technology
from seed
1 WHO WE ARE

INESC-ID is a research institute dedicated to advanced research and development in the areas of Electronics, Communications, and Information Technologies.

INESC-ID was created in 2000, as a result of the reorganization of the R&D activities of its parent institution, INESC, in Lisbon.

INESC-ID is a not for profit, privately owned institution, declared officially of public interest. It is owned 51% by IST - Instituto Superior Técnico – and 49% by INESC – Instituto de Engenharia de Sistemas e Computadores.

INESC-ID operates in two locations, near (or inside) the two campuses of IST, namely Alameda and Taguspark.

1.1 ASSOCIATE LABORATORY

INESC-ID was awarded the status of “Laboratório Associado” in December 2004. This has increased the funding and enabled the recruitment of a number of postdoctoral researchers and support staff.

The activities of INESC-ID in 2012 are structured into four research lines:

- Information and Decision Support Systems
- Interactive Intelligent Systems
- Embedded Electronic Systems
- Computing Systems and Communication Networks

Some research lines are composed of different research groups, but the research and administrative planning, once centred in the groups, has progressively moved towards the research lines.
1.2 INSTITUCIONAL STRUCTURE

1.2.1 Management structure

INESC-ID is structured according to the organization chart shown below. Current management of the organization is ensured by the Board of Directors, assisted by the Project Support Office (GAP), the Human Resources Office (GARH), and other administrative support units, which provide services sub-contracted to INESC (holding) or to INESC INOV: Financial Control Department (DFA), Budget Control Department (DAF), Legal Support, Infrastructures Department (DGI), and Computer Network Support.
Board of Directors

The Board of Directors is composed of three members proposed by the Scientific Council and appointed by the General Council. It is in charge of the general management of the Institution. In 2012 the Board was composed by Leonel Sousa (chairman), José Carlos Monteiro and Luís Rodrigues.

General Council

The General Council is composed by three representatives of IST (Instituto Superior Técnico), two of INESC, and by the chairman of the Scientific Council of INESC-ID. The General Council approves the annual technical and financial reports, as well as the plan and the budget. It appoints the board of directors under proposal by the Scientific Council. In 2012 the General Council was composed by Arlindo Oliveira, Paulo Martins, José Tribolet, Abílio Ançã Henriques and João Miranda Lemos.

Audit Board

The Audit Board is composed of three members appointed by the General Council. It examines and certifies the accounts of the Institution. In 2012 the Fiscal Council was composed by Hermínio Ribeiro, Dr. João Catarino and Grant Thornton & Associados – Sociedade de Revisores Oficiais de Contas, Lda.

Scientific Council

The Scientific Council is composed of all researchers with a Ph.D. degree. It is responsible for the strategic planning and for the organization of the research units, and evaluates the research projects, annual budget, plan, and report. The Scientific Council is assisted by the Advisory Board which visits INESC-ID on a regular basis.
Board of the Scientific Council

The Scientific Council has a managing board composed of a chairman and two other members. In 2012 the Board of the Scientific Council was composed by Prof. Luís Silveira, Prof. Inês Lynce, and Prof. João Miranda Lemos (chairman).

Scientific Council Coordinating Committee

The Coordinating Committee is composed of the Board of the Scientific Council and representatives of the thematic areas.

Advisory Board

The Advisory Board is composed by external advisors that provide advice concerning the strategy and plans of the Institution. The members of the Advisory Board are currently Profs. Franco Maloberti (Univ. Pavia, Italy), Srinivas Devadas (MIT, USA), Morris Sloman (Imperial College, London, UK), and Carlos Príncipe (Univ. Flórida, USA).

Human Resources Office

The Human Resources Office (GARH – Gabinete de Apoio aos Recursos Humanos) is responsible for the management of the human resources of INESC-ID.

Projects Support Office

The Projects Support Office (GAP – Gabinete de Apoio a Projetos) is responsible for the control of the execution of national projects. It also provides administrative support to the activity of the Board of Directors.

Administrative Support

The Administrative Support is provided by five secretaries that support the researchers of the different R&D groups.
1.2.2 Scientific Structure

The research developed at INESC-ID is organized in four Research Units, and each research unit is organized around several research groups.

Each research unit has one or two Coordinators, elected among the researchers with a doctoral degree. The functions of the Coordinators are as follows:

• Represent the research unit of the Coordinating Committee on the Scientific Council;
• Coordinate the activities of the various groups which belong to the research unit;
• Promote the preparation of proposals for R&D projects;
• Coordinate the preparation of plans and reports concerning to the research unit.
Each research unit integrates different research groups, which are listed below together with their coordinators in 2012:

**Information and Decision Support Systems**
**Coordinators Prof. Mário Silva, Prof. Ana Teresa Freitas**
- SW Algorithms and Tools for Constraint Solving – Prof. Inês Lynce
- Knowledge Discovery and Bioinformatics – Prof. Ana Teresa Freitas
- Information Systems – Prof. Miguel Mira da Silva
- Data Management and Information Retrieval – Prof. Mário Silva

**Interactive Intelligent Systems**
**Coordinators Prof. Isabel Trancoso, Prof. Joaquim Jorge**
- Spoken Language Systems – Prof. Isabel Trancoso
- Intelligent Agents and Synthetic Characters – Prof. Ana Paiva
- Intelligent Multimodal Interfaces – Prof. Joaquim Jorge

**Embedded Electronic Systems**
**Coordinators Prof. Jorge Fernandes, Prof. Nuno Roma**
- Analogue and Mixed-Signal Circuits – Prof. Jorge Fernandes
- Control of Dynamic Systems – Prof. João Miranda Lemos
- Signal Processing Systems – Prof. Nuno Roma
- Quality, Test and Co-Design of HW/SW Systems – Prof. Marcelino Santos
- Electronic System Design and Automation - Prof. Horácio Neto
- Algorithms for Optimization and Simulation – Prof. Luís Silveira

**Communication Networks and Mobility**
**Coordinators Prof. Augusto Casaca, Prof. Paulo Ferreira**
- Distributed Systems – Prof. Paulo Ferreira
- Software Engineering – Prof. João Cachopo
- Communication Networks and Mobility – Prof. Augusto Casaca
2 WHAT WE DO

2.1 OBJECTIVES

INESC-ID aims to produce added value to people and society in the field of Information and Communication Technologies (ICT). The mission of INESC-ID is to develop tomorrow’s technologies by excelling in research, today.

The main objectives of INESC-ID are: to integrate competences from researchers in electrical engineering and computer science to advance the state of the art in computers, telecommunications, and information systems; to support the first stages of the value generation chain: basic research, applied research, and advanced education; in cooperation with other institutions, to perform technology transfer, to support the creation of technology based startups, and to provide technical support.

Tangible results of the activity of the institution are: publications in national and international journals and conferences; methodologies, tools, patents, and prototypes to be transferred to the academic, scientific or industrial sectors, advanced professional education and training.

In order to fulfill its mission, INESC-ID values internationalization, networking, partnership and visibility.

R&D activities cover a broad (although focused) range of research areas and application markets, such as wireless communications, electronic equipment, health care, medical imaging, industrial automation, e-learning, and enterprise information systems. INESC-ID also acts as a service provider, to stimulate cooperation with industry, to focus research on practical issues, and to make the economic market aware of its capabilities. Close ties with professionals qualified by INESC-ID are encouraged, not only for lifelong education support, but also for networking activities.
The scientific activities of INESC-ID are financed by a number of funding agencies, of which the most important are FCT-Fundação para a Ciência e Tecnologia, ADI – Agência de Inovação, and the European Comission. Additionally, INESC-ID also participates in other funding programs involving government funding with the purpose of developing R&D in companies through consortiums with research partner institutions.

2.2 **MAIN ACHIEVEMENTS**

In the last year the institution has worked hard to fulfill its mission. Our research is now quite visible at an international level, and its quality is recognized.

INESC-ID has also been involved, at an institutional level, in the establishment and development of the training activities developed in the context of the Portugal-CMU and the Portugal-MIT programs.

Among the most significant achievements, we would like to highlight the following activities:

- The exceptional quality of the publications of INESC-ID researchers has been recognized in 2012 with several best paper awards, in national and international conferences;
- In 2012 Prof. Luís Miguel Silveira was elevated by the IEEE to the degree of Fellow;
- The organization of the 31st Annual ACM SIGACT-SIGOPS Symposium on Principles of Distributed Computing (PODC2012), the 8th International Conference on the Quality of Information and Communications Technology (Quatic2012), the Third International Conference on Serious Games Development and Applications (SGDA2012), and the International Workshop on Information Technology for Energy Application (IT4Energy), that required the participation and the effort of the institution as a whole;
The success of the five INESC-ID startup companies. Three of them (Coreworks, VoicelInteraction and PetSys) were created in early years as a result of a very significant technology transfer. In 2009 there is also the participation in a fourth startup company, NWC, a highly innovative company in the implementation and development of specific social and network applications. The newest participation is SiliconGate, a start-up that operates in the field of microelectronics and develops and licenses high performance power management blocks that are key elements in any mobile equipment;

The increasing in scientific productivity results in about 112 international journal papers, and more than 300 communications in international conferences. Moreover, about 14 PhD theses were finished in 2012;

From a total of 18 research projects that started in 2012, 2 have received European funds and 16 are supported by national funding (FCT). In 2012 there were a total of 82 research projects ongoing (18 European, 2 managed by ADI and 62 funded by FCT);

The number of contracts has also increased, namely with international and national companies. Comparing with the former year, we increased in about 50% the total amount of revenues from R&D contracts. This increase is mainly due to a general institutional effort of uprising other sources of funding, allowing also to bound connections with industry and companies with whom we are able to strengthen future partnerships. Some examples are ITDS, SiliconGate, Fundação PT, and Qualcomm, which general description can be seen in the chapter highlights of this report.
HUMAN RESOURCES
INESC-ID ANNUAL REPORT 2012
3 HUMAN RESOURCES

The majority of the researchers of INESC-ID are members of the academic staff and post-graduate students of IST. There are also researchers from other Universities and Polytechnic Institutes and a small number of contracted postdoctoral researchers.

On 31 December 2012 INESC-ID had 391 collaborators, 133 of which with a Ph.D. degree and 129 with a M.Sc. degree.

Since INESC-ID focuses its activity on the rapid growth areas of information technology, communications and electronics, an increase is to be expected in the number of researchers with higher degrees within the next few years. Many researchers are carrying out their post-graduate work at INESC-ID. Table I summarizes the qualifications of INESC-ID researchers.

Table I – Human Resources

<table>
<thead>
<tr>
<th>ACADEMIC DEGREE</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habilitation</td>
<td>24</td>
</tr>
<tr>
<td>PhD Degree</td>
<td>109</td>
</tr>
<tr>
<td>MSc Degree</td>
<td>129</td>
</tr>
<tr>
<td>1st Degree</td>
<td>122</td>
</tr>
<tr>
<td>High School</td>
<td>7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>391</strong></td>
</tr>
</tbody>
</table>

The increase of technical and scientific activity, as a result of the status of Associate Laboratory, leads to the need to improve technical support and administrative services. The institution is mostly composed by researchers with a PhD, which reflects the motivation given to our collaborators to develop a structured researcher career.

INESC-ID also has a very young structure, due to the amount of fellowships and young researchers; 63% have ages between 20 and 40 year old and have a high degree level.

INESC-ID is continuously seeking highly qualified candidates with a PhD degree and with a track record showing their ability to perform independent research in their scientific areas. These openings were announced in national and international journals and websites. A call for research staff positions was opened during 2012, and about 80% of the applications received were from foreign researchers.

Two researchers were hired: Pedro Monteiro, with a PhD degree in “Towards an integrative approach for the modeling and formal verification of biological regulatory networks” at INRIA Grenoble, France, and Mikolas Janota, with a PhD degree in “SAT Solving in Interactive Configuration” at University College, Dublin.
OUTCOME
INESC-ID ANNUAL REPORT 2012
4 OUTCOME

A main source of national funding of INESC-ID is FCT – Fundação para a Ciência e a Tecnologia, through direct funding of the associate laboratory projects awarded in a nationwide competitive basis. National funding is also provided by AdI – Agência de Inovação. Another main source of funding are European Union projects.

The following set of tables summarizes the activities carried out in 2012 and the results achieved.

**PROJECTS**

<table>
<thead>
<tr>
<th>TYPE OF PROJECT</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>International Programs (research projects ongoing)</td>
<td>18</td>
</tr>
<tr>
<td>National Programs (research projects ongoing)</td>
<td>64</td>
</tr>
<tr>
<td>Contracts with companies</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
</tr>
</tbody>
</table>

**R&D**

<table>
<thead>
<tr>
<th>PUBLICATION TYPE</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
<td>4</td>
</tr>
<tr>
<td>International Journals</td>
<td>112</td>
</tr>
<tr>
<td>National Journals</td>
<td>2</td>
</tr>
<tr>
<td>Book Chapters</td>
<td>19</td>
</tr>
<tr>
<td>International Conferences</td>
<td>349</td>
</tr>
<tr>
<td>National Conferences</td>
<td>36</td>
</tr>
<tr>
<td>Patents</td>
<td>1</td>
</tr>
<tr>
<td>Technical Reports</td>
<td>35</td>
</tr>
<tr>
<td>Special Issues of Journals (edition)</td>
<td>3</td>
</tr>
<tr>
<td>Conference Proceedings</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>568</strong></td>
</tr>
</tbody>
</table>
568
PROJECTS
102
R&D PUBLICATIONS
559
DISSERTATIONS
80
SCIENTIFIC EVENTS
## DISSEMINATIONS

Table IV – Thesis

<table>
<thead>
<tr>
<th>TYPE</th>
<th>ONGOING</th>
<th>COMPLETED</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhD Theses</td>
<td>115</td>
<td>14</td>
<td>129</td>
</tr>
<tr>
<td>MSc Theses</td>
<td>285</td>
<td>107</td>
<td>392</td>
</tr>
<tr>
<td>Graduation Theses</td>
<td>37</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>437</td>
<td>122</td>
<td>559</td>
</tr>
</tbody>
</table>

## ORGANIZATION OF SCIENTIFIC EVENTS

Table V – Organization of Scientific Events

<table>
<thead>
<tr>
<th>TYPE OF ACTION</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate Editor of Journal</td>
<td>11</td>
</tr>
<tr>
<td>Committee Chair</td>
<td>22</td>
</tr>
<tr>
<td>Committee Member</td>
<td>117</td>
</tr>
<tr>
<td>General Chair</td>
<td>4</td>
</tr>
<tr>
<td>Invited Speaker</td>
<td>27</td>
</tr>
<tr>
<td>Reviewer</td>
<td>80</td>
</tr>
</tbody>
</table>
COOPERATION,
PARTNERSHIP
AND MOBILITY
INESC-ID ANNUAL REPORT 2012
5 COOPERATION, PARTNERSHIPS AND MOBILITY

INESC-ID participates in the programs between Portugal and CMU (Carnegie-Mellon University) and with Portugal/MIT (Massachusetts Institute of Technology). Other partnerships include Cadence Design Systems, TU Darmstadt, IST, ISCTE, Universidade da Madeira, Escola Superior de Tecnologia e Gestão de Beja, and Escola Superior de Tecnologia de Setúbal. Other partnerships are already in course, namely with Instituto Superior de Engenharia de Lisboa (ISEL) and Universidade da Beira interior (UBI). In addition to the above formal partnerships, there is a large number of cooperation agreements with other institutions within the framework of the research projects.
6 TECHNOLOGY TRANSFER

Our research and development activities cover a broad range of research areas and application markets, such as wireless communications, electronic equipment, health care, medical imaging, industrial automation, e-learning, and enterprise information systems. INESC-ID also acts as a service provider, stimulating cooperation with industry and focusing research on day life issues, providing a high level of technology transfer.

Several “start-up” companies have been created by researchers and former graduate students associated with INESC-ID. This is an interesting indicator of the industrial technology impact of INESC-ID.
INESC-ID currently has equity in the following start-up companies:

**Coreworks** \ digital integrated circuit design

Coreworks, founded in 2001 by two researchers of INESC-ID, is a provider of Semiconductor Intellectual Property (SIP) for multi-standard multimedia and communications applications, such as digital television, internet protocol television (IPTV), portable audio players, mobile Internet devices, and software defined radio. Their products have been implemented in a wide variety of technologies, for more than 30 customers worldwide. The company received an A-series investment round from Espírito Santo Ventures in 2006.

**SiliconGate** \ mixed-signal circuit design

SiliconGate operates in the field of microelectronics and develops and licences high performance Power Management blocks that are key elements in any mobile equipment. Funded in 2008, SiliconGate brought together the experience of senior designers from Industry with the research expertise of an INESC-ID research group.

Recently, Wolfson Microelectronics plc, a global leader in high-performance mixed-signal semiconductor solutions for the consumer electronics market, has selected SiliconGate to provide high-performance power management IP in a four year contract.

**PETsys** \ medical imaging

PETsys, SA was established in 2008 to exploit the results of a research project, started in 2003, on PET (positron emission tomography) systems for mammography. The shareholders are 5 institutions, and 15 individuals that participated in the project, together with a Belgium business angel.

PETsys has acquired the rights to use the internationally patented PET scanner technology that allows early cancer detection with higher resolution (1-2 mm against 5-10 mm) and higher sensitivity (x10) than with standard devices.
**VoiceInteraction** \ speech processing

VoiceInteraction was founded in 2008 by researchers from the Spoken Language Systems Lab of INESC-ID, following the work developed in TECNOVOZ, a technology transfer project funded by the Portuguese Innovation Agency (AdI).

