

The Virtual Triad

Society and Man under the Sign of Virtuality

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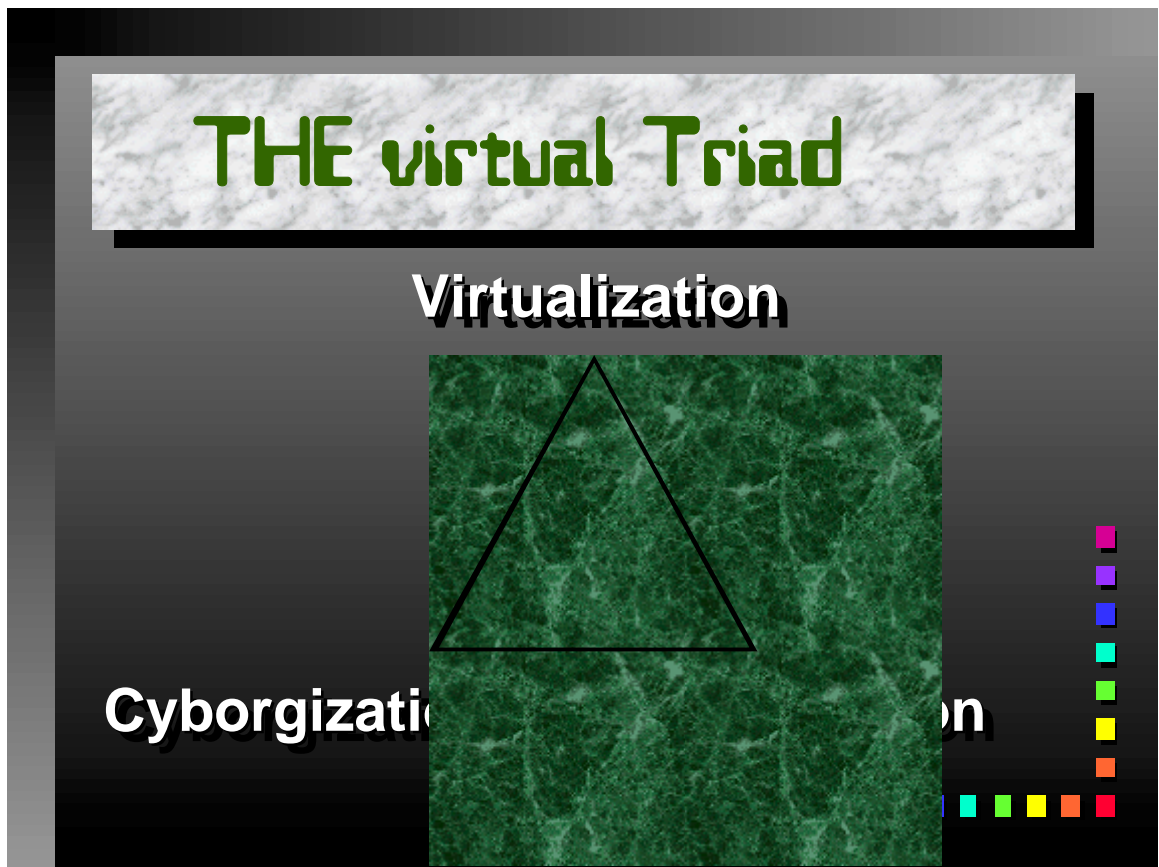
The virtual Triad, outlined in this essay for the Honeywell Futurist Competition 'Be Brilliant', is a processor-oriented model that offers both a taxonomy of different technological developments and a frame of reference for the analysis of resulting social impacts. This essay is based on the general assumption that a need exists for such a sociologically informed perspective on the new media and technologies, as the following quote from Howard Rheingold suggests:

'Every flavor of technological futurist, from Alvin Toffler and John Naisbitt to Peter Drucker and George Gilder, base utopian hopes on "the information age" as a techno-fix for social problems. Yet little is known about the impact these newest media might have on our daily lives, our minds, our families' (Rheingold 1995, 12).

The Virtual Triad as a Frame of Reference and Taxonomy

The virtual triad as a model of virtuality in modern society offers two main features:

- The virtual triad is a processor-oriented, systematic frame of reference, within which fields of research, technological development, observations and questionings can be integrated. Taking into account the complexity and the many links within the different fields of technology such attempts to systematize are becoming increasingly necessary and valuable.
- The model of the virtual triad integrates for the first time different strands of development into one single model. The processes of virtualization, cyborgization and bionization, which so far have largely been discussed independently from each other, are combined in the virtual triad, whereby systematic links between such different elements as artificial intelligence, cyborgs, artificial limbs, biochips, virtual reality etc. are revealed.



