

# Preface

*In memory of Roberto Cordeschi*

This book of Proceedings contains the accepted papers of the second International Workshop on Artificial Intelligence and Cognition (AIC 2014), held in Turin (Italy) on November 26th and 27th, 2014. The series of workshop AIC was launched in 2013 with the idea of fostering the collaboration between the researchers (coming from the fields of computer science, philosophy, engineering, psychology, neurosciences etc.) working at the intersection of the Cognitive Science and Artificial Intelligence (AI) communities, by providing an international forum of discussions and communication of the research results obtained.

In this workshop proceedings appear 3 abstracts of the talks provided by the keynote speakers and 15 peer reviewed papers accepted by the Program Committee Members through a process of peer-review. Specifically, 10 full papers (31% acceptance rate) and 5 short papers were selected out of 32 submissions coming from researchers of 18 different countries from all the continents. In the following, a short introduction to the content of the volume (full and short papers) is presented.

In the paper “An Interdisciplinary Approach for a Holistic and Embodied Emotion Model in Humanoid Agents”, by Samer Schaaf, Matthias Huber, Klaus Doblhammer, Dietmar Dietrich, the authors survey contributions from different disciplines (such as Neuroscience, Psychoanalysis, Neuropsychology, and in Agent-based Systems) to a holistic and embodied emotion model. In particular, the paper investigates how models from relevant disciplines can be beneficial in building Agents Systems.

In the paper “Using Meta-Cognition for Regulating Explanatory Quality Through a Cognitive Architecture”, by John Licato, Ron Sun and Selmer Bringsjord, the authors present an investigation on the generation of explanations, framed in the meta-cognitive and non-action-centered subsystems of the cognitive architecture CLARION. The paper focuses on the generation of qualitatively different types of explanations.

The paper “Revisiting Interacting Subsystems Accounts of Cognitive Architecture: The Emergence of Control and Complexity in an Algebra Task”, by Gareth Miles, presents a simulation of an algebra task in the cognitive architecture GLAMP where the cognitive control is not implemented directly but rather emerges from the interaction of several sub-systems.

The paper “Biologically Plausible Modelling of Morality” by Alessio Plebe presents a biologically plausible neurocomputational model of moral behaviour. The model is implemented in a neural network combining reinforcement and Hebbian learning and simulates the involvement of the sensorial system interaction

with emotional and decision making systems in a situation involving moral judgments.

The paper “How Artificial is Intelligence in AI? Arguments for a Non-Discriminatory Turing test”, by Jack Birner, presents a theoretical contribution where the author suggests a resemblance between some long-forgotten ideas of F. A. Hayek’s and some ideas discussed by A. Turing in his well-known 1950 article “Computing Machinery and Intelligence” lying at the basis of “classical” AI.

In the paper “On the Concept of Correct Hits in Spoken Term Detection”, by Gábor Gosztolya, the author compares system for spoken term detection (STD) against human response in dealing with the Hungarian, which is an agglutinative language and, as such, poses additional challenges to both human and automatic STD tasks. A discussion on how the spoken term detection task is evaluated is provided, along with practical tools to individuate ground truths for evaluation (by starting from user information).

The paper “Action Recognition based on Hierarchical Self-Organizing Maps”, by Miriam Buonamente, Haris Dindo, and Magnus Johnsson, presents a hierarchical neural architecture, based on Self-Organizing Maps (SOM), able to recognise observed human actions. The architecture is evaluated in an experimental setting based on the recognition of actions from movies taken from the INRIA 4D repository.

In the paper “Learning Graspability of Unknown Objects via Intrinsic Motivation”, by Ercin Temel, Beata J. Grzyb, and Sanem Sariel, the authors propose a machine learning optimization aimed at learning whether and how some simple objects can be grasped through a robotic arm. The optimization relies on the notion of frustration. The frustration, which is governed by the ‘impulsiveness’, that measures how fast a robot gets frustrated. The introduced frustration is experimentally proven useful to faster learning.

