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(Im)Paired Bodies: design as co-domestication, the case of wearables

Emeline Brulé

Abstract:

The emergence of “smart” devices close to bodies and fed by personal data (smartwatches, smartphones, smartglasses, smart fabrics...), questions our definitions of agency, sociability and embodiment. How do you design objects acutely aware of what one's body is, with respect and care for one's agency, while enabling a continuous evolution of the self? What may design enable to contemporary embodiments? How could we design intimate sociable objects? And last but not least, why are we investigating these potentialities?

We will first introduce the historic and philosophical roots of wearables, before presenting short case studies of a serie of smartwatches and highlights their common points: rhetorics of health, productivity and control. We will then propose a framework for their analysis, and present the major issues of their design process, building upon our current experiment. To conclude, we will discuss the definition of paired technologies.

Keywords

Smart objects; disability studies; wearables; design; algorithms

1- Historic and philosophical roots of wearables

“Smart objects” commonly define artefacts presenting one of several of these capacities : (self-)identification, data capturing and processing, communication and actuation (Perez Hernandez & Reiff-Marganiec, 2014). They belong to the paradigm of the Internet of Things, which emerged as a concretization of Weiser’s notion of Ubiquitous Computing, or Ubicomp (Thebault, 2013). On a broader scope, Ubicomp is rooted in the humanistic ideal of the modern project[1] and proposes to “activate the world” (Weiser, 1991) through mediating apparatuses. Even though it acknowledges the entanglements of the computational, social, cultural and natural spheres, it remains a project for the lab (Bell & Dourish, 2007) and does not clearly unveil its political implications, issues for surveillance, governance, diversity and ideology (Dourish and Bell, 2014).

[1] Especially Heidegger and his notions of periphery and ready-at-hand.

Wearables constitute category of smart objects. As stated by Mann, one of the pioneer in the field of wearable technologies, it designates a “miniature body-borne computational[, programmable] and sensory devices [that] may be worn under, over, or in clothing, or may also be themselves clothes” (Mann, 2014). Because this definition is sometimes insufficient (Is a smartphone a wearable? What about smart rollers? Or bionic prosthetics? Or embodied technologies, such as implants and smart medical devices?), he proposed to use the word *bearables*, for body-borne technologies. We will use both words indistinctively in the rest of this article. He also defines them as “an embodiment of Humanistic Intelligence” “- i.e. intelligence that arises by having the human being in the feedback loop of the computational process” (Mann, 2014). They inherit from various technical artefacts, such as glasses, watches, prosthetics, abacus rings or navigation tools (fig. 1).

2- Understanding Smartwatches

Wearables being loosely defined as cognitive embodied apparatuses and tools, objects named as such may be quite diverse. With this concern in mind, we constituted a corpus of smartwatches to attempt characterizing them more precisely through that example. We chose smartwatches for several reasons. First because the measurement of time they allow has been widely studied through epochs and culture, underlining its entanglements with work, social and cultural organization (Thompson, 1967). Second, because watches are the first widespread personal mechanical device and strong cultural icons (Hall, 2008), while smartwatches are *mimesis* of past devices, covered by a name easing their adoption (Huyghe, 2014), building on strong imaginaries from fictions (Smartwatch Group, n.d.). Third, because they represent an important part of the wearable market, with “nine percent of online U.S. adults plan[ning] to purchase a smart watch in the next 12 months” and “projections to grow from 600,000 units [...] for 2013 to 960,000 units [...] for 2014.” (CEA, 2013) Therefore, if we are able to identify what comes from the past, we may be able to uncover what constitutes their “innovation,” while taking into account their process of concretization (Simondon, 1958) on a technical and social level.

This corpus is constituted of eight smartwaches that received an award from the *Consumer Electronic Show* (CES) in 2015, a yearly event showcasing worlwide technological innovations for the public for more than 40 years, “organized by the Consumer Electronics Association (CEA), the technology trade association representing the U.S. consumer electronics industry” (CES, n.d.).They were represented in three categories: Accessible Technologies, Fitness, Sports

and Biotech and Wearable Technologies. One received two awards. (Table 1) Since they are considered as exemplary of what a smartwatch can be, their features may highlight characteristics useful to draw a design space. In table 1, we listed all the features listed on the US product websites.

