Wearable Artifacts as Research Vehicles

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Introduction.

The wearable technology field, including terms and areas such as wearable computing and fashionable technology, has been evolving at the cross-section of various disciplines including science, technology, arts, augmented reality, design, cybernetics, ergonomics, and fashion. The field continues to investigate and develop wearable items that employ emergent technology. For example, the research community in wearable computing has been carrying out profound work in understanding and defining many key principles in the field. According to these researchers, the wearable computer is understood as a kind of extension of the body, which enables it to perform tasks that would not otherwise be possible, such as being in several places at the same time[1]. This is an example of one of the approaches currently existing in this multifaceted field.

However the field also contains other detectable approaches, each with their own distinct aim. These approaches vary from developing solutions to engineering problems to developments in fashion and design, and further to more conceptual approaches in addressing the field with what the author refers to as a playful attitude. When one more closely investigates various projects in the wearable field one can detect at least three clearly distinct approaches. The first approach is to follow the general guidelines for wearable computing development and objectives defined during the 1990s. The second approach –sometimes called fashionable technology, to some extent follows similar directives as the first approach, but additionally it is strongly related to traditions and expectations in the areas of fashion and textile. The third approach has self-defined aims, which are partially contradictory to the general goals prevailing in the field. This third approach has been left almost without a notice in publications emerging from the field as well as in other theoretical writings concerned of art and technology. Until now the wearable technology field has been discussed primarily as one unified area striving toward similar goals.

This article investigates this third approach. It asks how and why some of the projects in the field seem to differ from the general goals persisting in the field, and examines what the possible motivations and intentions behind this alternative approach are.

To begin, the article introduces common ideas and expectations about technology, and how development in wearable technology has evolved. The article presents the perceivable characteristics of the above-mentioned alternative approach in the field.

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[1] http://www.wearitatwork.com/What-is-wearable-computing.84.0.html [accessed 11.9.2009]

Lastly, the article introduces the Hybronaut as a concept related to the author's practice and research.

Common Ideas, Expectations, and Evolution.

Following the vision of Mark Weiser's definition on ubiquitous computing, it has been argued that the successful technology is able to become so intuitive to our use that it becomes invisible (Weiser & Brown, 1996, Clark, 2003). This often happens when technology becomes accepted into everyday use by large numbers of people, and it transforms into a self-evident commodity as the result of this process. Lisa Gitelman compares the acceptance of media technologies to scientific instruments and their employment. She claims that when scientists invent a new instrument, they have to demonstrate its use and meaning. If they are successful, other scientists start using the instrument and its general acceptance will gradually make it a transparent fact of scientific practice. (Gitelman, 2006) According to Gitelman, media technologies work in a similar manner— technology and its protocols become transparent through a general acceptance of its use. Gradually we will become unaware of our use of technology, its defined aims and underlying structures, although it will keep influencing the context within which it is used.

This kind of transparency of technology as well as its focus on functionality leaves, easily without notice, other aspects of its use, such as what and how these devices impact in the social sphere. One example is the invention of the clock, which synchronized and ordered the life of the people in the cities. The clock became the central medium for structuring daily life, at least until the middle of the nineteenth century. Today telecommunications have taken over the task of ordering and synchronizing life into a global time regime, and its accompanying social structures (Kluitenberg, 2006). Also inventions such as mass-production and the assembly line are claimed to have influenced the standardizing effects of technology on society (Nye, 2006). Furthermore, commercially available technological devices, such as mobile phones, are commonly standardized and restricted to pre-defined functions. Even if it may seem that we have a wide selection of diverse devices and models, they all still appear within the same technological structure deeply embedded into the society. Like David Nye writes: "It is easier to select among many telephones than it is to do without one." (Nye, 2006)

Many of the still prevailing aims for wearable computing were defined in the mid and late 1990s. For example, Barfield and Caudell claim that wearable computing development, and its related field of augmented reality, are driven by the need and desire for people to access and manage information while being mobile. To achieve this we have developed various devices from glasses to wristwatches and mobile phones. We have also invented devices, such as microscopes, telescopes, and telecommunication devices to extend and improve our sensory abilities and communication possibilities. (Barfield & Caudell, 2001)

When looking closer at developed mobile and wearable technologies and devices, it becomes evident that this kind of technology, which is made to be worn and used by humans, is in most cases thought out and constructed for providing purposeful functionality that extends the abilities of human. This development has its roots in the

history. For example the development of wearable technology is often reflected on and compared to the concept of the cyborg. The term "cyborg" was coined for the first time in an article "Cyborgs and Space" by Manfred Clynes and Nathan S. Kline in 1960. This original concept of the cyborg coming from the science was concentrated primarily in extending the functionality of an organism, or a human, to be able to achieve certain goals. These purposefully designed functionalities could be either physiological or psychological, although the emphasis seems to have been on physiological adaptation.

