



FOCUS GROUP MEETING ON

Embedded Systems & Ambient Intelligence

Meeting Report

FG ORGANIZATION

**Infonomics & New Media Research Centre
Zuyd University, The Netherlands**

DATE

31th Octobre 2008

PLACE

European Journalism Centre, Maastricht, The Netherlands

PARTICIPATING PROJECT PARTNERS

CSSC, CESAGEN, OPTEL

HOGESCHOOL ●●● ZUYD



Research Centre
Infonomics and New Media

HIDE Focus Group Meeting on

Biometrics and Body Data in Embedded Systems and Ambient Intelligence

Report by Isolde Sprenkels, INM Zuyd University (i.sprenkels@hszuyd.nl)

On **October 31**, 2008, Zuyd University (Infonomics and New Media Research Center) organized the first HIDE focus group meeting on Embedded Systems and Ambient Intelligence in Maastricht, The Netherlands.

For background documents, agenda and list of participants:

see http://www.hideproject.org/events/fg-embedded_technology.html

Focus group introduction

In the morning session, focus group leader dr. Irma van der Ploeg, recalled the mission and aims of the FG, and introduced the topic of embedded systems and ambient intelligence.

The focus group exploring ethical and social issues in relation to embedded technologies, is one of the four technological areas of Work Package 3 on Critical Issue Identification. Since only a limited number of embedded systems actually involve (personal) identification, the related and partly overlapping technological areas referred to as 'Ambient Intelligence'(AmI), 'Pervasive technology', 'Ubiquitous Computing'(UbiComp) and 'The Internet of Things'(IoT) were also included.

These technological areas all denote a view of a near future, in which a shift away from PCs and desktop configurations to devices embedded in the physical environment, is seen. Essential in this development are radio frequency identification (RFID), miniaturisation, wireless, sensor and networking technologies, which enable people to move through and interact with their physical environments in new ways, and enable objects to interact, communicate and send information about themselves, their users, or their environments to electronic networks and databases.

On the one hand, huge gains in convenience, efficiency and safety are expected, but, on the other hand, it could mean the ultimate track- and traceability and loss of privacy. The information generated on the behaviour of people might form highly tempting resources for law enforcement, crime prevention and security policy, and the collection or processing of personal data can raise serious problems. Moreover, with their emphasis on unobtrusiveness, ease of use, efficiency, personalisation, and convenience, Embedded Systems and Ambient Intelligence appear to be on a collision course with the requirement stipulated in EU Data Protection Directive, art. 7. par.1, that data subjects should at all times be aware and informed of personal data collection.

The primary aims of this first FG meeting were defined as

- Agreeing on a further specification and narrowing down of the topic of the FG
- Discussing a set of key questions to start critical issue identification

After this introduction, dr. Emilio Mordini gave a short introduction to the HIDE project in general, which was followed by the two expert presentations.

Expert presentations

The purpose of the expert presentations was to update and inform participants on state of the art technical developments in the fields relevant to the FG topic. (*presentations available at http://www.hideproject.org/events/fg-embedded_technology.html)*

Dr. Dimitroz Tzovaras, coordinator of FP7 project ACTIBIO at the Informatics and Telematics Institute in Thessaloniki, Greece and dr. Ruud van Munster, senior consultant biometrics and surveillance at TNO Science and Industry in Delft, The Netherlands, were invited to fill the participants in on the state of the art in biometric identification technologies applied in Ambient Intelligence and embedded contexts.

Dr. Dimitroz Tzovaras described two EC funded projects: first, HUMABIO: Human Monitoring & Authentication using Biodynamic Indicators and Behavioural Analyses, and second, ACTIBIO: Unobtrusive Authentication using ACTivity Related and Soft BIometrics.

HUMABIO (2006-2008) intended to address issues that biometric solutions face, like the limited use of multiple biometric modalities, the increased spoofing possibilities and biometric template ageing. Its aim was to develop multimodal biometric authentication and monitoring systems that utilize a biodynamic physiological profile (EEG / ECG – brain and heart activity) and advancements in behavioural and other biometrics such as facial-, speech- and gait recognition and seat based anthropometrics (the way a person sits on a seat / bodyshape). It introduced novel sensors aiming at the user's convenience and system unobtrusiveness, and developed a security framework in order to guarantee trust and privacy concerning a person's personal template and data.