Smartwatch Name	Award category	Features
2EzLt	Accessible technologies	Optically senses fingers, wrist worn mouse capabilities, interfaces with other devices, watch
Polar M400	Fitness, Sports and Biotech	GPS, coaching, training and activiy tracking, cardiac frequency measure, smartphone alerts, sleep analysis, evaluation of burnt calories, watch
Polar V800	Fitness, Sports and Biotech	GPS, coaching, training and activity tracking, cardiac frequency measure, coordinate specific sensors for cycling/running, smartphone alerts, sleep analysis, altimeter, barometer, evaluation of burnt calories, watch
Withings Activité	Fitness, Sports and Biotech, Wearable Technologies	Activity tracking, coaching, sleep analysis, evaluation of burnt calories, time zone automatic synchronization, watch
GUESS Connect	Wearable Technologies	Smartphone alerts, voice command, watch
InBody Band	Wearable Technologies	Activity tracking, sleep analysis, measurement of fat mass, percentage of body fat, muscle mass and body mass index, cardiac frequency measure, evaluation of eaten and burnt calories, watch
Moto 360	Wearable Technologies	Activity tracking, cardiac frequency measure, voice command, contextual informations, smartphone alerts, watch
Samsung Gear S	Wearable Technologies	GPS, music reader, UV intensity sensor, cardiac frequency measure, evaluation of burnt calories, coaching, voice command, smartphone alerts, activity tracking, phone, internet access, watch. Independant from smartphone.

2.1 Features and Argumentative Support

As we can see, there is a strong focus on activity tracking (6/8), coaching and evaluation of burnt calories (5/8), sleep analysis and cardiac frequency measure (4/8), plus a number of health related functions like the evaluation of UV intensity and sun exposure or evaluation of fat mass. All of them can still be used as a watch, and most of them serve as an extension for smartphone (alerts, notifications etc.). Several provide interfacing tools, through voice command (3/8) or gestures (1/8). While some are highly specialized (2/8 for high intensity training), others seem to be versatile.

Baselines or incentives of the products confirm they are supporting “health”, “healthier lifestyle” or “empower healthy lifestyle” with “style.” Several also underlines “performance,” “success” and to “push your limits” and they encourage mobility, as “motion is life.” (Table 2)

Smartwatch Name	**Argumentive support**
2EzLt	“Disorders can be minimized” / “Never give up” / “The power of light is yours”
Polar M400	“stylish training companion” / “enhance your experience”
Polar V800	“reach peak performance” / “enhance your experience” / “beat your personal best”
Withings Activité	“Motion is life” / “Get on the right track” / “stylish”/ “inspire and empower a healthy lifestyle”
GUESS Connect	“smart, high-tech value to GUESS’ young, sexy and adventurous buyers”
InBody Band	“Exercise band, as well as a fitness and health management”
Moto 360	“A watch for our times [...] that suits your style.” / “inspires a healthier lifestyle”
Samsung Gear S	“Connect Like Never Before” / “designed to push your limits and track your success”

Table 2: Argumentative supports of smartwatches.

What this may indicate is a form of normative control (Cerderström, 2011; Deleuze, 1990) that relies both on the institution (such as the wearable industry, the medical organization and health politics) and on an internalized norm. It places health as a medicalized (Lupton, 1995) on-going process, to achieve through self-control. This form of control is not only presented as desirable (a “style,” with “style”), but also as empowering, supporting a true, authentic self as long as it is not deviant (Cerderström, 2011). Interestingly enough, two products do not use this argumentation: one is mostly destined to people with some form of disability, the other is a luxury good. The rest targets members of the productive force. Which would point towards the use of “health and authenticity [...] for controlling and regulating identities in the workplace.” (Cerderström, 2011) It places the smartwatch not just as a manager of activities but as their motivation. In most of the argumentative support, there is a claim to agency from the object, wich “inspire,” “empower,” “push,” “enhance”...

