



## Empowering Romanian Research on Intelligent Information Technologies

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### Deliverable 2.2

## Report on the participation in the events

Project title:	ERRIC: Empowering Romanian Research on Intelligent Information Technologies
Contract no.:	FP7-REGPOT-2010-1 No. 264207, 2010-2013
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Deliverable No.:	2.2
Deliverable Title:	Report on the participation in the events
Deliverable WP:	2
Nature:	R
Dissemination level:	Public
Date:	31.08.2011
Version:	1.1
Code:	ERRIC-D2.2-Y1
Project Year:	Year 1

**Abstract**

This report describes the participation of the members of the Faculty of Automatic Control and Computers (A&C) involved in Intelligent Information Technologies (IIT) research to scientific events and that have been supported by the ERRIC project. One of the main objectives of ERRIC is to have a better dissemination of the results of research activities within A&C and thus ERRIC is providing financial support for attending (mainly) scientific events.

In the first year of the project, the foremost step was to develop the criteria used to choose which scientific events should be funded by ERRIC, given that there are more requests for funding the participation to events than the resources available for this task in the project. The main points used as criteria are: quality of the presented research paper/talk within the event, the importance of the event and the opportunities for extending the research network and engage in future research proposals and projects with foreign partners.

The next step was to select the researchers that have outstanding results, demonstrated by having papers accepted to important conferences in IIT which meet the criteria specified above, and to provide them the financial support for attending these events. In the first year of the project, only 6 researchers have been financed by ERRIC to participate to 4 different events. However, there are another 3 selected research papers that shall receive financial support until the end of October 2011. In this same report we present the visit of Andrei Ismail to Metz Smart Room. The main aim of the visit was to see a paradigm of an Ambient Intelligence Laboratory as a driver for our future AmI Lab.

The main outcomes of these participations of the A&C staff to the scientific events are: extending the scientific network, establishing new contacts, improving old collaborations and being able to present important results of projects that have no funding for travel or that have just finished. However, the most important result of these participations will be the future proposals of project proposals that hopefully would be also funded, with partners that were met within these events, thus attracting more funding for the research teams in A&C.

**Document Revision History**

<b>Date</b>	<b>Version</b>	<b>Author(s)</b>	<b>Summary of main changes</b>
20.09.2010	0.1	Adina-Magda Florea	Conference participation report to S3T 2010
30.05.2011	0.2	Theodor Borangiu	Conference participation report to IESM 2011
04.07.2011	0.3	Costin Chiru	Conference participation report to ISMIS 2011
5.07.2011	0.4	Andrei Ismail	Participation to Metz Smart Room
12.07.2011	0.5	Stefan Trausan-Matu	Conference participation report to CSCL 2011, Conference participation report to ISMIS 2011
18.08.2011	1.0	Traian Rebedea	Produced the integrated version of the report.
21.08.2011	1.1	Traian Rebedea	Added "Future participation to the events" section and produced final version of the report.
30.08.2011	1.2	Adina Florea	Checked and made some minor modifications

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## 1. Introduction

In the first year of the project, several steps were undertaken regarding the future participation in scientific events, funded by ERRIC, in order to ensure that the best results of the research teams in Intelligent Information Technologies (IIT) working at the Faculty of Automatic Control and Computers (A&C) are selected for funding. First, there has been developed a methodology with criteria for selecting the participants to scientific events that shall be used within the scope of the project and then extended for funding the best research papers of the A&C research staff at valuable conferences and other scientific and dissemination events. Second, this methodology was used to select the participants to conferences in the first year of the project. It must be noted that all these events are related to the IIT domain or to the direct dissemination of the ERRIC project. Thus, the researchers that are funded by ERRIC are working in one of the following research topics: agreement technologies, semantic and collaborative technologies for the web, advanced grid technologies, large scale distributed system services, adaptive intelligent control.

The remainder of this section presents the methodology was developed for selecting the participation in events funded within ERRIC, a short overview with the participation in events in year 1 of the project and the key benefits for attending these events. The report then continues with detailed reports about the participation in each event, that were written by the participants using a common structure imposed used for reporting within ERRIC. Thus, section 2 presents details about the attended events, the reasons for participating to them and the main outcomes (short-term) that can be reported. Section 3 contains a short list of the planned participation to events in year 2 that were already selected to be funded by ERRIC. The report ends with a brief chapter with conclusions on the activities that were undertaken for this task in year 1.

### 1.1. Methodology

The methodology developed for selecting the participants to scientific and dissemination events funded within ERRIC was needed to ensure that the best results shall be presented at these events and that all the members of the research laboratories in IIT within A&C have equal rights when selecting the participants.

The methodology contains clear and simple criteria that are used for evaluating a proposal for funding the participation to an event. These are based on the following factors:

- Type of the event: presentation of scientific results or dissemination of the ERRIC project (or both). The scientific results are considered to have priority, although very important events where ERRIC can be presented to a wide and relevant audience are also relevant. Only scientific results in the topics defined within ERRIC (agreement technologies, semantic and collaborative technologies for the web, advanced grid technologies, large scale distributed system services, adaptive intelligent control) are considered candidates for funding.

- Quality of the scientific event: in order to ensure the objectivity of this criterion, rankings developed by relevant authorities are used (e.g. the Australian Research Council Conference Ranking, Microsoft Academic Rankings, etc.). The higher the ranking of an event, the higher the priority that participation has.
- Reasons for participating in the event: that may include presenting an accepted research paper accepted at the main conference, presenting results in workshops, organizing workshops. It has been considered important that all the non-dissemination events should have at least a paper accepted for presentation after peer review.
- Number of papers presented
- Location of the event: events organized in Europe have a higher priority, other events must meet additional criteria (e.g. very important and relevant conferences, more than a paper accepted for presentation, etc.)
- Other criteria: including if the participation can lead to new international cooperation, proposal of European projects, extending the research network, involvement in direct bilateral research activities, presentation of important research results from projects without funding.