The model of the virtual triad consists of the three processes of virtualization, cyborgization and bionization.

The Process of Virtualization

The process of virtualization is the main process of the virtual triad. At its center stands the diffusion of virtual realities - virtual worlds, virtual databases, virtual networks, ...etc. - and their embedding into the social fabric. In the course of virtualization virtual realities are becoming more and more an important part of the daily life of modern man. Thus, life in the 21st century will be marked by a multitude of virtual and non-virtual lifeworlds, which will compete with or complement each other.

Definition

'Virtualization is the process of increasing digitalization and evolution of networks of data and media, whereby virtual realities evolve, increasingly becoming a part of daily life and permeating the non-virtual domains of everyday life'.

Virtualization and Technology

The technologies of data processing, telecommunication and the technology of 'virtual reality' are the three core technologies to be identified in the process of virtualization. Within the field of data processing the tendency of a steady increase of processor performance and reduction of size will continue to prevail during the next 25 years. In the field of telecommunication, higher capacities will become available thanks to optic fibre and satellite networks. Furthermore, the convergence of telecommunication and information technology leads to 'telematic technologies', which will finally result in a digital, multimedia 'supermedium', described by Beat Schmid in the following way:

'It is, in the shape of the new hypertext, a continuation of printed media, regarding sound and image a further development of television, regarding interactivity and the possibilities for synchronous communication an extension of phone- and videoconference' (Schmid 1996, 74, translation by the author).

Another core technology for the process of virtualization and the evolution of cyberspace in the Gibsonian sense is 'virtual reality' (VR) technology (see Gibson 1986, 67). The aim of VR is the precise stimulation of the five human senses in order to create an accurate simulation of reality and a full experience of immersion. With different HMD (head mounted display) technologies a perfect stimulation of the visual sense will become likely within the next 25 years; in the field of acoustic stimulation the aim of VR is nearly reached through digital sound and three-dimensional headphones. Still, it is doubtful whether the haptic, olfactory and gustatory senses can be stimulated perfectly within the following decades, as until now only small steps have been made. The key technology, however, could be neurotechnology, which would make an exogeneous stimulation superfluous thanks to neuro-silicium-couplings in the respective regions of the brain.

Digitalization and the Evolution of Networks

In the course of the process of virtualization a digital code, which is based on binary arithmetic with the digits one and zero, becomes the dominating code for processing, transmitting and storing data, gradually replacing the original, analog codes. Through this convergence to one standardized, digital code a common format for handling data and media evolves. Pictures can be processed and edited as well as voices, music, video films, journals or a book. The common digital code makes it possible to send and receive all data through the same channel.

Besides digitalization, virtual databases will increasingly be linked to each other within networks and can thus be accessed independently of time and space. This evolution of networks is already observable in many ways, and influences both workplaces, public institutions, educational institutions, libraries and exchanges or financial markets. Thus, the means of data transfer are as irrelevant as the storage media - e.g. electromagnetic disks, harddisks, tape streamers, RAM chips or CD-ROMs - on which digital data is saved.

The Virtualization of Daily Life

New technologies are more and more becoming a part of everyday life in modern society. In that sense we can speak of a virtualization of daily life, whereby virtual realities will increasingly overlap the non-virtual lifeworld. The remaining part of face-to-face communication will be substituted by mediated, virtual communication within the next 25 years. As a result of these new possibilities and necessities, virtual relationships and virtual communities evolve.

'Changes in media and communication technologies aren't marginal improvements. The system of society consists of communication. There are no other elements, no other substance than communication. Society does not consist of human bodies and brains. It is simply a network of communication. Thus, if media and communication technologies change, new structures become possible and maybe even necessary in order to deal with the new complexities' (Luhmann 1989, 12, translation by the author).

The Process of Cyborgization

One of the foundations of the process of cyborgization was laid by Norbert Wiener (1948; 1954) with his concept of the 'cybernetic automaton'. He described the leitmotif of cyborgization as follows:

'We have modified our environment so radically that we must now modify ourselves in order to exist in this new environment' (Wiener 1954, 46).

The most important technological developments of the upcoming 25 years concerning the process of cyborgization will most likely evolve in the field of nanotechnology, bioengineering, neurosciences and bionics.