The 1960s seems to have been an especially active period for the early developments that later led to the emergence of fields such as wearable technology, augmented reality, and virtual reality. Ivan Sutherland, pioneer on computer graphics, was working on virtual and augmented reality and developing the first see-through head-mounted display in the mid-60s (Sutherland, 1965). During the first years of the 1960s Edward O. Thorp collaborated with Claude Shannon in constructing the first wearable computer, which was a roulette-predicting device hidden in a shoe. (Thorp, 1998). These examples, along with many other examples, can be considered as predecessors of the field of wearable technology that started to be perceived as its own field during the late 1990s, mainly owing to an active and enthusiastic work by Steve Mann who has written extensively about the area[2].

Perceivable Characteristics and An Alternative Approach.

A thorough investigation has revealed that in the current wearable technology field projects exist that present us with unexpected characteristics that intentionally contradict the goals for smooth and purposeful functionality. Although the single projects differ from each other, one can trace shared identifiable characteristics such as an overall ironic attitude, peculiar functional structures, and a sense of exaggeration in visual aesthetics. In comparison to the typically sleek and unobtrusive design of the commercially aimed wearable technologies, these projects often appear overtly visual and theatrical. Additionally, they are not necessarily designed to be convenient to wear, but their unconventional characteristics often entail physical and even mental adaptiveness from the users.

The rejection of demands for rational functionality and the above-mentioned unexpected characteristics set these projects apart from the rest of the field. While these projects, with their distinct style and unexpected aspects, can also have interesting technical functions or other technical qualities, there is clearly another kind of criterion that takes precedence. The impacts of the criterion can be seen, for example, in a way that these projects challenge the standardized ways in which technology is usually understood and used in wearable technology. Secondly, the projects create awareness about the processes that make technology transparent and seemingly resist it. And lastly, while

[2] http://genesis.eecg.toronto.edu/ [accessed 15.9.2009]

posing questions about the meaning and purpose of technology in our everyday life, these projects propose new viewpoints into the field[3].

Because these kinds of above-defined projects differ clearly from other more conventional approaches to wearable technology, it is worth considering why these projects appear in the first place and, further, what their aims are. At one level these projects seek to question and even to go beyond the traditional assumptions and expectations about the functionality of wearable technology. In this way, they help us to see how technology and various devices determine our behavior and influence our thinking, which is often happening without notice due to the growing invisibility of technology. On another level one can see that the use (or the uselessness) of these kinds of above-defined wearable technology projects can be purposeful for other things. Since they do not follow the general assumptions and expectations, they offer possibilities for re-interpretation of the purpose and meaning of these applications and technology in general. Therefore they can be seen as an open opportunity for re-evaluation of technology and future prospects of humans.

For the readers' convenience, a list of relevant examples of wearable technology projects (by the author) are at the end of the text.*

Hybronaut – Concept and Figure.

The author's artistic practice and production can be seen as examples of the above described approach to wearable technology. These projects deal ironically with the possibilities of current communication technologies and wearable technology. Instead of focusing on constructing practical applications and smart devices, they are testing the potentials of existing technological infrastructure by developing proposals and projects that deal with technology from a different, new perspective. This viewpoint questions the general perception about the role of wearable technology and the underlying expectations of its purposefulness.

The projects (by the author) focus on investigating technology, and its character in the so-called hybrid space. Hybrid space appears in the merger of physical and virtual space. It can be understood as an environment where social and other practices may occur simultaneously in the physical and in the technologically constructed virtual space. (de Souza e Silva, 2006) One of the interests in the wearable technology projects by the author is precisely such technologically enabled hybrid space, and its potentials to use it for constructing alternative perspectives to technology and to everyday life.

