes an untamed, unmotivated and apparently endless unwinding of techniques, or, to use contemporary language, "effects," as cinema new way of speaking.

All in all, A Man with a Movie Camera not only anticipates the problematics which new media brings to the surface but it appears to be ahead of much new media art. It combines a database with a narrative form; and, rather than staying away from different visual "effects" or using them without the connection to meaning (the typical strategies of contemporary media art ad media industry, respectively), it fully embraces all the "effects" at its disposal as a way to construct meaning.

Today, as more and more artists are turning to new media, few are willing to undertake systematic, laboratory research into its elements, its new compositional, expressive and generative strategies -- the kind of research which was undertook by Soviet avant-garde artists of the 1920s in relation to new media of their time: photography, film, printed page. Whose few who are able to resist the temptation to immediately compose multimedia novels and instead focus on determining what can be a multimedia sentence, or even a word, or even a letter, are rewarded with amazing findings. Olga

Kisseleva belongs to this category, and her Chameleon is an important step in understanding what it may mean to speak using the key communication machine of our age -- digital computer.