Inaugural Meeting for AWARENESS partners

14-15 December 2010
Amsterdam

FP7: FET Proactive Initiative: Self-Awareness in Autonomic Systems (AWARENESS)
Introductions
Meeting objectives

Get to know each other better
Understand the Awareness projects better
Appreciate areas of commonality and where we can work closer together
Understand AWARE’s activities and how you can participate, or how you can influence these
Appreciate where the AWARE CA can help your project
Get to know each other better!
# Agenda

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Monday, 3 January 2011
The ASCENS approach will focus on service-component ensembles (SCEs), hierarchical ensembles built from service components (SCs), simpler SCEs and knowledge units (K) connected via highly dynamic infrastructure.

**Partners:**
LMU Munich
Università di Pisa
Università di Firenze
Fraunhofer Gesellschaft
VERIMAG Laboratory
Università di Modena e Reggio Emilia
Lero - University of Limerick
Université Libre de Bruxelles
EPF Lausanne
Volkswagen AG
Zimory GmbH
ISTI (Third Party)

Prof. Dr. Martin Wirsing (Coordinator)
Universität München,
Institut für Informatik
The EPiCS project aims at laying the foundation for engineering the novel class of proprioceptive computing systems. Proprioceptive computing systems collect and maintain information about their state and progress, which enables self-awareness by reasoning about their behaviour, and self-expression by effectively and autonomously adapt their behaviour to changing conditions.

**Partners:**
University of Paderborn
Imperial College London
University of Oslo
Klagenfurt University
University of Birmingham
EADS Innovation Works, Munich
Swiss Federal Institute of Technology Zurich
Austrian Institute of Technology GmbH, Vienna

Prof. Dr. Marco Platzner
Coordinator
University of Paderborn
The RECOGNITION project concerns new approaches for embedding self-awareness in ICT systems. This will be based on the cognitive processes that the human species exhibits for self-awareness, seeking to exploit the fact that humans are ultimately the fundamental basis for high performance autonomic processes.

Partners:
Cardiff University
Italian National Research Council
University of Cambridge
National and Kapodistrian University of Athens
Eurécom
University of Florence

Prof. Roger M. Whitaker
(Coordinator)
Cardiff University
The objective of SAPERE is the development of a highly-innovative theoretical and practical framework for the decentralized deployment and execution of self-aware and adaptive services for future and emerging pervasive network scenarios.

**Partners:**

Università di Modena e Reggio Emilia

Birkbeck College – University of London

The University Court of the University of St Andrews

Alma Mater Studiorum – Università di Bologna

Johannes Kepler Universität Linz
The main focus of SYMBRION is to investigate and develop novel principles of adaptation and evolution for symbiotic multi-robot organisms based on bio-inspired approaches and modern computing paradigms. Such robot organisms consist of super-large-scale swarms of robots, which can dock with each other and symbiotically share energy and computational resources within a single artificial-life-form.

**Partners**

Universitaet Stuttgart  
Universitaet Graz  
Vrije Universiteit  
Universitaet Karlsruhe  
Flanders Institute for Biotechnology  
University of the West of England, Bristol  
Eberhard Karls Universitaet Tuebingen  
University of York  
Universite Libre de Bruxelles  
Institut National de Recherche en Informatique et Automatique

Serge Kernbach (Coordinator)  
Universitaet Stuttgart

Monday, 3 January 2011
Overview of AWARE

AWARE Coordination Action in Self-Awareness in Autonomic Systems
Main Objectives: what we hope to achieve

To encourage greater cooperation and exchange between projects funded under the FET Proactive Initiative Awareness

To support researchers and encourage international collaboration

To improve visibility for the grand challenges and methodological approaches identified by this community

To support training activities including summer schools and exchange activities

To help expand a repository of knowledge for researchers (improved synchronisation of concepts, terminology, approaches, etc)

To organise a range of workshops and research consultation events

To promote the field more widely, generating interest with publishers, national science funding agencies, and within commercial environments.
Main Activities

**Website**: a constant presence and focal point for the community, providing information across a range of topics for a variety of users

A series of **workshops** for learning, information dissemination and knowledge transfer opportunities

**Research exchanges** to encourage greater interdisciplinary research

**Summer schools** to train the next generation of researchers and extending skills to the whole community

Research consultations and future **roadmapping** activities

**Newsletters** to provide regular updates of research news and events

An online **Magazine** promoting features on self-awareness research

The **Awareness Book** aimed at the general science public and considering wider socio-technical, socio-political and/or environmental impact

**Documentaries**, including website videos and other promotional videos to create a coherent thematic narrative of Awareness research aimed at engaging a wider audience.

Monday, 3 January 2011
Main Activities

All Coordination Actions aim to provide good cross-over between activities and the AWARE team works closely together

Community Building: Emma Hart
Publicity and Dissemination: Jeremy Pitt
Training: Gusz Eiben, Martijn Schut and Willem van Willigen
Emerging Research Themes: Giacomo Cabri
Supported by Jennifer Willies, Ingi Helgason and Callum Egan
AWARE Project Coordinator: Ben Paechter
Community Building

Why are we doing this?

