

MAP-I

Joint doctoral programme in Computer Science of Universidade do Minho, Universidade de Aveiro and Universidade do Porto

2010/11 Course Edition

Ubiquitous computing

System Software and Applications for
Ambient Intelligence

Teaching Team

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A. Course Description

1. Overview and Context

This document describes a course on “**System Software and Applications for Ambient Intelligence**” to be offered as part of the 2010/11 edition of the Joint doctoral programme in Computer Science of Universidade do Minho, Universidade de Aveiro and Universidade do Porto (MAP-I).

The course introduces students to the general topics of ubiquitous and pervasive computing and is particularly focused in systems and applications for Ambient Intelligence. At the end of this course, students should be able to create systems that explore the enormous innovation potential raised by the increasingly pervasive presence of information technologies in all aspects of our everyday life. This corresponds to an emerging need in the market for people that are skilled in designing, developing, deploying and evaluating Ambient Intelligence systems.

The course is organised by researchers from the Universities of Minho and Porto with a vast and complimentary research and teaching experience in the field of Ubiquitous Computing and Ambient Intelligence. This course has already been offered as part of the 2008/09 and 2009/10 editions of MAP-I, and thus reflects the experience gained from those previous editions.

This course is being proposed as one of the options in the UC on Programming Paradigms. This is how it has been offered in the previous editions and the scope that provides the best match with the key objectives of the course.

Ambient Intelligence

Ambient Intelligence (AmI) is a compelling vision of smart environments that are reactive to people and able to make our actions safer, more efficient, more informed, more comfortable or simply more enticing. According to the AmI vision, our environments will be embedded visual, audio or many other types of sensing systems, pervasive devices, and networks that can perceive and react to people, sense ongoing human activities and proactively respond to them. The AmI vision began its influential role at the turn of the century, when the Information Society and Technology Advisory Group (ISTAG) of the European Commission published an influential set of reports on the topic and gave AmI a prominent role in the FP6 IST programme. The subsequent association of AmI with the European policies towards the knowledge society, as agreed at the Lisbon Council of 2000, and the continued financial backing in the following research programmes contributed to make AmI a very active research topic that was able to mobilise academic researchers and companies to contribute towards the realisation of the AmI vision. As a result, in the past 10 years, this vision has emerged as a multidisciplinary field within ubiquitous computing, attracting considerable research, funding and public attention and leading to many research groups and conferences specifically focused on Ambient Intelligence topics.

Ambient Intelligence builds on the paradigm of Ubiquitous Computing, and most of the defining characteristics of AmI can be traced back to the origins of ubiquitous computing. They both share many similar assumptions and challenges, such as

spontaneous interoperation, seamless integration between physical and virtual environments, natural interaction, and the vision that computation will be embedded into everyday objects, creating an environment where everything communicates with everything else, and where virtual and physical environments are closely interconnected. With computing devices becoming progressively smaller and more powerful, it is sensible to expect that almost any object, from clothing to coffee mugs, will be embedded with some sort of computational capability and able to connect to any other device. This enables Ambient Intelligence and will dramatically change our perception of what a computer system is, as the entire environment with all its integrated devices and associated services becomes indistinguishable from the computer. In such a scenario, the environment becomes the interface and computation devices, as we currently know them, fade into the background. Ambient Intelligence and Ubiquitous Computing systems are thus radically different from traditional distributed systems, and set many new research challenges that cut across various disciplines.

System Software and Applications for Ambient Intelligence

System software for Ambient Intelligence environments has become a particularly active topic of research, its ultimate goal being the creation of a meta-operating system for physical environments. Such software infrastructure should be able to transparently manage the relevant resources and provide an integrated execution environment in which applications, seen here as orchestrated collections of services, could be executed in association with the corresponding physical environment. Many middleware architectures have been proposed that aim to provide the necessary glue to integrate an open, diverse and a priori unknown set of services into a functioning system. Examples include the Event Heap [1], One.World [2], Aura [3] and GAIA [4]. Typical issues include the architectural approach, the discovery, selection and spontaneous interaction between entities, naming, event notification, and the ability to enable cooperation between entities even if separated in time and space. These systems provide some type of programming model that application developers can use to create new applications without having to consider the details of the underlying infrastructure. Research in the area of middleware for Ambient Intelligence environments has been in progress for the last few years, both in academia and industry, and it is now possible to study and compare a diverse number of approaches and their accomplishments.

