

Preface

This book of Proceedings contains the accepted papers of the AIC 2015 – the International Workshop on Artificial Intelligence and Cognition, held in Turin (Italy) on September 28th and 29th, 2015. AIC workshops aim at fostering the collaboration between the researchers coming from the fields of computer science, philosophy, engineering, psychology, neurosciences etc. and working at the intersection of the Cognitive Science and Artificial Intelligence (AI) communities.

AIC workshops (Lieto and Cruciani 2013; Lieto, Radicioni and Cruciani, 2014) have produced, in the past years, a recognized level of discussion in Europe on the cross-border themes between AI and Cognitive Science and selected and expanded versions of their scientific papers have been published in dedicated special issues on international journals such as Connection Science and Cognitive Systems Research (edited by Lieto and Cruciani (2015), and Lieto and Radicioni (2016), respectively).

AIC 2015 has been made possible thanks to the “Fondazione Ricerca e Talenti” (<http://www.ricercaetalenti.it>) of the University of Turin that has fully sponsored the whole event. We would like to thank them for their financial and organizational support. Also we are grateful to the members of the Scientific Program Committee for their valuable work. Finally, thanks should be given to our wonderful student volunteers for their help in many practical issues.

In this workshop proceedings appear 2 abstracts of the talks provided by the keynote speakers Aldo Gangemi and Amanda J. Sharkey and 13 peer reviewed papers accepted by the Program Committee Members through a process of peer-review.

Specifically the 13 papers were selected out of 21 submissions coming from researchers of 16 different countries from all the continents.

In the following, a short introduction to the content of the volume is presented.

In the paper “Cognitive Programming”, by Loizos Michael, Antonis Kakas, Rob Miller and Gyorgy Turan, the authors point out some foundational issues regarding the design of cognitive systems and propose a novel methodological approach for human-computer interaction based on what they call “cognitive programming” paradigm.

In the paper “Towards a Visual Remote Associates Test and its Computational Solver”, by Ana-Maria Olteteanu, Bibek Gautam and Zoe Falomir, the authors describe a computational solver for a visual version of the Remote Associate Test (RAT, a test used for measuring creativity in humans) and present the result of an evaluation done w.r.t. human responses.

The paper “Modeling the Creation and Development of Cause-Effect Pairs for Explanation Generation in a Cognitive Architecture”, by John Licato, Nick Marton, Ron Sun and Selmer Bringsjord presents the rationale for modelling the learning of cause-effects explanations in the CLARION cognitive architecture by using, as reference point, a Piaget's experiment introduced to understand how children generate explanations. The paper “A cognitive view of relevant implications”, by Claudio Masolo and Daniele Porello, presents an interesting link between Relevance Logic and Conceptual spaces and It provides a cognitive view and formalization of relevance implication.

In the paper “Information-Theoretic Segmentation of Natural Language”, by Sascha Griffiths, Mariano Mora McGinity, Jamie Forth, Matthew Purver and Geraint A. Wiggins., the authors extend to natural language a statistical model originally devised in the domain of music perception and cognition; in particular, the authors adopt a statistical (information-theoretic) learning approach on sequential data.

In the paper “Pattern Recognition: A Foundational Approach” by Agnese Augello, Salvatore Gaglio, Gianluigi Oliveri and Giovanni Pilato, the authors discuss some foundational issues regarding the “patterns problem” and propose a three layer architectures as a suitable solution for pattern understanding.

In the paper “World Modeling for Tabletop Object Construction”, by Arda Inceoglu, Melodi Deniz Ozturk, Mustafa Ersen and Sanem Sariel the authors discuss the problem of scene recognition in a robotic environment and propose a framework not relying only on perceptual factors but also relying on a knowledge updating process for their scene recognition approach.

The paper “A Network-based Communication Platform for a Cognitive Computer”, by Mostafa W. Numan, Jesse Frost, Braden J. Phillips and Michael Liebelt, presents a novel hardware-based approach for the design of cognitive computer based on an energy efficient approach for computation with a parallel production system.

In the paper “Developing Fuzzy Cognitive Maps with Self Organizing Maps”, by Marcel Wehrle, Edy Portmann, Alex Denzler and Andreas Meier, the propose the combination of SOM and FCM in retrieving the semantic structure of web documents.

In the paper “Property-based semantic similarity: what counts the most?”, by Silvia Likavec and Federica Cena, the authors discuss the problem of conceptual similarity in ontologies by exploiting the Tversky-distance and by pointing out the importance of weighting the features (the object properties in ontological terms), the values filling such features and the importance of the hierarchy of values.

In the paper “Do the self-knowing machines dream of knowing their factivity?”, by Pierluigi Graziani, Alessandro Aldini and Vincenzo Fano, the authors the authors present a formal account of the "Gödelian Argument", according to which the human mind would be equivalent to a finite machine unable to understand its own functioning.

The paper “Extracting Concrete Entities through Spatial Relations”, by Olga Lidia Acosta López and C. Antonio Aguilar, the authors describe system able to bootstrap the

recognition of concrete entities from medical domain texts by taking advantage of the use of the expression of spatial relationships

Finally, the paper “A Framework for Uncertainty-Aware Visual Analytics in Big Data”, by Amin Karami, proposes a framework combining Fuzzy SOM (self organising maps) within the MapReduce framework to model uncertainty and knowledge visually within big data sets.

Turin, November 2015

The AIC 2015 Chairs

http://www.di.unito.it/~lieto/AIC2015/program_committee.html

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Sponsoring Institution Message

This publication collects the papers selected for AIC2015 – International Workshop on Artificial Intelligence and Cognition (Turin 28th-29th September 2015), an event organised with the support of Fondazione Fondo Ricerca e Talenti.

Fondazione Fondo Ricerca e Talenti is one of the first university foundations in Italy, and the first to apply innovative fundraising mechanisms to research activities. Its aim is twofold:

- promoting fundraising activities for the University of Turin, to which the Foundation belongs;
- financing scholarships and supporting scientific dissemination activities, for the benefit of young researchers of our University.

We firmly and concretely believe in the importance of research. We know, as many do, that research is the foundation of our competitiveness, of our health, of our capacity to deal with social and cultural challenges, of our future.

We also believe in our researchers, as much as in research. We know that their ideas need an opportunity to grow and show their potential. Our strive to provide such opportunity – even a small, but real opportunity – is at the core of our mission.

For us, doing so means three very simple things: reward merit, be inclusive and engaging, do not hesitate to think out of the box, stick to our vision and keep an eye on our future. These principles allowed us in two years, with very few human and financial resources, to sponsor dozens of bursaries and dissemination events, to create a network of hundreds of voluntaries supporting our initiatives on the field and to have excellent echo on the media and at institutional level (including the European Commission).

We want to build ties with students, with the civil society and with the private sector in order to make the University of Turin a forge of opportunities at the service of our youth and of our territories as a whole.

This is the reason why we particularly welcome spin-off initiatives like this publication, which contributes to further develop and disseminate research ideas stemming from our financed seminars on cutting-edge matters like Artificial Intelligence and Cognition.

In line with our spirit, we hope that this publication will highly benefit the scientific community and will have a positive impact on they way we – as Human Intelligences and Cognitive Beings – understand and live this complex world.

Fondazione Fondo Ricerca e Talenti
The President
Gianmaria Ajani

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