DEAR RAIRO-OPER. RES. READERS,

Cognitive or Intelligent Sensors are becoming smaller, lighter and increasingly sophisticated, enabling technologies that span from living room golf to the battlefield management of autonomous vehicles and unmanned aircraft. Sensors are now more and more integrated in complex systems and information systems. This trend aims at implementing more coherent, efficient, and reactive processes. Nevertheless, their development involves suitable evolutions in signal and image processing concepts. On one hand, disparate data have to be efficiently managed from the observation to the decision level, taking into account all their specificities. On the other hand, information has to be obtained through a dynamical process of resource management, such that the whole system provides the best fitting with needs, environment and context. Obviously system design and control are major problems in term of autonomy of sensors and interactions between them, and they need individual and collective behavior optimization.

In parallel in information analysis framework, cognitive systems monitor conversations, political events and financial markets and make sense of the confusion of information, leading to breakthrough applications in security management and securities investment alike. Information extraction and fusion, natural language processing and ontological knowledge representations are the building blocks of complex cognisant systems that are migrating into everyday applications.

The purpose of the COGIS (COGnitive systems with Interactive Sensors) conference is to build a prospective view of this particularly large but emergent thematic, considering methodological aspects as well as application potential. Initiated in 1999 by THALES Scientific & Technical council as internal technical workshop, 1st COGIS'03 conference was launched as a french workshop by SEE in 2003. Since 2006, COGIS'06 has become an International conference with more than 120 attendees in Paris. In 2007, invited by Stanford University, COGIS'07 took place in US to federate new actors in North America. In 2009, SEE and IET have decided to join their forces and their networks to organize this 4th edition of COGIS'09. As soon as 2010, COGIS'10 will be organized in UK by IET in collaboration with SEE.

In this special issue of RAIRO, SEE organizing committee and RAIRO Editorial board have selected a collection of extended paper versions from COGIS'09 conference (http://www.cogis2009.org/) where more than 80 publications equally distributed between Universities and Industries were presented, testifying the world wide interest for topics covered by COGIS.

Article published by EDP Sciences

The **seven** papers of this RAIRO-Oper. Res. special issue cover different COGIS topics on Sensors, Systems and Information Analysis:

- Paper *Design of a participation decision making agent architecture based on argumentation and influence function – Application to a serious game about biodiversity conservation* by A. Sordoni, J.-P. Briot, I. Alvarez, E. Vasconcelos, M. de Azevedo Irving and G. Melo, addresses an ongoing experience in the design of an artificial agent taking decisions and combining them with the decisions taken by human agents.

- Paper *Dynamics estimation of evidence discounting rates based on information crdibility* by M.C. Florea, A.L. Jousselme and E. Bosse, uses Dempster-Shafer theory of evidence as framework for representing and combining uncertain pieces of information, and a method based on the consensus to estimate the source reliability.

- Paper *Self-adaptive air-sea simulation based on multi-sensors agentification* by S. Peyruqueou, D. Capera, T. Médina and C. De Murcia, proposes an adaptive multi-agent system in which each entity is considered as a smart sensor/effector mobile for training simulation of combat management system.

- Paper *Belief functions induced by a multimodal probability density functions, an application to the search and rescue problem* by P.E. Doré, A. Martin, I. Abi-Zeid, A.L. Jousselme and P.Maupin, generalizes the approach of Ph. Smets on continuous belief functions and its association to a multimodal probability density function for the Search And Rescue (SAR) problem.

- Paper *Summarizing sensors data in vehicular* ad hoc *networks* by Dorsaf Zekri, Bruno Defude and Thierry Delot, focuses on data aggregation in vehicular ad hoc networks to generate additional knowledge to assist drivers by providing them useful information.

- Paper *Combining Odometry and Visual Loop-Closure Detection for Consistent Topo-Metrical Mapping* by S. Bazeille and D. Filliat, addresses the problem of simultaneous localization and mapping (SLAM) by combining visual loop-closure detection with metrical information given by a robot odometry.

- Paper *A cooperative sensor network: Optimal deployment and functioning* by Alfonso Farina, Antonio Graziano, Francesca Mariani and Francesco Zirilli, considers a network of mobile cooperative sensors with problems of the optimal deployment of the sensors and the detection of local anomalies in the noisy data measured by the sensors.

I wish you a good reading and I hope that you will find in this special RAIRO-Oper. Res. issue relevant information for your own research.

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Best regards

Frédéric Barbaresco
COGIS'09 organizing committee chairman
Thales Air Operations

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