Besides the methodology for selecting the participants to be funded, there was also established the rules to be respected when applying for funding. Thus, each researcher should send a request for funding to the WP2 leader, Prof. Valentin Cristea, together with the details for the event to be funded and the reasons (such as name of the conference, accepted paper and reviews). The research committee analyzes the participation funding requests and takes the decisions for funding the requests based on the quality of the other proposals, the availability of funds and the score for the current request. If the participation is selected, then that researcher must write a report after attending the event for the ERRIC board that includes details about the event, presented papers and main outcomes of the participation.

### ***1.2. Overview of the participation in the events in year 1***

In the first year of the project, there have been selected 6 participants that were funded by ERRIC for participating in events, thus resulting in 5 researchers that have attended 4 different events that are summarized in table 1. Most of the participations were related to presenting the scientific results of the A&C research activities in IIT: 3 participants were related to the topic of semantic and collaborative technologies for the web and 1 participation was in adaptive intelligent control. There were also 2 participants to a dissemination event organized in Bulgaria where ERRIC was presented (with participants especially from NMS and AC).

One of the reasons for having so few participants to events in the first year is also related to the fact that for important conferences in Computer Science, the deadline for submitting papers is usually about 6 months prior to the conference. Therefore, after the call for participations to be funded, the researchers needed time to write the papers and wait for the reviews. These statements are also proved by the data in table 1 which shows that all the

participation in conferences started after May 2011 (month 9 of the project), except for the dissemination event in Bulgaria. However, the process of selecting and funding participants should run much more smoothly in the following years of the project as can be also demonstrated in section 3, which presents that for the first two months of year 2 of ERRIC there are several participations that have already been selected for funding and shall take place until the end of October 2011.

<b>Participant</b>	<b>Event</b>	<b>Period</b>	<b>Venue</b>	<b>Motivation</b>
Prof. Adina-Magda Florea	Second Workshop of the Networking initiative for ICT related projects (S3T 2010)	10-11 September 2010	Varna, Bulgaria	presentation of ERRIC
Prof. Eugenia Kalisz	Second Workshop of the Networking initiative for ICT related projects (S3T 2010)	10-11 September 2010	Varna, Bulgaria	presentation of ERRIC
Prof. Stefan Trausan-Matu	9th International Conference on Computer-Supported Collaborative Learning 2011 (CSCL 2011)	3-9 July 2011	Hong Kong, China	3 papers 1 poster 1 workshop
Prof. Theodor Borangiu	International Conference on Industrial Engineering and Systems Management 2011 (IESM 2011)	24-28 May 2011	Metz, France	2 papers 1 special session
Prof. Stefan Trausan-Matu	19th International Symposium on Methodologies for Intelligent Systems 2011 (ISMIS 2011)	27-30 June 2011	Warsaw, Poland	2 papers
Ass. Prof. Costin Chiru	19th International Symposium on Methodologies for Intelligent Systems 2011 (ISMIS 2011)	28 June-1 July 2011	Warsaw, Poland	1 paper
As. drd. ing. Andrei-Adnan ISMAIL	Visit of Ambient Intelligence Laboratory – an example for our future Aml Lab	12-15 December 2010	SUPELEC, Metz, France	1 experience

Table 1 – Overview of the participation in events financed by ERRIC in year 1

It should be noted that all the events have been organized in Europe, except for the CSCL 2011 conference that was located in Hong Kong, China. However, it is one of the best conferences in Computer Science (ranked A+) and there have been 3 papers co-authored by Prof. Trausan-Matu, 1 poster and 1 workshop participation. Moreover, the results that were

presented were very relevant and novel, related to the FP7 ICT LTfLL (Language Technologies for Lifelong Learning) project that had just finished in February 2011.

### **1.3. Benefits for participation in the events in year 1**

It is very difficult to evaluate the middle and long-term impact of participating in the events that were funded by ERRIC in year 1. However, the most important results that these participants should bring are related to a better involvement in proposals (that hopefully also get funded) for bilateral, European and other trans-national research (such as other FP7 project proposals, EUREKA, etc.). Of course, as the methodology and selection criteria take these aspects into consideration when evaluating a request for funding the participation in events, there are high expectations that the funded participants shall engage in further European project proposals, also with contacts from these events.

The short-term benefits that can be easier evaluated are related to the following aspects, as section 2 further expands in the outcomes subsection of each participation in particular:

- Increasing the visibility of the high-quality research performed in the A&C laboratories
- Improving the research network and contacts
- Meeting old research partners to tighten up the relations
- Discussing new research directions and agreeing on further cooperation

It should also be noted that these research results could not have been presented without the support of ERRIC, as the current research funding in Romania does not allow most of the researchers to present their results even at important conferences. Only those few research teams that are working in projects funded by the European Commission really have the necessary funding to properly disseminate their activities and results. Furthermore, for young researchers, such as Ass.Prof. Costin Chiru, this opportunity is even more important as they are able to make new contacts and extend their ideas by engaging in discussions with important researchers present at these events.

## **2. Conference participation reports**

This section presents the detailed reports that were written by the participants to the events in the first year of ERRIC. They focus on the subject and the importance of the event, the reasons for participating, including paper and/or presentation details and the main outcomes following the participation on the short-term.



## **2.1. CSCL 2011 - Computer-Supported Collaborative Learning (Trausan-Matu)**

### **2.1.1. Brief presentation of the event**

The CSCL (Computer-Supported Collaborative Learning) Conference is a prestigious conference (rated A+ in all the important conference rankings) on collaborative learning with computers, including artificial intelligence and semantic technologies. It is organized on a biannual periodicity and the majoritary participation is from USA, including top universities like MIT, Standford, Berkeley, CMU, Harvard etc. From Europe participated only a very few countries (Germany, UK, France, Sweden, Netherlands, Finland, Norway and Romania), I was the single presenter from Romania.

The conference took place between 4-8 July, in up to 6 parallel sections and participated teachers and researchers from across the world. The papers of the previous editions were indexed in major databases, for example ACM. The first two days were dedicated to workshops and the following to the main conference.

