THE BLACK BOX

FOREWORD

This research was initiated by the look of an old folded up viewcamera that reminded the shape of an alien box. The theme of the black box was the subsequent thought, brought with the fascination for the unknown within, where only input and output is known, but the transition between remains ambiguous. Besides a short overview of the technical image in media history, the main subject in this entry will be the analog digital conversion. The construction of the analog photographic image and the digital video image will be juxtaposed and serve as foundation to examine the idea of the so-called loss of materiality. This process of transformation will be looked at in a rather metaphorical way and expresses some philosophical and poetic aspects of its media specificity.
The theme of a black box is very vast and its concept applied in different fields. In psychology the brain is considered as a black box, in photography it is the camera and in new technology it can be the computer. To begin with our brain, the two latter can be seen not only as interfaces, but also as extensions of the human body. In an article about his video work *Eye/Machine* the filmmaker Harun Farocki says: “Eye/Machine surveys a world of hyper alienation, not merely of man from world, but of world from man - a world of our making that has moved beyond our reach.”

INTRODUCTION

When photography was invented, the technical image was born and has evolved through the last century an enormous complexity. So far that we might consider today's media itself as an impenetrable black box. Its output always requires an interpretation, this necessity of decoding makes it difficult to expand into the essence of the technical image, because there are million ways to get lost inside the black box. And even though we accomplish to learn all about the inner life of the machine, we still miss the moment of transaction. This incapacity of the user underlines the loss of control and leads to the autonomy of the machine. The missing transparency covers the disappearance inside the unknown internal structure. Based on the present we are only able to make hypothetical guesses about the hidden absent. Many questions arise: does the transformation during the analog digital conversion as an example of the concept of the black box cost loss of identity, does the process only go one way, a dead-end with no turning back and what would it mean to break open the box?
Psychology uses the concept of a black box as a method to investigate different cognitive processes and it is applied in marketing to analyze the consumer behavior.[1] In the philosophy of the radical constructivism a core theme is that during communication the counterpart can be understood as a black box.[2] Furthermore the system theory uses the concept of a black box by only looking at the relation between the input and the output, this exterior observation helps to reduce complexity of the device and is used for example in software development.[3] One construct of the system theory is the interface, which serves the communication.[4] We can recognize today that interfaces became more and more invisible, for instance the wireless connection for the Internet, infrared connections or Bluetooth. We stand among all different kinds of interfaces, mostly without recognizing them.
In his video with the title *Interface* the German filmmaker Harun Farocki uses the notion to analyze the process during editing. Translated into German interface means both *Schnittstelle* and *Schnittplatz*, it names the cut in between as well as the editing place itself. Farocki mentions the role of the fingertip while editing film and video and how the tactile sense is essential, he uses the term of transfer only "a punctual connection to the real world". He continues and compares the interface with the Enigma typewriter, which was used by the British Empire during the Second World War for coding and decoding information. He says it is all about decoding a secret or keeping it.[5]

THE TECHNICAL IMAGE

New technologies serve to create information and to communicate, but what happens when the operation itself becomes a black box? It is certain that perception has change since the advent of the technical image, but what does its complexity cause to the user and the observer?
In a text about *The Nam June Paik Award*, the author writes, that new media art is not anymore like in the 90's a formal category which is based on a specific tool, it is now much more about being part and aware of the contemporary world which is shaped by media.[6] And just because of that, the role of the device shouldn't be neglected, because it becomes more and more dominant and challenges the artist's control. Based on that, shouldn't we then consider every artist's tool in new media as a black box and where leads that reciprocal influence between art and technology?
A good understanding of that effectiveness provides the text from philosopher Vilém Flusser, *Philosophy of photography*. In the chapter about the technical image, Flusser compares it to the traditional images, which are abstractions in the first degree, whereas the technical image is an abstraction in the third degree, the last part in a causal chain and has to be considered as a concept that requests decoding. What can be seen on a photograph are not symbols like in the digital image, photographs are much more symptoms of the world, because they are in a direct reference to it, as Flusser argues. From there the misinterpretation has its seeds, while looking at the photograph it seduces with its illusion of a window to the world and confirms the trust in the objectivity of the

