A Short Note on the Social Consequences of Wearables

Kristiina KARVONEN
Department of Computer Science, Helsinki University of Technology
P.O.B. 9700 HUT, Finland

and

Jarmo PARKKINEN
Department of Computer Science, Helsinki University of Technology
P.O.B. 5400 HUT, Finland

ABSTRACT

This paper addresses the social aspects embedded and, till now, mostly neglected in introducing wearable technology to the "common man". These include personal, psychological, practical, and social issues as related to wearables. The privacy issues that using a wearable will come along, are also touched on briefly.

Keywords: Wearables, social aspects, privacy.

1. INTRODUCTION

Not long ago it was considered "fancy" to have a personal computer on your work desk. The small size and, later, the graphical user interface turned a professionals' tool to everyman's assistant. As we speak, this process is going on at an ever-increasing speed, making these tools even smaller and even handier. No longer is it science fiction to talk about hand-held computers, or even wearable computers, that can be as convenient as any other day-time wear one might dress in. Having a computer with you will soon be equal to wearing a pair of glasses - just as comfortable, and just as unnoticeable.

There are two overlapping paradigms to the subject: "Wearable Computing" and "Ubiquitous Computing". Ubiquitous computing is usually described as myriads of invisible computers that accomplish tasks we give them, and make computing power as available to us as is the air we breathe [2]. Wearable computers, then, can be defined as small-size device(s) that we may carry around in our pockets, wrists or bodies, and can be used constantly concentrating on them [2]. In our view, these paradigms are overlapping, and may support each other. Finding the boundaries of the paradigms is however out of scope of this paper.

Till today, being technologically equipped has always meant carrying a separate device around. In the near future, the separate device will disappear, and ordinary clothes, or other equipment, such as a wristwatch, will encompass the same functionality. But is this what we want? The answer is probably "yes", even if the issue in itself is not completely problem-free. Yes, we do want this technology, but *how* we want it is another issue. How, in fact, are we going to integrate the technology into, say, our clothes remains to be seen. To get a better idea of the problems - or challenges - that wearables will bring along let us list down a few of them that first spring to mind:

- **Personal issues**: people like different things, so personal likings and also fashion issues matter. Even with mobile phones, coloured slip-on covers are a popular way to personalise the device. With a wearable, the fashion trends and individual likings are likely to have even more significance.

- **Psychological issues**: People are a bit afraid of technology, for example the radiation amounts that mobile phones let out were a big worry a little while ago. Wearables bring the technology much closer to the user's body than mobiles ever did, so this worry is likely to come up again, and has to be dealt with to gain consumer trust.

- **Practical issues**: "How are you ever going to wash a wearable?" is a question that will spring to the mind of any mother or father of a teenager. How, indeed? And, how ergonomic will a wearable be? These are worries that users will have to be provided answers with, before they can be expected to be interested in using wearables.

- **Social issues:** How will wearing a device, having a wearable that is invisible and goes undetected influence the daily social interaction? Is it socially acceptable to

wear them at any and every occasion? Should you let others know that you are wearing a wearable? What will be the new etiquette for behaviour with a wearable? Who willl write this etiquette?

2. PERSONAL ISSUES

"Individuality" is a common and often praised goal for many people today in the Western society. We like to differentiate ourselves from others through personal style, personal interests, and personal lifestyle. Dressing up is one way to do this – it is possible to make fashion statements that are individual through choice of dress codes. Of course, not everyone is as interested in her outer appearance, but may be content wearing more or less the same garments from one day to the next. However, personal issues cover a wider range of dressing, namely, *personal comfort*: Someone who easily feels chilly prefers a blouse with long sleeves and a high collar, whereas another person feels overly packed and hot in the same garments. The same goes for the relevant choice of a suitable wearable.

The selection of wearables should also comply with various personality types. One issue to be dealt with is **vanity.** New technology has status value. This may impact the use in two ways: one PDA user we introduced was unwillling to use her device in front of others because she thought others would envy her for it, and would not be so friendly towards her anymore. Another user wanted to achieve quite the opposite - she wanted others to envy her. Thus, their use of the PDA was entirely different. Such interpersonal differences will create a variety of needs that are contradictory, and that the design of the wearables should be able to fulfill.

Clearly, the wearable should be adjustable to many personal types. To please those who like to follow fashion trends, there should be wearables available that are designed by hot names in fashion industry. Another approach is to make the wearables such that they can easily be attached and unattached from regular clothes, to allow for fashion up-dates. The colourful, and/or designed plastic covers of mobile phones can give a key to understand this issue. The same laws of desirability and visibility will comply with the acceptability of wearables as well.

3. PSYCHOLOGICAL ISSUES

For most people, unfamiliar – and even familiar - technology is a bit frightening. A good example is the discussion about the radiation amounts that mobile phones let out that has been a big worry recently. It is a good example in that it shows how little the average man really understands about how technology works, and in that it shows, just how emotional and psychologically sensitive issue one's own body actually is. In an era that idolizes good health and long life with high quality, the news about the possible health-reducing effects of personal technologies such as mobile phones or wearables are far from welcome.