### **2.1.2. Presented papers**

Professor Stefan Trausan-Matu presented two papers, a poster, a workshop paper at the conference, and was a coauthor of a symposium paper, as follows:

1. Dan Banica, Stefan Trausan-Matu, Traian Rebedea, Detecting Collaboration Regions in a Chat Session, in Hans Spada, Gerry Stahl, Naomi Miyake, Nancy Law (Eds.) CSCL 2011 Conference Proceedings, vol 2, pp. 771-775
2. Mihai Dascalu, Traian Rebedea, Stefan Trausan-Matu, Gillian Armit, PolyCAFe: Collaboration and Utterance Assessment for Online CSCL Conversations, in Hans Spada, Gerry Stahl, Naomi Miyake, Nancy Law (Eds.) CSCL 2011 Conference Proceedings, vol 2, pp. 781-785
3. Stefan Trausan-Matu, Experiencing, Conducting, Designing and Evaluating Polyphony in CSCL Chats, in Hans Spada, Gerry Stahl, Naomi Miyake, Nancy Law (Eds.) CSCL 2011 Conference Proceedings, vol 2, pp.906-907
4. Stefan Trausan-Matu, A Polyphonic Analysis of the Data for Open Source Development Projects as Learning Communities, presented at the Connecting Levels of Learning in Networked Communities Workshop
5. Daniel Suthers, Kristine Lund, Carolyn Rose, Gregory Dyke, Nancy Law, Chris Teplovs, Wenli Chen, Ming Ming Chiu, Heisawn Jeong, Chee Kit Looi, Richard Medina, Jun Oshima, Keith Sawyer, Hajime Shirouzu, Jan Willem Strijbos, Stefan Trausan-Matu, Jan van Aalst, Towards Productive Multivocality in the Analysis of

Collaborative Learning, in Hans Spada, Gerry Stahl, Naomi Miyake, Nancy Law (Eds.) CSCL 2011 Conference Proceedings, vol 2, pp 1015-1022

The papers present the results of the research in our department in the direction of combining semantic technologies (natural language processing of conversations and forums) with Web2.0 applications for developing software tools for supporting collaborative learning.

The second paper was written in collaboration with dr. Gillian Armit. The symposium paper was written in a team including professors from CMU, SUNY, Rutgers University, Drexel University, Washington University, Universities of Compenhagen, Shizuoka, Chukyo, Leiden, Singapore, Hong Kong, Korea, Hawaii.

The papers were received with interest by the audience and future collaborations were agreed and planned.

### **2.1.3. Outcomes**

The research presented in the papers was disseminated among an important number of researchers and professors from all around the world, including prestigious universities from USA, Japan, China, and Europe.

They were interested in the presented work and professor Trausan-Matu discussed about it with:

- Assoc. prof. Carolyn Rose, Carnegie Mellon University
- Prof. Ming Ming Chiu, State University of New York at Buffalo
- Prof. Fei-Ching Chen, National Central University, Taiwan
- Prof. Pirita Seitamaa-Hakkarainen, PhD, Helsinki University
- Senior lecturer Tee Meng Yew, PhD, University of Malaya
- Mikko Henrik Pitkanen, Univ. Jvaskyla, Finland

There were discussions and agreement to try (or continue) a future cooperation with:

- Prof. Dan Suthers, University of Hawaii (with whom I collaborated also at the symposium and workshops)
- Prof. Gerry Stahl, Drexel University, Philadelphia (with whom I collaborated also at the symposium and workshops)
- Prof. Ulrich Hoppe and dr. Sam Zeini, University of Duisburg-Essen, Germany (with whom I collaborated also at the workshop)
- Prof. Hajime Shirouzu, Chukyo University, Japan (with whom I collaborated also at the symposium and workshops)
- Assoc prof. Jianwei Zhang, PhD, State University of New York at Albany
- Crina Damsa, Oslo University

## **2.2. IESM 2011- International conference on Industrial Engineering and System Management (Borangiu)**

### **2.2.1. Brief presentation of the event**

The global economy and the recent developments in IC technologies have significantly modified the business organization of enterprises and the way that they do business. New forms of organizations such as extended enterprises, networked enterprises, supply chain networks, etc., turn to appear and they are quickly adopted by most leading enterprises. The evolvement from single enterprise with a high vertical range of manufacture towards enterprise networks offers new business opportunities especially for small and medium enterprises that are usually more flexible than larger companies are. The 2011 edition of IESM aimed at bringing together researchers and professionals from all industrial engineering and service sciences disciplines to discuss issues and share their research and development results and experience.

### **Conference topics**

- Artificial Intelligence and its applications in industrial engineering
- Customer service systems design and management
- Cleaner and sustainable production systems and services
- Project management
- Data warehousing and data mining
- Decision analysis and decision support systems
- E-Services and Technologies for distributed manufacturing
- Facilities design, planning, and layout
- Heuristics and meta-heuristics for advanced manufacturing
- Human factors and ergonomics
- Human-computer interaction and cognitive engineering
- Information systems and management
- Health care systems
- Service sciences management and engineering
- Industrial engineering and systems management
- Innovation management and entrepreneurship
- Intelligent control, holonic and product-driven systems
- Logistics, transportation, and distribution systems
- Maintenance and reliability
- Manufacturing executive systems and standards
- Monitoring of manufacturing systems

- Production planning and scheduling
- Product life cycle management
- Quality management
- Supply chain design and performance evaluation
- Warehouse and inventory management

### 2.2.2. Presented papers

There have been presented two papers:

- T4S2: *Product driven automation in a service-oriented manufacturing cell*, Borangiu, Th. and Raileanu, S.
- T4S3: *A PLC-based control solution for a holonic planned manufacturing system*, Ivanescu, N.A. and Borangiu, Th.

The papers describe a solution for the automation of a flexible manufacturing system using the concept of product-driven automation. A semi-heterarchical control model based on the concept of holonic manufacturing is proposed which switches its operation mode from hierarchical to heterarchical in the presence of perturbations to ensure as long as possible global optimization and agility to changes in the production environment. In order to ensure this functionality a service oriented manufacturing environment is proposed and implemented, whose structure is described by and accessed through a decentralized fault-tolerant Resource Service Access Model. This mode is used to reduce the myopia of the scheduling system at the level of products in execution. Besides the design of a generic structural and dynamic model, a real implementation solution is proposed using a multi-agent framework.

