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Experience in the Era of Information

Friedrich A. Kittler

Editors: In your recent work, you specifically reflect upon a computerized worldview. How do you evaluate the consequences of such computerization for the aesthetic experience?

Friedrich Kittler: I want to remark first that I am certainly a bit biased in my heavily stressing the computer world while neglecting its biogenetic side. Yet, I must confess that I am not interested in biogenetics since I consider it anti-humanistic and too close to my own body. My fascination for computers has a biographical component; I built computers from scratch before they really existed in a general sense. That is why I am always somewhat shocked and disappointed when people turn out to be involved in the aesthetic consequences of something I am interested in for its own sake. It is true, though, that in the days when I constructed my first aluminum computer apparatus, I did so with an aesthetic intention, since its output was music rather than the analog and digital chip sort of thing. Obviously, human beings need some output from computers and the most rewarding output seems to be aesthetics. In those days, it was not feasible and also too expensive to go into three-dimensional computer aesthetics. Therefore, I thought in terms of one-dimensional computer aesthetics, which resulted in digital music processing without any instrument. It was not until the 1990s that two-dimensional processes became possible, whereupon I started to be interested in computer graphics and animation. Both the acoustic and the later graphic and pictorial output are indeed interesting, but for me such output is, in fact, a by-product. One does not retain the output, i.e. one does not record one's computer music. One might try out some effects, but then throws that out again in order to start thinking about another hardware device. So, I believe that aesthetics has been slightly overcome by the process of processing. In other words, the concept of the artwork is no longer fixed and rigid.

Editors: In light of a shifting aesthetic experience, how would you view the Kantian categories of perception, such as space and time? In other words, do the categories of space and time need to be reinterpreted because of a computerized view of the world?

Kittler: There is much to say for Kant, as for Newton, whom Kant formalized in his three *Critiques*. Time and space had been considered continuous and divisible into infinitely fine parts. In opposition to that, Newton and Leibniz introduced the construction of a differential space and time into mathematics. Kant took these ideas and inserted them into his philosophy. After having constructed his first computer in 1947, Turing said that time has to be discrete and cut into quantifiable

atoms. In computer graphics, you have atoms of space or, better put, atoms of two-dimensional pixels which can no longer be divided. Therefore, you can divide any computer image into its pixels, but you cannot subsequently divide the pixels. The pixels are the last atomic or indivisible parts. That is the principal difference between Kantian space and time and our current conception of space and time. Strangely enough, physicists have adopted the concept of a discrete, quantified space and time from computer science rather than the other way around.

As regards aesthetics, atomic space and time can be manipulated, whereas continuous space and time cannot. In other words, one can play with atoms, therefore, one can play with pieces of space and pieces of time. However, one cannot play around with water, i.e. continuous space and time as such, since it will disappear and vanish in one's hands. One can pick up the pixels, though, and rearrange them. In so doing, one can turn the past into the future, and revert time and space in that discrete way. That is the aesthetic effect. We cannot manipulate nature itself. However, as in quick time, letters as small mathematical symbols can be freely manipulated; we can now manipulate the representation of nature in our machines.

Editors: In order to be able to adequately reflect on the world, you argue that human beings should have a command of computer languages. You once claimed that these languages "have eroded the monopoly of ordinary language and have grown into a new hierarchy of their own." How did that linguistic process come about?

Kittler: That notion of hierarchy stems more or less from Wolfgang Hagen, who worked on linguistic hierarchy and its paradox the Babel metaphor. At the beginning of the formal computer language programs, which started around 1950, the clear intention was to develop one universal computer language. Such language could easily compete with the multitude and Babel-like structure of everyday languages. However, that did not work out, so Hagen became deeply interested in the paradoxical, historically self-contradicting development of different programming languages and all their preferences and styles. Nobody among the programmers knows every computer language; everybody has a certain style, every style has its limitation as regards impact, and the mathematically most elegant, computational languages are in real time the worst - and vice versa, since real time languages are illogical and even sometimes contradictory to mathematics.

The historical origin of the programming languages is the incapacity of human beings to deal with the first computer hardware. It would have been too complicated to switch everything by hand, so programming languages were initially designed close to human language as an interface slightly more human than the machines themselves. Data and commands such as "please add" were all treated on the same level, i.e. as numbers. Thus, if one wanted to add two numbers in the center processing unit, one could put three numbers in the machine and have the

third number tell the machine to add. That was a first step in the dehierarchization of language. Then came a phase where people said the numbers four and three could also very well be seven and eight or something else. For example, one could say, "Let the first operant be symbolic sign a and the second one b", which could as well have been, "Let the first operant be apple and the next one strawberry." With that, we are no longer on the level of assemblers, but on the level of symbolic languages such as C. In C, one continues to define operants. For example, one could give at a certain moment the apple or symbol a the numerical value of four and, in another part of the program, one could write symbol a which before had been defined as four but now has been given the numerical value of 17450.