Based on a solid background of R&D, VoiceInteraction offers innovative solutions in the area of speech processing. Their solutions are based on speech recognition, speech synthesis, 3D facial animation, and spoken dialogue systems technologies. The applications cover different areas: subtitling systems for RTP (public national TV broadcaster), media clipping, dictation systems for hospitals, spoken dialogue systems for kiosks in monuments.

**NetworkConcept** \ communication networks

NWC Network Concept, Lda was founded in 2008. It had origin in a joint project by Instituto Superior Técnico (IST) and INESC-ID to develop a software multi-services platform, Kelius.

Kelius integrates all the services in residential or professional environments, including Internet, video surveillance, television, and telephone.

The control is performed through an interface implemented in a computer or in a Personal Digital Assistant (PDA). The new methods and techniques behind this platform are patented.

Besides owning equity in each company, there is close connection of these start-ups with INESC-ID due to partnerships for R&D projects.
7 VISIBILITY

7.1 Annual General Meeting

INESC-ID has been organizing each year a strategic planning meeting. These meetings, that have taken place since 2004, have involved the participation of external invitees with high impact backgrounds. The 2012 meeting took place in October, at Vimeiro, were researchers met to discuss issues related with the Energy Systems, due to the integration of new researchers of this area within the institution organization.

With specific goals of gathering the institution research team, team building activities with outdoor tasks were organized. A huge opportunity to improve bonds between collaborators and also stimulate leadership and management group characteristics.

A special attention was also given to the study made by IST about the research units related with this university.

António Vidigal, from EDP, and Luís Oliveira e Silva, from IST were this year invited speakers for the general annual meeting.
7.2 Seminars

INESC-ID has also a very active schedule of seminars, presented by our researchers and/or invited speakers. These seminars are organized in a regular basis, in order to promote collaboration between researchers and research groups and also across disciplines.

These seminars are opened for all the scientific community: students, researchers and general public are welcome to participate. A significant amount of external speakers were invited to present and participate in some of these seminars. During 2012, more than 40 seminars were organized by our research groups at INESC-ID facilities. These seminars are described in the annexes of this report.

7.3 Distinguished Lecture Series

The INESC-ID Distinguished Lecture Series is designed to bring to the institute outstanding scientists, academics or practitioners to share their vision, and present their groundbreaking work.

The series aims to promote a regular sequence of high quality seminars in the core areas of the lab. Invited speakers cover a broad range of interests, activity profiles, and different stages of the professional career, being selected among those that have raised significantly above their peers in one or more aspects of their activity.

One of the main goals of the Distinguished Lecture Series is to encourage the interaction and promote discussion and exchange of ideas between the invited speakers and lab researchers. The INESC-ID Distinguished Lecture Series was launched in September 2012, with a seminar planned to take place every month.

September 2012 - Dr. Anne-Marie Kermarrec, INRIA Senior Researcher (Directrice de recherche), INRIA-Rennes, FRANCE, with the theme “WhatsUp: a P2P instant news items recommender”;

October 2012 - Prof.Barbara Liskov, Massachusetts Institute of Technology, a Distinguished Lecture Series were INESC-ID associated with the DLS series of Universidade Nova de Lisboa, Faculdade de Ciências e Tecnologia, with the theme “Programming the Turing Machine”;

November 2012 - Prof. Eduardo F. Camacho, Dpto. Ingeniería de Sistemas y Automática, Escuela Superior de Ingenieros, Sevilla, with the theme “Control of solar thermal plants”.

7.4 Media & Dissemination

INESC-ID research work is often news in several wide public known media. Besides TV interviews and paper, our researchers are opened to show their team work at several levels. In 2012 we were news for several research projects results. These news are also published in our website or social networks.

7.5 Prizes and international Recognition

INESC-ID researchers were awarded the following prizes recognizing the excellence of the R&D activities developed:

- Honorable Mention to the PhD Dissertation “Recovering Capitalization and Punctuation Marks on Speech Transcriptions”, PhD Dissertation contest, PROPOR 2012, April 2012, Fernando Batista, Nuno Mamede;


- Best paper award for paper: Socially Present Board Game Opponents, in International Conference on Advances in Computer Entertainment 2012, A. Pereira, R. Prada and A. Paiva;

- 2nd Best Demo Award at IberSPEECH 2012 Demo Session VITHEA: On-line word naming therapy in Portuguese for aphasic patients exploiting automatic speech recognition, Spain, Madrid, Nov 2012, Annamaria Pompili, Pedro Fialho, Alberto Abad;

In 2012 internal prizes were given. The commission nominated to this purpose is the INESC-ID Advisory Board, composed by Profs. Franco Maloberti (Univ. Pavia, Italy), Srinivas Devadas (MIT, USA), Morris Sloman (Imperial College, London, UK), and Carlos Príncipe (Univ. Flórida, USA).

The commission selected for the Best PhD Student Award Joana Gonçalves, for the Best Young Researcher Luís Veiga, and, for the Best Senior Researcher Prof. Luís Rodrigues.

The Institute of Electrical and Electronics Engineers, IEEE, appointed Prof. Luís Miguel Silveira as a Fellow of this prestigious institution. Quoting the certificate of appointment, the award was attributed to Luís Miguel Silveira "for contributions to analysis and modeling of VLSI interconnects".
7.6 Exhibitions

In 2012 the effort to improve the external image of the institution continued. INESC-ID has organized and participated in several events of high visibility, such as:

- Open Infrastructures forum, an event co-organized with FCT and promoted by the Information and Decision Support Systems research unit and involving several external invited speakers. This event occurred in Fundação D. Pedro IV in December 10th.

- 1st INESC-ID Open Day, with special visits and demos to our laboratories. This was a wide public attendance event, with the participation of several companies and with the effort of all the institution. Demos of several research projects were presented, in both campuses of Alameda and Taguspark. INESC-ID startups also participated opening their workplaces to the visitors. A successful event which will certainly be repeated in the future.

These events/exhibitions allow not only a closer relation between INESC-ID and other scientific organizations, but also an important promotion of our activities near the general public and companies. These activities help to strengthen important connections in order to improve technology transference.

Besides the high impact exhibitions, INESC-ID also promoted external visits, mostly from other organizations and groups of external researchers or students from abroad.
HIGHLIGHTS
INESC-ID ANNUAL REPORT 2012
8 HIGHLIGHTS

8.1 Qualcomm

INESC-ID has signed a research contract with Qualcomm, one of the largest American companies in the area of circuits, devices and systems for wireless communication.

Under this contract, INESC-ID undertakes to develop techniques for the implementation of more efficient circuits for digital signal processing, to be used in wireless communication systems.

The design of INESC-ID in the area of automatic generation of optimized architectures for signal processing, in particular by maximizing the sharing of terms during the computation, allows for the reduction of close to 30% of silicon area, and a similar level of savings terms of the power consumed by the circuit. These savings are obtained on top of the circuits synthesized by state-of-the-art silicon compilers, which are not able to take advantage of high-level features of these designs.

Qualcomm is a leader in mobile, including fourth generation 4G through technology Long Term Evolution, LTE. Under this new standard, much of the complexity of the system is in digital signal processing, hence the importance of the collaboration with INESC-ID in this area.
8.2 Galeno

Project GALENO aims at modeling and control for personalized drug administration, with emphasis on general anesthesia. This project is coordinated by Faculdade de Ciências da Universidade do Porto and, in addition to INESC-ID, participants include Centro Hospitalar do Porto (previously Hospital Geral de Santo António), Hospital Pedro Hispano (Matosinhos) and Instituto de Ciências Agrárias e Agro-Alimentares do Porto. INESC-ID participates through the Group Control of Dynamic Systems, with the researchers João Miranda Lemos and Bertinho Costa and the research grant holders Daniela Caiado and Ana Coito.

General anesthesia comprises three main components, namely neuromuscular blockade (NMB) to prevent involuntary patient movements (areflexia), the loss of the patient self-consciousness (hypnosis) and the insensitivity to noxious stimuli or “pain” (analgesia). A number of commercial measurement systems are currently available, either for neuromuscular blockade or for hypnosis. Together with computer controlled drug perfusion syringes (to administrate, for instance, atracurium or rocuronium for NMB, and propofol for hypnosis), that constitute actuators, it is therefore possible to implement feedback control systems for anesthesia. The control and supervision algorithms, as well as the interface with the anesthetist that monitors the full process, are embedded in a computer that reads sensor measures and yields the required commands to the drug perfusion syringes through USB connections. Since the system is very slow (with sampling intervals of 20 second for NMB and 5 second for hypnosis) the anesthetist may ensure the safety of the whole process and easily act to perform in manual mode any actions that are required.

The participation in the project capitalizes INESC-ID know-how in areas such as system modeling and identification, parameter estimation in dynamic models and controller design for dynamic systems that rely on different types of techniques. Among other tasks, INESC-ID has been cooperating in the developing of dynamical models of neuromuscular blockade level and of hypnosis measured through the BIS index measured by commercial biomedical equipment. Furthermore, INESC-ID successfully developed robust control algorithms that are able to compute the drug doses required to keep these levels close to the desired levels, even when facing high uncertainty in the knowledge of the patient model (that in general characterizes biomedical systems). The new algorithms for the tasks described above are incorporated in the HIPOCRATES system for anesthesia control, to which INESC-ID provided several contributions that consist not only of the previously mentioned algorithms, but also of the overall system structure definition and of the software development for the interfaces with measure equipment and drug perfusion syringes.
The GALENO project comes in the sequence of the participation in previous projects and research activities in the area of anesthesia, including the co-supervision of a Ph. D. student and the coordination of project IDEA, financed by FCT, and where the Group SIPS (that, together with the Group Control of Dynamic Systems, also integrates the Line of Action on Embedded Electronic Systems). Project GALENO was financed by FCT in the main scientific area of Health Sciences – Biomaterials and Biomedical Engineering, with a total of 189 k€. INESC-ID participation was financed with a total of 46 k€, to be completely executed until the end of the project, in September 2013.

8.3 DIRHA

The DIRHA (Distant-speech Interaction for Robust Home Applications) project addresses the challenge of natural spontaneous speech interaction with distant microphones in a home environment. The main fields on which research is conducted, and for which suitable solutions will be identified and embedded in real-time prototypes, are: multichannel acoustic processing, distant speech recognition and understanding, speaker identification/verification, and spoken dialogue management. The project also aims to investigate the use of a new type of acquisition device consisting of MEMS (Micro Electrical-Mechanical System) digital microphone arrays. The project addresses four languages: Italian, Greek, Portuguese and German.

The L2F team of INESC-ID contributes to several scientific and technological aspects of the project, including audio segmentation and classification, speech enhancement, robust speech recognition for Portuguese and robust distant speaker identification.

Target application and users. The targeted application includes voice-enabled interaction with appliances and other automatic services available in a household. For some individuals (e.g. motor impaired), being able to interact at four-five meters from microphones in a crowded room, with music playing, and other possible active sound sources is a strong immediate requirement, which is the main reason for addressing firstly this category of users under the DIRHA project. It is foreseen that the most advanced technologies resulting from the project will be integrated in a real-time prototype installed in automated homes, and daily used by the end-users for evaluation purposes.
Objectives and Innovation. One of the most challenging and innovative aspects of the project is the development of an “always listening” distant speech interaction system, robust to speaker position, even in a noisy and reverberant environment and eventually in a multi-speaker context. Many other projects have recently addressed this concept and tried to realize some early solutions. However, DIRHA will investigate on novel techniques which allow the realization of distant-speech interaction in a multi-room environment and possibly with multiple users.

Results. The DIRHA project aims both to make advances at research level in the given scientific fields and to progress at technological level, with the development of a proof-of-concept system which can represent the starting point for a next exploitation action to be addressed by the involved industrial partners. Research activities will also include the creation of experimental tasks and corpora which will enable initiatives of dissemination and benchmarking at international level. As for the final prototype, it will run based on microphone devices installed in different rooms in order to monitor selectively acoustic and speech activities observable inside any space of the household.

Project Information. DIRHA is funded by the European Commission under the FP7 program with 3.5 Million Euro. The DIRHA consortium is coordinated by the Fondazione Bruno Kessler (Italy), and brings together 4 research teams and 3 companies. The research participants are: Fondazione Bruno Kessler (Italy), Athena Research and Innovation Center in Information Communication & Knowledge Technologies (Greece), INESC ID - Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento em Lisboa (Portugal) and Technische Universität Graz (Austria). The industrial partners are: DomoticArea S.r.l (Italy), NewAmuser S.r.l. (Italy), and ST Microelectronics S.r.l. (Italy).
8.4 eMote

Significant work has been devoted to the design of artificial tutors with human capabilities with the aim of helping increase the efficiency achieved with a human instructor. Yet, these systems still lack the personal, empathic and human elements that characterise a traditional teacher and fail to engage and motivate students in the same way a human teacher does. Empathy and engagement, abilities that are key to influence students’ learning, are often forgotten when such learning systems are created.

The EMOTE (EMbOdied-perceptive Tutors for Empathy-based learning) project will design, develop and evaluate a new generation of artificial embodied tutors that have perceptive capabilities to engage in empathic interactions with learners in a shared physical space. Overall, the EMOTE project aims to (1) research the role of pedagogical and empathic interventions in the process of engaging the learner and allowing their learning progress and (2) explore if and how the exchange of socio-emotional cues with an embodied tutor in a shared physical space can create a sense of connection and social bonding and act as a facilitator of the learning experience. This will be done across different embodiments (both virtual and robotic), allowing for the effect that such embodiment will have on engagement and empathy to be explored. Further, the project will support the migration of the artificial tutors across different embodiments, to support students’ learning in both formal and informal settings. To ground the research in a concrete classroom scenario, the EMOTE project will develop a showcase in the area of geography, focusing on environmental issues.

EMOTE will adopt a learner-centric approach, applied to the design of curriculum-driven learning scenarios, where personalised and pedagogically sound learning strategies will be employed by the tutor in order to successfully adapt to the learner’s engagement and progress in the learning task. Further, to ground the research in a concrete classroom scenario, the EMOTE project will develop a showcase in the area of geography, focusing on the processes associated with the dynamically changing world, such as the greenhouse effect, acid rain, and global warming. Indeed, a variety of teaching strategies are used nowadays to foster learning in a changing society, in particular in areas such as sustainable living. These areas require learners to have a capability of deep understanding of physical processes, ways to shift perception, taking perceptive of different stakeholders, and empathising with different populations and points of view.

In order to achieve these objectives, EMOTE will integrate interdisciplinary research on affect recognition, learner models, adaptive behaviour and embodiment for human-robot interaction in learning environments, grounded in psychological theories of emotion in social interaction and pedagogical models for learning facilitation.
The team at INESC-ID is composed by researchers from GAIPS (Intelligent Agents and Synthetic Characters Group) lead by Prof. Ana Paiva. The other partners in this consortium are: University of Birmingham (UK), Heriot-Watt University (UK), Jacobs University Breemen (Germany), Goeteborgs Universitet (Sweden) and YDreams Robotics (Portugal).

8.5 FastFix

FastFix (Monitoring Control for Remote Software Maintenance) is an open-source platform for remote software maintenance (www.sourceforge.net/p/fastfix-rsm). This platform is the result of a 33 month long, €3.5M european research project financed by the European Union’s Seventh Framework Programme in which INESC-ID Lisboa’s Distributed Systems Group (DSG) took part.

FastFix’s motivation was the need to aid software maintenance teams in the task of supporting applications that are deployed on client devices at remote locations. These applications, inspite of pre-deployment tests, will suffer from software errors that require intervention. The overall goal of the FastFix project is to provide software developers with a maintenance environment that combines time efficiency with low cost and high precision.

**The FastFix platform architecture.** FastFix remotely monitors Java programs so as to simplify error correction. The FastFix system allows for the collection of error reports with higher precision and privacy. The system, once installed on a program in a client computer monitors the device and the application in order to gather information that may help solve any software problem that may arise. This information is relayed to the FastFix server and the application’s maintenance team. At the server, all information is stored and correlated to detect frequent erroneous workflows.
FastFix also performs the automatic disabling of faulty program features. When a user interaction with a program causes an error, this is reported to the FastFix server which creates a patch for the program which is sent to the client in order to inhibit the faulty interaction.

FastFix allows for the detailed replication, by the maintenance team, of reported errors. This is the aspect where the DSG team focused their effort. It is known that developers often cannot reproduce the error situations observed by remote users. FastFix provides a mechanism for the precise replication of errors observed by users with the additional benefit of defending the users’ privacy by minimizing the amount of private information that is leaked out of the client’s device.

Several techniques developed for FastFix in the domains of fault replication, patch generation and error correlation are new. Particularly, the inclusion of these mechanism in an integrated platform where these features can cooperate and be extended is a significant contribution for the software maintenance community. In addition to the open-source dissemination of the platform’s code, the FastFix consortium published 31 international papers and publicized the project’s results at multiple scientific and industrial fora. The industrial partners have integrated FastFix components in their software tools such as software security monitoring and error reporting in industrial manufacturing, and will continue to use FastFix tools and know-how in the upcoming years.