The papers were published in the IESM Proceedings volume (on CD with ISBN). Each paper has the length of 6 pages.

The papers are currently evaluated post-conference for possible publishing in Elsevier journals.

### 2.2.3. Outcomes

Professor Theodor Borangiu was involved in the following activities related to the IESM scientific event:

- **Author of two scientific papers**, presented in sessions (T4S2 and T4S3):
  - T4S2: *Product driven automation in a service-oriented manufacturing cell*, Borangiu, Th. and Raileanu, S.
  - T4S3: *A PLC-based control solution for a holonic planned manufacturing system*, Ivanescu, N.A. and Borangiu, Th.

- Organizer of Special Session IESM: Service-Oriented Control in Holonic Manufacturing [Theodor Borangiu (University Politehnica of Bucharest) and Paulo Leitao, Instituto Politecnico de Bragança - Portugal] (see description below):

**Special Track/Session on: Service-Oriented Control in Holonic Manufacturing****Proposed by:** Theodor Borangiu (University Politehnica of Bucharest, Romania)

Paulo Leitao (Instituto Politécnico de Bragança, Portugal)

**Short presentation:**

The main objective of this special session is to demonstrate how Multi-Agent Systems (MAS) and Holonic Manufacturing Execution Systems (HMES) contribute together to global sustainable manufacturing by help of service orientation. Service Oriented Architecture (SOA) represents the basis for describing the Resource Service Access Model (RSAM) in distributed manufacturing control, i.e. batch planning, scheduling (resource allocation) and execution control. MAS is the main technology used to set up and maintain a RSAM at shop floor level. This model, judiciously defined and used in real-time by the (holonic) manufacturing control system, may solve myopia in resource allocation from the point of view of both production cost and energy efficiency, thus contributing to sustainable manufacturing. On the other hand, HMES use detailed information about resource behaviour, performances and service capabilities to optimize globally (at batch level) or locally (at packet level) production. Efficient holonic manufacturing execution systems should switch between hierarchical control mode (to provide optimality) and heterarchical control mode (to provide agility and fault tolerance), triggered by a diversity of changes: (i) resource status or performance change (breakdown / recovery / penalties / awards); (ii) rush orders; (iii) accomplishment of a priori established power consumption programs. Manufacturing sustainability will be addressed in the session's papers with respect to: fault-tolerance to disturbances; energy efficiency at shop floor level; balancing resource usage; makespan/cost efficiency; in line quality control of products. SOA and web services in manufacturing will be addressed by papers in two directions: (1) linking the business layer of the enterprise to the technical layer at shop-floor level; (2) Object-Oriented modelling and design of control processes in manufacturing and interoperability concerning: product execution recipes (external data- knowledge-base access), resource usage (legacy and integration aspects) and shop-floor configuring for batch execution (constraining the topology of the transportation system, defining I/O terminal points, setting up the relation: product circulation paths – access to resources). In the above mentioned context, the "product-driven manufacturing", intelligent product" and "semi-heterarchical control" approaches are expected to be found in the session's papers; the common concept in this respect considers active holon entities (AHE) extending the product during its lifecycle with intelligent embedded devices.

**Keywords:** Service-Enabled Manufacturing, MAS, HMES, SOA, Intelligent Product

- **Member of the IESM'11 International Program Committee**

- **Chair of the Plenary Session:** *Distributed Control of Manufacturing and Service Systems* - speaker Vital Prabhu (USA) [Theodor Borangiu]

The participation of the ERRIC CCIT\_RM team at the IESM'11 Conference allowed establishing new contacts for scientific and R&D collaboration:

- The French national R&D structure GdR-MACS, the workgroup IMS2 (Intelligent Manufacturing Systems and Services) - Chair Professor Janan Zaytoon
- The LAMIH Research Laboratory of the University of Valenciennes, France - Head of Research Professor Damien Trentesaux
- The Research Group of the Ecole Nationale d'Ingénieurs de Metz (ENIM) - Principal investigator Lies Beyouneff
- The CRAN-UHP Research Centre of Nancy - Principal investigator Professor André Thomas
- The Polytechnic Institute of Bragança, Portugal - Head of R&D in Holonic and MAS for Manufacturing Professor Paulo Leitao
- Marcus Department of Industrial and Manufacturing Engineering Pennsylvania State University - Head of Dept. Professor Vittal Prabhu

### **2.3. ISMIS 2011 - 19th International Symposium on Methodologies for Intelligent Systems (Trausan-Matu)**

#### **2.3.1. Brief presentation of the event**

The ISMIS Conference is a prestigious conference on artificial intelligence, reaching the 19th edition (being generally biannual). The conference took place in three days (28-30 June) in 2-4 parallel sections and participated teachers and researchers from across the globe. The papers were included in two volumes published by the prestigious publishing house Springer (in the series "Lecture Notes in Computer Science" and "Studies in Computational Intelligence"). Besides the papers several keynote speakers were invited. One of these was the outstanding Professor Jaime Carbonell of Carnegie Mellon University, USA.

#### **2.3.2. Presented papers**

Professor Stefan Trausan Matu presented two papers at the conference:

1. Claudiu Musat, Julien Velcin, Stefan Trausan-Matu, Andrei RizoIU, Concept-based Topic Model Improvement, to appear in *Studies in Computational Intelligence*, Springer
2. Ana Gainaru, Emil Slusanschi, Stefan Trausan-Matu: Mapping Data Mining Algorithms on a GPU Architecture: A Study, in: Marzena Kryszkiewicz, Henryk

Rybinski, Andrzej Skowron, Zbigniew W. Ras (Eds.): Foundations of Intelligent Systems - 19th International Symposium, ISMIS 2011, Warsaw, Poland, June 28-30, 2011. Proceedings. Lecture Notes in Computer Science 6804 Springer 2011, ISBN 978-3-642-21915-3: 102-112

The first paper presents a method for improving the extraction of topics from texts with a direct application for semantic web and text mining applications. The idea is the integration of LDA with WordNet. An original algorithm was proposed. The paper had as co-authors two French teachers at the University Lyon2, where Claudiu Musat had an internship in HRD.

