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3\textsuperscript{rd} AWARE workshop on Challenges for Achieving Self-Awareness in Autonomic Systems

Giacomo Cabri  
Università di Modena e Reggio Emilia  
Modena, Italy  
Email: giacomo.cabri@unimore.it

Emma Hart  
Edinburgh Napier University  
Edinburgh, UK  
Email: E.Hart@napier.ac.uk

Jeremy Pitt  
Imperial College London  
London, UK  
Email: j.pitt@imperial.ac.uk

Abstract—The AWARE workshop focuses on identifying and addressing challenges related to the development of self-aware systems, which are capable of autonomous management thanks to different levels of awareness. The edition of 2013 follows two successful editions in the past SASO conferences, 2011 and 2012.

Keywords - self-awareness; autonomic computing;

I. HISTORY

The AWARE workshop ran successfully at SASO 2011 and again at SASO 2012.

In 2011, there were a total of 5 full papers were accepted, and 2 further short papers presenting work in progress In addition, a keynote speaker from the US, Dr Niranjan Suri, opened the workshop with a talk and discussion. Over 25 people attended the workshop.

At SASO 2012, the workshop consisted of an invited talk (prof. Marco Aiello from NL), 6 accepted papers, a poster session with 3 posters, and a PhD forum for doctoral students to present their work and receive informal feedback; registrations again numbered approximately 25. AWARE also sponsored a Science Caf at Lyon open to all SASO participants to informally discuss some key research challenges over refreshments at the end of the first workshop day.

II. GOAL AND MOTIVATIONS

The goal of the AWARE workshop is to identify key challenges involved in creating self-aware systems which are capable of autonomous management, and to consider methods by which these challenges can be addressed.

The workshop specifically targets an interdisciplinary community of researchers in the hope that collective expertise from a range of domains can be leveraged to drive forward research in the area.

Developing computing and communication systems that are able to autonomously manage themselves in order deliver high-quality of service, while at the same time optimising overall performance and resource usage, is extremely challenging: systems must respond to ever changing conditions, and continuously adapt to external context (such as user requirements and behaviour).

To achieve this, autonomic systems need to develop awareness across a hierarchy of levels, ranging from awareness at individual component level to global levels of patterns of use, system performance, network conditions and available resources.

The workshop is supported by all the projects in the Awareness Proactive Initiative [1] funded by the EC including ASCENS [2], EPiCS [3], RECOGNITION [4], SAPERE [5], and also some “adopted” projects such as CoCoRo [6], Organic Computing [7], and Symbrion [8]. Many of these projects contributed in proposing topics in the workshop call for papers. In addition to healthy interest from many leading European researchers allied to these projects, the workshop anticipated further interest from the wider community working within the fields of self-aware and autonomic computing.

The AWARE workshop is well connected with the topics of the SASO main conference, which are concerned with the systems which exhibit self-* properties. The workshop focuses on a specific sub-topic of self-* systems which is how to achieve self-awareness in large, complex systems.

III. ACCEPTED PAPERS

We have accepted 9 papers, which have been divided into 3 sessions, listed below. Authors were asked to present their papers in short presentations of 10 minutes each. Three panels were arranged during which the attendees were able to question the speakers; this gave an opportunity for the speakers to provide further details of the presented work and discuss any pros and cons. This kind of format was very useful in providing a forum for proper discussion within the workshop.

A. Design

- **Designing Self-Aware Adaptive Systems: from Autonomic Computing to Cognitive Immune Networks** by Nicola Capodieci, Emma Hart, Giacomo Cabri

- **A Modelling and Simulation Environment for Self-aware and Self-expressive Systems** by Tatiana Nya, Stephan Stilkerich, Peter Lewis
• A Life Cycle for the Development of Autonomic Systems: The e-Mobility Showcase by Tomas Bures, Rocco De Nicola, Ilias Gerostathopoulos, Nicklas Hoch, Michal Kit, Nora Koch, Giacoma Valentina Monreale, Ugo Montanari, Rosario Pugliese, Nikola Serbedzija, Martin Wirsing, Franco Zambonelli

B. Open Systems

• Parking assisting applications: effectiveness and side-issues in managing public goods by Evangelia Kokolaki, Merkourios Karaliopoulos and Ioannis Stavrakakis

• Partial Scalability to Ensure Reliable Dynamic Re-configuration by Mohammad Ghafari and Abbas Heydarnoori


C. Synchronisation, Space and Reflection

• The Challenge of Decentralised Synchronisation in Interactive Music Systems by Kristian Nymoen, Arjun Chandra and Jim Torresen

• Reasoning and Reflection in the Game of Nomic: Self-Organising Self-Aware Agents with Mutable Rule-sets by Stuart Holland, Jeremy Pitt, Dave Sanderson and Dídac Busquets

• A Novel Spatial Property Aware Multihop Communication Solution for Autonomous Mobile Networks by András Kökuti, Vilmos Simon, Bernát Wiandt

IV. AUDIENCE

There were around 30 attendees at the workshop. Although mainly from academia, there were also some people from industry, who provided a useful contribution to the discussion.

In addition to the three panels, the workshop participants were also invited to participate in an activity regarding challenges related to self-awareness.

Starting from the 101 Challenges collected by the AWARE Coordination Action 1, participants were invited to refine the challenges, and ultimately select the five most important challenges. The interactive nature of this activity led to much further discussion on self-awareness in general.

The 5 challenges that emerged are described below:

1) How to engineer the system to produce the correct emergent behavior? How can distributed systems with no central controller become collectively self-aware, rather than at individual node level?

2) To combine computer science with social science and to consider sociological aspects besides technical aspects.

3) How to let different systems interoperate and collaborate? How to manage the relationship between individual and group?

4) To address real problems by means of exemplars.

5) How to measure adaptiveness and self-awareness?

V. PROGRAM COMMITTEE

The Program Committee of the workshop was composed of the following members:

• Andy Adamatzky, University of the West of England
• Stuart Allen, Cardiff University
• Nicola Capodieci, University of Modena and Reggio Emilia
• Pedro Maurício Costa, Imperial College London
• Francesco De Pellegrini, CREATE-NET
• Nora Koch, Ludwig-Maximilians University of Munich
• Peter Lewis, University of Birmingham
• Marco Mamei, University of Modena and Reggio Emilia
• El-Azouzi Rachid, University of Avignon
• Julia Schaumeier, Imperial College London

VI. ACKNOWLEDGMENTS

The workshop chairs would like to thank the authors that have submitted a paper to the AWARENESS workshop, the PC members for their effort in reviewing papers, the SASO 2013 organisers for the opportunity of holding the workshop, and Jennifer Willies for the outstanding support in the organization of the workshop.

REFERENCES


1http://www.aware-project.eu/research-agenda/awareness101/