Applications

Driving the behaviour of the system, applications lie on top of the system software and have to deal with the complexity and diversity of an Ambient Intelligence environment. Issues such as the user experience, privacy, social and legal implications, business models, and user-led innovation must all be considered when designing these applications. For example, in Ambient Assisted Living scenarios, in which the environment assists patients or elderly people in their daily tasks, e.g. reminding them to take prescribed medicine, application designers may need to find approaches that enable patient monitoring without clashing into their privacy and values. Ambient Intelligence scenarios are rich with such applications and challenges. Rather than simply evaluating the final system, interaction design techniques and evaluations are crucial from the beginning, as they play a central role in informing the evolution of the system design in a way that matches the expectations, opportunities and practices of the people for which the system is being designed.

Applications Domains

Research and Development in Ubiquitous Computing and Ambient Intelligence is intrinsically related with the application domains for which the technology is created. To convey a more profound perspective of the implications and opportunities in specific application domains, the course also includes the analysis in more detail of two particular application domains, more specifically Urban Computing and Ambient Assisted Living. The emphasis is on highlighting the specific issues raised in a particular domain, analyse how they are handled in reference systems, and discuss the potential of ubiquitous computing and Ambient Intelligence technologies within the scope of specific domains.

References

- [1] B. Johanson and A. Fox, "The Event Heap: a coordination infrastructure for interactive workspaces," presented at Fourth IEEE Workshop on Mobile Computing Systems and Applications, 2002.
- [2] R. Grimm, J. Davis, E. Lemar, A. MacBeth, S. Swanson, T. Anderson, B. Bershad, G. Borriello, S. Gribble, and D. Wetherall., "System support for pervasive applications.," *ACM Transactions on Computer Systems*, vol. 22 No 4, pp. 421-486, 2004.
- [3] J. P. Sousa and D. Garlan, "Aura: an Architectural Framework for User Mobility in Ubiquitous Computing Environments," presented at Software Architecture: System Design, Development, and Maintenance (Proceedings of the 3rd Working IEEE/IFIP Conference on Software Architecture), 2002.
- [4] M. Román, C. K. Hess, R. Cerqueira, A. Ranganathan, R. H. Campbell, and K. Nahrstedt, "Gaia: A Middleware Infrastructure to Enable Active Spaces," *IEEE Pervasive Computing* No Oct-Dec., pp. 74-83, 2002.

Scientific areas

C. Computer Systems Organization/ C.2 COMPUTER-COMMUNICATION NETWORKS/ C.2.1 Network Architecture and Design
C. Computer Systems Organization/C.2 COMPUTER-COMMUNICATION NETWORKS/C.2.4 Distributed Systems
D. Software/D.1 PROGRAMMING TECHNIQUES/D.1.3 Concurrent Programming
D. Software/D.2 SOFTWARE ENGINEERING/ D.2.11 Software Architectures
D. Software/ D.2 SOFTWARE ENGINEERING / D.2.12 Interoperability
H. Information Systems/ H.5 INFORMATION INTERFACES AND PRESENTATION/

Similar courses

In recent years, Ubiquitous and Pervasive Computing has become a common topic for graduate courses in computing. For example, for some years, the CMU PhD Programme in Computer Science includes a course on Mobile and Pervasive Computing (<http://www.cs.cmu.edu/~15-821/>) and another on Research Topics in Ubiquitous Computing (<http://www.cs.cmu.edu/~jasonh/courses/ubicom-sp2007/>).

However, and despite the emergence of multiple types of courses dedicated to Ubiquitous and Pervasive Computing, this is still a relatively recent topic for which there is no widely accepted view on the respective body of knowledge. This reality is exacerbated by the inherent multi-disciplinary nature of Ubiquitous and Pervasive Computing, which means that different courses may approach the topic from very diverse perspectives.

In 2003, as multiple courses were spreading everywhere, multiple workshops and papers started addressing the topic of ubiquitous and pervasive computing education. One of the most influential in terms of defining the core body of knowledge associated with pervasive and ubiquitous computing was the *Ubicomp Education: Current Status and Future Directions* [1]. Even though this is not a formal curriculum for ubiquitous and pervasive computing, it remains the most important reference for the structure of such courses and will also be used as the base structure for this course. Those interested in the details of the proposed structure are referred to the IEEE Pervasive Computing article where the workshop conclusions are presented[2].

[1] Abowd, G.D., G. Borriello, and G. Kortuem. Ubicomp Education: Current Status and Future Directions: workshop at Ubicomp 2003, Seattle, USA. 2003. Available from: <http://ubicomp.lancs.ac.uk/workshops/education03>.

[2] Abowd, G.D., G. Borriello, and G. Kortuem, Report from the Ubicomp Education Workshop. IEEE Pervasive Computing, 2004. 3(1): p. 94-98.

