

Design for the user – or be prepared to fail

13 February 2017 | **Internet of Things, Internet of Things Articles** | [Oliver Zihler](#)

Reading time: 5 minutes

How will IoT and wearables improve our daily lives in the future? To get a glimpse of the current state of the art in both science and industry, I visited UbiComp and ISWC, two A* conferences hosted in Heidelberg. I will hereafter present topics, devices, and applications in the context of ubiquitous computing and wearables demonstrated there to identify areas with high promises for success in the near future and original ways to solve problems, also as inputs to our innovation driven work process.

Expanding on limited design spaces for wearables

Current trends: Wristbands and jewelry for sportive and fashionable women

The majority of all wearable devices and applications available to customers in the years 2014 to 2015 were either wristbands (35%) or jewelry (29%). 66% of all applications are designed for women only, 20% for all genders, and only 15% for men. Moreover, around 80% of these applications can be found in sports/fitness or lifestyle/fashion (40% each). These numbers illustrate a severe limitation of the explored design space. Thus, where else except for women with a sense for fashion and fitness can wearable tech be applied?

An Illustrative example: Wearable health appliances

To illustrate how innovation is currently established, I chose the most numerous presented domain of wearable health appliances. For example, the impact of devices for continuous glucose monitoring for diabetes patients was explored with a special focus on a patient's social and cognitive impact. It was found that many devices suffer from false alarms, social inhibitions (they make other people aware of a patient's condition), and usability problems (e.g. pain when wearing the device), causing patients to discontinue its usage despite the improved quality of life. So how could these problems be tackled? One idea of a monitoring system is to help chronic disease patients to take their medication at an appropriate time using a combination of machine learning, a wearer's context, and health expert knowledge. It can be connected to FitBit or Microsoft Band for example, devices that already enjoy high user acceptance, limiting the risk for creators to invent yet another immature device. It was stressed that the user ultimately decides on the success of a device or application. Creating effective wearables requires inventors to completely understand the users in their personal, social, and environmental context, and to innovate specifically for their desires and needs. If the solution is not perfectly suited for them, it will not get adopted and the creation, no matter how innovative it is, will fail. Furthermore, the adoption rate tends to be higher when relying on existing devices with an already established user base.

Wearable health devices may be able to change the way we see healthcare. Nowadays, people go to the doctor when they feel ill. With the help of appropriate devices, health insurance companies could proactively assist us in staying healthy instead. The doctor could come to us before we require (expensive) treatment. Although digitalization is progressing rapidly, companies, not only for health insurance, do not know how to address this issue and may thus be stuck in old ways of solving problems, leaving great potential to radically innovate on the table. Moreover, the analysis of data using machine learning and prediction strategies are realities that have to be incorporated much more into future devices and services, which consequently requires skilled developers.

But what about privacy and security? Will an insurance company charge me more if I decide to lead an unhealthy life? The topic was widely discussed with presentations ranging from the encryption and hiding of sensitive data inside less sensitive data to secure it from outside attacks to a photo capturing system that allows for automatic removal of one's portrait when a stranger takes a picture. The high focus on security and privacy thus hints at the increasing number of ubiquitous devices and sensors requiring innovative solutions that can only be found with an enhanced skill set in the security domain.

Lessons learnt from successful innovators

So how can we be creative, generally speaking? Below I have compiled a list of what industrial entrepreneurs had to say on how to avoid possible pitfalls when designing:

1. Design for users. If they do not accept it, the innovation will always fail.
2. Convince other companies to employ your innovation.
3. If you try a solo run, you are likely to fail. Therefore, partner up with a strong ally.
4. Do not only rely on corporate partners: incorporate researchers of scientific institutions. They have the time and resources to explore new design. Conferences like Ubicomp/ISWC that are joined by industry and research institutions allow them to establish such networks.
5. Cut down to the simplest idea. The simpler the better.
6. Keep features outside the current scope for the next iteration.
7. Innovate for a reason. If a problem cannot be solved with established solutions, innovate. But do not always reinvent the wheel just for the sake of it.

Summary: What do we need to do now?

So what are the key ingredients to exploit these innovation design spaces? It clearly surfaced that there is an undeniable need for intensified multi- and interdisciplinary approaches. Without expert knowledge to distinguish right and wrong inputs, machine learning

approaches are unlikely to succeed. However, the number of skilled developers in the context of user interaction (especially user acceptance), data analytics and machine learning, security and 3D programming grows steadily. Thus, it makes sense to invest in these domains to accommodate and help shape current technological and social changes. And as always, design for the user – or be prepared to fail.