The FastFix project’s consortium included INESC-ID’s Distributed Systems Group (www.gsd.inesc-id.pt) as well as partners from TUM (www.bruegge.in.tum.de, Germany), LERO (www.lero.ie, Ireland), TXT (www.txtgroup.com, Italy), ProDevelop (www.prodevelop.es, Spain) and S2Grupo (www.s2grupo.es, Spain).
RESEARCH UNITS
INESC-ID ANNUAL REPORT 2012
9 RESEARCH UNITS

9.1 Information and Decision Support Systems

The “Information and Decision Support Systems” research line aims at designing novel processes, techniques, and technology for the analysis, design, development, integration, deployment, and operation of distributed information systems and enterprise architectures. It gathers the INESC-ID groups that perform research in the fundamental areas of knowledge required to assure efficient, intelligent, aligned, safe, reliable, secure, and trustworthy information systems to support the whole structure of the modern economic and social framework. In this context, INESC-ID gathers a body of competences that renders it a national and international reference. These competences include significant expertise in fundamental technology, techniques, algorithms, data structures, and programming techniques, as well as in more applied areas such as software engineering and web application development.

Domains of activity:

- Constraint solving and optimization algorithms (Boolean satisfiability and discrete optimization algorithms);
- Databases: data profiling and cleaning, transformation and integration;
- Text mining: information extraction, sentiment analysis;
- Information retrieval;
- Knowledge management and engineering;
- Linked data and semantic web technologies;
- Scientific data management and digital libraries;
- Computational biology, systems biology and bioinformatics;
- Health Informatics;
- Social Computing;

The team has a diverse set of backgrounds/competencies:

- Algorithms and complexity;
- Machine learning and data mining;
- Statistics;
- Software engineering: requirements engineering, model-driven engineering;
- Enterprise engineering;
- IT projects and services management;
- Corpus linguistics.
9.2 Interactive Intelligent Systems

This research unit was recently restructured to encompass three different groups with strong synergies between them: GAIPS (Intelligent Agents and Synthetic Characters), VIMMI (Visualization and Intelligent Multimodal Interfaces), and L2F (Spoken Language Systems). Their goals are:

- explore multimodal interaction models in virtual environments by using interfaces based on synergic recognition of multiple modalities;
- create intelligent agents and synthetic characters that can interact with users in a natural way, inspired in the way humans interact with each other;
- bridge the gap between natural spoken language and the underlying semantic information;
- create and develop new architectures of cooperative virtual environments using artificial intelligence techniques to create realistic synthetic characters;
- develop software architectures for virtual environments, with emphasis on image synthesis algorithms;
- develop innovative applications in areas such as games and learning environments.
9.3 Embedded Electronic Systems

Embedded Electronic Systems (EES) are crucial in the development of new devices and products, for emergent applications, and for consumer electronics, IT, communications and media, energy, environment, transports, biomedicine and life sciences.

The EES covers all the areas for designing electronic based systems, with research activity on new algorithms, architectures, methodologies, tools, electronic and microelectronic circuits covering RF, analog, mixed-signal and digital parts. The EES comprises the know-how to design and produce prototypes using discrete electronic systems, ASICs and reconfigurable electronics for the design of complete embedded electronic systems.

The EES performs advanced research, development, innovation, technology transfer and professional training with, and for, the academia, R&D, and industry with the highest international standards.

The EES main targets are to produce highly trained human resources, to establish international networking, and to push research economic value, promoting the global competitiveness of the existing industry or the creation of new start-up companies.

9.4 Computing Systems and Communication Networks

The Computing Systems and Communication Networks research line (Sistemas Computacionais e Redes de Comunicação) integrates the following research groups: Distributed Systems, Communication Networks and Mobility, Software Engineering.

Thus, this research line aims at providing innovative algorithmic, middleware, communications architecture and mobility support to build complex and dynamic distributed applications and network protocols.

It gathers the INESC-ID groups that perform research in the fundamental areas of knowledge required to assure efficient, safe, reliable, secure, and trustworthy computing and network systems to support the whole structure of the modern networks and complex software.

In this context, INESC-ID gathers a body of competences that renders it a national and international reference. These competences include significant expertise in fundamental technology, techniques, protocols, architectures and algorithms.
10 Anexes

10.1 Research Projects

**Title:** CPIT – Consulting and development in the ProjectIT context

**Financed by:** Multiple entities

**Coordinator from INESC-ID:** Alberto Silva

**Summary:** ProjectIT initiative has been producing several scientific results, which are being applied in real software development projects in connection with different software houses and companies. The purpose of this project is to participate in consulting and training activities, where these research achievements are applied and validated.

**Title:** LIREC: LIving with Robots and InteractivE Companions

**Financed by:** FP7

**Coordinator from INESC-ID:** Ana Paiva

**Summary:** LIREC aims to establish a multi-faceted theory of artificial long-term companions (including memory, emotions, cognition, communication, learning, etc.), embody this theory in robust and innovative technology and experimentally verify both the theory and technology in real social environments.

LIREC will advance understanding of the concepts of embodiment, autobiographic memory and social interactions in the context of companions where the ‘mind’ might migrate to differently embodied ‘bodies’.

**Title:** EURO-NF: Anticipating the Network of the Future - From Theory to Design

**Financed by:** FP7

**Coordinator from INESC-ID:** Augusto Casaca

**Summary:** Euro-NF will therefore cover the integration of a wide range of European research capacities, including researchers and research and dissemination activities. As such Euro-NF will continue to develop as a prominent European center of excellence in Future networks design and engineering, acting as a “Collective Intelligence Think Tank”, representing a major support for the European Society leading towards a European leadership in this area.

**Title:** MIA-VITTA: Mitigate and assess risk from volcanic impact on terrain and human activities

**Financed by:** FP7

**Coordinator from INESC-ID:** Teresa Vazão Vasques

**Summary:** The MIAVITTA project aims at developing tools and integrated cost effective methodologies to mitigate risks from various hazards on active volcanoes (prevention, crisis management and recovering). Such methodology will be designed for ICPCs contexts but will be helpful for European stakeholders.
to improve their experience in volcanic risk management. The project multidisciplinary team gathers civil defense agencies, scientific teams (earth sciences, social sciences, building, soil, agriculture, information technologies and telecommunications) and an IT private company.

Title: **Sideworks**  
Financed by: QREN  
Coordinator from INESC-ID: several groups involved

Summary: The main objectives of this project/task is the hardware implementation of an algorithm for biological sequence alignment (DNA, RNA or amino acids). A dedicated architecture based on the SideWorks template should be developed. This architecture should be special tailored to the most intensive tasks of the selected alignment algorithm. The remaining and less intensive tasks of the sequence alignment algorithm should be executed on the FireWorks embedded processor.

Title: **SE2A: Nanoelectronics for Safe, Fuel Efficient and Environment Friendly Automotive Solutions**  
Financed by: EC/FCT  
Coordinator from INESC-ID: Leonel Sousa

Summary: The main objective of this project, in what respects the participation of INESC-ID SiPS group in SE2A, is to design and implement an instrument electronics unit able to simultaneously acquire signals from a set of sensors required to implement an Inertial Navigation System (INS).

Title: **Multicon - Architectural Optimization of DSP Systems with Multiple Constants Multiplications**  
Financed by: FCT  
Coordinator from INESC-ID: Paulo Flores

Summary: The main goal of this research project is the development of new models and algorithms for optimization of Multiple Constant Multiplications (MCM) architectures. As an outcome of the research project, a set of tools, adequate for integration in a typical design flow and incorporating the developed optimization algorithms for specific architectures, will be made available as open software in a public webpage of the project.

Title: **REAP.PT: Computer Aided Language Learning - Reading Practice**  
Financed by: FCT  
Coordinator from INESC-ID: Nuno Mamede

Summary: In order to enable students to learn to read another language, a good tutoring system should give them much opportunity for practice and make the experience as engaging and personalized as possible. The REAPPT system is being designed to complement teacher time by giving the student documents to read and questions about new words they have seen in the documents. It will personalize the work by choosing texts in Portuguese that are at the reading level of the individual student, presenting words that the student needs to learn and having documents on subjects that the student is interested in. Questions will be automatically generated about the meaning of the words that the student saw in a document and reports will be given to the student and to their teacher.
**Title:** PT-STAR: Speech Translation  
Advanced Research to and from Portuguese

*Financed by:* FCT

Coordinator from INESC-ID: Maria Luísa Coheur

**Summary:** Within this project, several problems are envisaged, such as spontaneous speech translation – for which the performance of the automatic speech recognizer component seriously degrades – and voice conversion – which allows the synthesized speech to retain the characteristics of the original voice. Moreover, several major problems in statistical machine translation are addressed, as for instance the study of different methods to automatically extract bilingual lexicon from non-aligned parallel corpora and to update the translation model. Finally, PT-STAR targets the implementation of a proof of concept prototype.

**Title:** BioHypo: Confronting the clinical relevance of biocide induced antibiotic resistance

*Financed by:* FP7

Coordinator from INESC-ID: Ana Teresa Freitas

**Summary:** The overarching question which BIOHYPO is aimed to address is: has the use of biocides contributed to the development and spread of clinically significant antibiotic resistance in human pathogens? Core of BIOHYPO are a high throughput screening approach on collections of thousands of well characterized microorganisms and an interactive web based data analysis platform. Phenotypic screening for reduced susceptibility to biocides, detection of novel resistance genes and mobile elements, and screening for their molecular epidemiology and metagenomics will be accompanied by methodological innovation for testing, risk evaluation and registration of biocides. Altogether BIOHYPO aims to provide solid data and analysis to direct future issuing of guidelines for safe environmental, medical and industrial use of biocides.

**Title:** SFERA: Solar Facilities for the European Research Area

*Financed by:* FP7

Coordinator from INESC-ID: João Miranda Lemos

**Summary:** The purpose of this project is to integrate, coordinate and further focus scientific collaboration among the leading European research institutions in solar concentrating Systems. To define and validate new methodologies for comparative durability tests by accelerated aging of selected CSP components. Improve the capacities of the installations to allow for:- tunable levels of flux by adaptive control of shutters -flexible temperature control of test bed to create thermal gradients at samples -transient heating and cooling to adjust for thermal cycles - quick flux cycles for thermal shock investigations.

**Title:** Impact: Innovations in MOS Parametric Amplification Circuit Technology

*Financed by:* FCT

Coordinator from INESC-ID: Jorge Fernandes

**Summary:** 1) Design of a high-speed ADC fully based on Parametric Amplification (PA) – Members of the research team of this proj-
ect have proposed novel, power-and-area efficient basic building blocks based on the PA principle (e.g. comparators, multiply-by-two amplifiers and multiplying digital-to-analog converters). These circuits have so far been considered at theoretical level and some simulation results have been published. In this project new building-blocks will be developed in which PA is combined with open-loop structures (basic source-followers), so operational amplifiers (opams) are not required. These blocks will be used to design, fabricate and test a silicon demonstrator of an 8-bit 120 MS/s 2-channel time-interleaved pipeline ADC fully based on PA.

Title: Cloud-TM: A Novel Programming Paradigm for Cloud Computing

Financed by: FP7

Coordinator from INESC-ID: Paolo Romano

Summary: This project aims at designing, building, and evaluating an innovative middleware platform for service implementation of Cloud based services: Cloud-TM (Cloud-Transactional Memory). Cloud-TM offers a simple and intuitive programmiq model for large scale distributed applications that integrates the familiar notion of atomic transaction as a first-class programming language construct, sparing programmers from the burden of implementing low level, error-prone mechanisms (e.g. locking, persistence and fault-tolerance) and permitting major reductions in the time and costs of the development process. Cloud-TM will embed a set of atomic mechanisms to simplify service monitoring and administration, a major source of costs in dynamic and elastic environments such as the cloud.

Title: ARGUS: Activity recognition and object tracking based on multiple models

Financed by: FCT

Coordinator from INESC-ID: João Miranda Lemos

Summary: Development and test of algorithms for activity recognition and object tracking based on multiple models

Title: ARIA: Ambient-assisted Reading Interfaces for the Ageing-society

Financed by: FCT

Coordinator from INESC-ID: António Serralheiro

Summary: The ARIA project aims at defining a framework for assisted reading, particularly targeted for elderly communities. It envisages a broad and active perspective of reading, where annotation and group communication tasks complement and build upon the main reading activity, taking advantage of a digital proactive medium. It addresses elderly individuals through the adoption of an assisted and adaptive stance that adapts document content navigation, presentation and interaction.
Title: HIVCONTROL: Control based on dynamic modeling of HIV-1 infection for therapy design

Financed by: FCT

Coordinator from INESC-ID: Susana Martins

Summary: Immunology is increasingly recognized as a major field in the area of Biomedicine. Establishing efficient therapeutics for infectious diseases is a major problem of the human society. In particular, this is illustrated by the emergence of the Acquired Immune Deficiency Syndrome (AIDS), which raised new problems and concerns worldwide. Controlling this type of diseases has thus a significant socio-economical impact. Furthermore it also raises challenging problems that only an interdisciplinary approach can tackle. In this respect a systems’ approach is attracting more and more attention in recent years and forms a global framework for this proposal. The aim of this project consists of designing personalized therapy strategies to control HIV-1 infection using model based nonlinear control and estimation techniques.

Title: Aquanet: Decentralised and reconfigurable control for water delivery multipurpose canal systems

Financed by: FCT

Coordinator from INESC-ID: João Miranda Lemos

Summary: Design and test of algorithms for decentralised and reconfigurable control for water delivery multipurpose canal systems.

Title: MIVIS: Modelação Procedimental de Superfícies Implicitas para Visualização

Financed by: FCT

Coordinator from INESC-ID: Joaquim Jorge

Summary: The main objective of this project is to improve on current sketch-based modelling research to create more complex and detailed models than is currently possible. The project will use a combination of implicit surfaces and polygonal representations with real time direct manipulation for free form procedural modelling and rendering operations.

Title: REFLECT: Rendering FPGAs to Multi-Core Embedded Computing

Financed by: FP7

Coordinator from INESC-ID: Pedro Diniz

Summary: This project will develop, implement and evaluate a novel compilation and synthesis system approach for FPGA-based platforms.

Title: RuLAM: Running Legacy Applications on Multicores

Financed by: FCT

Coordinator from INESC-ID: João Cachopo

Summary: In this project we build on the work done in the area of automatic parallelization, and extend it with the new and promising advances made in the area of Software Transactional Memory (STM).
Title: Alberti-Digital: Tradição e inovação na teoria e prática da arquitectura em Portugal

Financed by: FCT
Coordinator from INESC-ID: Joaquim Jorge

Summary: This research project is both, a celebration and innovation. A celebration in order to celebrate the order given by D João III, in XVI mid-century, to André de Resende to translate into Portuguese the - de re aedificatoria- Leon Battista Alberti. An innovation in order to produce for the 1st time, an intelligent computing environment to understand the cultural impact of this treatise on classical architecture.

Title: Galeno: Modeling and Control for personalized drug administration

Financed by: FCT
Coordinator from INESC-ID: João Miranda Lemos

Summary: This project aims at designing personalized drug administration system using Modeling, Estimation, Control and Advisory methods. The approach proposed in this project consists on the online estimation of the parameter models starting from a tailored a prior distribution developed also within this project by novel methodology and refining these estimates using effect measurements, in the presence of perturbations and sensor noise.

Title: MPSat: Multi-Packet Detection Techniques for Satellite

Financed by: FCT
Coordinator from INESC-ID: Augusto Casaca

Summary: Development Multi-Packet Detection Techniques for Satellite Networks

Title: 3DORUS: 3D Object Retrieval using Sketches

Financed by: FCT
Coordinator from INESC-ID: Manuel Fonseca

Summary: The main goal of this project is to develop novel multimedia information retrieval mechanisms, to replace the current non-natural and ill-suited methods for retrieving 3D objects. We will do this by developing novel algorithms to simplify, analyze and describe the content of three-dimensional objects, based on new techniques for partial structure-driven matching of three-dimensional models.

Title: PNEUMOPATH: A comprehensive dissection of pneumococcal-host interactions

Financed by: FP7
Coordinator from INESC-ID: Susana Martins

Summary: Transmission of Streptococcus pneumoniae to a new host can result in clearance, asymptomatic colonisation or progress to invasive disease. To date, study of infection has tended to be a reductionist approach, considering the contribution of each virulence factor or host factor in isolation.
Title: CRUSh - Clip-art Retrieval using Sketches

Financed by: FCT

Coordinator from INESC-ID: Manuel João Fonseca

Summary: In this project we want to develop a new approach to retrieve clip-arts, independently of their format (raster images or vector drawings), that will combine the potentialities from image and drawing analysis techniques.

Title: microEGo: Did you ask for something small? The microRNAs power in a Eucalyptus tension world!

Financed by: FCT

Coordinator from INESC-ID: Ana Teresa Freitas

Summary: In this project we will identify and characterize E. globulus miRNA’s involved in the regulation mechanisms of wood formation and their target genes, using as a model the tension wood forming tissues. The long term aims is to use this information to devise new ways to control the quality of wood produced by E. globulus and to provide the breeding programs with tools to direct their work to the selection/production of genotypes with desired wood qualities.

Title: Prosopon: Partilha de Ciclos de CPU para Identificação e Indexação Facial em Multimédia

Financed by: FCT

Coordinator from INESC-ID: Luís Veiga

Summary: PROSOPON will support users’ contributions to guide the process of face classification. The peer-to-peer infrastructure will be used with an additional overlay for distributed fault-tolerant storage of the video library and the index that results from the face indexing process. This additional overlay index will have a multidimensional structure according to the parameters used in the face identification phase (e.g. eigenfaces/eigenfeatures) and will be used to efficiently execute queries on the indexed library.