Thus, the programming languages are increasingly approaching human mathematics and human logics. One could say, "Let there be two propositions which can be true or false at a given time." One proposition is "it rains", and the other one is "it is the weekend". In a logical rather than in a mathematical sense, one could test whether it does not rain and whether it is the weekend at the same time. Then one could write a very primitive programming language stating, "This weekend you can go to the beach." That is the origin of software. Software is written in such languages, so that programmers can see what they do. Some software, though, has a proprietary quality where the end users are not allowed to see the code and the software program as such. Nobody will understand what is at stake in such programs, but hackers feel driven to find that out.

Editors: In your view, the development of computer languages suffers from systematic and philosophical misunderstanding. You once maintained that "the so-called philosophy of the computer community tends to obscure hardware by software, electronic signifiers by interfaces between formal and everyday languages." How could such philosophical misunderstanding be explained?

Kittler: That philosophical misunderstanding does not come from traditional philosophy as such, nor from the computer community itself. For a long time, the doctrine taught to young computer scientists at universities has been at an impasse, since other young computer scientists not from the university, but from the Fachhochschule - specialized technical universities - are much better. The technical university students are closer to hardware and more familiar with the interaction between hardware and software. Academic students only deal with software for six years, so that they do not get a sense of what program code would be elegant in the computer. As a consequence, they write programs like 19th- century novels. Presently, we can no longer stand that. Who among us is still reading Sir Walter Scott with his endless novels? Why couldn't our computer programs be as efficient as Samuel Beckett's prose? Beckett once said that he listens to human mouths when he writes his texts. His work is a study of tongue and mouth, where, in a sense, the open and closed mouth is the hardware and the tongue the software.

Presently, I am interested in new drivers for graphic cards and a new genera-

was a transmission medium and we can look into the heart of the Roman empire with its data processing and data storage.

We understand cultural history better by following this rather formal, but conclusive way of thought. I believe that concepts of computer technology and science are conclusive for the good reason that they indeed function - as we can see in our daily lives. In the time of their emergence and their introduction, there might have been mistakes, but these logical mistakes have been overcome. As a consequence, both computer-based theory and computer-based metaphors have a sort of self-proving, self-realizing effect which philosophical theories and theories based on everyday languages do not have. We would like Hegel to be right, but neither he nor his readers can really prove the Hegelian system. Nobody can process it, although many people have tried and many people have looked for contradictions in Hegel's work. Obviously, human brains are not able to control what one human brain has put down into about thirty volumes.

Editors: Wouldn't the mathematical approach imply the same danger as Max Bense's information-aesthetic has, namely the blind-spot exclusion of the dynamic of the cultural process where essential elements such as, for example, ambiguity disappear from view?

Kittler: Max Bense was a deep disappointment. At first sight, his work seemed so promising, but when one tried to follow the aesthetic complexity it did not work, whereas Birkoff, the American mathematician, was wrong from the very beginning with his silly ideas about lyrics and poems. Ambiguities are indeed constitutive for aesthetic and cultural effects. I do not know, though, whether computers will ever be able to handle subjects such as beauty and the sublime in the Kantian sense. At the same time, I believe that we should not take concepts such as freedom or aesthetic feelings in an educational way from the past. I rather think that we have to construct our concepts from scratch and in the here and now. Let us say that any intuition that works is a real intuition which should go into future reflections. Freedom has to come from our decisions rather than from reflections on what history could have been if Robespierre "had only been a bit nicer". Surely, the French Revolution is extremely ambiguous, but from such ambiguity one cannot draw any ethical or moral claim about our present situation. Therefore, I just hate when educational, ethical and historical aspects are mixed up. History is gone and that is why history has to be looked upon coldly, particularly in our day. I studied the history of Japan, which really fascinates me. Some Japanese colleagues of mine are in the process of constructing a meta-history: one part is my work *Discourse Networks*, and another part is based on questions similar to my examining of Japanese culture. Only if we formalize both the European history of media and cultures and the Japanese one without taking anything at nominal value could we arrive at a better understanding of each other.

Editors: In order to be able to distinguish between traditional and technical art you employ notions such as fiction and simulation. You consider traditional art as (Lacanian) operations in the symbolic production of imaginary effects on a psychological level, whereas the technical media employ symbolic procedures at a level concerned with reality and its unpredictability. Would such a strict distinction be sufficient for the practice of art, and what does this distinction imply for the concept of art as such?