[1] http://de.wikipedia.org/wiki/Black_Box_%28Psychologie%29
[2] http://de.wikipedia.org/wiki/Radikaler_Konstruktivismus
[3] http://en.wikipedia.org/wiki/Black_box
[4] http://de.wikipedia.org/wiki/Schnittstelle
[5] Harun Farocki, *Interface*
[6] The Nam June Paik Award, Kunststiftung NRW

technical image. The construct of device and user sees Flusser as a black box: "The coding happens inside this black box and therefore every critic of the technical image has to be based on that, to reveal the inner life. As long as we are not in possess of this critical view, we remain analphabets."
In another chapter Flusser uses the camera as a suitable prototype for a general analysis of devices, started from the administrative machinery until the point of the microchip. He then questions the term apparatus and comes to the Latin word *apparare* what leads to the idea that the apparatus is preparing something and as every consumer good and tool it conceals its purpose. Is that also the case for the camera? During the industrial revolution tools became machines, extensions of the human body. Now the relation has turned and man functions in order of the machine. The information that devices produce becomes all the more efficient and expansive, devices can program and control.
Meanwhile the photographer searches for new possibilities to create information. His interest to the world is according to Flusser, only a pretext and rather focused on the device itself. The camera is a black box and can never be looked through. Just in this blackness of the box lies the reason for the photographer to take photographs. He controls the exterior of the device and is controlled by its opacity. The work is automated and though allows him to play. To resume this chapter, Flusser considers technical devices as black boxes, which simulate the thinking in a way of a game with combinations, they automate the thinking, hence man become decreasingly competent. Furthermore Flusser notices that it is not essential anymore who owns the device, but who fully utilizes the potential of the program.[7]
In their film proposal for a documentary Chico Toledo and Mauricio Dwek take on the ideas of Flusser by saying, "how essential his communication theory is for the comprehension of what lies inside the black box of the so-called new media." According to Flusser there were two revolutions: the first changed the work and the second the communication and how people are relied to each other. "Our reality is increasingly mediated by apparatuses that simulate our thoughts and actions."[8] Hector Rodriguez also refers to Flusser and mentions in his analysis *The Black Box* the artist's equipment, "whose internal operation appears mysterious" and the tools "fundamentally opaque". He uses as examples the camera and the computer, prominent parts in the production process of contemporary media art. Rodriguez claims, "that the black box is the fundamental concept of media art theory, because it defines the specificity of its object. The operation is intended to be automatic and results in the exclusion of the human operator from certain stages of the process."[9]

ANALOG DIGITAL CONVERSION

Built on this general vision about the technical image, this part will apply now the concept of the black box to the specific example of the analog digital conversion. An analysis of a process that allows linking the beginning of the technical image, the photography, with the digital image of the video.
Almost every gadget of the modern communication and consumer electronics uses the technology of an analog digital converter, that lies in the core of the device. Inside a scanner or a digital camera the light hits the photosensitive CCD (charge-coupled device) sensor, which then translate the light into electronic charge. The converter furthermore transforms the continuous variations into levels attributed with digital binary values. The number of bits determines the resolution, which means the exactitude of the reproduction.[10] The exact process can be examined into very much detail, but what stands more in the interest of research, is the meaning of the conversion. Under the aspect of a translation from one material into another, the question comes up if there is any loss during the process and if so, what is then being lost? To develop a better understanding for that question, it is crucial to examine with a closer look first the construction of the technical image, the analog photographic as well of the digital video image, before continue with conclusions about the so-called loss of materiality.

In *New media and the forensic imagination* the author Matthew Kirschenbaum embraces the essential during the process of digitizing: Rather than manipulating matter, the computer manipulates symbols. Compared to an atom which has certain physical attributes "a bit has no color, size, or weight, it is a

[7] Vilém Flusser, *Philosophy of Photography*
[8] Chico Toledo and Mauricio Dwek
[9] Hector Rodriguez, *The Black Box*
[10] Thierry Fumey, *Technologie de la photographie*

state of being: on or off, true or false, a 0 or a1."[11] Kirschenbaum adds, they are "symbols to be set and reset, over and over again. A digital environment is an abstract projection supported by its capacity to propagate the illusion of immaterial behavior."[12]
In another text that treats the issue, *The digital event*, the author Norman David Rodowick sees time as the main difference between analog and digital. He pursues his text under the question from Babette Mangolte: "Why is it difficult for the digital image to communicate duration?" and focus his analysis on the film *Russian Ark*, whose shooting was executed in continuous duration. According to Rodowick there are three principal creative operations in digital cinema: the digital capture, the synthesis and composing. During the digital capture, the image is never recorded as a whole, because "the light recorded on the CCD sensor is already fragmented into a discrete mosaic of picture elements, which are then read off as distinct mathematical values. The process of conversion or transcoding separates the image into mathematically modular elements. The separation of outputs from inputs and the process of calculation converting light into code, unravel the unity of the pro-filmic spatial event." He goes on and argues that therefore "the image is always a montage in the sense of singular combination. Even an unaltered digital still is already a work of montage. Digital synthesis produces an image of what never occurred in reality; it is a fully imaginative and intentional artifact." Through digital conversion the direct contact to the world is interrupted, "what looked photographically real has actually lost its indexical qualities." "Russian Ark is no longer an expression of time and duration, rather a manipulation of the layers of the modularized image subject to a variety of algorithmic transformations. This is what I call the digital event."[13]