The second paper analyzes the usage of GPU architectures for running data mining algorithms.

The papers were received with interest by the audience, for example, Dr. Frederic Theodore Stahl at the University of Portsmouth.

### **2.3.3. Outcomes**

The research presented in the papers was disseminated among an important number of researchers and professors from all around the world.

Future cooperation was discussed with:

- Dr. Frederic Theodore Stahl at the University of Portsmouth
- Dr. Dan Simovici, Professor and Graduate Program Director la University of Massachussets, Boston, SUA
- Mathilde Forestier, Universite Lyon2

## ***2.4. ISMIS 2011 - 19th International Symposium on Methodologies for Intelligent Systems (Chiru)***

### **2.4.1. Brief presentation of the event**

ISMIS is an established and prestigious conference for exchanging the latest research results in building intelligent systems. The scope of ISMIS is intended to represent a wide range of topics on applying Artificial Intelligence techniques to areas as diverse as decision support, automated deduction, reasoning, knowledge based systems, machine learning, computer vision, robotics, planning, databases, information retrieval, etc. The focus is on research in intelligent systems. The conference addresses issues involving solutions to problems that are complex to be solved through conventional approaches and that require the simulation of intelligent thought processes, heuristics and applications of knowledge. The integration of these multiple approaches in solving complex problems is of particular importance. ISMIS provides a forum and a means for exchanging information for those interested purely in

theory, those interested primarily in implementation, and those interested in specific research and industrial applications.

#### **2.4.2. Presented paper**

Costin Gabriel Chiru presented a paper which describes a model and an application that can be used to assess chat conversations according to their content, which is related to a number of imposed topics, and to the personal involvement of the participants. The main theoretical ideas that stand behind this application are Bakhtin's polyphony theory and Tannen's ideas related to the use of repetitions. The results of the application are validated against the gold standard provided by two teachers from the Human-Computer Interaction evaluating the same chats and after that the verification is done using another teacher from the same domain. During the verification we also show that the model used for chat evaluation is dependent on the number of participants to that chat.

The conference proceedings (including the paper) are published by Springer in the LNAI series, no. 6804, ISSN 0302-9743, ISBN 978-3-642-21915-3, Pages 513-523

The questions received at the conference emphasized the importance of accurately identifying the topics from given texts and remarked the utility of the application, that became evident from the huge gaps between the grades given by teachers and the ones provided by the application. The application allowed for a more accurate and finer grained evaluation of the conversation and of the participants.

#### **2.4.3. Outcomes**

After the discussion that followed the presentation of the paper, we have been suggested to try to do the same analysis in an online fashion, as to provide guidance to the chat participants as the conversation proceeds. We have also found out about another researcher based in University at Albany, New York, USA – Tomek Strzalkowski – whose interest is related to our research.

During the event, we have established contacts with researchers from various countries, like: Michal Barla – Slovakia; Bahareh Sarrafzadeh – Canada; Philippe Baecke – Belgium; Dusan Stevanoviz – Canada; Piotr Artiemjew – Poland and Andrew Matusiewicz – USA.

### ***2.5. S3T 2010 - Second Workshop of the Networking initiative for ICT related projects (Florea and Kalisz)***

#### **2.5.1. Brief presentation of the event**

The participation to S3T 2010 (Second Workshop of the Networking initiative for ICT related projects), held in Bulgaria in September, had as main objective the presentation of the current research directions and projects taking place in UPB, the introduction of the ERRIC project in



the context of current ICT European projects and the formation of connections with people in the same areas of interest. The meeting was organized under the FP7 SISTER project, which aims to increase the research capacity of Bulgaria as a new state joined the EU. The event was attended by important personalities representing various academic and research entities in the European Union. The ERRIC contribution at the Workshop consisted of two presentations having the title "Empowering Romanian Research on Intelligent Information Technologies".

The workshop followed the first workshop of the kind, organized on 6 May 2009 in Brussels. The purpose of the workshop was to support the networking initiative launched in Brussels which aims to liaise a portfolio of projects (initially 10) funded under the FP7 calls of both the programmes "Regions of Knowledge" (ROK) and "Research Potential" (REGPOT). The initiative was constructed to stimulate a better visibility and networking of ICT (Information and Communication Technology) related research driven clusters at European level and provide them access to cutting edge scientific knowledge and technology generated by research entities and their partner organisations that benefit from the research potential scheme. Conversely, REGPOT projects may benefit from liaison with networks of the clusters and gain best practise how to better contribute to regional capacity building.

The workshop was organized as a concomitant event of the Second International Conference on Software, Services and Semantic Technologies (S3T Conference) under the FP7 REGPOT SISTER Project, held in Varna, Bulgaria, on September 11-12, 2010. This allowed the workshop participants to benefit also from participating in the S3T Conference, as well as in the 14th International Conference on Artificial Intelligence: Methodology, Systems, Applications (AIMSA 2010), Varna, Bulgaria, September 8-10, 2010. In addition, the workshop brought some policy makers, experts and companies at a regional level.

After a welcome address from a policy maker (representative at a national or regional level), the workshop was opened by an introductory session (keynote) given by Mr. Stefan Weiers, European Commission, DG RTD. He put attention on: lessons learnt in ROK and REGPOT Projects, how to be innovative in building research capacity, future perspectives of ROK and REGPOT etc. The presentation included information on open calls for proposals in the programmes ROK and REGPOT. The second keynote presentation was of Prof. Roumen Nikolov, Coordinator of SISTER Project, who analyzed some concrete experience in a convergence region.

Two Parallel interactive sessions were held: First session focused on Key Technological Issues of Common Interest, and the Second one on devoted to Programmatic and Knowledge Transfer Issues. The latter implied the knowledge transfer from these projects into the regions in order to boost innovation and sustainable development, while taking into account novel initiatives such as the new EU macro-regions strategy.

