

Special Issue on International Journal of Imaging and Robotics

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Abstract *This paper presents a brief summary of the post-proceedings of the International Symposium on Distributed Computing and Artificial Intelligence (DCAI 2013) held in Salamanca in March 22nd-24th, 2013. This special issue presents a selection of the best papers selected from those that were accepted on the symposium focused on image processing and robotics.*

Keywords: artificial intelligence, distributed computing, multiagent systems, image filtering and processing, robotics.

INTRODUCTION

This paper presents a brief summary of the post-proceedings of the International Symposium on Distributed Computing and Artificial Intelligence (DCAI 2013) held in Salamanca in May 22nd-24th, 2013 within the 11th International Conference on Practical Applications of Agents and Multi-Agent Systems (PAAMS'13). The International Symposium on Distributed Computing and Artificial Intelligence (DCAI) is an annual forum that will bring together ideas, projects, lessons, etc. associated with distributed computing and artificial intelligence, and their application in different areas. The artificial intelligence is changing our society. Its application in distributed environments, such as the Internet, electronic commerce, mobile communications, wireless devices, distributed computing, and so on is increasing and is becoming an element of high added value and economic potential, both industrial and research. These technologies are changing constantly as a result of the large research and technical effort being undertaken in both universities and businesses.

The symposium is organized by the Bioinformatics, Intelligent System and Educational Technology Research Group (<http://bisite.usal.es/>) of the University of Salamanca. It is an international forum to present and discuss the latest scientific developments and their effective applications, to assess the impact of the approach, and to facilitate technology transfer, has become a necessity. The exchange of ideas between scientists and technicians from both academic and business areas is essential to facilitate the development of systems that meet the demands of today's society. This volume includes a selection of the best papers presented in the symposium, focusing on distributed computing, artificial intelligence and its applications.

International Symposium on Distributed Computing and Artificial Intelligence Details

This special issue presents a selection of the best papers selected from those that were accepted on the symposium focused on image processing and robotics. These articles capture the most innovative results and trends in this sense: Artificial Intelligent Applications: Software in Ubiquitous and Distributed Computing; Agent technologies for Ambient Intelligence; Image reconstruction; Mathematics of visualization; Biomedical imaging: Applications of Imaging in sciences; Technologies for Production Systems; Mobile computation and mobile Communications. In this edition, 101 papers were submitted from over 19 different countries (Colombia, Czech Republic, Finland, France, Germany, Greece, Italy, Japan, Libya, Mauritius, Mexico, Morocco, Poland, Portugal, Romania, Slovakia, Spain, Thailand, Tunisia), representing a truly “wide area network” of research activity. The DCAI'13 technical program selected 75 papers. From the 75 papers accepted and presented in symposium, 6 were selected for this special issue:

In the first paper, Martínez *et al.* present the implementation of a soccer mobile robot agent that uses vision based object detection procedures. The soccer mobile robot is based on a Google Android smartphone and takes advantage of its computation and sensing capabilities. The agent implementation uses a multi-threading methodology to generate different agent processes such as the vision sense, the decision-making, and the application manager. The vision sense thread captures images from the smartphone camera and provides environment information using Renderscript computation while the decision-making thread provides effective soccer agent behavior. This paper presents and discusses the agent implementation and the effectiveness of the vision based object detection procedures.

Soriano *et al.*, in the second paper, present a new methodical approach to the problem of collision avoidance of mobile robots taking advantages of multi-agents systems to deliver solutions that benefit the whole system. The proposed method has the next phases: collision detection, obstacle identification, negotiation and collision avoidance. In addition of simulations with virtual robots in a 2D and 3D space, an implementation with real mobile robots has been developed in order to validate the proposed algorithm. The robots are based on Lego NXT, and they are equipped with a ring of proximity sensors for the collisions detections. The platform for the implementation and management of the multi-agent system is JADE

In the third paper, Poza-Luján *et al.* propose an architecture of a mobile-based distributed system which aims to minimize the social impact of abandoned or lost animals. To reach this purpose the distributed system has two main goals: obtain the pets best quality information, and optimize the reporting process that allows their rescue. The distributed system is based on the client-server paradigm. Clients are based on smart mobile devices to provide message warnings of animals localized. In order to enter data such as photography, audio and artificial images, system uses different mobile device interfaces. Messages with the pet information are stored in a server database to be processed intelligently. Data processing consists mainly in matching localized animals with lost animals, assigning abandoned animals at shelters and generating notifications for animal shelters or authorities. This matching uses an efficient selection algorithm based on common meta-information to each image. This efficient selection facilitates a selective notification deliveries avoiding redundancy. At the pre-

sent article the architecture details are shown, as well as the first achieved results with prototypes and real data.

In the fourth paper, Rebelo *et al.* show an emotional system, based on the OCC (Ortony, Clore and Collins) model. The study of the impact of emotion and affect in decision making processes involved in a working team stands for a multi-disciplinary issue (e.g. with insights from disciplines such as Psychology, Neuroscience, Philosophy and Computer Science). On the one hand, and in order to create such an environment we look at a team of affective agents to play into a battlefield, which present different emotional profiles (e.g. personality and mood). On the other hand, to attain cooperation, a voting mechanism and a decision-making process was implemented, being Robocode used as the simulation environment. Indeed, the results so far obtained are quite satisfying; the agent team performs quite well in the battlefield and undertakes different behaviours depending on the skirmish conditions.

In the last paper, Fiosins propose a decentralized solution to the unsplittable flow problem (UFP) in a transport network, where each flow uses only one route from source to sink and the flows cannot be separated into parts in intermediate nodes. The flow costs in each edge depend on the combination of the assigned flows as well as on external random variables. It is supposed that the random variables can be common for several edges. The distributions of the random variables are unknown, only samples are available. In order to use the information available in the samples more effectively, several resamples are constructed from the original samples. The nodes agree on the resamples in a decentralized way using a cooperative resampling scheme. A decentralized asynchronous solution algorithm for the flow routing problem in these conditions is proposed, which is based on the ADOPT algorithm for asynchronous distributed constraint optimization (DCOP). An example illustrating the proposed approach is presented.

Special Issue Acknowledgements

We would like to thank all the contributing authors, as well as the members of the Program Committee and the Organizing Committee for their hard and highly valuable work. Their work has helped to contribute to the success of this symposium. Finally, the Guest Editors wish to thank Professors Radu-Emil Precup and Tanuja Srivastava (Editors-in-Chief of International Journal of Imaging and Robotics) for the publication of this special issue that notably contributes to improve the quality of the workshop and the iHAS project associated. We hope the reader will share our joy and find this special issue very useful.

ACKNOWLEDGMENT

This work has been carried out by the project Sociedades Humano-Agente: Inmersion, Adaptacion y Simulacion (iHAS). TIN2012-36586-C03-03. Ministerio de Economía y Competitividad (Spain). Fondos Feder.