The philosopher Maurizio Lazzarato investigates in his book *Videophilosophy* also the construction of the digital image and the notion of time and space. What does it mean when the image is in constant construction and never here as a whole and how is the spectator involved in the process? In the chapter *Video, Flows and Real Time*, Lazzarato discuss the movement of the light. He argues that video captures the pure vibration of light, therefore it is constantly moving, not like the immobile single frame in analog cinema, which moves through its mechanical alignment. He continues by referring to Henri Bergson who understands the image as an artificial product of the mind.[14]
At this point it is worth to shortly insert the philosophy of the radical constructivism, whose quintessence lies on the concept that perception does not deliver a reality independently from the consciousness, but reality is for each individual always a construction of sensory stimulus and the performance of the memory. Therefore objectivity in the sense that the perceived image accords to reality is impossible. Every perception is completely subjective.[15]
Lazzarato compares the light in the analog and digital, based on the idea of Henri Bergson that the time-based model should be considered superior to the optical model. Lazzarato continues by saying that the general conception is based on a definition of the vision as optical perception, which confronts the world with the image, but the complexity of the image production cannot be reduced to this optical model. A reduction of the simulation technology like video only to the process of recording would imply a reduction of the human perception to automatic recognition. The optical image links to the reality, literally in the corn of the film or in the magnetic particles of the electromagnetic tape. During the processing of the light the machine reveals what exist already before. According to Emond Couchot the "informational machine" breaks with that optical representation. The synthetic image does not reveal an optical mark anymore, but a logical mathematical model that is no more based on phenomenological aspects of the real. The new image indicates the real not through inscription of the light, but through interpretation of the real.
For Bergson in the center of the construction of the image lies the activity of the memory and the intellectual work. Referred to him the impact of the light in our brain provokes not a single image but an infinite amount of images and it needs the intervention of the memory to compose these millions of vibrations. That is what he calls "intellectual work" and only through that we see and perceive. Digital technologies imitate according to Lazzarato, what Bergson calls "the work of the intellect". They are able to imitate the construction of images that do not yet exist.[16]

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[11] Nicolas Negroponte, *Being Digital*
[12] Matthew Kirschenbaum, *New media and the forensic imagination*
[13] Norman David Rodowick, *The digital event*
[14] Henri Bergson, *Matter and Memory*
[15] http://de.wikipedia.org/wiki/Radikaler_Konstruktivismus
[16] Maurizio Lazzarato, *Videophilosophy*

After that glimpse into the construction of the video image, this text shortly deviates to the photographic image before returning again to the moving image.
The photographic act from Philippe Dubois serves here as a background. The petrification of the object is an essential point in the photographic act. Dubois uses the myth from Orpheus who dies while turning back, like the photographic model petrifies while being seen, a clear counterpart to the digital moving image.
Remaining with photography, this passage allows a short aside to Charles Baudelaire's critical position towards this new technology invented in the 19th century, what links to new media art and Vilém Flusser's point of view mentioned earlier in the text. Baudelaire argues that the faith in science is what made photography to art and that under the pure materialistic progress, the artistic aspects seems to be forgotten. "Nobody can ignore that the industry, when it interacts with art, becomes the worst deadly enemy. Photography degenerate art, thank to its ally that it finds in the mass." Furthermore Baudelaire continues his worries, "if we allow such intervention to the spheres of the mystery and the imaginary, in everything, that only has its value because man add a part of his soul - then woe to us!"
The inherent part of photography is the indexicality through physical contact of the light that comes from the subject. The photograph can therefore literally be understood, as Roland Barthes would say "emanation of the referent". Philippe Dubois underlines that by arguing that what is primary in the analog image is not the resemblance but rather the physical contiguity to its referent. Dubois mentions the transfer of the light during a fraction of a second, only in this "tiny moment, in this space between, the photo is the pure mark of the act, only in this moment it has a relation to its referent in the complete immediateness, the real co-presence and the physical contiguity." By imaging this inner life of the camera, this leads us back to the fascination of the black box, what is hidden, what we do not see and whose we can not be a part of. "I can not get to the bottom of the photograph, I can not penetrate it. I only may wander my glance over the still surface. Because referred to the look, the photograph seams to be completely exterior and yet inaccessible and mysterious as the inner imagination. Hidden, but still apparent, it is about this presence-absence what creates the fascination for the siren."[17]
Later in his text Dubois introduces the theme of the materiality, the silver salt crystals that are hit by the light and how the transformation occurs during the process. "The grains are not defining the image support, they are the actual material of the image, the specific substance. These small grains constitute the matter of the image." Dubois argues that it cannot be compared with the electronic raster of the video image. Chemistry has nothing to do with electronic, he continues. The silver salt crystals are very uneven, without a precise order or fixed orientation, unlike points of the electronic image, where it lies in their origin to be similar and ordered in a very strict model. What is furthermore important in this comparison between photography and video is again the factor of time. "Every point lights only after its antecedent and before its subsequent, which means there is only one point that shines in time", that seems to be the essence of the digital image compared with the photochemical one. "This alternating illumination and termination imply that the video image as such never exists, or at least not in space, but only in time. A synthesis of time, that relies on succession, on endlessly spatial discontinuity. Whereas in photography the image exists entirely in space as in time."[18]