The groups of the two discussion sessions were invited to submit further ideas in a short, written form. They nominate Raporteurs who reported the conclusions of the group during the

general session. When brainstorming, the groups took into account the possible synergies between different funding sources beyond FP7 such as structural funds and CIP should be examined. Furthermore, co-operation models between projects and good practices to achieve more critical mass in view of future funding programmes were explored.

### Objectives of the Workshop:

- To present experiences and lessons learnt from ongoing projects;
- Knowledge sharing on issues of common interest both from a technology and a regional development perspective;
- To gain overview on relevant EU policies notably regional development and information society, including the EU2020 Strategy, the new macro-region strategies (e.g the Danube Region strategy), etc;
- To explore key technologies and future trends of common interest;
- To discuss regional development aspects on how to harness RTD and innovation for regional development from an ICT sector point of view;
- To explore possible synergies with other funding sources such as the structural funds and CIP in order to ensure a better sustainability and higher impact of the projects.
- Discuss options for future continuation of the networking e.g. setting up of ICT cluster regional, definition of possible thematic working groups

Extract from the Workshop agenda stating the contribution of people from the project ERRIC:



**Second Workshop of the Networking initiative for ICT  
related projects: "Possibilities for widening further  
partnership for new cooperative activities"**

Varna, September 10 - 11, 2010

### AGENDA

**10 SEPTEMBER, 2010**

*Moderator: Prof. Roumen NIKOLOV*

on concrete experience in a convergence region.

**10:20 – 10:40 COFFEE BREAK**

*Moderator: Prof. Avram ESCENASY, Institute of Mathematics and Informatics, BAS*

**10:40 – 11:50 Set of ICT NW presentations:**

**10:40 – 10:50** ERRIC Project: Empowering Romanian Research on Intelligent Information Technologies **Prof. Adina Magda Florea**, Faculty of Automatic Control and Computers, University "Politehnica" of Bucharest, Romania

**10:50 – 11:00** MULTISAUND Project: MULTilingualism Integrated to Speech & Audio UNDERstanding **Dr. Omer Ileri**, TUBITAK National Research Institute of Electronics and Cryptology, Turkey

### 2.5.2. Contribution of the ERRIC participants to the Workshop

During the workshop, Prof. Florea made a contribution which covered the presentation of UPB and the presentation of ERRIC.

- **Empowering Romanian Research on Intelligent Information Technologies**

Prof. Adina Magda Florea

*Abstract:* Founded in 1818, University POLITEHNICA of Bucharest is the oldest and the largest technical university, amongst the most prestigious universities in Romania. The mission of A&C faculty from within UPB is the strategic combination of education, research and innovation, which are keys to achieving a knowledge based society and economy. In this context, the ERRIC project leverage, support and further develop the existing high quality human and material resources of A&C with the goal of achieving international recognition for the Faculty as an outstanding unit of research excellence in selected areas of Intelligent Information Technologies: agreement technologies, semantic and collaborative technologies for the web, advanced grid technologies, large scale distributed system services, and adaptive intelligent control. The project aims to Stimulating the realization of the full research potential of the enlarged Union by unlocking and developing existing or emerging excellence in the EU's convergence regions and outermost regions, and helping to strengthen the capacities of their researchers to successfully participate in research activities at Community level.

### 2.5.3. Outcomes

Besides the presentation and dissemination of information about the ERRIC project, other activities of Prof. Florea and Prof. Kalisz during the workshop included:

- Participation to the several sections of the Workshop about networking and future project proposals
- Liaison with the project SISTER in order to find common points of interest
- Liaison with the project MULTISAUND and Ph.D. Omer Ileri towards building a consortium for a project proposal in FP7
- Discussions with Ph.D. Weiers about the beginning, the management of the project, and about the organization of ERRIC Kickoff meeting

Following the initial discussions with Ph.D. Omar Ileri, the following project proposal of TUBITAK was joined by UPB: Rescue teams in crisis scenarios. This topic is now becoming famous in crisis management and in multinational collaborations during disasters (such as earthquakes, floods, epidemic diseases). The collection of relevant information from the field, assess and evaluate their content and use them for decision making or coordination actions require a deepened R&D focus.

A second meeting with TUBITAK, namely with Ph.D. Alper Kanak, Chief Researcher at TUBITAK UEKAE, was organized during the participation of Ass. Prof. Traian Rebedea – UPB, A&C – to the ICT 2010 Conference

([http://ec.europa.eu/information\\_society/events/ict/2010/index\\_en.htm](http://ec.europa.eu/information_society/events/ict/2010/index_en.htm)) organized in Brussels, on 27-29 September 2010 (participation that was financed from other sources).

## **2.6. Metz Smart Room (Ismail)**

The visit to the AmI laboratory (“Smart Room”) in Metz, France had as main objective the observation of the existing AmI laboratory and gathering of information about:

- the problems have arisen when building the laboratory, and what were the physical and technical challenges
- the sensors that can be deployed and how they should be chosen
- the kind of physical infrastructure that is necessary for such a laboratory (electrical, climatization, special type of lighting, mobile walls for easy reconfiguration of the room and phonic insulation of the walls for sound-based applications)
- the kind of IT infrastructure that is necessary for such a laboratory (a cluster of computers and an intelligent software that can easily use more and more computers as they are added to the network)

The AmI laboratory is located to the south-east of Metz, in a large technological center called “Technopole”. Technopole hosts schools, large IT companies, and research institutes, among which, the SUPELEC.

The hosts were professors Stephane Vialle and Patrick Mercier, both distinguished researchers at the SUPELEC. Mr. Vialle is the leader of the IMS Research Team, a team that is researching AmI-related topics, and Mr. Mercier has supervised the building of the laboratory from scratch. The full staff list of the IMS team can be accessed here:

<http://ims.metz.supelec.fr/spip.php?rubrique36>

### **2.6.1. Smart Room – building characteristics and staff**

The Metz Smart Room is an intelligent environment that will serve as a testbed for AmI software and hardware applications, combined with robotics. It was built from scratch, and the whole process took about 1.5 years and costed approximately 3 million euros (including the equipment inside the building). Pictures of each of the phases of construction can be viewed here: <http://ims.metz.supelec.fr/spip.php?rubrique86>

The resulting building has 3 main areas of activity (besides the auxiliary ones and two course rooms):

- the robotics room, where experiments with robots interacting with each other take place.