In the paper “On the Cognitive and Logical Role of Image Schemas in Computational Conceptual Blending”, by Maria Hedblom, Oliver Kutz, and Fabian Neuhaus, the role of image schemas in computational concept creation process is discussed. In particular, the authors propose to build a library of formalized image schemas, and illustrate how they can guide the search for a base space in the concept invention workflow.

The paper “Monoidal Logics: how to Avoid Paradoxes”, by Clayton Peterson, presents monoidal logics as a formal solution that can be useful in AI in order to avoid some classical paradoxes based on cartesian logical structure. The main differences between standard Cartesian logics and monoidal logics are presented in the article.

In the paper “Mathematical Patterns and Cognitive Architectures”, by Agnese Augello, Salvatore Gaglio, Gianluigi Oliveri, and Giovanni Pilato, the authors investigate the nature of mathematical patterns and some elements of the cognitive structure an agent should have to recognize them, and propose a mapping of such patterns in the setting of Conceptual Spaces.

In the paper “Romeo2 Project: Humanoid Robot Assistant and Companion for Everyday Life: I. Situation Assessment for Social Intelligence”, by Pandey *et al.*, concerns robotic situational awareness and perception in HRI scenarios. In particular, a general overview of a multi-modal perception and situation assessment system built in the Romeo2 project. redmi pare che questa frase non stia in piedi: forse possiamo aggiungere ‘are illustrated’ alla fine? verrebbe quindi: In particular,

#### IV

a general overview of a multi-modal perception and situation assessment system built in the Romeo2 project are illustrated.

In the paper “Information for Cognitive Agents”, by Nir Fresco, a theoretic account of the concept of “information” is proposed. In particular, the author defends the importance of a pragmatic - neo Peircean - account of information that can be useful in the area of cognitively inspired AI.

In the paper “Mining and Visualizing Uncertain Data Objects and Named Data Networking Traffics by Fuzzy Self-Organizing Map”, by Amin Karami and Manel Guerrero-Zapata, the authors propose a novel algorithm to mine and visualize uncertain objects; the proposed algorithm is successfully applied to known benchmarks and to mine and visualize network attacks in the context of the Named Data Networking (NDN).

In the paper “Implementation of Evolutionary Algorithms for Deep Architectures”, by Sreenivas Sremath Tirumala, the author advocates for further research on deep learning by evolutionary computation (EC) researchers. A review of some latest deep architectures is presented and a survey is provided about some evolutionary algorithms that can be explored to train these deep architectures to the ends of promoting the research on evolutionary inspired deep learning techniques.

December 2014

Antonio Lieto  
Daniele P. Radicioni  
Program Chairs, AIC 2014

## Acknowledgments

We would like to thank the keynote speakers of the workshop: Prof. Aaron Sloman (University of Birmingham, UK), Prof. Diego Marconi (University of Torino, Italy) and Prof. Giulio Sandini (Italian Institute of Technology, Italy) for accepting our invitation.

We sincerely thank the Department of Computer Science of the University of Turin, Italy (<http://www.di.unito.it/>), the Italian Association for Artificial Intelligence (AI\*IA, <http://www.aixia.it/>), and the Italian Association of Cognitive Sciences (AISC, <http://www.aisc-net.org>) for their support in the organisation of the workshop, and also the Rosselli Foundation (Fondazione Rosselli), Turin, Italy, for its precious logistic support. The organization of the workshop also was partly supported by the Progetto di Ateneo-San Paolo, ‘The role of visual imagery in lexical processing’ (RVILP), TO\_call03\_2012\_0046, we are indebted with this sponsor, as well.

We are grateful to the members of the Scientific Committee and to the additional reviewers for their valuable work during the reviewing process. Finally, thanks should be given to our wonderful student volunteers for their help in many practical issues.

This book is dedicated to Roberto Cordeschi, unfortunately no longer among us, whose research was dedicated to the investigation of the epistemological roots of Cybernetics and Artificial Intelligence, with a focus on the explanatory role of the computational models of cognition for the comprehension of the human mind.

December 2014

Antonio Lieto  
Daniele P. Radicioni  
Program Chairs, AIC 2014