The preceding insights in the construction and the nature of the photographical image now arrive at the issue of the so-called loss of materiality during the process of digitalization and arise the question how far an exact translation of the origin goes?
Therefore conducts Joanna Sassoon's text, *Photographical materiality in the age of digital reproduction*. Her arguments add other aspects to the discussion about the constitution of the photographic image by reinterpret the term of materiality in a different way. It is not about the materiality in its purely physical sense, but rather about its context, the process of perception and its social impact.
Nowadays most of institutions digitize their whole collection. Looking closer to that act, questions come up under what aspects the photographic image should be treaten. Some of them were mentioned above in this text. Here it is not only about the object itself but the meaning being reframed and transmitted into the context of a digital image bank. Patricia Hayes says that this shift results to a "massive de-contextualization, which, if it had occurred with documents, would create a massive scandal". Sassoon goes on by arguing, "what appears to be a technical transformation from the material to the digital should in fact be seen as a cultural process". What constitutes a photograph

[17] Roland Barthes, *Camera lucida*
[18] Philippe Dubois, *The photographic act*

goes beyond the physical and chemical process, the same is applicable for the part of digitizing, it is not "merely changing the physical state of a photograph from the material to the pixel. If a photograph can be seen as a more complex object than simply an image, digitizing can be seen as more than simply a transformation of state. The translation from the material to the digital becomes a cultural, rather than simply a technological process."
Sassoon mentions three prominent attributes of photographs: "the materiality of the photographic object, the concept of the original photograph and the origin of photographic meaning. It is therefore appropriate to consider a photograph as a multilayered object in which meaning is derived from a symbiotic relation between materiality, content and context. From this foundation it is possible to investigate how these aspects of the photograph are altered during the digitization process."
The original photograph can often reveal additional information, for example about the specific camera, the date and even different photographic processes. Through digitizing, not all of them are being replicated, a variety of physical distinctions are eliminated. "Technology reduces the subtlety of the material features of the individual photographic object and highlights the homogeneous nature of the digital image. The concentration on its visual nature at the expense of other material features is further emphasized in the viewing of images through an intermediate and universalizing technology" It is crucial to be aware of that reduction. Saasoon writes that with the average screen "the way we interact with a digital image is entirely different to that with an original photographic object." The example of using a loupe to enlarge detail and to delve into "the core materiality of the surface" underlines what is no longer possible with a screen, the loupe is being replaced by a keyboard or a mouse. What other consequences result of the practice of institution digitizing their collection? It needs to be mentioned that "while digitization is being driven by the real need to increase access to the image content of collection, the question becomes: access to what?"
At this point the singularity and the origin of photographs is introduced and even the negative is understood as the original, the message is being passed through the print. Because different prints can be found in different contexts, made for different purposes and contain material distinctions, they can be considered as multiple original photographs. Saasoon refers to different owners, the past uses and meanings of a photograph. She writes, " Being translated into a digital image is a new stage in the life of the photographic object and a profoundly transforming one. Photographs that were once drawing meanings from their contexts of creation, production and function have been relegated to content-based digital orphans." She underlines this by saying that while creating a digital version of their collection the emphasis of the institutions is more on "the aesthetics of the image content rather than archival material context and research value", which means a missing completeness of "the historical source" in the process of digital conservation.[19]

CONCLUSION

Is it the system, the device or the product itself? A final answer in how to define a black box would diminish the argumentation in this text. The only evident outcome is that there is no clear unique conception of the issue and the previous examination operates with the concept of the black box rather as self-referential approach.
A metaphor that allowed me combine and articulate different concerns I have. In addition to that my own research proposal has become clearer through writing this work. I would like to lead over this thematic to my own critical positionLINK towards new technology and begin reading writers, like the culture critic Paul Virilio and Junichiro Tanizaki to then finally deepen my self directed research based on a comparison between photography and video, the construction of the image and its meanings.LINK Basically the whole working method can be considered as a black box, with deviations between the input and the output and the earlier mentioned loss of control during the process. There is still no display that shows a preview of the result.

With the advice to never open the box Pandora could not resist, with the consequence that all disaster spread out into the world over mankind. The only thing left over and hidden inside the box was hope. And even while being a little pathetic, this metaphor of the other box might close the best with an open ending.

[19] Joanna Saasoon, *Photographical materiality in the age of digital reproduction*