This is basically a large open-space surrounded by desktop computers on its sides, leaving a large space in the middle as a space for robots to explore

- the apartment room, which resembles a modern european apartment, with furniture for the living room and kitchen. It features a large sofa, carpets, a large flat-screen TV-set and book shelves for the living room, and an electric oven, sink (without tap water for now), cupboard

and a table for the kitchen part. The purpose of the kitchen part is to recreate a human environment that is otherwise dangerous for computers, because it has humidity, heat, lack of good lighting and possibly sharp obstacles

- the holophonic room, a closed room with phonicP insulation on the walls, having very many microphones and speakers on the walls, complemented by sound-absorbing material. This room is supposed to recreate an immersive environment, from the sound point of view.

While speaking to the laboratory staff, some very important characteristics of the environment have been identified:

1. **Constant lighting** is essential for computer vision applications. In the Smart Room, natural light is obstructed completely, and it has been replaced with a pair of expensive, LED-based light-bulbs that give constant lighting regardless of the intensity variations on the electrical network. The reason for maintaining constant lighting is simple: it is easier to prototype algorithms that process images and video streams without taking into account the changing ambient lighting and different types of shades. However, it must be possible to replace the artificial lighting with the natural one at some point, after the algorithms have been perfected.

2. **Smart electrical infrastructure** is a must for an AmI laboratory. First of all, a laboratory requires a higher density of electrical outlets than a normal laboratory. They have to be neatly distributed throughout the room, and the Metz solution is to integrate them in the floor, covering them with a small plastic hood whenever they are not used. The energy distributed throughout the room must be stabilized (Uninterruptible Power Supplies can be used, or even an independent generator), given the amount of equipment present.

It is very useful to be able to control the power in the room remotely, and this can be implemented using APC power switches (<http://www.apc.com/>). These switches allow power to be switched on and off via a secured web interface or even via programmatic means. It is very important to have a programmatic means of controlling power, because when doing experiments, the set-up of the environment can be very complex, and it is useful to script the power set-up part.

3. **Mobile walls** are a very useful feature of an AmI laboratory. This allows the space to be reorganized on-the-fly in order to build more than one scenario. However, care has to be taken when equipment has to be fixed on those walls, as mobility comes with a price in stability.

4. **Vertical space for cables and small equipment integrated in the floor and the ceiling.** It is useful to have a vertical space of up to 1 meter both above and below the laboratory, so that access to all the 6 walls of the room is effortless. In Metz, there is a level “-1” below the laboratory, and the laboratory room is higher than normal, and some of the vertical space is used up using a fake ceiling, above which lots of electrical cables are hosted. One important problem that was observed by the Metz staff is that the vertical space should be constant in height.

5. **Phonic insulation for sound-based applications.** Just as artificial, constant lighting is useful when prototyping computer vision systems, having as little unexpected sound interference as possible is useful when prototyping intelligent applications using sound. For this, there are several options available: build phonic insulation into the wall and use sound-absorbing materials fixed on the inside of the room.

6. **Security infrastructure observing international standards.** It is useful to build the laboratory with security measures that minimize the damage in case of a conflagration. Some of the measures taken in Metz that I could observe were:

- smoke detectors were placed on the ceiling of the laboratory
- whenever smoke is detected, the electrical circuit is automatically closed, minimizing the risk of power surges
- however, lighting is absolutely necessary during a fire, so after the electrical circuit is closed, a series of light-bulbs which are resistant to heat and which function based on a battery are switched on
- it is useful to have “push” exits in every important room, because it is easier to escape a room with “push” doors instead of normal, knob-based doors.
- visual and audio alarm in case of fire (the visual alarm is useful for people who cannot hear)

7. **Climatization of the laboratory.** In order to obtain a deterministic environment, it is useful to maintain a constant temperature regardless of the time of the year. In Metz, this is implemented using a sensor-actuator network, but with one flaw: the sensors are placed only in one part of the building, resulting in measurements that do not correctly reflect the state of the rest of the building. Therefore, the temperature sensors must be evenly distributed throughout the building.

The Metz laboratory has several staff members:

- full-time researchers, carrying out experiments, and making sure that the necessary infrastructure is acquisitioned and put into place correctly. These are usually experienced professors.
- a full-time system engineer, whose role is to supervise the good functioning of the equipment in the laboratory. One of the duties of the engineer is to write the scripts for setting up power in the room for experiments by controlling the APC power switches using scripts
- part-time researchers, carrying out simpler experiments, and testing the new equipment. These are usually PHD students and bachelor's students.

## **2.6.2. Smart Room – experiments carried out by the Metz team**

While visiting the Smart Room, I was introduced by the researchers to the experiments they were doing in the AmI laboratory. I will describe several of those here

### **1. Non-intrusive position tracking using microphones**

This is a very ingenious experiment, featuring a few microphones placed in a line on one of the walls of the room and a camera above them which follows the person who is currently speaking. The camera turns whenever someone starts speaking, in order to face that person. This is possible due to location detection of the person, done using pairs of microphones. The technique for detecting location is this: given two microphones with known location, one can measure the time difference between the moments T1 and T2, where T1 is the time when a sound hits the first microphone, and T2 is the time when the same sound hits the second microphone. After measuring the time difference, one can compute the difference in distance from the sound source to the two microphones, by multiplying the time difference with the speed of sound.

Given the two fixed microphones and the difference in distance from the sound source to them, this places the sound source on a hyperbola, which can be further approximated to one of its tangents, if the difference is small enough. By intersecting several such hyperbolas and correcting the results by eliminating the most probable wrong measurements, the location of a person can be tracked with an accuracy of up to 0.5 meters.

This experiment took place in the apartment part of the laboratory.