Title: RepComp: Replicação de Componentes para Melhoria de Desempenho ou Fiabilidade em Sistemas Multicore

Financed by: FCT

Coordinator from INESC-ID: Luís Veiga

Summary: In this project, we propose a complementary approach that can be used by both applications that include multiple threads and by applications that include a single thread. The main insight for our approach is that applications almost always resort on a set of components with standard interfaces - e.g., data structures, algorithms, etc.
**Title:** PNEUMOSYS: A systems biology approach to the role of pneumococcal carbon metabolism in colonization and invasive disease

**Financed by:** FCT

**Coordinator from INESC-ID:** Susana Martins

**Summary:** The ultimate GOAL of this project is to develop a multi-level mathematical model that can predict factors in sugar assimilation essential to thrive in the different host niches. However, a systematic, systems biology approach towards determining the factors governing sugar metabolism is far from trivial.

---

**Title:** iExplain - Reasoning About Unsatisfiability

**Financed by:** FCT

**Coordinator from INESC-ID:** Vasco Manquinho

**Summary:** In this project, a new formalism named Weighted Boolean Optimization (WBO) is proposed that extends the Maximum Satisfiability (MaxSAT) problem by introducing the use of pseudo-Boolean constraints as soft or hard constraints. Furthermore, several algorithms to solve WBO will result from this project.

---

**Title:** ParSat: Parallel Satisfiability Algorithms and its Applications

**Financed by:** FCT

**Coordinator from INESC-ID:** Paulo Flores

**Summary:** Our goal in this project, is to research and develop techniques to speedup the solution of SAT problems. Distributed SAT algorithms, using parallel computing environments (such as multicores, GPU’s, etc...) are a promising approach to reach this goal. Using these new computing platforms, we plan to explore techniques both at the algorithmic level and at the implementation level.

---

**Title:** EnviGP: Improving Genetic Programming for the Environment and Other Applications

**Financed by:** FCT

**Coordinator from INESC-ID:** Sara Silva

**Summary:** Genetic Programming (GP) is the youngest paradigm inside the artificial intelligence research area called evolutionary computation, and consists on the automated learning of computer programs. In this project we will develop and test new approaches to the bloat and overfitting problems in GP, while studying the relationship between the two, and adapt GP for improved efficiency in multiclass classification problems. The achievement of these goals will ultimately produce a powerful general-purpose tool that can be used by practitioners of many diverse areas of research.

---

**Title:** High-Performance Computing over the Large-Scale Internet

**Financed by:** FCT

**Coordinator from INESC-ID:** Luís Eduardo Teixeira Rodrigues

**Summary:** This project advances the current state of the art in platforms for Internet-wide computation, by designing, implementing and evaluating new mechanisms that move beyond the traditional client-server architecture of...
these platforms to support, for the first time, scalable decentralized cooperation among clients. This proposal addresses the key challenge of transitioning from the centralized architecture to one that is distributed and scalable. By adding communication between clients, we may remove the central server from the communication loop, for the sake of economy and speed. Whenever possible, direct (or delayed) exchange of data among clients may save precious bandwidth resources from the project’s owner. Additionally, for applications with controlled IO requirements, inter-client communication may speedup execution. To support this goal, most of our work will focus on two aspects: one is to prepare the BOINC middleware for the change, the other is to build on P2P computation to achieve some guarantees in such a hostile environment.

Title: FastFix - Monitoring Control for Remote Software Maintenance

Financed by: FP7

Coordinator from INESC-ID: Luís Eduardo Teixeira Rodrigues

Summary: FastFix results will include a platform and a set of open source tools to online monitoring of execution environments, gathering semantic information on application and user behaviour. This information is sent in real time to support centre, taking special care on privacy and security issues. Using event correlation techniques, FastFix identifies failure symptoms, performance degradation or changes in user behaviour and allow for failure replication, patch generation and patch deployment, resulting in a self-healing software application.

Main objectives are to develop (1) tools to gather context information on user and application, (2) a run-time with minimum impact on application performance, (3) a secure method to send this information to a centralized fault analysis platform, (4) a tool to detect software failures, undesirable execution trends and performance degradation, (5) a platform to replicate failure conditions within a virtual machine and (6) a tool to generate change strategies and necessary patches.
Title: VITHEA - Virtual Therapist for Aphasia Treatment

Financed by: FCT

Coordinator from INESC-ID:
Alberto Abad Gareta

Summary: Aphasia is a particular type of communication disorder caused by the damage of one or more language areas of the brain affecting various speech and language functionalities. Cerebral vascular accidents are one of the most common causes. A frequent syndrome among aphasia patients is the difficulty to recall names or words. Typically, word retrieval problems can be treated through word naming therapeutic exercises. In fact, frequency and intensity of speech therapy is a key factor in the recovery of lost communication functionalities. In this sense, speech and language technology can have a relevant contribution to the development of automatic therapy methods. VITHEA is an on-line platform designed to act as a “virtual therapist” for the treatment of Portuguese speaking aphasic patients. Concretely, the system integrates automatic speech recognition technology to provide word naming exercises to individuals with lost or reduced word naming ability. The adopted solution is based on a keyword spotting approach that validates the correctness of what was said by the patient. The program provides feedback both as a written solution and as a spoken message produced by an animated agent using text-to-speech synthesis. The application allows the easy addition of new therapy exercises and provides tools for the therapists to remotely track the recovery of the patients.

Title: Reaction - Retrieval, Extraction, and Aggregation Computing Technology for Integrating and Organizing News

Financed by: FCT

Coordinator from INESC-ID:
Mário Jorge Costa Gaspar da Silva

Summary: We research new tools for providing greater automation in news gathering, analysis, and delivery, while respecting practical constraints of news producers and consumers. We emphasize decomposition of stories into finer-grained elements and discovery of implicit relations between them. We also emphasize the relationship between news and social networks, both explicit and implicit, which underlie the news and significantly shape its content, quality, and authority. Hands-on experience in the newsroom will enable practitioners to innovate current practice of news production and identify important avenues for future research in computational Journalism.

Title: eCUTE - Education in Cultural Understanding, Technologically-Enhanced

Financed by: FP7

Coordinator from INESC-ID:
Ana Maria Severino de Almeida e Paiva

Summary: The eCUTE project aims to develop innovative, technologically-enhanced learning approaches in cultural awareness and understanding that will help overcome cultural, ethnic and religious differences that can lead to social stresses and sometimes outright conflict. The technologies to be developed in eCUTE include virtual world simulations with
intelligent interactive graphical characters embodying models of culturally-specific behavior and interaction in scenarios developed via a user-centered design process.

Title: MAIS-S - Multiagent Intelligent Surveillance System

Financed by: FCT

Coordinator from INESC-ID:
Francisco António Chaves Saraiva de Melo

Summary: With the generalized use of intelligent technology, the interaction between multiple smart devices poses interesting challenges both in terms of engineering and research. In this project, we model such complex networks as multiagent systems where each node corresponds to an agent. We propose the use of decision-theoretic models - Dec-POMDPs and specializations thereof - that naturally capture the decentralized nature of these networks in terms of local perception, interaction/communication and local actuation.

We are interested in heterogeneous surveillance networks that include different kinds of nodes, with different perceptual and actuation capabilities, as well as different processing power. The work will follow along two main lines. We formalize several fundamental problems typically found in most surveillance systems as optimal decision-making problems (Tasks 1-2) and tackle these problems in a principled way, proposing solutions that offer some theoretical guarantees of performance. On the other hand, we investigate several practical problems faced in deploying such a heterogeneous network (Tasks 3 and 4) and bring the results from Tasks 1-2 into practical use.

Title: SIREN - Social games for conflict RESolution based on natural iNteraction

Financed by: FP7

Coordinator from INESC-ID:
Ana Maria Severino de Almeida e Paiva

Summary: The Siren project aims to create a new type of educational game, the conflict resolution game, which takes advantage of recent advances in serious games, social networks, computational intelligence and emotional modelling to create uniquely motivating and educating games that can help shape how children think about and handle conflict. The software developed by the project will be able to automatically generate conflict scenarios that fit the teaching needs of particular groups of children with varying cultural background, maturity, and technical expertise, and the desired learning outcomes as specified by a teacher. This will enable the system to be used by school teachers all over Europe, without specific technical training. To realize this vision, a number of advances to the state of the art will be made throughout the various disciplines that members of our thoroughly multi-disciplinary consortium specialize in.

Title: ATTEST - AlgoriThms and Tolls for reasoning about dEpendable SysTems

Financed by: FCT

Coordinator from INESC-ID:
João Paulo Marques da Silva

Summary: Given the ever increasing importance of verified software, namely in safety-critical applications, the development of provably correct verification tools is a relevant and strategic research topic. This issue has been addressed in earlier work [22], but ex-
Existing software verification tools are currently unable to certify their results. Essentially, although software verification tools are known to be extremely reliable, it is also true that these tools have not been proved correct. For many applications, the use of uncertified software verification tool may represent an acceptable compromise. However, in applications where safety is a primary concern [e.g., human transportation, including avionics, automotive, railways and shipping], certified software verification solutions will bring added confidence to deployed software systems. The ATTEST project will develop a new generation of software verification tools built on top of formally certified components. The resulting software verification tools will provide a much higher degree of confidence in verified software systems.

Title: GaLA - Game and Learning Alliance

Financed by: QREN

Coordinator from INESC-ID: Ana Maria Severino de Almeida e Paiva

Summary: The GaLA motivation stems from the acknowledgment of the potentiality of Serious Games (SGs) for education and training need to address the challenges of the main stakeholders of the SGs European landscape (users, researchers, developers/industry, educators). A foundational fault issue in this context is the fragmentation that affects the SG landscape. GaLA aims to shape the scientific community and build a European Virtual Research Centre (VRC) aimed at gathering, integrating, harmonizing and coordinating research on SGs and disseminating knowledge, best practices and tools as a reference point at an international level. The other two key focuses of the project are (1) the support to deployment in the actual educational and training settings and (2) the fostering of innovation and knowledge transfer through research-business dialogue. The NoE organizations aim to integrate their activities and resources in a long-term view structuring the activities along 3 major axes: research integration and harmonization, joint research activities, and spreading of excellence.

Title: FalaComigo - Enhance the Cultural Tourism through the Interaction with Virtual Characters

Financed by: QREN

Coordinator from INESC-ID: Maria Luísa Torres Ribeiro Marques da Silva Coheur

Summary: FalaComigo aims to develop a solution to -Enhance the Cultural Tourism through the Interaction with Virtual Character-, by providing a set of applications, that will be settled in various places of touristic interest.

The goal of FalaComigo is, therefore, to develop a solution that helps tourists to take a different view of the monument or place of cultural interest that they are visiting, allowing them to interact with a set of virtual characters through questions and answers, specific for each location. Through these solutions, FalaComigo team will provide new and compelling ways of interacting with visitors, supplying a remarkable sensory experience. On the basis of development of these solutions we find a spoken dialogue system with speech recognition and synthesis, 3D facial animation, spoken dialogue management systems and question/answer technologies.
Title: INVITE - social Identity and partNer-ship in VIrTual Environments

Financed by: FCT

Coordinator from INESC-ID: Rui Filipe Fernandes Prada

Summary: The focus of the project will be around the notion of partnership of a human with another human or a virtual agent in a virtual environment: the project will study how partnership is created, maintained or broken during an interaction supporting the realization of a particular task in a virtual environment.

The hypothesis we propose is that inclusion of AI models that incorporate social intelligence, inspired by human behavior, in a virtual environment will foster believability in virtual agents within the context of partnership.

Title: ADAAS - Assuring Dependability in Architecture-based Adaptive Systems

Financed by: FCT

Coordinator from INESC-ID: Luís Eduardo Teixeira Rodrigues

Summary: As software systems become increasingly central to support everyday activities, there is a critical need to improve their dependability and optimize their performance, while reducing their development and operational costs. This project will focus on the provision of self-adaptability as a means for achieving dependability in the context of the other requirements. In particular, focusing on the use of architectural models at run-time, it will develop new languages, techniques and tools for creating dynamic adaptation strategies that allow a system to automatically respond to change and improve its behaviour as it executes. Relative to current research in this area, key innovative qualities of these adaptation strategies will be their analyzability and their flexibility. The former is necessary to establish the correctness of adaptation strategies and ensure that they will achieve the desired outcomes. The latter is necessary to accommodate uncertainty in the operating environments and changes that may occur.

Title: EUTV - Adaptive Channels in Europe

Financed by: FP7

Coordinator from INESC-ID: Isabel Maria Martins Trancoso

Summary: EUTV plans to perform research and develop and deploy the best-of-class extractors for indexing and analysing the individual information modalities (text, speech, audio, image, video) perform research on multimodal feature fusion of the individual extractors exploiting structural characteristics of the multimedia streams and the content domains (ie news, sport, documentaries) and descriptions about concepts modelled into ontologies. The EUTV framework will be based on service-oriented architecture so to be able to easily update extractors when better versions are available.

Title: PROBCONTROL - Probabilistically Coordinated Control with Limited Communications

Financed by: FCT

Coordinator from INESC-ID: Miguel José Simões Barão

Summary: The aim of this project is to develop coordinated control algorithms in a probabilistic setting. We consider a system that can
be actuated by several “agents”. When this agents have limited or no communication, they can still do useful work. On way to deal with the situation is to describe the behavior of the actuating agents probabilistically, and recast the whole problem in an information geometric context. The work to be developed follows this route.

Title: CEDAR - Collaborative Engineering Design And Review

Financed by: FCT

Coordinator from INESC-ID: Joaquim Armando Pires Jorge

Summary: Advanced Computer Graphics and Virtual Environments has caused a digital revolution in many activities, thanks to the novel visualization and manipulation possibilities they provide. Ironically, engineering teams still regard some of these systems as laborious and complex, and collaborative virtual environments have been hindered by archaic interfaces based on the desktop model.

CEDAR - Collaborative Engineering Design And Review - proposes to advance the state of the art in this field. The main idea of our research approach is to combine the power of novel interaction paradigms with the results from ethnographic observations of real world engineers and their successive evaluations to the different versions of the system.

Title: HELIX - Heterogeneous Multi-Core Architecture for Biological Sequence Analysis

Financed by: FCT

Coordinator from INESC-ID: Nuno Filipe Valentim Roma

Summary: The HELIX project aims at the development of integrated and parallel hardware and software platforms targeting the acceleration of a wide range of bioinformatic algorithms. It exploits new Single Program Multiple Data (SPMD) parallel processing strategies to accelerate several algorithms related to DNA re-sequencing, Multiple Sequence Alignment (MSA) and gene finding. Such approach will be supported with the development and implementation of a highly efficient and flexible programmable multi-core parallel architecture. In order to speedup the execution of the most demanding computational kernels that are shared by these applications.

Title: PMU - High Efficiency PMU’s for SOC

Financed by: FCT

Coordinator from INESC-ID: Marcelino Bicho dos Santos

Summary: High power conversion efficiency at all loading conditions - through dynamic optimization of the power device driver voltage as the load current decreases. Minimize the internal voltage spikes - as the output current increases, the strength of the gate driver is dynamically controlled ensuring the reliability of the system, without compromising the efficiency and transient response speed.
Title: SInteliGIS - Intelligent Geographic Information Services

Financed by: FCT

Coordinator from INESC-ID: Bruno Emanuel da Graça Martins

Summary: Geographic data is ubiquitous and highly valued, supporting research and decision-making in many fields of science and engineering. Still, there are many open issues in terms of the existing technology for managing and processing geographic data. The SInteliGIS project proposes to advance the state-of-the-art in terms of the existing geographic Web service technology, researching problems related to the integration of information from heterogeneous sources, particularly when this information combines geospatial and temporal aspects or when it is not geo-referenced in the traditional sense of using geospatial coordinates (e.g., textual information geo-referenced through the use of place names or street addresses). The main objective is to evolve the geographic Web service specifications proposed by the ISO and the OGC, for instance by proposing new specifications (e.g., services for data integration and for processing textual data according to geographic criteria) or by leveraging on non-GIS standards proposed by organizations such as the W3C.

Title: LSDMOG - large scale distributed consistency of replicated data for MMOGS

Financed by: FCT

Coordinator from INESC-ID: Paulo Jorge Pires Ferreira

Summary: In the last decade Multiplayer Online Games experienced a fast increase in popularity, helped by the expansion of broadband Internet access and the advances in graphic cards and processing power. Games evolved from one-time play, small environments to Massively Multiplayer Online Games (MMOGs)-worldwide networks with thousands of interacting users and, ever more often, persistent game state. Supporting this new form of game playing presents several challenges. First of all, high performance is required in order to provide the highly interactive experience demanded by the players of the game. Second, these games must scale to an increasingly large number of users and size of game environment. Third, it is fundamental to provide constant availability, so users can play whenever they want, for as long as they would like and with as few disruptions as possible.

Title: OOBIAN - Living Knowledge

Financed by: QREN

Coordinator from INESC-ID: Nuno João Neves Mamede

Summary: Construction of lexical and grammatical resources for local integration in the mechanism that recognizes syntactic-semantic relationship on text. Integration on an indexing system.
Title: RC-Cloud - Resilient Computing in the Clouds

Financed by: FCT

Coordinator from INESC-ID:
Miguel Nuno Dias Alves Pupo Correia

Summary: Cloud computing is a recent approach for providing computing, network and storage resources over the internet. This virtualization of resources allows companies to benefit from scalability and pay-per-use pricing. However, the notion of having computing or storage resources located in a third party's infrastructure leads to concerns about security and dependability. These concerns prevent many companies from adhering to cloud computing due to the criticality of their resources, or at least to the risk of economical losses. This project aims to tackle the challenge of improving the security and dependability of cloud computing services using recent techniques investigated under designations such as resilience, Byzantine fault tolerance or survivability.