2. Objectives and Learning Outcomes

This course aims to introduce students into the topics of Ubiquitous and Pervasive Computing, providing them with the key technological knowledge and methodological approaches for designing, developing, deploying and evaluating systems based on those paradigms. Within the broad set of topics associated with Ubiquitous and Pervasive Computing, this course has a particular focus on software and applications for Ambient Intelligence environments, working in more detail the challenges and reference approaches for enabling software infrastructures that become integral parts of their physical and social environments.

At the end of this course, students are expected to be able to:

- Explain the general principles of Ubiquitous Computing and the key technical and social factors driving the change towards post-desktop paradigms
- Explain the main implications of Ubiquitous Computing for system design, development and deployment.
- Explain reference approaches used in Ubiquitous Computing and evaluate their applicability in specific application scenarios
- Analyse an existing infrastructure for Ambient Intelligence from the perspective of the key design approaches.
- Realise simple Ambient Intelligence environments that combine virtual and physical, while showing a balanced attention to the relevant technical, social and economical factors involved.
- Understand the role of evaluation at the various design stages and the key evaluation techniques used in ubiquitous computing.

3. Program

- A. Introduction to Ubiquitous and Pervasive Computing
 - a. General principles
 - b. Motivation and key driving factors
 - c. Main characteristics of post-desktop computing
 - d. The Ambient Intelligence vision

- B. Merging the virtual and physical worlds
 - a. Integration techniques and technologies
 - b. Sensing and modelling the physical environment
 - c. Machine learning and activity recognition
- C. Interaction Models
 - a. New interface concepts
 - b. Emerging interaction paradigms
 - i. Context-awareness
 - ii. Pro-active computing
 - iii. Activity-based computing
 - iv. Situated interaction
- D. Software Architectures for Ambient Intelligence
 - a. Key Challenges for software development
 - b. Design Principles for Smart Spaces: Volatility, Boundary, Self-configuration, Graceful degradation, and Maintainability
 - c. Key services for pervasive computing environments: Context, Location, Discovery, Events, Communication services, Bootstrapping, Security and Privacy.
 - d. Service discovery and collaboration patterns
 - e. Toolkits and middleware
 - f. Application frameworks
 - g. Case Studies: Event Heap, Gaia, Aura, Anywhere Places
 - h. Collaborative Networks and Group Decision Support Systems
- E. Evaluation in ubiquitous computing
 - a. Evaluation techniques and processes
 - b. Models and prototypes in ubicomp evaluation
 - c. Interaction Design for everyday life
 - d. Deployment challenges
 - e. Open Innovation in Ubiquitous and Pervasive Computing
- F. Application Domains
 - a. Healthcare Systems and Ambient Assisted Living (AAL)
 - b. Urban Computing and Reality Mining

4. Teaching Methodologies and Assessment

This course corresponds to 5 ECTS involving a broad range of learning activities with a particular focus on active learning techniques. These will be favoured, not only for their ability in stimulating student engagement, but mainly because the learning outcomes proposed for this course include high-level objectives that can only be achieved through the execution, by the students, of analysis, development and discussion tasks. Furthermore, the high quality of the students involved, will contribute to maximise participation and therefore the benefits of the approach. A small practical component is included as part of a system report. Some level of practical experimentation is often referred and recommended as a key enabler for learning in Ubiquitous Computing because of its role in structuring the relationship between the conceptual aspects of the

field and the reality of deploying information technology for the mundane realities of everyday life.

Lectures will be used to provide an initial background and quickly prepare everyone to the topic. The use of videos and the study of reference case studies will be used to complement the presentation of the topics and guide the study of the most commonly used approaches and issues. Student presentations and exercises will be used to promote engagement and exercise the analysis of existing work.

In the **System Report**, students will be asked to propose a particular system for Ambient Intelligence and a set of associated research questions. This will be an opportunity to conceive small but challenging systems that will help students in mastering ambient intelligent technologies and best practices. While implementation is not required, practical evaluation of key technologies may be important in gaining insight into some of the key issues involved, and will be strongly recommended. Simulation using virtual worlds may also be used not only to reduce hardware requirements for class but, most importantly, enable students to develop more interesting Ambient Intelligence systems and applications. The need to indicate research questions associated with the proposed system aims to stimulate students to go beyond the merely technical specification and exercise their analysis skills by identifying and describing the broad issues involved in creating ambient intelligence systems.

An intermediate version of this report will be delivered and presented half-way in the course. This intermediate version will focus on the State of the Art. Students have already chosen their topic and they should include a section in this intermediate report where they briefly describe and analyse previous research. This will be an opportunity for students to develop their research skills in searching and analysing previous work, while studying in more detail a particular topic that they find motivating. A presentation of the results to the class will also be part of the activity.