Definition

'The social process of cyborgization leads to a melting process between man and machine. Man is becoming more and more a cyborg, a man-machine hybrid. In the course of cyborgization man invades his body ever deeper with the help of technology and

accelerates the prosthetization of the naturally imposed biological body. This leads to a gradual leaving and disposing of the natural body and the imposed restraints'.

The Invasion of the Body

The history of medicine is also a history of opening, decoding, exploring and invading of the human body. Nowadays, there is a considerable amount of invasive and non-invasive technology available, whereby especially angiography, magnetic-resonance-angiography, endoscopy and computer tomography are most prominent. However, our visual and acoustic senses are being improved as well through invasive artificial devices, for example through permanent contact lenses which are planted directly beneath the cornea, or cochlea-implants, that are directly placed into the cochlea of the human ear.

The Prosthetization of the Body

This process of prosthetization can be observed with exogenous prosthesis, worn on the outside of the body, or endogenous prosthesis, which functions within the human body. Examples of cyborgization through exogenous prosthesis are pagers, mobile phones, personal communicators, palmtops or multifunctional watches, while heart pacemakers, artificial limbs or retina-implants are good examples of endogenous prosthesis.

Leaving the Body

In the course of the prosthetization the natural body is being disposed of and gradually left behind. Thus in the following 25 years man will keep on trying to get rid of the imposed, bodily restraints and to overcome the limits of nature, a development described by Peter Gross as the

'disposing of human corporeality. The hunt for the perspiring human body, which hobbles bashfully after technical devices, is afflicted with diseases and shrivels towards his own death, has begun. The substitution of its organs is already under way' (Gross 1994, 245, translation by the author).

The Process of Bionization

The process of bionization is diametric opposite to the process of cyborgization and aims at the assimilation of machine to man, whereby the machine becomes a biological-technical hybrid. The process of assimilation takes places both at a

hardware and software level, where technological developments in the field of bionics, neuroinformatics, artificial intelligence and artificial life play an important role.

The final goal of bionization is the creation of virtual and non-virtual artificial life. Thus the process of bionization - as well as the process of cyborgization - will fundamentally change the relationship man-machine and man-technology and lead to a new definition and re-evaluation of this ambiguous relationship.

Definition

'The social process of bionization aims at the assimilation of machine to man, within which biological and human features are incorporated into the machine both at the hardware and software level. Thus the machine becomes a biological-technical hybrid'.

The Bionization of the Machine

The discipline of bionics designs machines and electronic parts following the model of biological organisms (see Steele 1995, 55). Thanks to such an 'Électronique embryonique' smartifacts are created, that work more efficiently and better than common artefacts, as biological principles have been formed and improved in a thousand-year-long selective process of evolution. Thus in the near future neuronal computer systems, smartifacts and products which are based on biological principles will increasingly be embedded into everyday life. "Intelligent" neuroprosthesis, for example, are researched within neurotechnology, that are able to interact with parts of the human neural system (see Eckmiller 1990). Thus, within the next 25 years, biocomputers based on biochips with neuron-silicium-interfaces will appear that support a further merging of man and machine.

Artificial Intelligence

The key problem and at the same time the biggest challenge for any assimilation of machine to man lies in the development of bionization at the software level. No consensus has been found so far within the research field of artificial intelligence what intelligence actually is, how intelligent behaviour could be measured and whether intelligence can be actively created or just simulated (see Minsky 1986; Moravec 1996). In spite of many criticism from different perspectives (see Dreyfus 1985; Weizenbaum 1985; 1994; Rammert 1995) this discipline is expected to make advances within the next 25 years.

Artificial Life

The implicit goal of the process of bionization is the creation of artificial life. To this end, two general approaches are taken: the creation of artificial life in a virtual environment, e.g. within a computer system, and the creation of robots for non-virtual environments.

The discipline of robotics (see Randow 1997), which could also be called the entering of artificial intelligence into the real world, has not yet achieved any significant break-throughs. The virtual approach, however, has been successful in simulating flora, bacteria and viruses in virtual environments, whereby genetic algorithms and neural networks are responsible for reproduction, the sensory system and interaction with the environment. It can be assumed that both approaches will achieve several break-throughs within the next decades, that will bring us closer to mankind's old dream of creating artificial life, a dream that can be traced back into human history over several millennia.

The Convergence of the Three Processes of the Virtual Triad

The three processes of the virtual triad outlined above are closely linked to each other. Through the convergence and the social impact of the three triadic processes, the reality of modern man in the 21st century will be changed dramatically within the next 25 years.