Title: COST Action BM1006 Next Generation Sequencing Data Analysis Network

Financed by: COST

Coordinator from INESC-ID:
Ana Teresa Correia de Freitas

Summary: Next Generation Sequencing (NGS) is a highly parallelised approach for quickly and economically sequencing new genomes, re-sequencing large numbers of known genomes, or for rapidly investigating transcriptomes under different conditions. The massive data volumes being generated by these new technologies require new data handling and storage methods. Hence, the life science community urgently needs new and improved approaches to facilitate NGS data management and analysis. This COST Action unites bioinformaticians, computer scientists and biomedical scientists, harnessing their expertise to bring NGS data management and analysis to new levels of efficiency and integration. Rigorous surveillance of NGS technology and NGS-related software developments will allow the partners to generate software solutions for future NGS opportunities in a timely manner. The Action will increase the ability of European groups to maximally benefit from NGS technology, and will create a nucleus for world-wide activities to jointly address the upcoming biomedical informatics revolution.

Title: TAGS - The power of the short - Tools and Algorithms for next Generation Sequencing applications

Financed by: FCT

Coordinator from INESC-ID:
Ana Teresa Correia de Freitas

Summary: This project will address the models and methods that will be used to effectively re-sequence genomes, taking into account the characteristics of the new HTS technologies. An integrated parallel programming framework will be developed in order to implement the algorithms developed in this project.

Title: Educare - Visualização e modelação de comportamentos em educação

Financed by: FCT

Coordinator from INESC-ID:
Daniel Jorge Viegas Gonçalves

Summary: The Educare project aims to provide educational community with a software
package that covers all aspects of educational data analysis, from students’ behaviors to teacher strategies, walking through programs and subjects organization. The basic idea is to consider two main entities in the educational context: actors (students and teachers) and curricular units; and to deal with different levels of abstraction for actors (individual, working group and set of actors), and curricular units (subjects, groups of subjects and programs). Using this conceptual framework, will then be possible to understand the entire educational process, and prevent and correct problematic situations, whenever is possible. The distinction between educare and other software tools, resides on the fact that each educational entity can be addressed by similar approaches, since all of them share temporality and the educational context. Indeed, the strategy is to create a package that can be guided by contextual information, in order to anticipate failure situations, either from actors’ or curricular units the point of view.

Title: ASPEN - Answer Set Programming with Boolean Satisfiability

Financed by: FCT

Coordinator from INESC-ID: Maria Inês Camarate de Campos Lynce de Faria

Summary: Answer Set Programming (ASP) is a form of declarative programming particularly suited for knowledge representation. Enormous progress concerning the theoretical foundations of ASP have been made in recent years, and the existence of reasonably efficient ASP solvers has made it possible to use it in real. Answer set solvers -solvers for generating stable models normally start with grounding the program by instantiating its variables by ground literals, thus obtaining a propositional formula. At this stage, the use of Boolean satisfiability (SAT) solvers plays a key role. The ASPEN project is expected to be a breakthrough in Answer Set Programming by providing a flexible albeit competitive ASP solver, which will be able to take into account the user needs and preferences. These goals will be achieved extending the SAT solver which is the core of the ASP solver. Flexibility will be achieved through providing the user with detailed reasons for supporting either the solutions found or the nonexistence of solutions. The user will also be given the possibility to interact with the solver requiring other more suitable solutions.

Title: Collaboration in the upgrade of the Tilecal/ATLAS/LHC back end electronic systems to the specifications of the SLHC

Financed by: FCT

Coordinator from INESC-ID: José António Soares Augusto

Summary: To collaborate on the ongoing efforts for upgrading the Tilecal detector electronics systems, belonging to the ATLAS CERN/LHC experiment. The TILECA will have to meet the requirements in data transfer bandwidth, radiation tolerance and processing speed, which are predicted for the SLHC (Super Large Hadron Collider). Broadly speaking, as the SLHC will afford a tenfold increase in luminosity, those system characteristics will have to engage also in an tenfold Improvement. Besides the Institutions signing the project proposal, the Un. of Valencia (through the IFIC - Instituto de Física Corpuscular) and one CERN Department.
Title: TIMBUS - Digital Preservation for Timeless Business Processes and Services

Financed by: FP7

Coordinator from INESC-ID:
José Luís Brinquete Borbinha

Summary: This project will address the problem of the digital preservation of business environments, comprising the information, business processes and applications.

Title: SEMIRA - Simulating the EMergent Impact of Regulations Across cultures

Financed by: FP7

Coordinator from INESC-ID:
Ana Maria Severino de Almeida e Paiva

Summary: The SEMIRA project studies the interaction between emerging normative behaviour and new regulations in different cultures and different countries. The goal is to support the preparation of new regulations of different government bodies. A theoretical framework will be developed based on work done on emerging norms on the one hand and formal frameworks on norm enforcement. The other will do large scale simulations based on emergent behaviour.

Title: SMARTIS - Smarter Indexing and Search Schemes

Financed by: FCT

Coordinator from INESC-ID:
Pavel Pereira Calado

Summary: In this project, we will study, implement, and evaluate several solutions for Information Retrieval (IR) problems, using intelligent schemes. By intelligent schemes we mean the application of IR solutions capable of adapting to the syntactic and semantic characteristics of the documents being processed. Such capability has two main goals: (1) avoid, or minimize, the need for human intervention when applying the same technique in different contexts; and (2) allow the use of semantic information to improve the performance of IR techniques. Besides the research performed and the resulting knowledge acquired, we expect this project to produce a set of tools for the processing of textual information, called the SMARTIS Toolkit. All tools in the SMARTIS Toolkit should be automatically adaptable to the document collections were they are applied and have the ability to use external information to improve retrieval results. Furthermore, the tools must be robust, able to deal with very large amounts of data, and be available to the community as open-source software.

Title: 6DSPACES - Superfícies interactivas 3D em larga escala

Financed by: IDE-RAM

Coordinator from INESC-ID:
Joaquim Armando Pires Jorge

Summary: This Project is about Research and Development of large-scale interactive 3D
surfaces for public spaces using a cluster of computers to control an immersive system driving a synchronized array of projectors, aroma synthesizers, sound transducers, sensors and actuators to make it possible to experience virtual environments in novel ways. These different dimensions of user experience (3D projection, sounds, touch and smell) has definitely become a mainstream concern. Transactional Memories (TM) answer the need to find a better programming model for PP, capable of boosting developers’ productivity and allowing ordinary programmers to unleash the power of parallel and distributed architectures avoiding the pitfalls of manual, lock-based synchronization. It is therefore no surprise that TM has been subject to intense research in the last years. This Action aims at consolidating European research on this important field, by coordinating the European research groups working on the development of complementary, interdisciplinary aspects of Transactional Memories, including theoretical foundations, algorithms, hardware and operating system support, language integration and development tools, and applications.

---

**Title:** Synergy-VM: Uma Infra-estrutura para os Futuros Ambientes de Execução

**Financed by:** FCT

Coordinator from INESC-ID: Luis Manuel Antunes Veiga

**Summary:** In this project, we intend to research support for application development in clusters of multi-core machine. Unlike in the past, in these new environments, programming for a single computer or for a cluster of computers is no longer that different, as programmers always have to deal with concurrent threads of execution.

---

**Title:** EURO-TM – Transactional memories: foundations, algorithms, tools and applications

**Financed by:** FP7

Coordinator from INESC-ID: Paolo Romano

**Summary:** Parallel programming (PP) used to be an area once confined to a few niches, such as scientific and high-performance computing applications. However, with the proliferation of multicore processors, and the emergence of new, inherently parallel and distributed deployment platforms, such as those provided by cloud computing, parallel programming has definitely become a mainstream concern. Transactional Memories (TMs) answer the need to find a better programming model for PP, capable of boosting developers’ productivity and allowing ordinary programmers to unleash the power of parallel and distributed architectures avoiding the pitfalls of manual, lock-based synchronization. It is therefore no surprise that TM has been subject to intense research in the last years. This Action aims at consolidating European research on this important field, by coordinating the European research groups working on the development of complementary, interdisciplinary aspects of Transactional Memories, including theoretical foundations, algorithms, hardware and operating system support, language integration and development tools, and applications.

---

**Title:** Neuroclinomics - Understanding NEUROdegenerative diseases through CLINical and OMICS data integration

**Financed by:** FCT

Coordinator from INESC-ID: Sara Alexandra Cordeiro Madeira

**Summary:** This project is an innovative approach to understanding neurodegenerative diseases through heterogeneous data integration. A sophisticated knowledge discovery system will integrate powerful mining algorithms to unravel potentially relevant links between omics and clinical data. Disease diagnostic and prognostic markers, disease progression rates, and patient profiles will be tackled. Apart from the challenging goal of studying complex diseases, developing efficient and effective integrative approaches to biomedical data analysis is a research hot topic, not only due to the highly heterogeneity of data but also to their massive volume.
Title: SCOMagNO - Frequency Synchronization of a CMOS RF Oscillator by a Magnetic Nano-Oscillator Based on Spin Transfer Torque

Financed by: FCT

Coordinator from INESC-ID: Manuel de Medeiros Silva

Summary: The objective is to use a high-Q nano-oscillator to synchronize by injection-locking an inductorless oscillator operating in the GHz range.

Title: XML Data Cleaning

Financed by: FLWOR

Coordinator from INESC-ID: Helena Isabel de Jesus Galhardas

Summary: The work to be developed consists in the following items: (i) development and dissemination in the community of a library of XQuery data cleaning functions; (ii) design and execution of XQuery data profiling programs for two XML data sets, in order to identify the existing data quality problems; (iii) design and execution of XQuery data cleaning programs for addressing the data quality problems identified in (ii); (iv) discussion about the adequacy of the library of XQuery data cleaning functions for writing the programs in (ii) and (iii); (v) identification of open problems in the XQuery language for specifying these data cleaning programs, such as issues related to computational performance and exception handling; (vi) proposal of solutions for overcoming the open problems identified in (v); and (vii) validation of these solutions.

Title: Wiz - Touchpoint Activator Framework

Financed by: WIZ

Coordinator from INESC-ID: Paulo Jorge Pires Ferreira

Summary: O presente contrato visa formalizar a transferência de tecnologia entre o INESC-ID - através do Grupo de Sistemas Distribuídos - e a WIZ no âmbito das actividades de I&D da empresa, na área de desenvolvimento de soluções de sistemas distribuídos (com ênfase em algorítmicos, cálculos estatísticos e integração de sistemas para as áreas de marketing e publicidade bem como em testes de software).

Title: Biomag PLT - Platform for Magnetoresistive Biochip Research and Development

Financed by: INL

Coordinator from INESC-ID: José António Henriques Germano

Summary: INESC-ID developed a Biochip Reading Platform to exploit the magnetoresistive biochips developed by INESC-MN. This compact autonomous system is capable of on-site biorecognition assays without the need of other instrumentation. Only a laptop is required for the user Interface; biochip driving, reading and feature extraction is
performed in the embedded system. The full prototype consists on a cartridge that includes the interface with the biochip, the box with the control electronics, and a software program to interface with the user. The platform is able to measure biosignals with an amplitude 10 times lower than state of art laboratory equipment. The prototype system has been successfully used for the past three years by the INESC-MN to aid the development of new magnetoresistive biochips, both at sensor design and biorecognition level. Two new prototypes of the Biochip Reading Platform will be built, tested and calibrated. Additionally, two Enhanced Biochip Reading Platforms will be developed. The new platforms will be used as a tool for Biochip research and development in INESC-MN and International Iberian Nanotechnology Laboratory (INL).

**Title:** IMAGIC - Integrated Magnetic imAgery based on spintronics Components

**Financed by:** FP7

**Coordinator from INESC-ID:** Moises Simões Piedade

**Summary:** Structures reliability, installations safety and products quality are requirements that industrial sectors must take into account. In transport and nuclear fields, a major stake of people safety is associated. To take up this challenge, industries are users of non destructive testing (NDT). IMAGIC aims at developing a new integrated magnetic imagery based on high sensitive and spatial resolution GMR and TMR array sensors. The objective is to lead developments to the industrialization of smart systems combining technological developments (array sensor, integrated electronic) with sophisticated treatment tools (sensors design, flaw characterization). IMAGIC will ensure the increase of the probe sensitivity and spatial resolution: smaller and more buried cracks and located in complex zones could be detected. Magnetic probes based on new spintronics array components will also have important impact for biomedical and geological applications. In the current context of sustainable development, IMAGIC will promote the use of magnetic methods as an alternative method to penetrant inspection, whose exploitation is threatened due to the use of polluting products.

**Title:** I2D - Intelligence to drive (Phase I and II)

**Financed by:** ITDS

**Coordinator from INESC-ID:** José António Henriques Germano

**Summary:** This project aims to develop a device able of collecting, on-board of a vehicle, a set of data that is usable for various applications: estimation of fuel consumption and emissions, production of indicators in terms of safety and comfort, maintenance and fault records, or simply to obtain data for the evaluation and qualification of driving behavior. The device processes the collected information, stores it in flash memory and transmits it via a bidirectional link data via mobile network (GPRS) using IP (Internet Protocol) to a server on the Internet.

The device is connected to the OBD port, from which receives power supply and collects the information available in accordance with the standard EOBD. It also has additional sensors to measure atmospheric pressure (altimeter), vehicle acceleration in three axes and a GPS receiver. The device also supports Bluetooth and USB connectivity and it can operate autonomously in the event of loss of power supply from the OBD port.
Title: ARISTOS - Autonomic Replication of Software Transactional memories

Financed by: FCT

Coordinator from INESC-ID: Paolo Romano

Summary: 1. Extend the conventional notion of STM to seek a convergence with the distributed computing paradigm, and introduce a novel programming abstraction which combines the simplicity of STMs with the scalability and failure resiliency achievable by leveraging the resource redundancy proper of large scale cluster environments.

2. Design and implement ARISTOS, an autonomic, self-optimizing distributed STM platform. The ARISTOS platform will autonomously monitor the workload generated by the user level applications and seek optimal performances by transparently adapting the mechanisms used both 1) to regulate concurrency between local transactions (i.e. at the STM level), and 2) to detect conflicts originated by transactions executing at different nodes (i.e. at the replication protocol level).

Title: DIRHA - Distant-speech Interaction for Robust Home Applications

Financed by: FP7

Coordinator from INESC-ID: Alberto Abad Gareta

Summary: The DIRHA project addresses the development of voice-enabled automated home environments based on distant-speech interaction in different languages. A distributed microphone network is installed in the rooms of a house in order to monitor selectively acoustic and speech activities observable inside any space, and to eventually run a spoken dialogue session with a given user in order to implement a service or to have access to appliances and other devices. The multi-microphone front-end is based on the use of arrays consisting of analog microphones or Micro Electro-Mechanical Systems (MEMS) digital microphones. The targeted system analyses the given multi-space acoustic scene in a coherent way, by processing in a parallelized fashion simultaneous activities which occur in different rooms, and in case by supporting the same time the interaction with users who may speak in different areas of the house.

Title: HEIDI - HIGH Dimensional Indexing

Financed by: FP7

Coordinator from INESC-ID: Andreas Miroslaus Wichert

Summary: Traditional indexing of multimedia data leads to dilemma. Either the number of features has to be reduced or the quality of the results is unsatisfactory, or approximate queries is preformed leading to a relative error during retrieval.

The promise of the recently introduced subspace-tree is the logarithmic retrieval complexity of extremely high dimensional features. The subspace-tree indicates that the conjecture “the curse of dimensionality” is false.

The search in such a structure starts at the subspace with the lowest dimension. In this subspace, the set of all possible similar objects is determined. In the next subspace, additional metric information corresponding to a higher dimension is used to reduce this set. This process is then repeated. The theoreti-
cal estimation of temporal complexity of the subspace tree is logarithmic for evenly distributed data. It means that depending on the distribution of our data, we have to choose an ideal projection into the subspaces leading to an ideal hierarchy.

In the project we will perform experiments on different databases, high dimensional data up to several thousand, and of size till 1 billion

..........................................................

**Title:** Machimina - Metodologia e Plataforma para Produção de Videojogos e Narrativas Interactivas

**Financed by:** BeActive

**Coordinator from INESC-ID:** Rui Filipe Fernandes Prada

**Summary:** The project focuses on the creation of two tools: a structure for the game and its history and another to define the behavior of characters in stories.

..........................................................

**Title:** AVoz - Models for automatic speech recognition for elderly

**Financed by:** FCT

**Coordinator from INESC-ID:** Thomas Aurelien Pellegrini

**Summary:** The AVoz project aims at understanding the specifics of elderly speech in the context of large vocabulary automatic speech recognition. Both acoustic and language modelling will be investigated to increase ASR performance. The project contributions will be: - The building of an elderly speech large corpus in Portuguese, about 50 speakers male and female are targeted. We plan to make the corpus available for research purposes. - A module that automatically detects ageing altered speech, which will be a statistical classifier trained with features whose prediction power will be investigated during the project, - Acoustic and language model adaptation techniques will be implemented, in order to improve ASR performance.

..........................................................

**Title:** Threads - Multitask System Framework with Transparent Hardware Reconfiguration

**Financed by:** FCT

**Coordinator from INESC-ID:** Pedro Filipe Zeferino Tomás

**Summary:** The project proposes the development of a framework for reconfigurable computing systems based on the following characteristics:

* the invocation of the reconfigurable processing units (RPUs) is completely transparent to the programmer; he does not require to know if a given call to a library function is executed in the general purpose processing unit (GPPU) or in an RPU;

* a user can download a highly optimized core from an online RPU store and install it on the system, just as he can install a new library in a personal computer;

* the framework includes a set of pre-developed hardware and software interface modules that eases the development of new RPUs by hiding the complexity to interface the remaining system (GPPU, memory, etc);
* each RPU acts as an independent processing core able to fetch data directly from memory, thus allowing the GPPU to continue processing other threads.

