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## Autonomous Systems 2013

Proceedings  
of the 6<sup>th</sup> Workshop



**FernUniversität in Hagen**  
Schriften zur Informations-  
und Kommunikationstechnik

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Autonomous systems and especially those consisting of numerous autonomous agents or sub-systems have gained increasing importance in recent years. The proper function and all components' co-ordination required must be guaranteed, in particular, if central instances can oversee or control the behaviour of entire systems. In addition, the more or less permanently needed communication – mainly over the Internet – is another characterising challenge of such systems. To master problems arising in the area of hard- and software, innovative algorithms for classification, learning, self-organisation and adaptation are presented here. These new approaches ensure real-time behaviour, security and fault tolerance on the system level.

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## Preface

This year, the international workshop on Autonomous Systems takes place for the seventh time and, already traditionally, on the Spanish island Majorca. Its timing in late October became a fixed entry in the agenda of most participants, who appreciate the workshop's quiet and inspiring atmosphere offering ample opportunities for intensive, undisturbed discussions with colleagues, to develop new ideas and to obtain inspiration from solutions found in other research areas. This is mainly achieved by the event's familiar setting and the seclusion of its location in a small hotel far away from daily business and stress. In addition, the workshop serves as doctoral seminar as well, where PhD students present their ideas and projects, discuss their progress with people coming again each year, and where they may meet potential reviewers of their theses.

The contributions to these proceedings give mostly a survey of the participants' recent research activities and interests in the context of autonomous systems. The papers were reviewed for scientific and technical soundness, only, while their content was fully determined by our participants, some of whom decided, however, just to give oral presentations.

Thematically this volume is divided into four main parts.

- Fast hardware, embedded (computing) systems and – today more than before — hardware-based security solutions are the fundamentals of autonomous systems, to be discussed in the first part. The work presented ranges from on-chip network solutions to the verification procedures required.
- Overall system design becomes an increasingly complex and tedious task, which can be supported by suitable models, new analytical methods, simulations and innovative architectural solutions. Several interdisciplinary ideas for doing so are presented in this volume's second part.
- Algorithms are the basis for various solutions and, therefore, in the focus next. As broad as the application area of autonomous systems may be, so wide is the range of topics addressed by our participants in the third part of these proceedings on theoretical approaches touching the areas game theory, graphs and Petri nets, security as well as data mining and classification.

- The final, fourth part is dedicated to the topics search, classification and self-organisation. Since optimising computer networks requires, at the same time, knowledge about the networks themselves, their users and the content provided, methods are presented that take the mutual influences between these three aspects into consideration. This year, content and natural language processing is a theme for particularly intense discussion during the workshop.

Last but not least, a special 'thank you' shall be extended to Jutta Düring for editing this book, and to Barbara Kleine and Werner Schubert for their help in preparing the workshop and taking care of numerous organisational details as well as special wishes of our participants. Also, the support provided by FernUniversität in Hagen in creating this volume is highly appreciated.

Hagen, August 2014

Wolfgang A. Halang  
Herwig Unger

## Contents

### Hardware and Security

Networks in Embedded On-chip Solutions B. Däne, I. Gushchina, A. Osadchuk, M. Müller, W. Fengler . . . . .	1
Towards a New Standardisation of PEARL Oriented at Functional Safety C.K. Houben . . . . .	14
Towards the Verification of a Table-driven Microprocessor Architecture for Safety-critical Systems M. Schaible . . . . .	24

### Algorithms

Classification of Inactivated Pathogens Using Multivariate Adaptive Embedding G. Sartorius, St. Talbot . . . . .	31
Regenerative Recommender Systems M. Komkhao, W. A. Halang . . . . .	48
A Survey Analysis of Music Emotion Recognition M. Sodanil . . . . .	60
An Approach for Determining Optimal Contrast in Visual Cryptography J. Juhnke, H. Lefmann, V. Strehl . . . . .	68

### Structural Aspects

Modelling Aspects of Input Queued Crossbars Applying PENECA Chromos for Coloured Petri Net Simulations Z. Szeifert . . . . .	80
Serial Code Detection with Spiking Networks G. Heinz . . . . .	100

Cascading Failures of Power Grids under Edge-attacks	
G. Zhang, Z. Li, B. Zhang, W. A. Halang . . . . .	122
Trees, Grids and Peer-to-peer Overlays	
H. Unger, Th. Böhme . . . . .	132