Modern Man in the 21st Century

Man as a 'cyborg' (Clynes/Kline 1995; Haraway 1995) in the 21st century is an 'artificial man' (Lem 1996, 31), who looks better and has better physical abilities than genuine man. Physical capacity will then depend solely on technical advances, whereas intellectual capacity can be improved with the help of bionic brain implants. Such a 'homo cyber sapiens' (Steels 1996) is the logical answer to the information overload of modern society.

The process of cyborgization leads gradually to the leaving of the human, natural body and the gradual casting-off of natural restraints. Thus cyborgization harmoniously joins the programme of modernization, always trying to improve everything, and at the same time fulfills the old human dream of individual immortality and full control over nature.

Living in Virtual Worlds

Virtual realities and virtual worlds are becoming part of our daily life as a result of the process of virtualization. Depending on individual lifestyle and preferences, modern man of the 21st century will spend a significant part of his day in virtual worlds, within which we will work, communicate, inform and entertain ourselves. Virtualization also opens new opportunities in different areas of daily life. With the end of 'monogamous work' (Gross 1996) telecommuting makes it possible for the individual in modern society to become an enterprise, a 'one-person company' (Nohria/Berkley 1994, 123) or 'infopreneur', and to hold a portfolio of gainful occupations (see Dance 1994; Fischer 1995). At the same time, a decline in importance of the immediate, geographic neighborhood and the family network takes place within the private sphere of daily life, resulting in a gradual dissolution of community and social structures. Through virtualization, however, alternative means of communication and social networks spring to life. These enable experiences of interpersonal relationships and community independently of time and space. Virtual worlds, created through the process of virtualization, are becoming the new social spaces that are available to the cyborgs of modern society as an alternative world to non-virtual daily life.

The Virtual Triad and the Project of Modernity

The newly-created worlds of entertainment and simulation have a strong fascination for man in modern society, because they offer a more beautiful and better world, compared to the one that is perceived by a non-virtual look out of the window. In virtual worlds everything is possible: you can change your identity and your looks completely and at the same time enlarge your non-virtual portfolio of roles with any virtual role of your dreams. Virtual worlds of simulation are beyond time and space and are under full human control, and thus they let the dream of omnipotence come true. The project of modernity lies heavily on the shoulders of modern man in the 21st century, and this pressure for more can only be sustained through technological progress. A global abandoning of the 'coercion to correct and improve the world, man and oneself' (Gross 1994, 412, translation by the author) is thus very unlikely and the dynamics of the project of modernity will further be accelerated by the processes of the virtual triad.

'The better and the more precisely we can change biological processes and organisms, the more important becomes the criterion of efficiency to value the living, the less will we accept sickness, impediment or simply a peculiarity of the body that we rate as not beautiful' (Roetzer 1996, 314, translation by the author).

And the categories of beauty, sickness and impediment continue to be defined within the media, which dazzle us with supernatural standards and at the same

time accelerate and justify the processes of the virtual triad. For 'the media is the pacemaker of the optionizing of all realms of being' (Gross 1994, 40, translation by the author) in modern society and thus the most important catalytic agent of the project of modernity.

Conclusion

In 25 years a multitude of virtual worlds will exist as a consequence of the processes of the virtual triad. These worlds will temporarily be inhabited by partly disembodied man-cyborgs and by an abundance of artificial lifeforms that behave in a more or less intelligent way.

These virtual worlds will have excluded non-virtual aspects of daily life to a significant extent, as they offer space for work, leisure, entertainment, communication, relationships and community. Only the basic functions of the human body will still play a role in the non-virtual part of life, as long as they haven't been substituted by the process of cyborgization.

In the course of this development a multitude of social questions and challenges emerge, that have to be tackled, researched and brought into social discourse as soon as possible. It is important not to forget that any new technology cuts both ways, a fact that Stanislaw Lem describes in his witty aphorism:

'with a razor blade you can shave or cut your throath.

It's about the same with technology'

St. Gallen, 22.6.1997
Daniel Diemers

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Executive Summary

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Society and Man under the Sign of Virtuality

The essay under consideration deals with technological developments within the next 25 years and their impact on society. A theoretical model of analysis is outlined, which is constituted by the three interdependent processes of virtualization, cyborgization and bionization. In the course of these processes the ambivalent relationship between man and machine will change significantly, and the daily lifeworld will increasingly be dominated by the new technologies. The essay concludes with the recommendation that these specific developments should be put at the heart of academic research and social discourse. Only if possible social impacts are analysed and discussed in an early phase, will society as a whole be able to benefit from the new technologies.