Title: NetDyn: Understanding real large networks, from structure to dynamics

Financed by: FCT

Coordinator from INESC-ID: Alexandre Paulo Lourenço Francisco

Summary: In recent years, with the explosive growth of real networks and structured data sets, a new class of graphs came to light. This kind of graphs are huge and very sparse in general, with some prevailing characteristics. The structure of such networks is hard to describe in general and, moreover, the structure is only a starting point. When we think about complex networks, we should take into account connectedness both at the level of structure and of behavior. This means that, in addition to tools to analyze network structure, we also need a framework for reasoning about behavior and interaction in network contexts, where a single event may cause subtle cause-effect events. Although it is commonly accepted that structure has influence on behavior, to our knowledge little work has been done on how dynamics influence network structure. On the other hand, since complete observation may not be possible and tinkering with real systems may lead to unexpected disruptions, suitable simulation models and tools are a must. This project comes in this line of research, with the aim of developing new models and tools for the study of large networks structure evolution and processes dynamics.

Title: NOVAGEO - niuGIS-Plataforma Avançada para Harmonização de Informação Geográfica

Financed by: IAPMEI

Coordinator from INESC-ID: Mário Jorge Costa Gaspar da Silva

Summary: Technical consulting support to the project of harmonization of geographic information.

Title: POLARIS - POLynomial hierARchy algorithms and applicationS

Financed by: FCT

Coordinator from INESC-ID: João Paulo Marques da Silva

Summary: The POLARIS project will develop a new generation of algorithms for decision problems complete for the polynomial-time hierarchy, and also for PSPACE-complete decision problems. All algorithms will be based on iterative calls to a SAT oracle, following the CEGAR-based paradigm. One of the main contributions will be to develop CEGAR-inspired algorithms for each restriction of QBF and also to the general QBF problem. Another main contribution will be to develop dedicated algorithms for representative problems in the lower levels of the polynomial-time hierarchy.
Title: specSTM: Software Transactional Memory with Thread-Level Speculation Support

Financed by: FCT

Coordinator from INESC-ID:
João Pedro Faria Mendonça Barreto

Summary: Building from our experience in STM, specSTM project will depart from stand-alone STM algorithms combine them with TLS support. Hence, specSTM will leverage STM with the ability to automatically parallelize each thread forked by the programmer (in the multi-threaded TM program). More precisely, specSTM will divide the code of the currently active transaction at each thread into multiple tasks that will run in parallel. If no conflicts arise among the multiple tasks, then the transaction can commit earlier. Furthermore, specSTM can even be more optimistic and speculative execute future transactions of a thread, even when the current transaction in that thread is still active. If the current transaction commits and the transaction(s) running in out of order tasks spawned by TLS did not perform any read that violates the corresponding thread’s program order, then further parallelism is possible.

Title: VoiceWorks

Financed by: QREN

Coordinator from INESC-ID:
João Paulo da Silva Neto

Summary: Technical and scientific assistance in the project Individual RTD SI No. 5108 - Distribution and Filtering Information associated with Semantic Multimedia Content. Technical and scientific assistance in the project Individual RTD SI No. 5328 - Development of a System to capture / processing and automatic speech transcription for meetings, public assistance and supervision.

Title: DreaMachine - Design of a Reconfigurable Many-Core Architecture for High Performance Computing

Financed by: FCT

Coordinator from INESC-ID:
Mário Pereira Véstias

Summary: Development and prototyping of an adaptable/reconfigurable many-core architecture using reconfigurable processors and an adaptable on-chip interconnection network (OCIN) for high performance computing (HPC).

Develop a methodology to explore the design space of the architecture. A framework will integrate tools for architecture specification and configuration, for hardware synthesis, for kernel mapping and for architecture simulation.
Title: SUSPECT - SecUre SPEeCh Technologies

Co-Supervisor from INESC-ID: Isabel Maria Martins Trancoso

Summary: The goal of this project is to develop privacy-preserving frameworks for processing voice data. Processing will be performed without having access to the voice, i.e., access to any form of the speech that can be analyzed to obtain information about the talker or what they spoke. Using a combination of tools from cryptography and secure-multiparty computation we will render voice processing algorithms secure (i.e. privacy-preserving), so that the privacy of all parties is preserved. We specifically propose to develop solutions for secure speaker verification and keyword spotting problems. We envision a mechanism whereby police/security agencies could obtain publicly-accepted forms of legal sanction to look for pre-specified voices or phrases. The privacy-preserving framework will ensure that they are only notified when these occur, but will have no access to the voice data itself, thus preserving citizens’ privacy. Although this proposal addresses only speech processing techniques, the impact of this type of technique is not restricted to this area. In fact, it may affect all types of multimedia documents.

Title: CAMP - Computational Analysis of MicroRNAs in Plants

Co-Supervisor from INESC-ID: Ana Teresa Correia de Freitas

Summary: The objective of this project is to develop new computational tools for the study of miRNA-mediated gene regulation. The methods that will be developed will focus on plant genomes, in particular woody plants. The reasons for this are pragmatic. First, the biogenesis and the binding of miRNA to their targets are different in animal and plants, and therefore the computational methods need to be specialised for either kingdom. Between the two, the plant miRNA bioinformatics is less developed and hence offers more research opportunities. Secondly, and crucially, this project intends to complement and to capitalise on the public investment already made in other projects run by (part of) our team, namely the FCT-funded GeneGLobWq and migroEGO projects, both dedicated to woody plants, in particular Eucalyptus species that are of great importance for Portugal’s economy.

Title: Cervantes - Co-VAlidatioN Tool for Embedded Systems

Co-Supervisor from INESC-ID: José Carlos Campos Costa

Summary: In this project we propose to work at the system-level validation and produce a tool to automatically generate input test vectors, from a system-level description in SystemC, that allows a user-specified coverage to be obtained. We propose also to apply
our methodology to the interaction between a hardware part described in SystemC with an Instruction Set Simulator which is running the software part. Hence obtaining true hardware/software co-validation.

Title: PAELife - Personal Assistant to Enhance the Social Life of the Seniors

Financed by: FCT

Coordinator from INESC-ID: Daniel Jorge Viegas Gonçalves

Summary: This project aims to develop solutions like a personal assistant to senior citizens, enhancing their independence and connection to others (family or not).

Title: VOCE - Voice Coach for Reduced Stress

Financed by: FCT

Coordinator from INESC-ID: Hugo Daniel dos Santos Meinedo

Summary: VOCE shall develop methods and algorithms that enable the online classification of stress from live speech with the goal of providing feedback cues to the speaker in real-time to improve his communication skills. The work will focus on detecting and classifying stress in speech by leveraging advanced signal processing and machine learning techniques, complemented with psychological analysis of different aspects of stress perception.

Title: SOMER - Semantic Ontology Matching using External Resources

Financed by: FCT

Coordinator from INESC-ID: Mário Jorge Costa Gaspar da Silva

Summary: As ontologies become more prevalent and expressive, the lack of coordination that characterizes their development results in the parallel creation of ontologies for the same or related domains, disregarding interoperability. Thus, there is a prominent need to automatically match these ontologies in order to achieve semantic interoperability, bringing us a step closer to the semantic web vision. This need has been addressed by several ontology matching techniques, which aim at “finding correspondences between semantically related entities of different ontologies”. The most widely used techniques are based on the comparison of the strings of textual properties of ontology concepts, at the element level. They can also be used in conjunction with global similarity computation techniques, which work at the structural level to propagate similarities over the whole ontology, based on the relations between ontology concepts.

Title: POPStar - Public Opinion and Sentiment Tracking, Analysis and Research

Financed by: FCT

Coordinator from INESC-ID: Mário Jorge Costa Gaspar da Silva

Summary: POPSTAR has two main goals. The first is to design an opinion mining system capable of measuring, almost in real-time, sentiments vis-à-vis parties and political actors and the economy in the contents of both
conventional web-based media (online newspapers) and the so-called social media (blogs and micro-blogs). The second is to use the collected data to explore and explain the relationship between trends in sentiments as expressed in the conventional media, the social media and the public opinion polls and surveys in Portugal.

Title: Qualcomm- Consulting with Qualcomm Flarion Technologies

Financed by: QUALCOMM

Coordinator from INESC-ID: José Carlos Alves Pereira Monteiro

Summary: The FlashLinQ and Lycan modems employ FIR filters within the signal processing blocks. New techniques developed by the ALGOS group can optimize these filters if they use constant multiplications. These algorithms maximize the sharing of partial terms hence yielding significant area reductions. Initial experiments on low-pass filters within the RL Sample Rate block in FlashLinQ showed area reductions of approximately 24%.

INESC-ID will provide engineering services to analyze and design alternate FIR filter structures that will further reduce area. Specifically, within the RL Sample Rate block logic is shared between the I and Q paths of the filters. INESC-ID will generate RTL code for these alternate structures that Sponsor can use in the RL Sample Rate blocks in order to estimate area savings.

Title: LUP - Language Understanding Platform

Financed by: INOV

Coordinator from INESC-ID: Maria Luísa Torres Ribeiro Marques da Silva Coheur

Summary: Develop a natural language understanding platform that can be used in different scenarios.

Title: CO-EVOL - Co-evolução e auto-organização da cooperação

Financed by: FCT

Coordinator from INESC-ID: Francisco C. Santos

Summary: This is project aims at developing and applying theoretical and computational tools towards the understanding of different evolutionary processes that recur in physical, biological, medical, and social sciences, exhibiting common patterns and characteristics, hence justifying a unified approach. The main focus of our contribution can be concisely described in terms of problems of collective cooperative action, conflict resolution and self-organized behavior leading to the possible emergence of division of labor. In particular, we are interested in situations in which individual goals collide with collective endeavors.
**Title:** Class D - Monolithic Mems-Based Hearing Aid

**Financed by:** FCT

Coordinator from INESC-ID:
Edgar Francisco Monteiro Albuquerque

**Summary:** Design of Mems-based hearing aid (microphone and speaker) and corresponding electronic circuits for signal processing and amplification.

**Title:** EnergIST - Smart Metering System
**Instituto Superior Técnico**

**Financed by:** IST

Coordinator from INESC-ID:
Berend Willem Martijn Kuipers

**Summary:** The ENERGIST system enables the analysis of permanent logging of real-time instantaneous electrical consumption, which become available at all times to all IST community, in real time, allowing one to have a truly living laboratory with a focus to increase the consciousness of all towards the actual effects of good practices related to efficiency and sustainable use of resources.
11 Publications

11.1 Books & Books Chapters


- Christian Bignami (ed) and Vittorio Bosi (ed) and Licia Costantini (ed) and Chiara Cristiani (ed) and Franck Lavigne (ed) and Pierre Thierry (ed) and et al and Ricardo Lopes Pereira and Teresa Maria Sá Ferreira Vazão Vasques and João Trindade and Fernando Henrique Corte Real Mira da Silva, Handbook for Volcanic Risk Management - Prevention, Crisis Management, Resilience, Nov 2012.

- Manuel J. Fonseca and Pedro Filipe Pereira Campos and Daniel Jorge Viegas Gonçalves, Introdução ao Design de Interfaces, Oct 2012, FCA.


- Ricardo Chaves, Embedded Systems Design with FPGAs, Chapter Compact Clefia Implementation on FPGAs, Sep 2012, Springer.


• Nuno Miguel Silvestre Apolónia and Paulo Ferreira and Luis Veiga, Computational Social Networks Tools, Perspectives and Applications (Computer Communications and Networks series), Chapter Enhancing Online Communities with Cycle-Sharing for Social Networks (catalogued date), Mar 2012, Springer.


• João Ferreira and Alberto Rodrigues da Silva and João L. Afonso, Computational Intelligence and Decision Making - Trends and Applications, Chapter Collaborative Broker for Distributed Energy Resources, Jan 2012, Springer Verlag.


• Alexandre Barão and Alberto Rodrigues da Silva, Handbook of Research on Enterprise 2.0: Technological, Social, and Organizational Dimensions, Chapter How to value and monitor the relational capital of knowledge-intensive organizations?, Jan 2012, IGI Global.

• Jacqueline Guzman and Regina Motz and Alberto Rodrigues da Silva, Handbook of Research on Enterprise 2.0: Technological, Social, and Organizational Dimensions, Chapter Valuing Learning Objects inside a Community, Jan 2012, IGI Global.

• Joao P. Carvalho, Soft Computing in Humanities and Social Sciences, Chapter Rule Based Fuzzy Cognitive Maps in Humanities, Social Sciences and Economics, Jan 2012, Springer.
11.2 International Journal Articles


• Ricardo Ferreira and Eduardo Paz and Paulo Freitas and João Pedro Fernandes Ribeiro and José Germano and Leonel Sousa, 2-axis

- Andrej Jerman Blažič and Cláudia Ribeiro and João Fernandes and João António Madeiras Pereira and Tanja Ah, Analysing the Required Properties of Business Simulation Games to Be Used in E-Learning and Education, Intelligent Information Management (IIM), 4(6), pp. 348-356, Nov. 2012, SCIRP.


- Alberto Abad and Annamaria Pompili and Angela Costa and Isabel Trancoso and José Fonseca and Gabriela Leal and Luisa Farrajota and Isabel P. Martins, Automatic
word naming recognition for an on-line apha- 
sia treatment system, Computer Speech 

• Han The Anh and Luís M. Pereira and 
Francisco C. Santos, Corpus-based 
Intention Recognition in Cooperation 
Dilemmas, Artificial Life, 18(4), pp. 365-383, Oct. 2012, 
MIT press.

• Jose Miguel Heitor Machado Dores and 
Edwin C. Becerra-Alvarez and Miguel 
Martins and José M. de la Rosa and Jorge 
Manuel dos Santos Ribeiro Fernandes, 
Efficient biasing circuit strategies for in-
ductorless wideband low noise amplifiers 
with feedback, Microelectronics Journal , 

• Paulo Rogério Pereira and Augusto Casaca 
and Joel J. P. C. Rodrigues and Vasco N. G. J. 
Soares and Joan Triay and Cristina Cervelló- 
Pastor, From Delay-Tolerant Networks to 
Vehicular Delay-Tolerant Networks, IEEE 
Communications Surveys & Tutorials, 14(4), 
pp. 1166-1182, Oct. 2012, IEEE.

• Rui Cruz and Pedro Inácio and Mário 
Serafim Nunes, Quality User Experience 
in Advanced IP Video Services, Annals of 

• Gonzalo Navarro and Luís M. S. Russo and 
Yakov Nekrich, Space-Efficient Data- 
Analysis Queries on Grids, Theoretical 

• J. M. Martín-Sánchez and J. M. Lemos and 
J. Rodellar, Survey of industrial optimized 
adaptive control. Int. J. Adapt. Control 
Signal Process., Int. J. Adapt. Control Signal 

• Jucimar Souza and André Carvalho and 
Marco Cristo and Edleno Moura and 
Pável Calado and Paul-Alexandru Chirita 
and Wolfgang Nejdl, Using Site-Level 
Connections to Estimate Link Confidence, 
Journal of the American Society for 
Information Science and Technology, Oct. 
2012.

• José Simão and Tiago Garrochinho and 
Luís Veiga, A Checkpointing-enabled and 
Resource-Aware Java VM for Efficient 
and Robust e-Science Applications in 
Grid Environments, Concurrency and 
Computation: Practice and Experience, 

• J. M. Lemos and Miguel José Simões Barão, 
A control Lyapunov function approach to 
adaptive control of HIV-1 infection., Archives 
2012, Polish Acadely of Sciences.

• Alysson Bessani and Rudiger Kapitza and 
Dana Petcu and Paolo Romano and Spyridon 
V. Gogouvitis and Dimosthenis Kyriazis and 
Roberto G. Cascella, A look to the old-world 
sky: EU-funded dependability cloud com-
puting research. , SIGOPS Oper. Syst. Rev., 
46(2), Sep. 2012.

• M.L. Ciusa and L. Furi and Daniel Knight 
and F. Decorosi and Marco Fondi and Carla 
Raggi and Joana Coelho and Luís Aragones 
and Laura Moce and Pilar Visa and Ana T. 
Freitas and L. Baldassarri and Renato Fani 
and Carlo Viti and G. Orefici and Jose Luis 
Martinez and the BIOHYPO Consortium 
and Ian Morrissey and Marco R. Oggoni, A 
novel resistance mechanism to triclosan 
that suggests horizontal gene transfer 
and demonstrates a potential selective 
pressure for reduced biocide susceptibili-
ty in clinical strains of Staphylococcus au-
reus, International Journal of Antimicrobial 


• Nuno Mendes and Ana T. Freitas and Steffen Heyne and Marie-France Sagot and Rolf Backofen, Navigating the unexplored seascape of pre-miRNA candidates in single-genome approaches, , 28(23), pp. 3034-3041, Sep. 2012.


• Flávio L. Pinheiro and Francisco C. Santos and Jorge M. Pacheco, How selection pressure changes the nature of social dilemmas in structured populations , New Journal Physics, 14(), pp. 073035, Jul. 2012, IOP.


• Jeromos Vukov and Francisco C. Santos and Jorge M. Pacheco, Cognitive strategies take advantage of the cooperative potential of heterogeneous networks, New Journal Physics, 14(), pp. 063031, Jun. 2012, IOP.


• Sara Encarnação and Marcos Gaudiano and Francisco C. Santos and José A. Tenedório and Jorge M. Pacheco, Fractal cartography of urban areas, Scientific Reports, 2(527), Jun. 2012, Nature.