Wearables bring the technology much closer to the user's body than mobiles ever have, and on a constant basis – they are to be worn from nine to five. It is thus very likely that the fears and general resistance towards wearables will be far greater than in the case of mobile phones, for example. To succeed as products, these emotional issues have to be dealt with to gain consumer trust towards the gear as well as acceptability, and popularity.

4. PRACTICAL ISSUES

Even nowadays there are garments that require special care in the terms of washing, drying, and even dressing. For example, clothes that need chemical wash may be regarded as "upper-class" or "better" in another context, but "unpractical" or "unecological" in another.

At current when we are still in wait of the wearable markets to open up, the only way to gain an understanding on these practical issues of wearables is through analogies. One way of doing this is to collect data from user studies with small mobile devices that can be carried around in a pocket, thus simulating as far as possible the "wearability" aspect. In a study conducted in HUT (Helsinki University of Technology), eight students were given a PDA and a mobile phone, which enabled the students to browse web whenever and wherever they felt like it. The goal of the study was to see, if novel use situations would arise through the option for mobility. The students did not, however, use the browsing facility too much. As a reason was found, that carrying two separate peaces of equipment that needed to be arranged in a special way for browsing was regarded as too cumbersome, as compared to waiting to get to home, school or work, all places equipped with faster connections and equipments that were set up. The convenience of use was, thus, rated higher than location-independent access.

It can be argued that at least for now, special clothes are for special occasions only, and garments containing wearable computers must be designed and built for special use or robust enough to sustain everyday tear and wear. Things will change when the convenience of use rises to the same level as it is with "un-wearable" technologies.

5. SOCIAL ISSUES

Dyer & al. suggest that even experienced users expect technology to have a negative impact on social interactions [1]. In their studies, they also show that in social situations, the participant without technical devices is regarded as more positive than those with a technical device. According to them, the problem with contemporary devices is that their informational contents are not easily sharable, and using the devices requires careful looking which diverts the gaze of the user to the device, and away from the people around him, thus cutting down the contacts to people.

At current, there are many kinds of medical, legislative and military wearable computers under development. The development of these devices seems to suffer from the same symptoms as the development of early computer software: The most advanced wearables of today are always designed "by us, for them", by institutional or other authorities. Using a wearable may thus bear a social tradition and exhibition of governmental authority to some extent. Should the use of wearables be imposed on the users somehow, instead of the use being voluntary, the acceptability of wearables would naturally decrease. The horror view is that everyone has to have a microchip inserted inside the body that then allows for continuous surveillance and control over citizens. If wearables are perceived as means for such control, they are likely to be rejected by people. This discussion has, in a way, already started, with the introduction of location-aware services, the global positioning services (GPS) embedded in the current mobile phones. This new technology has given rise to a vivid discussion on people's rights to go undetected and unobserved about their daily business. How these issues will be settled, remains yet to be seen. In Finland, the emergency services of the state were recently allowed for tracking down the locations of a mobile phone an emergency call is being made from. This has seemed to have gained the acceptance of the public.

New social situations

Not only will wearables create new social situations, but also the existing social rules to a great extent will dictate how this new technology can and will be used in a given situation. For example, using a mobile phone in a crowded bus means having a different kind of conversation than when using a mobile phone in a private place. In Finland, the SMS messages are probably more popular than elsewhere in the world due to the fact that in Finland silence is appreciated in public places, so talking to a mobile phone in a bus means violating the rule of silence. Using an SMS message instead is a good solution that enables the user to use the communication facility provided by the mobile phone, without having to break the existing social rules.

Moreover, people still have a lot of difficulty in accepting the fact that nowadays, not everyone seemingly talking to themselves on the street has mental problems but may instead have a hands-free equipment in his use. Talking by yourself strongly breaks the existing rules for how to behave in a public place that this problem cannot be easily overcome. Far less so with a wearable - others may not be able to detect the existence of the device at all, and may be amazed and confused by the behaviour of the person wearing a wearable. It is also a good question if we really want people to adjust too much to this - if it happens, it may also mean that to get someone's attention on the street, talking to them is no longer enough: the "default value" will be that they are not talking to you, but to their wearable, and special indications will be needed to make it clear that the talk is addressed to the person standing next to you.

Visible or not?

The question of whether to make the wearables as visible or invisible as possible is not commonplace. On one hand the technology should become as unnoticeable and ergonomic a part of the cloth as possible to make the use user-friendly and unobtrusive, but on the other hand there is likely to be a strong need to "show off" the new technology - it will have status value. This is only humanely understandable. Also, another reason there will be need to show that someone is wearing a wearable is that under certain circumstances, such as during a confidential board meeting, a wearable must be recognisable somehow. It may be necessary that it can be deactivated in these occasions, as well. As always, it is again clear that wearables like any other technology can be misused - for spying, blackmail, and what-have-you, for example. Ther must be a way to deal with this issue as well. We can see that both solutions, visibility and invisibility, will have their place.