### **2. Immersive video conference**

This experiment consists of using the microphones and speakers into the holophonic room in order to reproduce the sound environment in the apartment part of the laboratory. So, for example, if person A is in the apartment part of the laboratory, and is in conference with person B, which is in the holophonic room, and person A hears a noise from its left, person B will hear the same noise from its left. In a non-immersive conference, there would normally be one pair of speakers, and all the sounds would come from that direction. It seems that the equipment used for reproducing immersive sounds is professional sound equipment that is used in studio recordings, because it could be controlled by a software from Adobe Systems.

### **3. Innovative, brain-activity-based, Human-Computer Interface**

For this experiment, the participating person would have to wear some kind of rubber helmet with electrical sensors on it. The sensors would measure the person's brain activity. The experiment features 3 flashing lights, each of them flashing with a different frequency. The sensors on the helmet will gather enough data so that the brain activity can be analyzed in such a way that the frequency of the flashing light the person is looking at can be derived. A robot will be controlled by the person, by assigning an action to each of the three flashing lights, as follows: one for turning left, one for turning right, and one for going forward. This experiment is spectacular, but unfortunately, it is intrusive.

#### **4. Video stream processing for person detection**

This experiment uses commodity video surveillance cameras, in a static environment with natural lighting. The purpose of the experiment is to detect the persons coming into the visual field of the camera, and to detect the moment in which these persons make contact (for example, shaking hands, or passing an object). The cameras have fixed positions and do not move throughout the experiment. Also, the only things that move in the background are the people in the scene, and the rest of the environment is static. This allows the person detection algorithms to be based on comparing previous frames with the current frame.

#### **5. Robotic exploration in the modern apartment**

This experiment aims to see how robots manage in a real-life human environment. For example, a green ball was placed on the floor, and both humanoid and non-humanoid robots were programmed to follow the ball. Here, constant lighting was of a real use because one could hard-code the color code of the ball, instead of also programming a color detection algorithm. The ball was being moved by the researchers, in order to follow the reactions of the robots. One very interesting result was that the humanoid robots paid more attention to following the target, than to their own stability. This resulted in instability and even falls when they stepped on the carpet which was in the room. Japanese researchers have reported to complete such an experiment successfully, but it is not customary to have a carpet on the floor in Japan. Another interesting conclusion was that due to the large number of wireless networks, there were a number of interferences that caused robots to not respond to the commands correctly at some points in time. This means that robots have to have a certain autonomous control algorithm to guide them while waiting for commands, even though they are remotely controlled by humans.

#### **2.6.3. Conclusions**

The most important conclusion is that before building an AmI laboratory, the team must have at least 2 or 3 scenarios in mind. The deployed sensors and the organisation of the laboratory must revolve around these scenarios. Also, the infrastructure must be flexible, in order to allow new scenarios to be tested, as ideas come through (mobile walls are an example of flexible architecture).

Also, an AmI laboratory requires quite a bit of computing horsepower. This means that the laboratory must be backed by a cluster of computers, or by a grid-like system. This is due to processing large streams of data, such as streams from video cameras in real time. There must be a convenient way for this cluster to communicate with the sensors from the room, and that is why the vertical space from the floor and ceiling is so important.



The last conclusion is that a great deal of effort must be devoted to building the right kind of infrastructure for the laboratory and maintaining it. Maintaining both hardware and software infrastructure might even require a specialized engineer for this task. Also, when building the laboratory itself, it is recommended to have qualified people (such as researchers) supervise the building process, in order to check that the requirements are correctly implemented by the construction firm.

### 3. Future participation in the events

The participation in events financed by ERRIC continues in year 2 and there have been already several requests for participation and three of them were selected for funding before the end of year 1. Thus, we have 1 participation to a conference presenting results in agreement technologies, 1 related to semantic and collaborative technologies for the web, and 1 for large scale distributed system services. This data is presented in brief in table 2. Moreover, the WP2 team is continuously examining requests for funding, whenever a researcher has a paper that is accepted to important conferences related to IIT and is able to provide the details requested by the selection methodology. It is expected that in year 2 of the project, more than 10 participations shall be supported by ERRIC in order to catch up the slow start in year 1, that was primarily related to the long period between submitting a paper and participating in the conference. As the A&C researchers are now already familiarized with the ERRIC call for funding relevant participation in events, they are more motivated to submit papers in important conferences and also know that there is a way to reimburse the expenses for their participation.

<b>Participant</b>	<b>Event</b>	<b>Period</b>	<b>Venue</b>	<b>Motivation</b>
Ass.Prof. Traian Rebedea	6th European Conference on Technology Enhanced Learning (EC-TEL 2011)	20-24 September 2011	Palermo, Italy	1 paper
Prof. Adina-Magda Florea	5th International Symposium on Intelligent Distributed Computing (IDC 2011) 3rd International Workshop on Multi-Agent Systems Technology and Semantics (MASTS 2011)	4-9 October 2011	Delft, Netherlands	MASTS organized under ERRIC, Chair of MASTS, 1 paper
Prof. Valentin Cristea	Sixth International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC 2011)	26-29 October 2011	Barcelona, Spain	1 paper

Table 2 – Overview of the already planned participation in events financed by ERRIC in year 2

## 4. Conclusions

This report has presented the results of the participation in events of A&C researchers in Intelligent Information Technologies (IIT) that were selected to be supported by ERRIC. There have been 5 participants that have attended 4 distinct events, one for dissemination of the project and all others for presenting the research results. Section 2 of this report has presented the conference participation reports for year 1, focusing in providing a closer look at the attended event, the reasons for attending it and selecting the participation to be funded by ERRIC – presented papers and other information, and the main outcomes after participating in the event.

In the first year, there has also been developed a methodology with clear criteria for selecting the most relevant researchers that are to be financed by ERRIC. These focus on the quality of the event and the importance of the presented research results. Moreover, it has been noticed a slow start in funding participants, mostly due to the fact that there is a large time span between submitting a research paper and the participation to the conference, especially for very important events. However, this has been taken into account and there are already some planned participations in year 2, when the WP2 team is hoping to have a higher number of requests for funding from the A&C researchers.