• Laura Beatriz Torres Simões Wise and Alberto Murta and Joao P. Carvalho and Marta Mesquita, Qualitative modelling of fishermen’s behaviour in a pelagic fishery, Ecological Modelling, 228(), pp. 112-122, May. 2012, Elsevier.


• Sven Van Segbroeck and Jorge M. Pacheco and Tom Lenaerts and Francisco C. Santos, Emergence of Fairness in Repeated Group Interactions, Physical Review Letters, 108(), pp. 158104, Apr. 2012, APS.


• Leonel Sousa and Samuel Freitas Antão, MRC-based RNS Reverse Converters for the Four-Moduli Sets \([2^{\text{2n+1}}, 2^{\text{n-1}}, 2^{\text{n}}, 2^{\text{(2n+1)-1}}]\) and \([2^{\text{2n+1}}, 2^{\text{n-1}}, 2^{\text{2n}}, 2^{\text{(2n+1)-1}}]\), IEEE Transactions on Circuits and Systema II (TCAS II), 59(4), pp. 244-248, Apr. 2012.


• Sérgio dos Santos Lopes Curto and Ana Cristina Mendes and Luisa Coheur, Question Generation based on Lexico-Syntactic Patterns Learned from the Web, Dialogue & Discourse, 3(2), pp. 147-175, Mar. 2012.


• Josep Argelich and Alba Cabiscoal and Inês Lync and Felip Manyà, Efficient Encodings from CSP into SAT, and from MaxCSP into MaxSAT, Journal of Multiple-Valued Logic and Soft Computing, 19(l), pp. 3-23, Jan. 2012.


• João António Rodrigues Sacramento and Francisco Burnay and Andreas Wichert, Regarding the temporal requirements of a hierarchical Willshaw network, Neural Networks, 25(l), pp. 84-93, Jan. 2012.

• Ana Cristina Mendes and Luísa Coheur, When the answer comes into question in question-answering: survey and open is-


11.3 International Conferences


• Taimur Kuntz and Jorge Manuel dos Santos Ribeiro Fernandes and Saed Nooshabadi and Cesar Rodrigues, A 749nW 1MSps 8-bit SAR ADC at 0.5V Employing Boosted Switches, IEEE International Conference on Electronics, Circuits, and Systems (ICECS), Dec. 2012.


• Diogo Rodrigues Oliveira de Brito and Jorge Manuel dos Santos Ribeiro Fernandes and Paulo Flores and J. Monteiro, Design and Characterization of a QLUT in a Standard


• João Barreto and Aleksandar Dragojevic and Paulo Ferreira and Ricardo Filipe and Rachid Guerraoui, Unifying Thread-Level Speculation and Transactional Memory (Best Paper Award), ACM/IFIP/USENIX Middleware Conference 2012, Dec. 2012, Springer, ACM.


• José Simão and Luís Veiga, A Progress and Profile-driven Cloud-VM for Improved Resource-Efficiency and Fairness in e-Science Environments, 28th ACM Symposium On Applied Computing (SAC 2013), Nov. 2012, ACM.


• Dalí F. D. Santos and Ilmério R. da Silva and Manuel J. Fonseca and Denise Guliato, Combining Color and Topology for Partial Matching, IEEE International Conference on Tools with Artificial Intelligence (ICTAI 2012), Nov. 2012, IEEE.


• Abilio Parreira and Floriberto Lima and Marcelino Bicho dos Santos, Digital Modular Control of High Frequency DC-DC Converters, Conference on Design of Circuits and Integrated Systems (DCIS), Nov. 2012.


• Stoyan Garbatov and João Cachopo, Explicit use of working-set correlation for load-balancing in clustered web servers, 7th International Conference on Software Engineering Advances, ICSEA, Nov. 2012.


• Marta Santos and Ricardo Lopes Pereira and António Brandão Leal, GBUS - Route GeoTracer, First international workshop on Vehicular Traffic Management for Smart Cities (VTM 2012), Nov. 2012.

• Thomas Pellegrini and Isabel Trancoso and Annika Hamalainen and António Calado and Miguel Sales Dias and Daniela Braga, Impact of age in ASR for the elderly: preliminary experiments in European Portuguese, IBERSPEECH 2012, Nov. 2012, Springer.


• Antonio Morgado and Mark H. Liffiton and Joao Marques Silva, MaxSAT-Based MCS Enumeration, Haifa Verification Conference (HVC 2012), Nov. 2012, Springer.

• Joana Coelho and Joao Carriço and Daniel Knight and Jose Luis Martinez and Ian Morrissey and Marco R. Oggioni and Ana T. Freitas, Mining relationships between antibiotic and biocide reduced susceptibility, II International Conference on Antimicrobial Research - ICAR2012, Nov. 2012.


• Paula Cristina Vaz and David Martins de Matos and Bruno Martins, Stylistic Relevance-feedback y B , B O '12 - Online Books, Complementary Social Media (workshop in conjunction wit CIK '12), O . 2012.


• José Simão and Luís Veiga, A Classification of Middleware to Support Virtual Machines Adaptability in IaaS, 11th International Workshop on Adaptive and Reflective Middleware (ARM 2012), In conjunction with Middleware 2012, Sep. 2012, ACM.


• José Lopes and Andrew Fandrianto and Maxine Eskenazi and Isabel Trancoso, Can a spoken dialog system be used as a tool to study convergence?, ISICS 2012 - International Symposium on Imitation and Convergence in Speech, Sep. 2012.


• Bruno Rodrigues de Araújo and Joaquim Armando Pires Jorge and José Pinto Duarte, Combining Virtual Environments and Direct Manipulation for Architectural Modeling, ECAADE 2012, Sep. 2012, ECAADE.


• Mário Pereira Véstias and Helena Sarmento, Design of an IEEE 802.15.3c Receiver in FPGA, International Conference on Consumer Electronics, Sep. 2012.


• Tiago Guerreiro and Joaquim Armando Pires Jorge and Daniel Jorge Viega Gonçalves, Exploring the Non-Visual Acquisition of Targets on Touch Phones and Tablets, ACM SIGCHI 2nd Workshop on Mobile Accessibility, Sep. 2012.


• David Ferreira and Alberto Rodrigues da Silva, Formally Specifying Requirements with RSL-IL, QUIC’2012 CFP, Sep. 2012, ICPS.


• Nick Degens and Gert Jan Hofstede and John McBreen and Adrie Beulens and Samuel Francisco Mascarenhas and Nuno Ricardo Ferreira and Ana Paiva and Frank Dignum, hen Agents Meet:


• Thomas Pellegriini and Angela Costa and Isabel Trancoso, Less errors with TTS? A dictation experiment with foreign language learners, Interspeech 2012, Sep. 2012, ISCA.


• Rafael Costa and Andras Hartmann and P. Gaspar and A. R. Neves and Susana Vinga, Modeling the dynamics of Lactococcus lactis central metabolism for strain development (poster), 11th European Conference on Computational Biology (ECCB’12), Sep. 2012.

• Pedro Mota and Luísa Coheur and Sérgio dos Santos Lopes Curto and Pedro Fialho, Natural Language Understanding: From Laboratory Predictions to Real Interactions, 15th International Conference on Text, Speech and Dialogue (TSD), Sep. 2012, Springer.


• João Miranda and João Paulo da Silva Neto and Alan Black, Parallel combination of speech streams for improved ASR, Interspeech 2012, Sep. 2012, ISCA.


• Helena Moniz and Fernando Batista and Isabel Trancoso and Ana Isabel Mata da Silva, Prosodic context-based analysis of disfluencies, Interspeech 2012, Sep. 2012, ISCA.


• André Negrão and João Filipe Ferreira da Costa and Paulo Ferreira and Luís Veiga, Semantic and Locality Aware Consistency for Mobile Cooperative Editing, 20th International Conference on COOPERATIVE INFORMATION SYSTEMS (CoopIS 2012), Sep. 2012, Springer, LNCS.


• Gopala Anumanchipalli and Hugo Meinedo and Miguel Bugalho and Isabel Trancoso and Luís C. Oliveira and Alan Black, Text-dependent pathological voice detection, Interspeech 2012, Sep. 2012, ISCA.


• Luis Javier Rodríguez-Fuentes and Mikel Penagarikano and Amparo Varona and Mireia Diez and Germán Bordel and Alberto Abad and David Martínez and Jesus Villalba and Alfonso Ortega and Eduardo Lleida, The BLZ Submission to the NIST 2011 LRE: Data Collection, System Development and Performance, Interspeech 2012, Sep. 2012, ISCA.


• Mário Pereira Véstias, Tradeoffs in the Design of a MIMO Receiver Based on the Alamouti Scheme, International Conference on Consumer Electronics, Sep. 2012.


• Fernando Costa and Luís Veiga and Paulo Ferreira, VMR: Volunteer MapReduce over the Large Scale Internet, 10th International Workshop on Middleware for Grids, Clouds and e-Science (MGC 2012). In conjunction with ACM/IFIP/USENIX 13th International Middleware Conference 2012, Sep. 2012, ACM.


• José Miguel Ranhada Vellez Caldas and Sandra Carvalho and Ana Rute Neves and Susana Vinga, A meta-analysis of the CcpA regulon (poster), ICSB 2012, Aug. 2012.


• Angela Costa, Analysis of the google translation of somatisms from English into Italian, Europhras Conference, Aug. 2012.


• Luís Jorge Matias de Lemos and Dina Silva and Manuela Guerreiro and Isabel Santana and Alexandre Mendonça and Pedro Tomás a S C., ‘f cognitive impairment using neuropsychological data, ACM SIGKDD Workshop on Health Informatics (HI-KDD 2012), Aug. 2012.


• Andras Hartmann and J. M. Lemos and Susana Vinga, Estimation of time-varying parameters in dynamic models of HIV-1 infection through nonlinear Bayesian filtering (poster), ICSB 2012, Aug. 2012.


• Bimal Babu Upadhyaya and Sandra Carvalho and Ana Rute Neves and Sara C. Madeira and Susana Vinga, Integration of genomics and transcriptomics: analysis of Streptococcus pneumoniae wild-type Δp (p ), ICSB 2012, Aug. 2012.


• Pedro Miguel Torpes de Amaral and Susana Pinto and Mamede de Carvalho and Pedro Tomás and Sara C. Madeira, Predicting the need for non-invasive ventilation in patients with Amyotrophic Lateral Sclerosis, ACM SIGKDD Workshop on Health Informatics (HI-KDD 2012), Aug. 2012.


• Lalith Suresh and Julius Schulz-Zander and Ruben Merz and Anja Feldmann and Teresa Maria Sá Ferreira Vazão Vasques, Towards Programmable Enterprise WLANs with Odin, Aug. 2012, pp. 115-120, ACM.


• João P. Carvalho and Fernando Batista and Luísa Coheur, A Critical Survey on the use of Fuzzy Sets in Speech and Natural Language Processing, WCCI2012 - IEEE World Congress on computational Intelligence, Jul. 2012, pp. 270-277, IEEE.


• António Manuel Rebelo Alves Homem Ferreira and Ricardo Lopes Pereira and Fernando Henrique Corte Real Mira da Silva, Content Redundancy in BitTorrent, 21st International Conference on Computer Communications and Networks (ICCCN 2012), Jul. 2012.


• Luis Rodrigues and Paolo Romano, Distributed Software Transactional Memories: A Summary of Research @ IST/INESC-ID, The 5th Workshop Large Scale Distributed Systems and Middleware (LADIS 2012), Jul. 2012.


• Sebastiano Peluso and Paolo Romano and Francesco Quaglia, Genuine replication, opacity and wait-free read transactions: can a STM get them all?, 4th Workshop on the Theory of Transactional Memory (WTTM 2012), Madeira, Portugal, Jul. 2012.


• Nuno Miguel Lourenço Diegues and João Cachopo, On the design space of Parallel Nesting, 4th Workshop on the Theory of Transactional Memory, Jul. 2012.


• Joao Carvalho and Luís Oliveira and Joao Oliveira and Joao Goes and M. Medeiros Silva, A balun Transimpedance Amplifier with adjustable gain for integrated SPO2 optic sensors, 19th IEEE Int. Conf. M x f I C Sy (IX S’12), 2012.

• Joana Carvalho Filipe de Campos and Henrique Teles Campos and Carlos António Roque Martinho and Ana Paiva, A Serious Game to Teach Conflict Resolution to Children, 11th International Conference in Intelligent Tutoring Systems, Jun. 2012, Springer Berlin/Heidelberg.


• Mário Pereira Véstias and Helena Sarmento, FPGA implementation of IEEE 802.15.3c receiver, IEEE International Symposium on Consumer Electronics, Jun. 2012.


• Carlos Páscoa and David Sardinha Andrade de Aveiro and José Manuel Nunes Salvador Tribolet, Organizational Configuration Actor Role Modeling Using DEMO, Practice-driven Research on Enterprise Transformation, PRET4@CAiSE 2012, Jun. 2012, pp. 18-47.

• Matteo Cesana and Alessandro Redondi and Nestor Michael Tiglao and António Manuel Raminhos Cordeiro Grilo and José M. Barceló Ordinas and M. Alaei and Petia Todorova, Real-time multimedia monitoring in large-scale wireless multimedia sensor networks: Research Challenges, 8th EURO-NGI Conference on Next Generation Internet (NGI 2012), Jun. 2012 , pp. 79-86 , IEEE.


• Gabriel José Faustino Fonseca Barata and Hugo Nicolau and Daniel Jorge Viegas Gonçalves, Appinsight: What have I been doing?, AVI 2012 - International Working Conference in Advanced Visual Interfaces, May. 2012.

• Ivan Bastos and Luís Oliveira and João Pedro Oliveira and João Goes and M. Medeiros Silva, Balun LNA with Continuously Controlable Gain and with Noise and Distortion Cancellation, IEEE Int. Symp. Circuits and Systems (ISCAS ’12), May. 2012, IEEE.


• Filipe Arroyo Cardoso and Tiago Costa and José Germano and Susana Cardoso and Jérôme Borme and João Gaspar, Integration of Magnetoresistive Biochips on a CMOS circuit, IEEE Int. Magnetics Conference (INTERMAG 2012), May. 2012.

• Filipe Arroyo Cardoso and Tiago Costa and José Germano and Susana Cardoso and Jérôme Borme and João Gaspar and Jorge Manuel dos Santos Ribeiro Fernandes and Moises Simões Piedade and Paulo Freitas, Integration of Magnetoresistive Biochips on a CMOS circuit, IEEE Int. Magnetics Conference (INTERMAG 2012), May. 2012.


• Joao Casaleiro and Luis Oliveira and Igor Filanovsky, Low-Power and Low-Area CMOS Quadrature Oscillator with Capacitive Coupling, IEEE Int. Symp. Circuits and Sy (ISC S’12), y. 2012.


• Pedro Louro and João Coelho Garcia and Paolo Romano, MultiPathPrivacy: Enhanced Privacy in Fault Replication, Ninth European Dependable Computing Conference (EDCC 2012), May. 2012.

• Huan Chen and Joao Marques Silva, New & improved models for SAT-based bi-decomposition, Great Lakes Symposium on VLSI (GLS VLSI 2012), May. 2012, ACM.


• Nuno Miguel Silvestre Apolónia and Paulo Ferreira and Luis Veiga, Trans-Social Networks for Distributed Processing, IFIP International Networking Conference 2012 (Lecture Notes in Computer Science), May. 2012, Springer.


• José Lopes and Maxine Eskenazi and Isabel Trancoso, Incorporating ASR information in Spoken Dialog System confidence score, PROPOR 2012, Apr. 2012, Springer.


• Nuno J. Mamede and Jorge Baptista and Cláudio Diniz and Vera Cabarrão, STRING: An Hybrid Statistical and Rule-Based Natural Language Processing Chain for Portuguese, PROPOR 2012 - 10th International Conference on Computational Processing of Portuguese, Apr. 2012 .


• José Miguel Ladeira Portelo and Bhiksha Raj and Isabel Trancoso, Attacking a Privacy Preserving Music Matching Algorithm, ICASSP 2012, Mar. 2012 , IEEE.

• Tânia Curiao and J. Mourao and Jose Luis Martinez and Fernando Baquero and Joana Coelho and Ana T. Freitas and Daniel Knight and Ian Morrissey and R. Cantón and Teresa Coque and BIOHYPO Consortium, Biocide susceptibility among clinical Enterobacteriaceae isolates, 22nd European Congress of Clinical Microbiology and Infectious Diseases, Mar. 2012 .


• Thomas Pellegrini and Helena Moniz and Fernando Batista and Isabel Trancoso and Ramon Fernandez Astudillo, Extension of the LECTRA corpus: classroom LECTure TRAnscriptions in European Portuguese, SPEECH AND CORPORA, Mar. 2012.


• Huan Chen and Mikolas Janota and Joao Marques Silva, QBF-based boolean function bi-decomposition, Design, Automation & Test in Europe Conference & Exhibition (DATE 2012), Mar. 2012, pp. 816-819, IEEE.

• L. Furi and M.L. Ciusa and Daniel Knight and V. Di Lorenzo and F. Decorosi and Joana Coelho and Ana T. Freitas and Carlo Viti and G. Orefici and Ian Morrissey and Marco R. Oggioni and BIOHYPO consortium, Role of resident and acquired multi-drug efflux pumps in reduced susceptibility to cationic biocides in Staphylococcus aureus, 22nd European Congress of Clinical Microbiology and Infectious Diseases, Mar. 2012.