One likely answer to the problem of visibility and invisibility is to base the answer on the **function** of the wearable: In "serious wearables" where the technology of the wearable may have life-saving value - such as when the cloth will both signal the location of a snowstorm victim and keep him warm till the rescue team arrives - the technology should be as ergonomic and visible as needed. Whether the wearable is ugly or not, does not really matter.

But, when we talk about "useful wearables" or "fun wearables" we immediately realise that aesthetics will start to matter. If we think of a useful wearable that helps an elderly to lead an independent life at home rather than in an institution, it is clear that such a wearable will have to be a s inobtrusive and unnoticeable as possible to avoid social stigmata. Another, more attractive approach would be to design this kind of wearables as aesthetically pleasing and desirable, so that they might actually become a fashion more widespread. Hirsch et. al. [2] give many examples on this, from designing scooters instead of wheelchairs to the disabled to avoid stigmatising, to OXO Good Grips kitchen tools that were originally designed for arthritic users but later gained a much wider user base. According to them, such social, emotional, and environmental factors play a

key role in the adoption and use of new products, so they should not be overlooked in designing of wearables either.

It is possible that designers will come up with a new design language of wearables that tells at once that we are encountered by a wearable. At least science fiction stores seem to suggest this. However funny it may seem, such fictive stories seem to hit the spot in these and other such issues considerably often. So, it seems likely that we will be encountered by new kind of fashion, the "wearable design".

6. PRIVACY ISSUES WITH WEARABLES

One more issue in dealing with the social consequences of wearables is privacy. How will wearing a device that will perhaps monitor user's every move, affect user's privacy? It is clear that such a wearable can be used to observe, and to control the user in many ways. For example, at a future workplace, the employer may keep an eye on the employees by having them wear such a wearable. Should this be allowed, and if so, to what extent?

It is likely that users will not understand their own best interests in this matter. It is indeed difficult to foresee, just how privacy-violating information about our bodily activities may be. A close analogy can be found from the Web behaviour: In the Web environment, users have not been able to fully comprehend, just how useful the information they leave behind as they click their way around the Web may be to merchants. Not many experts can claim they could forecast that user information would become a commodity that can be sold and bought either. Becoming aware of these privacy issues happened only later on. The case is even worse for wearables, for we do not have a real parallel of anything like them in real life, so the privacy problems are even harder to foresee.

Currently, there has been a lot of debate going on about the introducing the GPS (Global Positioning Services) to the services provided by an ordinary mobile phone. Having a GPS means that we can locate ourselves and other users on the map - and we can be located by others, be they our friends, enemies, employer, or some eager marketing people. This will no doubt be of help in many occasions, for example in the case of an emergency, where an unconscious patient can be located by the GPS of his mobile phone.

However, not always do we want our location to be known for everyone, and sometimes not to anyone. GPS can be used to control us by jealous husbands or by watchful employers. GPS can also be used by sales people to profile us, and to find out if we are close to their store, to tempt us into buying something "extra cheap" as we walk by. It is obvious that there have to be ways to regulate access to this information about our whereabouts, but how can this be done? And, can the user of the service trust that she or he really is in charge as to who gets this infromation and who does not? What if someone hackered the system? All these same problems will apply to wearables as well.

7. CONCLUSIONS

The future wearables are likely to vary in what kind of function they serve (serious, useful, or plain fun), and their appearance, design, and technological demands will vary accordingly. The use of **serious wearables** may include police work and firemen, soldiers, and medical health care. The **"useful wearables"** will include some other supportive systems, such as enabling the elderly to stay at home to a greater age, for example. The **"fun wearables"** might include having games embedded in the wearables, new dating possibilities etc. The fashion issues clearly fall most strongly in this section, too.

In the future, the whole concept of clothing may be reformulated through the introduction of the technical features in them. This may mean that clothes as we understand them now, may disappear, and wearables will take their place. Some suggestions of future trends of wearables were presented in a fashion show arranged by the Massachusetts Institute of Technology in 1998 (http://wearables.www.media.mit.edu/projects/wearables/out-in-the-world/beauty/show1.html). The idea was that speculation on the collision of fashion and high technology could not be complete without major input from the international design community. A few design schools were invited to participate. The schools formed numerous design teams and submitted close to 100 renderings. Displays, sensors, input devices, and electrical connections became part of hats, shoes, jewelry, and fabric itself, creating an opportunity to make functional technology fashionable. However, speculation about the future dictates that, while some garments incorporated working technology, others remained mere fancy.

The purpose of this short introduction to the social issues that wearing a device will bring along, is to show that they matter a great deal more than we have experienced before, when dealing with the acceptability of technology. Attitudes towards and opinions of technology are complicated and varied. From a user point of view, technology is practically never just technology. When it is something we will wear on our bodies, it becomes very personal indeed - and should be dealt with accordingly.

8. REFERENCES

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