Encourage research exchange and development
Support interdisciplinary research across national and international boundaries
Develop activities, promote events and disseminate useful materials
To encourage greater cooperation and exchange between people interested in self-awareness
Community Building Activities

**Website** as unified resource for **Awareness** community

Gather and publicise **information about research and researchers**, publications, surveys, articles; conference and workshop details; training materials

Regular **AWARE newsletters** and informative mailings

**Workshops** events in key research areas, ideally at major conferences preferred by **Awareness** projects

Annual **exchange event** involving all **Awareness**-funded projects aimed at cross-cutting themes and roadmapping objectives

Encourage greater **international research cooperation** by offering travel bursaries to researchers and inviting key international experts to **Awareness** events
Publicity and Dissemination

Why are we doing this?

Promote a common understanding of the science, technology and applications of self-aware systems across the range of Awareness projects.

Publicise and disseminate research results from the Awareness initiative, in an informative and accessible manner, through a number of conventional and innovative media.

Create lasting impact by producing tangible products whose utility to researchers and students will extend beyond the lifespan of the project.
Publicity and Dissemination Activities

Website, promoting the **public face** of self-awareness in autonomic systems

**Online Awareness magazine** showcasing success stories and highlighting innovation and development in a popular science journalistic style

**Awareness newsletter** promoting ASCENS, EPiCS, RECOGNITION, SAPERE, SYMBRION and Awareness activities and events

**Awareness book**, an edited volume aimed at the general science public explaining the implications for science research

**Awareness documentaries** demonstrating project results, interviews with leading researchers to be disseminated via **Awareness website**, *YouTube*, and at workshops, science fairs, FET events
Training

Why are we doing this?

To promote training as a form of knowledge transfer to help influence European commercial competitiveness
To organise educational and training activities
To produce training materials useful to academia and industry
Training Activities

Three **summer schools**, particularly aimed at PhD students, post-docs or those new to the field

Production of **training materials** for an academic course (8-12 weeks) and an educated layman seminar (1-3 hours)

Collation of **presentations** from conferences to assist researchers

Build and maintain a web-based **knowledge distribution** system

Work with Awareness-funded projects to develop suitable **training events**
Emerging Research Themes

Why are we doing this?

Research pathfinding involving the Awareness community to determine strategic research directions

To identify potential for interdisciplinary cooperation across communities involved in Awareness-related research themes

To identify emerging research problems, key knowledge gaps and strategic developmental areas for problems related to self-aware and autonomic systems
Organising **open web consultations** to promote continuous dialogues including blog- and video interviews involving the **Awareness** projects

Organising **consultation events** bringing together researchers to identify key research issues (eg at FET11, main conferences)

Surveying and roadmapping within the **Awareness** community to provide an **overview of research issues** related to self-awareness in autonomic systems

Identifying **potential synergies and complementarities** within the research groups involved in the **Awareness** community, as well as with groups involved in other FET Proactive Initiatives

Monitoring relevant **international research** activities and initiatives
Specific Areas for Collaboration
Online Awareness magazine

Similar to PerAda magazine

60 feature articles highlighting innovation, like a journal

Promotion and explanation in 800 words; written in popular science style like New Scientist

Opportunity for wide audience and increase citations

Recommendations for good research stories
Adaptation

- Adaption on multiple timescales
- Organised adaptation
- Adaptation to hostile situations
- Adaptation to changing environments
- Adaptation for robustness
Evolution
• Evolution of new collective behaviours
• Open-ended evolution

Emergence
• Emergent Systems
• Emergent behaviours
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<th>Self–awareness</th>
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<td>• Self–expression</td>
<td>• of state</td>
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<td>• Self–optimisation</td>
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<td>• Self–organising networks</td>
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<tr>
<td>• Self–organisation</td>
<td>• collective self–awareness</td>
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Awareness of me

• How do others see me?
• Look-* self-awareness
• Is the environment aware of me?
Learning/Behaviour

- Learning
- Cognition
- Filtering
- Characteristics of behaviours
- Opportunistic behaviour
- Knowledge
- Knowledge-intensive systems
Distribution and collectives

**Distributed**
- Decentralised systems
- Distributed artificial intelligence
- Robust distributed systems
- Distributed Control

**Collectives**
- Collective intelligence
- Global behaviour – local decisions
- Coordination technologies
- Collaborative decision making
System Properties

Robust/Resilient
• Fault tolerance
• Robustness to sub-ideal operation
• Resilience

Others!
• Relevant
• Out of control
• Homeostasis
• Efficient
• Autonomous
Socially Inspired

- Social media
- Social cognition
- Human cognition
- Human in the loop
- Augmented society
- Social networking
- Socio–technical combinatorics
Services/Systems

- Adaptive middleware
- Architecture support for adaptivity
- Self-joining services
- Common services (middleware)
- Service oriented architecture
- Autonomic service components
Information and Modelling