Building on the results of HUMABIO, ACTIBIO (started March 2008) intends to increase performance and unobtrusiveness and enhance safety and security in controlled environments by introducing activity related multimodal biometrics combined with unobtrusive behavioural and soft biometrics (soft biometrics focus on height, weight and body structure), by using unobtrusive sensors for activity related signals like the 'sensing seat', and by designing new application scenarios for unobtrusive authentication and monitoring.

Next, *Dr. Ruud van Munster* focussed on the development of a new concept of airport security at TNO, based on (semi) automatic and knowledge based observation. Van Munster described three innovations, the listening camera which not only provides visual information but analyses and classifies sounds as well, camera's working as a team that prevent the person to disappear by filming from different angles and a new approach for airports called 'integral observation' which profiles passengers through monitoring. Different sensors are to be used to recognize special patterns in body features which indicate arousal (like perspiration and heart beat frequency), behaviour (like motion analysis and trajectory analysis) and possession of objects and materials (like metal detectors and low energy X-ray) without people actively visiting observation stations. A person's risk level increases when combined observations indicate a deviation in

behaviour or possession and this person will be a candidate for closer examination. So each solution in this system of airport security functions as a filter which supports the decision the observers have to make, with the aim of reducing the current checking of all passengers to the '2% that actually need it'.

These two presentations did exactly what they were intended to do: they informed on recent developments in biometric identification technologies, and inspired the participants to raise several questions and discussion points for which the afternoon session was used.

Focal Issues and round table discussion

Prior to the focus group meeting, the participants had received a background document containing an introduction to the topic, some discussion notes developed from a review of a number of recent key documents published by various EC bodies (see key reference documents), and some questions to discuss in the focus group meeting. So in the afternoon session dr. Irma van der Ploeg introduced these focal issues and put some key questions up for discussion.

The key reference documents showed that the European policy context mostly focuses on radio frequency identification (RFID) and the Internet of Things (IoT); RFID and the IoT tend to dominate the regulatory and legislative discourse. To prevent to duplicate this debate, Van der Ploeg proposed to *focus on a particular subset of the technical developments* and applications within the broad area of embedded systems and ambient intelligence, namely those involving *identification, authentication and monitoring of the physical human body, that is, using biometrics and / or other body sensing and scanning devices*. The participants were therefore invited to concentrate on identification of critical issues potentially arising from the use of biometrics (and other personal and / or identifying body data) in, or in combination with the technologies subsumed under embedded systems, AmI, IoT, and RFID in particular, as well as applications of the latter that specially involve the human body.

A few questions that were put up for discussion in this context are: *What type of applications and systems enable surreptitious identification, tracking and tracing of individuals, and how? How should issues of transparency, consent, and possibilities for democratic control be negotiated in such systems? What type of systems and applications targeting the human body gives rise to which issues in particular, and why? What specific new vulnerabilities emerge with / from these systems, threatening whom in particular?*

What followed was a vivid round table discussion, moderated by Van der Ploeg, in which the participants were asked to respond to the proposal and key questions. Several issues were raised and advice was given. A few examples are: Investigate the concept of privacy because it seems to evolve with technological development. Investigate the 'unobtrusiveness' and 'convenience' of these technologies, because these characteristics in particular seem to be of moral and legal concern. Discuss the argument about the 'distinction' between machine and human in monitoring and judging 'suspicious behavior': is a machine really more objective, reliable and just in making such evaluations? Specify the particularities of the use contexts of these technologies. Devote attention to databases, data mining and profiling. Think of issues concerning proportionality and (automated)

discrimination, the link between body and data, bodily differences, and the implications of shifting from rule based to risk based approaches to security.

Results

The participants' contributions to this focus group meeting will be used as input by INM to produce a draft ethical brief, to be discussed, developed and finalised in the course of the next meetings, as the main FG deliverable. In addition, it was agreed to immediately and collectively work on a policy brief concerning the recent controversy on airport body scanning, and the proposal by European Commissioner for Transport Antonio Tajani, to introduce body-scanning technologies on European Airports in 2010. The European Parliament has criticized the European Commission's support for this technology, doubting the justifiability, proportionality, and necessity of the measure, and asking for prior assessment of the impact on privacy, data protection and human dignity.

Heerlen, November 10, 2008