• M.L. Ciusa and L. Furi and Daniel Knight and F. Decorosi and C. Raggi and Joana Coelho and Ana T. Freitas and L. Baldassarri and Carlo Viti and G. Orefici and Ian Morrissey and Marco R. Oggioni and BIOHYPO Consortium, Staphylococcus aureus mutants and clinical isolates with reduced susceptibility to the biocide triclosan differ in phenotype and genotype, 22nd European Congress of Clinical Microbiology and Infectious Diseases, Mar. 2012.


• Hrjove Benko and Ricardo Jorge Jota Costa and Andy Wilson, MirageTable: Freehand Interaction on a Projected Augmented Reality Tabletop, ACM CHI 2012, Feb. 2012, ACM.

• Ricardo Dias and Manuel J. Fonseca and Daniel Jorge Viegas Gonçalves, Music listening history explorer: an alternative approach for browsing music listening history habits, 2012 ACM inte f l U l f , IUI '12, . 2012 , pp. 261-264 , ACM.


• João Pedro Vieira Guerreiro and Juliana Gomes and Daniel Jorge Viegas Gonçalves, PersonalWeb: an extensible framework to recommend web and personal information, 2nd Workshop on Context-awareness in Retrieval and Recommendation (CaRR12), Feb. 2012, ACM.


• Fernando Carvalho and João Cachopo, Adaptive object metadata to reduce the overheads of a multi-versioning STM, Fifth Workshop on Programmability Issues for Heterogeneous Multicores (MULTIPROG-2012), Jan. 2012.


• Dzmitry Aliakseyeu and Jon Mason and Bernt Meerbeek and Harm van Essen and Serge Offermans and Valentina Sanesi and Andrea Alessandrini and Paulo Jorge Fernandes Carreira and Chad Eby, f ‘U I f Sy ’ W p IN C 2011, Constructing Ambient Intelligence, Jan. 2012, pp. 29–34, Springer.


11.4 National Conferences


• Marta Diogo Teixeira and João Cachopo, A study on the usage of third party libraries in Java applications, INForum 2012 - Simpósio de Informática, Sep. 2012.


• Pedro Jorge do Nascimento Neves and João Barreto and Paulo Ferreira, Data deduplication in Web prefetching systems (poster session), INForum, Sep. 2012.


• Pedro Miguel Torpes de Amaral and Susana Pinto and Mamede De Carvalho and Pedro Tomás and Sara C. Madeira, Merging Temporally-Related Clinical Data from Patients with Amyotrophic Lateral Sclerosis using Constraint-Based Hierarchical Clustering, Sessão Gestão Dados e Conhecimento, INFORUM, Sep. 2012.

• Pedro Mota, Natural Language Understanding as a classification process: report of initial experiments and results, Inforum, Sep. 2012.

• Pedro Mota and Luísa Coheur, Natural Language Understanding as a classification process: report of initial experiments and results, Inforum, Sep. 2012.

• Navaneeth Rameshan and Luís Veiga, RATS - Resource Aware Thread Scheduling for JVM-level Clustering, INFORUM 2012 - Simpósio de Informática, Sep. 2012.


11.5 Technical Reports

• Tiago Alexandre de Almeida Simão and Miguel José Simões Barão, Activity Recognition and Object Tracking Based on Multiple Models, INESC-ID Tec. Rep. 31/2012, Dec 2012.


• Telmo Santos and Luís Rosado and Pedro Vilaça and Moises Simões Piedade and Pedro Ramos and Rosa Miranda and Jorge dos Santos, FSWELL – Dedicated NDT system to detect LOP root defects in FSW of AlMgSc alloys. (Phase 1), INESC-ID Tec. Rep. 51/2012, Jul 2012.


• Marcelino Bicho dos Santos and Carlos Leong and Jorge Filipe Leal Costa Semião and Isabel Maria Silva Nobre Parreira Cacho Teixeira and João Paulo Cacho Teixeira, MSc proposal 2012/13, INESC-ID Tec. Rep. 10/2012, Apr 2012.


11.6 Special Issues of Journals


• Sara Silva and James A. Foster Ed., special issue on selected papers from the European conference on genetic programming, Genetic Programming and Evolvable Machines, 13(3), May. 2012, Springer.

11.7 Edited Proceedings


12 Dissertations

12.1 PhD Theses


12.2 MSc Theses


- Marcelo Vicente, DECT Shield for Arduino, MSc Thesis, IST, Dec 2012.


• Luis Jorge Matias de Lemos, A data mining approach to predict conversion from mild cognitive impairment to Alzheimer's Disease, MSc Thesis, Instituto Superior Técnico, Technical University of Lisbon, Nov 2012.


• Pedro Alexandre Cruz de Sousa, A Service Platform for Vehicular Networks, MSc Thesis, Nov 2012.


• Miguel António Moreira de Sousa Adaixo, Cloud DReAM - Dynamic Resource Allocation Management for Large Scale MMOGs, MSc Thesis, Technical Univ. of Lisbon, Nov 2012.


• Pedro Manuel Carvalho dos Santos Valada Fonseca, Conflict: A Conflict Resolution Games, MSc Thesis., Nov 2012.

• Alexandre Nuno Vicente Dias, Detecção de Vírus utilizando GPUs, MSc Thesis, Instituto Superior Técnico, TU Lisbon, Nov 2012.


• Luis Miguel Rosa dos Santos, Finding Place References in Textual Documents, MSc Thesis, Instituto Superior Técnico, Nov 2012.


• Ricardo Filipe de Sousa Brilhante, Idroid - interest aware augmented reality, MSc Thesis, Technical Univ. of Lisbon, Nov 2012.

• João Pedro Lima, Intrusion detection applied to mass transportation IT systems, MSc Thesis, IST, Nov 2012.

• Mauro André Mendes Silva, MobUser: Uma plataforma para a partilha de informação de dispositivos móveis centrado no utilizador, MSc Thesis., Nov 2012.

• Carlos Paulo Ferreira Santos, P2P-Clusters: criação dinâmica de clusters em cycle-sharing peer-to-peer, MSc Thesis, IST, Nov 2012.


• Rodrigo Joel Lucas Santos, Planning for Spatial Missions Using Answer Set Programming, MSc Thesis, Technical University of Lisbon, Nov 2012.


• Martim Luís de Carvalho e Silva Camacho, Smart Cards for Payments and Tickets, MSc Thesis, Nov 2012.

• Diogo Morgado, SmartSolarGrid - energy management for solar roads, MSc Thesis, Technical Univ. of Lisbon, Nov 2012.


• Roberto Leal Jacinto, SuusMDM: Gestão de Parques Informáticos de Terminais Móveis, MSc Thesis, Technical Univ. of Lisbon, Nov 2012.

• Tiago Esteves de Freitas, Syntactic REAP. PT - Exercises on Clitic Pronouning, MSc Thesis, Instituto Superior Técnico, Universidade Técnica de Lisboa, Nov 2012.


• Mafalda de Oliveira Ruas Gonçalves, Unravelling regulatory modules in Amyotrophic Lateral Sclerosis, MSc Thesis, Nov 2012.


• Vítor Francisco Estalagem Carvalho, Virtualização de sistemas de atendimento e Corporate TV, MSc Thesis, Technical Univ. of Lisbon, Nov 2012.


• Filipe Roque, Desenvolvimento de uma plataforma aberta e escalável para aquisição de dados no túnel aerodinâmico de baixa velocidade, MSc Thesis, IST - TU Lisbon, Oct 2012.


• João Paulo Sousa Dias Costa Amaro, SmartAndroid – Mobile Enterprise Development, MSc Thesis, Instituto

- Juan José Rebollo Barranco, Suporte Hardware para um Depurador para o Processador Pedagógico P3, MSc Thesis, IST, Technical University of Lisbon, Oct 2012.


- Mauro André Mendes Silva, A user-centered publish-subscribe platform for mobile devices, MSc Thesis, Sep 2012.

- Fábio Constantino, Best Effort Authentication, MSc Thesis, IST, Sep 2012.


- Tiago Castelo, Using Game Engines in Building Automation Control, MSc Thesis, IST Technical University of Lisbon, Sep 2012.


- Navaneeth Rameshan, Efficient Thread Scheduling for Distributed Java VM over Terracotta, MSc Thesis, Jul 2012.


- Guilherme Fermoselle Pires Coelho, Detecção de Fugas de Água em Redes Domésticas, MSc Thesis, Jun 2012.


• Tilia Ellendorff, Relation Extraction for People Search on the Web, MSc Thesis, University of Algarve and University of Wolverhampton, Jun 2012.


• Hélder Mendes, Study of matematical algorithms to identify abnormal patterns in aircraft flight data, MSc Thesis, IST / TU Lisbon, Jun 2012.


• Miguel Lopes Jerónimo, AffectiveWall - An intermedia instrument for affective generation of music and paintings through body-language expressivity, MSc Thesis, May 2012.

• Tiago lopes, Clientes e-voting confiáveis, MSc Thesis, May 2012.

• Inês Sampaio, Fault Tolerant Control of a Water Delivery Canal, MSc Thesis, Instituto Superior Técnico, May 2012.

• Paulo Alexandre Cristóvão Santa Rosa Pereira, FilterAdapt-Filtros adaptativos de coeficientes variaveis, MSc Thesis, IST, Technical University of Lisbon, May 2012.

• Diogo Rafael Bento Carvalho, Formula Student Racing Championship: design and implementation of an automatic localization and trajectory tracking system, MSc Thesis, Instituto Superior Técnico, Universidade Técnica de Lisboa, May 2012.


• Henrique Daniel Santarém Reis, LIE TO ME - Agentes que mentem, MSc Thesis, May 2012.

• Diogo Miguel Bábara Prista Caetano, Microelectronics Circuits for Neuronal Sensing and Stimulation, MSc Thesis, May 2012.


• Adriano Conde de Jesus Palma, Protocolo de Encaminhamento Multicast para Redes Veiculares Tolerantes a Atrasos, MSc Thesis, Instituto Superior Técnico, Universidade Técnica de Lisboa, May 2012.


• André Brioso, Virus Resistant e-Voting, MSc Thesis, Instituto Superior Técnico, May 2012.

• Micael Carreira, NoiseMapper, MSc Thesis, Apr 2012.


• Marco António Gonçalves Moreira, Desenvolvimento de um índice de Eficácia de um Subsistema Organizational como instrumento de cockpit organizacional, MSc Thesis, Academia da Força Aérea, Mar 2012.


• Maria Teresa Game, Fun Rehab - Can Rehabilitation Be Fun?, MSc Thesis, Instituto Superior Tecnico, Feb 2012.

• Eugénio Filipe Nogueira Costa, Aceleração por Hardware de Cálculos Matriciais para Aplicações de Comunicação Sem Fios, MSc Thesis, IST, Jan 2012.

### 13 Seminars

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Speaker/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-Dec-2012</td>
<td>Future Many-core Processors: Challenges and Solutions</td>
<td>Pedro Trancoso, University of Cyprus</td>
</tr>
<tr>
<td>19-Dec-2012</td>
<td>Challenges in the Application of Molecular and Quantum Mechanics to Biomolecular Problems</td>
<td>Prof. Mata, University of Göttingen</td>
</tr>
<tr>
<td>10-Dec-2012</td>
<td>Searching Web Archives</td>
<td>Miguel Costa, FCCN</td>
</tr>
<tr>
<td>05-Dec-2012</td>
<td>Cyber-physical MPSoC Systems: Future Multi-Core Architectures for reliable Mobility &amp; Technologies</td>
<td>Prof. Juergen Becker, Karlsruhe Institute of Technology, Karlsruhe, Germany</td>
</tr>
<tr>
<td>30-Nov-2012</td>
<td>The L2F Spoken Web Search system for Mediaeval 2012</td>
<td>Alberto Abad, Inesc-ID</td>
</tr>
<tr>
<td>12-Nov-2012</td>
<td>Map Matching :: Novageo Solutions at the 2012 ACM SIGSPATIAL Cup</td>
<td>Sérgio Freitas, Novageo Solutions</td>
</tr>
<tr>
<td>29-Sep-2012</td>
<td>Sucint structures to self-indexing text</td>
<td>Nieves R. Brisaboa, Universidade de Coruña</td>
</tr>
<tr>
<td>28-Sep-2012</td>
<td>Privacy-Preserving Speech and Audio Processing</td>
<td>Bhiksha Raj, Carnegie-Mellon</td>
</tr>
<tr>
<td>07-Sep-2012</td>
<td>FPGA-Based Platform for Real-Time Internet</td>
<td>Maciej Wielgosz, NTNU - Norwegian University of Science and Technology</td>
</tr>
<tr>
<td>06-Sep-2012</td>
<td>Speculations in Reliable Distributed Computing</td>
<td>Prof. Rachid GUERRAOUI, EPFL - École Polytechnique Fédérale de Lausanne</td>
</tr>
<tr>
<td>05-Sep-2012</td>
<td>Speculations in Reliable Distributed Computing</td>
<td>Rachid Guerraoui, EPFL - École Polytechnique Fédérale de Lausanne</td>
</tr>
<tr>
<td>07-Sep-2012</td>
<td>FPGA-Based Platform for Real-Time Internet</td>
<td>Maciej Wielgosz, NTNU - Norwegian University of Science and Technology</td>
</tr>
<tr>
<td>06-Sep-2012</td>
<td>Speculations in Reliable Distributed Computing</td>
<td>Prof. Rachid GUERRAOUI, EPFL - École Polytechnique Fédérale de Lausanne</td>
</tr>
<tr>
<td>05-Sep-2012</td>
<td>Speculations in Reliable Distributed Computing</td>
<td>Rachid Guerraoui, EPFL - École Polytechnique Fédérale de Lausanne</td>
</tr>
<tr>
<td>27-Jul-2012</td>
<td>Cleaning data with constraints</td>
<td>Floris Geerts, University of Antwerp</td>
</tr>
<tr>
<td>11-Jul-2012</td>
<td>Ensemble pruning via Weighted Accuracy and Diversity</td>
<td>Samuel Zeng, University of Macau</td>
</tr>
</tbody>
</table>
22-Jun-2012  
Entropy-based Pruning for Phrase-based Machine Translation  
Wang Ling, Carnegie Mellon University, USA and INESC-ID Lisboa, IST

04-Jun-2012  
Translational research on genomics and proteomics: experience of the SING group IST DEI

25-May-2012  
Formalization of English Phrasal Verbs  
Peter A. Machonis, Florida International University

25-May-2012  
Prediction of Escherichia coli single gene deletion mutants by projection to latent pathways  
INESC-ID

23-May-2012  
Epidemic spreading in online and offline social networks  
Ciro Cattuto, ISI Foundation

17-May-2012  
Assistive Speech Technology  
Steve Renals, University of Edinburgh

09-May-2012  
Gerenciamento Explícito de Memória de Rascunho a partir de Arquivos-objeto para Melhoria da Eficiência Energética de Sistemas Embarcados  
Prof. Dr. José Luís Almada Güntzel, Universidade Federal de Santa Catarina

04-May-2012  
Advances in Structured Prediction for Natural Language Processing  
André Martins, IST/Carnegie-Mellon

27-Apr-2012  
A Toolbox for Probability Calculus and Optimization  
Pedro Miguel Lúcio Melgueira, University of Évora

27-Apr-2012  
Dynamic neuroimaging using EEG-fMRI  
Patrícia Figueiredo, INESC-ID

26-Apr-2012  
Data Integration Issues in Facilities Management  
Paulo Jorge Fernandes Carreira, INESC-ID

13-Apr-2012  
Speaker and Content Identification  
Xavier Anguera, Telefonica Research

13-Apr-2012  
Hybrid Modeling for Systems Biology: Theory and Practice  
Rui Oliveira, Universidade Nova de Lisboa

29-Mar-2012  
Seminário do grupo DMIR: NetDyn - Understanding real large networks, from structure to dynamics  
Alexandre P. Francisco, INESC-ID Lisboa and IST

09-Mar-2012  
Computational Analysis of Protein Coevolution and Interaction  
Fábio Madeira, INESC-ID

02-Mar-2012  
Systems Analysis and Metabolic Networks Modeling  
Rafael Costa, INESC-ID
02-Mar-2012
Semantic Analysis of Streaming Social Data
Vasco Pedro, IST

22-Feb-2012
Coordinating towards a common good
Francisco C. Santos, INESC-ID Lisboa and IST

10-Feb-2012
Ciberescola da Língua Portuguesa: objectivos, construção e resultados
Ana Sousa Martins, Centro de Linguística da Universidade Nova de Lisboa

27-Jan-2012
Online Bayesian Time-varying Parameter Estimation of HIV-1 data
Andras Hartmann, INESC-ID

25-Jan-2012
CLIO & ++SPICY - tools for schema mapping
Valéria Magalhães Pequeno, INESC-ID Lisboa

06-Jan-2012
Supervised Topical Key Phrase Extraction of News Stories using Crowdsourcing, Light Filtering and Co-reference Normalization
Luis Marujo, INESC-ID Lisboa and IST
14 Distinguished Lecture Series

05-Dec-2012
Cyber-physical MPSoC Systems: Future Multi-Core Architectures for reliable Mobility & Technologies
Prof. Dr.-Ing. Juergen Becker, Karlsruhe Institute of Technology - KIT. Dept. Electrical Engineering & Information Technology. Institute for Information Processing - ITIV. Karlsruhe, Germany.

08-Nov-2012
Control of solar thermal plants

03-Oct-2012
Programming the Turing Machine
Prof. Barbara Liskov, Massachusetts Institute of Technology

05-Sept-2012
WhatsUp: a P2P instant news items recommender
Dr. Anne-Marie Kermarrec, INRIA Senior Researcher (Directrice de recherche), INRIA-Rennes, France