Kittler: Let us go back to the particles of reality, a point we discussed earlier. In a subliminal way, thus not accessible to the human senses, playing around with particles of reality will continue to be the property of digital art or high-tech art. At the time Orson Welles made his wonderful radio dramas, he included many elements of reality, materiality, voices, echoes, and sound. No art had ever before created such a wonderful and purely acoustic world which convinced one of its materiality without any optical information. I used to be fascinated by simulated materiality. However, presently, I am more involved in Brunellesci and Alberti's geometrical thought and in the Renaissance era, where musicians entirely changed the course of the musical world by inventing polyphony, and painters entirely changed the course of the pictorial world by inventing linear perspective. Furthermore, I am deeply fascinated by Johannes Vermeer. It has been proven that thirty-five Vermeer pictures have survived, and in each of these pictures it seems that the same room has been portrayed. That room was probably Vermeer's model room in Delft, with a varied positioning of a camera obscura. So, the reflection of light has not been taken by Vermeer's eyes, but by the camera obscura posed in a very precise place in that room, which really implies a new conception of painting. I like the hypothesis that two of Vermeer's not so brilliant paintings, each of which portrays a male scientist - the Astronomer, who looks up to the sky, and the Geographer, who looks down at the earth - portray the same young man, namely Antonie van Leeuwenhoek, inventor of the microscope. It cannot be proven that Van Leeuwenhoek was Vermeer's friend, but it is absolutely certain that after Vermeer's death, Van Leeuwenhoek was responsible for Vermeer's work.

Renaissance art bloomed in a highly scientific and mathematical era where artists invented a new categorical framework into which, afterwards, hundreds of thousands of possible paintings would fit without any new innovation. In my view, that was as important as Alan Turing's invention of the computer. Nowadays, some computer graphics are a homage to Vermeer and I really appreciate the effort of the computer graphic community to cope with Vermeer's brilliant legacy.

Editors: Cultural criticism has often been viewed as one of art's specific tasks. What are the possibilities in our day for such a view with respect to a technologized culture? To what degree is the Frankfurt school and its "instrumental reason" still of importance?

Kittler: The instrumental reason is of no importance since language and writing as such are part of technology. Language could not have been formalized into computer languages if it had not had a certain technical aspect from the start. All of that has been ignored by the Frankfurt School. Habermas did his best as regards the performative aspects which gave some backbone to the Frankfurt School language theory. Nevertheless, grammar and other technical elements are neglected when one only deals with performative acts. So, I believe that many things are very speculative and without foundation in the Frankfurt theory.

Methodologically, one should try to have a non-critical view of the facts. For example, when criticizing the French Revolution, one seems to believe in its historical rehabilitation. But why should we turn history into something better than it really was? It is not difficult to find facts. Foucault has given a wonderful example of that. The struggle between Foucault and Derrida was about how to decipher Descartes. Derrida's way of thinking was that one could just read Descartes. Foucault maintained that we should read Descartes within the contexts of Descartes' own epoch and time. Foucault employed these contexts and we can infer from his texts that Descartes indeed thought and wrote within the contexts of his own time.

Editors: Talking about Foucault, your work could be described as a media archeology. In your investigations you are also led by Nietzsche's perspective of the materiality of communication which, around 1800, is determined by alphabetization. Around 1900 there is a paradigm break. The monopoly of the word is broken by new media such as the gramophone and film. How could, in line with Nietzsche, an archeology of the era of information superhighways be described? Could we describe this as a New Renaissance episteme as Foucault suggested in *The Order of Things*?

Kittler: I am deeply interested in what could have been the discourse networks in eras such as the Middle Ages, the Renaissance, and Leibniz's time. However, I am always a bit unhappy when hearing statements about the return of the Renaissance, about entropy, about the irreversibility of history, and about how nothing will be the same again now that we have invented computers. At this very moment, there are millions of computers in the world. That situation cannot be compared to any other situation in the given past. Currently, culture itself is entangled in human beings and machines.

Traditional cultures such as the Neolithic culture or the agrarian were not just cultures of human beings. They were cultures of a symbiosis between human beings and domestic animals. Without horses and cows, there would have been no agricultural life on this earth. Man would still be some Neanderthal. In 1640, Descartes said that there are neither human beings nor animals: each human being and each animal is a machine. Jacques Lacan stressed time and again that the Greek and Roman cultures did not rely on machines but on slaves. In those cul-

tures, slaves were treated as animals. Aristotle did so even theoretically. In other words, there has never been a culture based on human beings alone. Thus, a culture based on machines is not a shocking fact happening for the first time in our 20,000 years of human experience. That culture is just a replacement of another culture. Another fact is that there are hardly any domestic animals left. And if there are animals they have Mad Cow Disease, which I consider a critical symptom of neglecting our animals. We like our machines precisely because they have no illnesses.

Presently, we are in a situation where we can no longer describe what is going on in machines. We do not simply program the machines; they program us as well. Because of the feedback between computers and human beings I am not able to write *Discourse Networks 2000*. Such a book should be a teamwork of an intelligent computer and a writer. So, we need two authors to write such an impossible book.