2.2 Coaching and the Medicalization of Health

As we saw, coaching is a well-represented function among our corpus. Three different types of coaching co-exist. The first is personal and aim at setting oneself norm, in order to gain a better understanding of activities. The second compares you activity to a pre-setted norm, with feedback from the wearable concerning how you do and how you could do better at one task, as a reflective practice. The third relies on visibility and networked goals, such as challenging your friends and getting social feedback on your activities. It is interesting to note that the smartwatches are given agency: they coach, “inspire”

In each case the protocol of data acquiring and processing is crucial to the production of the norm. But there is hardly any precision of how the standards are constructed. Tracking may lack accuracy, as exemplified by the Nike FuelBand (Case, Burwick, Volpp & Patel, 2015).The data may miss crucial parameters, such as who’s wearing the wearables, and the precise setting of the activity. The type of data captured itself answers to a specific and narrowed range of inquiries, informed by politics of health and ideology of motion and productivity.

If practices of self tracking are far from new (think of diaries) and that they have been widely studied as part of the quantified-self movement (e.g. Choe, Lee, Lee, Pratt & Kientz, 2014; Lupton, 2014...), to our knowledge, the material support of such practices have not been investigated much.

3- Analysis framework

One of the most obvious difference with traditional tracking tools (and even with smartphones) is their degree of closeness to the body. Most of the smartwatches are designed to be worn in all circumstances, at all time, much like orthosis or prosthesis. If representations of bodies through data create *bio-objects* or *data doubles* (Lupton, 2014; Webster, 2012) which already modify modes of embodiment, which effects do this orthotisation / prosthetisation proposed by wearables may induce? Since the lifetime of these body extensions is quite different from their host’s, how does it affect the sense of temporality?

This closeness means that, further than personalization, the bearables may propose one-on-one adaptation, a strong co-evolution, or what Haraway would call co-domestication (Haraway, 2008). As they are centered around activities and goals, while proposing situated interactions with the environment, they reconfigure not only the self and the embodiment, but

also how one relates to a larger network of humans and non-humans on various scales. Which questions the marge of autonomy in the evaluation of selves and in the actions they may accomplish on their own impulse.

Which open numerous challenges for design or design analysis, as it should take into account:

- The degree of physical closeness, and its own conception of what a body should be;
- The temporality of the relationship(s) to the object;
- The conditions for co-domestication, co-construction of bodies and objects;
- Various patterns of activities, that may or may not be aiming at productivity;
- The degree of autonomy and sociality of wearables, and allowing for the understanding of their decisions or recommendations.

4- Experimenting with Bearables

Which leads us to the question of how to test this set of hypothesis through design and to explore other possibilities for wearable design. With this concern in mind, we are currently building a set of participatory design experiments, aiming to imagine prospective practices of self (im)paired by bearables. To do so, we are taking design in the public space, a popular science and innovation center. Over the course of several weeks, we will ask various public to answer questionnaires on their knowledge of wearables, understanding of data-doubles, understanding and imaginaries of their bodies and desires for future bodies. Based on these insights, we will conduct ideation sessions relying on collages to imagine what they would like future bodies to look like. Then, other session will be concentrating on the design of a third arm—which is not unlike Stelarc's robotic piece, but rather aims to open the space for an encounter between a wide range of people and embodiments and such a reflective apparatus. Some of the designs proposed will then be built with co-designers from the first steps of the process in the Fablab associated with the innovation center. The goal is to obtain artefacts enabling various degrees of adaptation, and to have them tested during various periods of time by volunteers. Finally, we will ask them about how it may or may not have change their imaginaries, perceptions or desires for / of bodies.

At the intersection of a critical design and inclusive design processes, we hope to raise issues around the production of norms and the construction of bodies with artefacts and to challenge the current politics of wearables.

What we are aiming towards is a definition of paired technologies, through design. If we consider that every technology is assistive as “any device or system that allows an individual to perform a task that they would otherwise be unable to do, or increases the ease and safety with which the task can be performed” (Cowan and Turner-Smith), then it blurs the line between what is impaired and what is paired, and it allows to investigate specifically how bodies and objects may co-domesticate one another.

is a PHD Student in Design and Media Studies at Telecom ParisTech. Her research focuses on wearable technologies dedicated to health. She studies “smart” objects to develop a comprehensive framework of this family of objects. Using critical design, she explores the way we define our bodies via this new kind of prosthetics.

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