UBI-SERV

User-centric Design of Ubiquitous Welfare and Safety Services and Supporting Technologies for China and Finland

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The continued improvement in peoples' living standards coupled with advances in medical techniques has extended the span of human life and therefore the population of elderly is increasing dramatically. This development brings up certain significant challenges. Arranging nursing homes for elderly needing help is expensive, but it may also sometimes be culturally unacceptable for them to be cared of away from their families. An overwhelmed pension system limits already decreasing funds of senior citizens and organizing the pension system gets even more challenging as the ratio of workers to retirees continues to decline. The aging population is indeed recognized to form several challenges to healthcare economy and society in general. On the other hand, rapid development of wireless Information and Communication Technology (ICT) is having a fundamental impact to life both in developing and traditional, industrialized countries. While ICT technologies are global in their fundamental technical nature, the related service ecosystems do differ in applied geographical regions and in cultures. This diversity sets challenges to service design, business models and technology adaptation strategies. CHIFIN UBI-SERV project strives to investigate and develop technologies and services in the areas of health and public safety for senior citizens, with a particular emphasis on benchmarking Finnish and Chinese societies as service adapting cultures.

A special topic of the project, remote ubiquitous computing, investigates services applying networked, embedded sensors using Radio-Frequency Identification (RFID) and local communication gateways based on user-deployed femtocell base stations. Online social networks and dimensions of cloud computing are also addressed. We apply user-centric design approach in our research, which implies close interaction with targeted end-users and tight coupling of user needs in our service and technology development processes, both in Finland and China. Investigated applications consider health management and monitoring, such as medication reminders and vital statistics monitoring systems. In public safety we investigate multimedia emergency telemedicine to enable paramedics to improve pre-hospital care for senior citizens; automated emergency calling solutions for independent-living senior citizens; and rich multimedia warning dissemination for senior citizens under risk. In doing our research we strive to understand and map procedures and rules how UBI-service concepts should be culturally understood or even converted to other cultures. Our research includes both economical and ethical constraints aiming for overall, practical service concept applicability. The project has two basic research teams at Aalto University School of Science and Technology (formerly Helsinki University of Technology or (TKK) and Peking University (PKU). Furthermore, these paired research teams are widely networked with industry and universities both in Finland and China. FinChi centre of TEKES and Nordic Centre of Fudan University in Shanghai are our important partners in Chinese territory.

Key publications to date:

- *E. Kaasinen, M. Niemelä, T. Tuomisto, P. Välkkynen, I. Jantunen, J. Sierra, M. Santiago, and H. Kaaja, "Ubimedia Based on Readable and Writable Memory Tags", Multimedia Systems, DOI 10.1007/s00530-009-0171-3.*
- *X. Wang, and T. Korhonen, "Barriers of Implementing Applicable Remote Health Care System in China" in World Congress on Medical Physics and Biomedical Engineering, (Munich, Germany), IFMBE Proceedings, Springer, 2009, pp. 318–321.*
- *I. Jantunen, T. Korhonen, J. Hämäläinen, M. Husso, E. Mutafungwa, M. Pekkola, X. Wang, and Z. Zheng, "User-centric design of mobile & remote health care and safety services and supporting technologies for China and Finland", in OASIS 1st International Conference, (Florence, Italy), 2009.*
- *E. Mutafungwa, and J. Hämäläinen, "Leveraging Femtocells for Dissemination of Early Warning Messages", presentation at Next Generation Public Safety Communication Networks and Technologies (NGenSafe'09), workshop of ICC 2009, (Dresden, Germany), 2009.*
- *Y. Têtu, I. Jantunen, B. Gomez, and S. Robinet, "Mobile-phone-readable 2.45GHz Passive Digital Sensor Tag", in IEEE RFID 2009, (Orlando, USA), 2009.*

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