**Information/Recognition**
- Introspection about norms and conventions
- Utility of information
- Intention recognition
- Event recognition

**Models**
- Meta-modelling of run-time behaviour
- Organisational models
- Modelling the environment
- Modelling inner state
Techniques/Systems

Techniques
• Bio-inspired computing
• Stream computing
• Software-engineering
• Pervasive computing
• Social computing
• E-mobility
• Languages
• Measurement

Systems
• Multi-agent systems
• Ensembles
• Self-governing ensembles
• Cloud computing
• Sensor networks
• Eco system
• Robot swarms
• Autonomous systems
Questions

• How does self-awareness relate to self-*?
• How are self-aware systems designed?
• What are meaningful applications of self-awareness?
• How do we program such systems?
• How do we enable innovations?
Open consultation and networking session on common related to self-awareness in autonomic systems

90 mins: decide best format

What are the key issues to address?

Proposal limited to 500 words and deadline is 15 Jan

From FET11 Call for Sessions:

- Should address a topic that is embryonic, multidisciplinary, transformative or foundational.
- Should aim to present state-of-the-art, develop broad visions and new concepts and identify resulting challenges for frontier research.
- Should feature a broad range of views, enabling different disciplines to come together and engage in a dialogue that creates a wider context.

Highly interactive & unconventional session designs are welcome.

Selection criteria based on

1. Scientific and technological content
   - novelty and interest of proposed topic, including possible creation of new area or transformation of existing area
   - quality of proposed speakers
   - relevance to Future and Emerging Information Technologies
   - impact on science, technology or science policy
   - building of new collaborations, in particular across disciplines

2. Target group
   - key people/communities identified (e.g. diversity of actors)
   - level (not aimed too narrow/technical or too broad)
   - likely interest from addressed communities

3. Design and preparation
   - quality of session design
   - opportunity for interaction
Awareness Summer School 2011

Summer School 2011:

Early September : 5-6 days

Countryside, mountains or seaside : accommodation included

Anticipated numbers 25-35

Format: lectures and teamwork projects, practical examples, good social events, end-of-week presentations

Participants: PhD students, post-docs, yours?
Awareness Training Materials

Aim: to set up teaching repository on awareness

Focus now is downloadable slides/presentations

Focus later: might include text book

Templates for consistency wrt formatting and layout, but also wrt content, terminology, concepts etc

Input from summer school teaching materials, Awareness project, workshops

Weekend lock-in in a nice place!

Output to open courseware, tutorials, ITunesU, mobile apps (iOS, Android)

Bottom up process - input from projects

Visualisation and tag-cloud development
Organisation of workshops and support for workshops

Topics for workshops

What are the main conferences to aim for?

SASO 2011: Michigan Oct (SAPARE plus AWARENESS workshop)

ICAS 2011 Venice May

ICAC 2012 (intl conf autonomic computing)

SAKS 2011 Kiel, March

SAAES 2011 Algarve March

SEAMS 2011, Waikiki May

IROS San Francisco Sept

ACM-SAC
current website: www.aware-project.eu

More than the sum of our parts

Wordpress blog

Uses model of magazine/newspaper

Conversational (commenting system)

Main point of entrance to Awareness

Tagged navigation: highly optimised for findability

Multimedia content for maximum publicity on activities and events

Repository for resources, CFPs, surveys

RSS/Twitter/Facebook
Optimisation of Awareness for search engines

• the key is to get the Information Architecture right

• reciprocal linking is hugely important, esp. for a ubiquitous term such as awareness

• keyword/phrase/theme density in web writing is equally important

• integrating the websites will help to push all sites up the search engine rankings

• by creating a highly visible research portal our research community will grow in numbers and across borders

• please contact me with any keywords/phrases/themes that are core to this research domain: callum.egan@napier.ac.uk

• please link from your homepage to ours and link from your own web pages to each others and ours (thus, creating an AWARENESS network)
Awareness website

Interviews and short films on different subjects

Explaining project research to wider audiences

Awareness project documentaries
Newsletters, documentaries and shared information

Newsletters publicising project research, Awareness events, what is going on

Documentaries and website video clip

Let us help you with your project!

Let us capture your passions, your beliefs and your views on different subjects
Research exchanges

Six monthly simple application process

Aimed at multi-disciplinary collaboration between academics and/or industry

Contribution to travel/accommodation costs (need match funding, or in kind)

Short article for website to follow
Roadmapping consultations

Online blogging: how will this work?

Keyword recombination

What information researchers expect to find, and how will this help?

Online videos with experts’ opinions

Consultation events: what are the best formats and who to involve?

How best to represent the Living Document, how and who to shape it?
Awareness Common Days

First to be organised around Reviews next Oct?

Or at other suitable events?

Common subjects appropriate to most/all projects?

How to collate ideas and move forward?
What else can Awareness do for you?

Other ideas?

Over to you!

Contact us : www.aware-project.eu

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Callum Egan: callum.egan@napier.ac.uk

Ingi Helgason: i.helgason@napier.ac.uk