The Hybronaut is a practice-based concept developed as a kind of a research vehicle to aid in the investigations within the hybrid space. The Hybronaut is a metaphorical concept, a theoretical concept, and a realized figure or form which becomes visible when someone is wearing the offered equipment constructed for the Hybronaut. The Hybronaut was created because of a necessity to articulate and investigate the user

[3] Here it is worth of noting that there is a wide variety of projects in the field, and this proposed viewpoint is not meant to be rigid in categorizing them into one or another group. Many of the projects on the field may well fit under various categories.

and the device as a single entity instead of scrutinizing them separately. (Beloff, 2007) It is an open concept that transforms according to the situation and requirements, yet it has some permanent features, for example, the Hybronaut is irreversibly linked to its hybrid environment and dependent on the existing technological infrastructure. The Hybronaut's experimental equipment allows an imaginary expedition in hybrid space. The equipment functions as a catalyst that enables this process but itself does not change during the process. Compared to how we at the moment use the hybrid space primarily for performing of tasks, such as using a phone or obtaining information, the Hybronaut focuses simply on exploring and existing in the hybrid space. The Hybronaut resides in the merger of physical and technological, or virtual, space looking for new possibilities. In the same way as the Hybronaut's equipment is designed as open experiments, the enabled expedition does not have a pre-defined objective which it is aiming for. The Hybronaut calls into question our perception about technology and its expected rationality. A feature central to the projects by the author is the opportunity to the first-hand experience as a user, or as the Hybronaut. This experience concentrates on activity of the 'expedition' itself rather than aiming for presumed results. In the core of this research is the human and the human & technology relationship, and specifically the potentials and impacts of wearable technology. Compared to the product- and goal-oriented approach to wearable technology, the interpretation of purpose in these works is intentionally left open. They indicate a free research, an open possibility, or some kind of lab work where something new could emerge.

Conclusion.

Our understanding of technology is often tied to instrumental understanding and expectations, where technology is considered a useful servant to humanity. This is emphasized in the adaptation of technology as a tool, which, if successful, helps the transformation of technology to become transparent in everyday use. When the technology becomes transparent, we no longer see its implications to our lives. This is also the case when it concerns the field of wearable technology, which is primarily following the principles of ubiquitous computing and aiming at intuitive and smooth integration of users, environment, and transmitted data.

The author's investigation reveals that there exist projects within the field of wearable technology that do not follow traditional guidelines, but intentionally challenge the defined aims. These projects go beyond the traditional assumptions and expectations of wearable technology and make visible the ways in which technology determines our behavior and perception. Simultaneously these kinds of projects offer open possibilities for re-interpreting technology. The Hybronaut is a practice based concept and a developed research vehicle that explores hybrid space with the above-described alternative approach. Through the use of peculiar-looking equipment the Hybronaut ironically reveals our constructed expectations and increasing dependency on technology. The design principle of the Hybronaut's equipment is, firstly, creating the device and secondly, discovering the outcome, instead of developing the device and its outcome with predefined, intended goals. In this way these projects of the third aforementioned category of this article — that of self-defined aims, which are partially contradictory to the general goals prevailing in the field, enable the development of better understanding

of a relationship between body, technology, and environment, as well as they leave open space for interpretations of the future potentials.

*Examples of projects
EMPTY SPACE by Laura Beloff (2008-09) A loss of someone or something leaves a temporary empty space to one's world; this work offers a possibility to dedicate the wearable 'empty space' (a vacuum capsule) to ones needs. The work is functioning in hybrid space; it is accessible for the public through an online site, and the dedications will be visible on the physical and wearable capsule, which is carried around by volunteering people within their everyday lives on the streets, at homes, etc. This piece is not able to 'perform' without the participation of the public but is dependent on it. The work makes apparent the technologically networked world our lives are entangled in.
http://www.emptyspace.info/

HEART-DONOR by Laura Beloff & Erich Berger with Elina Mitrunen (2007) is a wearable vest addressing our life in hybrid space. You can "wear" the hearts of your own selected network, and observe the presence of these people in physical and virtual space. The work takes its point of departure by rejecting the concept of the differentiation of virtual and physical layers of the world. This work is specifically constructed for hybrid space. It is imagined as one's personal apparel –a life vest- for a long term everyday use. The work is not created as a tool or defined as a function aimed at specific tasks. It is created as wearable apparel enabling everyday existence within a hybrid space. One becomes an observer of the hybrid world, the one who simply exists within it.
http://www.realitydisfunction.org/heartdonor/

THE HEAD (wearable sculpture) by Laura Beloff (2004-06, 07 various versions)
http://www.realitydisfunction.org/head/
THE FRUIT FLY FARM by Laura Beloff (2005-06)
http://www.realitydisfunction.org/
SEVEN MILE BOOTS by Laura Beloff, Erich Berger, Martin Pichlmair (2003-04)
http://randomseed.org/sevenmileboots

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