Intimate Computing

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1 Intimate Technology & Vulnerability

Personal and intimate technologies [5] such as mobile location sharing technology, quantified self, social media, high-tech fashion, and virtual coaches in some sense "come close" to us in our daily lives. These digital technologies have many (potential) benefits, e.g., regarding health, efficiency, safety, and human connection. Yet they raise concerns about how they may affect us as human beings, in particular combined with the power of Artificial Intelligence and Data Science. A central challenge facing computer scientists involved in developing such technologies is how to take into account these concerns without loosing the technologies' benefits.

We make the following key observation: our concerns about intimate technologies can be understood as vulnerability arising from their intimate nature. This observation is grounded in research in philosophy of technology and social science [3, 1, 2]. Vulnerability can be defined as the capability to be hurt, and its dual – risk – as the possibility to be hurt. Coeckelbergh [3] argues that as human beings we are existentially vulnerable as a result of our inherent engagement with and openness to the world. This openness makes vulnerability on the one hand the birthplace of meaningful human experiences of love, belonging, joy, courage, empathy, and creativity [2]. Yet, the risk of being hurt also makes us feel afraid and we struggle against it. One way we struggle against vulnerability is through the use of technologies. However, while providing protection against some risks, at the same time technologies inherently create new risks and vulnerabilities, i.e., technologies *transform* vulnerabilities [3].

2 Engineering Intimate Technologies

We argue that intimate technologies make us vulnerable in a specific way, and that understanding *how* they make us vulnerable can form the basis for an engineering vision that takes these vulnerabilities into account, i.e., for a vision of intimate computing as computing with vulnerability. We argue that the core characteristic of our vulnerability in relation to intimate technologies is that it is personal: intimate technologies give rise to vulnerabilities that affect *physical, psychological and social aspects of our identity*. In this sense our relations with and through intimate technologies can be linked to the process of forming

intimate relationships: we expose ourselves to technology and through technology to other people, which can induce a personal response from technology and from other people – comparable to the two principal components of forming an intimate relationship, namely self-disclosure and partner responsiveness [4].

We argue that intimate technologies should allow humans to reflect on and actively shape their vulnerable existence in interaction with these technologies. Specifically, we propose to design intimate technologies as *electronic partners* [6] that allow humans to express to the technology how *they* want to be vulnerable, and that can adapt their behaviour accordingly, e.g., taking into account the supported person's norms and values in the context of their social relations. We argue that such active engagement with intimate technologies instantiates Verbeek's notion of freedom as "the existential space human beings have within which they can realize their existence" [7]. The resulting relation is one of human-technology partnership, in which neither party is fully autonomous nor fully under control. Through this vision we contribute to shaping what it means to be human in a society where people and technology become intimately connected.

References

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