Collective Wristwear: The World in the Hands of Humankind

Alois Ferscha
Institute of Pervasive Computing
University of Linz
4040 Linz, Austria
alois.ferscha@jku.at

Abstract
Personalized wearable ICT systems presented in fashionable and appealing lifestyle-designs have gained critical user acceptance, and comprise momentum to bring wearable computing to a socio-technical mass phenomenon within the next few years. Early indicators for this expected wearable systems 'tsunami' are the 'spring tide' of some 5.3 billion mobile phone platforms (i.e. mobile subscribers) as of the end of 2013, and an assessed market potential for 300 million smart watches in 2014 [1]. This technological and market evolution raises questions on the potentials and opportunities of turning these massively deployed wearable systems to a globe spanning superorganism of socially interactive personal digital assistants. While the individual wearables are of heterogeneous provenance and typically act autonomously, we can assume that they can (and will) self-organize into large scale cooperative collectives, with humans being mostly out-of-the-loop [2]. We could refer to these emerging massive collectives of wearables as a "superorganism" [3], since it exhibits properties of a living organism (like e.g. 'collective intelligence') on its own.

Keywords
Wearable Computing; Pervasive Collective Adaptive Systems; Socio-Inspired ICT; Socio-Technical Fabric.
Introduction

Today’s trends and observable indications for a near future mass deployment of wearable computing technologies like smart phones, smart watches, smart eyewear, etc. will lead to modes of use that go way beyond a pure individual, personalized assistive technology. Taking today’s computational, sensory, actuation and wireless communication capacities of such platforms, it is not just considered possible, but already a reality that these are programmed to operate cooperatively as very large scale ensembles of wearable appliances. As for example, smartphone apps have demonstrated globe-spanning cooperative sensing applications, liquid democracy applications, crowd steering and traffic management applications, power grid and energy efficiency applications, or virtual supercomputing applications etc. [4]. Smartwatch apps will presumably multiply these trends excessively.

One essential aspect of such globe-spanning collective ensembles is that they often exhibit properties typical observed in complex systems [5], like (i) spontaneous, dynamic network configuration, with (ii) individual nodes acting in parallel, (iii) constantly acting and reacting to what the other agents are doing, and (iv) where the control tends to be highly dispersed and decentralized. If there is to be any coherent behavior in the system, it (v) has to arise from competition and cooperation among the individual nodes, so that the overall behavior of the system is the result of a huge number of decisions made every moment by many individual entities. Another aspect is, that such compounds of huge numbers of possibly heterogeneous, self-aware [6] entities exhibit properties of collective adaptive systems (CAS), like “collective intelligence”.

We hypothesize, that the foreseeable mass deployment of wearable computing technologies like smart phones, smart watches or smart eyewear will lead to the emergence of a dense digital substrate to externalize and enhance our physical and social intelligence, and make it a pervasive aspect of our individual and social lives. We further hypothesize that pervasive/wearable computing technologies will make collective intelligence so deeply embedded in our activities [7] to make it impossible, in the near future, to distinguish about what aspects of our “intelligence” are to be attributed to us as individuals, to us as member of the world society, or to us as organs of a continuous and worldwide socio-technical superorganism. The technologies and the processes that will lead to the emergence of such collectively intelligent superorganisms are already in place today.

Acknowledgements

This work was supported by the Future and Emerging Technologies Initiative “FoCAS” of the European Commission (EU FP7-ICT).

References