Assessment

Assessment will be based on the evaluation of the intermediate and the final system report. The intermediate report will be evaluated mainly based on its scope and on the ability to analyze, compare, relate and judge the relevance of previous research. The System Report will be evaluated on the innovation of the proposed system, on the coherence of the specification and on the broadness of the issues considered. Both reports include an oral presentation made to the class.

5. Main Bibliography

Within the topics of this course, and particularly at this level, there are no text books that can significantly cover the proposed program. Therefore, the key bibliography for the course will be mainly based on research papers. In this section, we indicate only the key bibliography that can be considered more generic and mandatory reading for all participants in the course.

- R. Harper, T. Rodden, Y. Rogers, e A. Sellen, Being Human: Human Computer Interaction in 2020, Microsoft Research Ltd, 2008.
- J. Krumm, Ubiquitous Computing Fundamentals, Chapman & Hall, 2009.
- ISTAG, Scenarios for Ambient Intelligence in 2010, EC, 2001.

- Mark Weiser, "Some Computer Science Problems in Ubiquitous Computing," Communications of the ACM, July 1993. (reprinted as "Ubiquitous Computing". Nikkei Electronics; December 6, 1993; pp. 137-143.)
- M. Satyanarayanan, "Pervasive Computing: Vision and Challenges," IEEE Personal Communications, vol. 8, pp. 10-17, 2001.
- Banavar and A. Bernstein, "Software infrastructure and design challenges for ubiquitous computing applications," Communications of the ACM, vol. 45, pp. 92 - 96, 2002.
- Bell, G. and P. Dourish (2007). "Yesterday's tomorrows: notes on ubiquitous computing's dominant vision." Personal and Ubiquitous Computing 11(2): 133 - 143.
- Rogers, Y. (2006). Moving on from Weiser's vision of of calm computing: engaging UbiComp experiences. Ubicomp 2006, Orange County, California, USA, Springer-Verlag.
- Alex, S. T., H. Richard, et al. (2007). "Homes that make us smart." Personal Ubiquitous Comput. 11(5): 383-393.
- Kindberg, T.; Fox, A., "System software for ubiquitous computing", IEEE Pervasive Computing Magazine, vol.1, no.1, pp. 70- 81, Jan-Mar 2002
- N. Davies and H.-W. Gellersen, "Beyond prototypes: challenges in deploying ubiquitous systems," IEEE Pervasive Computing, vol. 1 No 1, pp. 26- 35, 2002.
- R. Sharp and K. Rehman, "The 2005 UbiApp Workshop:What Makes Good Application-Led Research?," IEEE Pervasive Computing, vol. 4 No 3, pp. 80-82, 2005.

B. Teaching Team

1. Coordinator

Rui José (University of Minho)
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2. Overview of the teaching team

The course will be conducted in collaboration between Rui José (University of Minho), Ricardo Morla (University of Porto), José Campos (University of Minho) and Paulo Novais (University of Minho). These researchers are all actively involved in ubiquitous computing and ambient intelligence research and together provide a valuable mix of complementary competences for the topics of this course.

Rui José is a member of the Ubicomp@UMinho team, a research group at Algoritmi, an ICT research centre of the Engineering School of University of Minho. This group has been actively engaged in ubiquitous computing research for some years, and has organised the first conference in this area in Portugal, CSMU'06, where Rui José was the Program Chair. In addition to the publication record, Rui José research experience in this area also includes the participation in several research projects and the regular contribution as a reviewer for the main conferences and journals in the field, including the Ubicomp and Pervasive conferences and the IEEE Pervasive Computing journal. Additionally, Rui José also has an extensive experience in teaching Ubiquitous and Pervasive Computing. He was the first Director of the MSc in Mobile Systems where he was responsible for the course on Ubiquitous Computing.

Ricardo Morla is actively conducting research in the field of Ubiquitous Computing and Ambient Intelligence. He is currently looking into immersive virtual worlds such as Second Life™ as a tool for simulation and prototyping of Ubiquitous Computing systems, as a middleware for Ubicomp applications, and as a tool particularly suited for teaching ubiquitous computing classes. Ricardo has a funded research project on this subject in collaboration with the University of California, Irvine, where he has lectured on distributed systems and mobility issues that are core to Ubiquitous Computing and Ambient Intelligence. Ricardo is also involved in other projects related to this field and is trying to create a research group on intelligent environments at his home institution; some of these projects he focus e.g. on the co-location of devices, on intermittent interaction, and on overlays for intelligent transportation systems, in addition to other projects that leverage on virtual worlds.

José Creissac Campos is a member of the Foundations and Applications of Software Technology research group at CCTC (Sciences and Computing Technologies Centre), a research centre from the Engineering School of the University of Minho. His research interests lie in the intersection of Software Engineering and Human-Computer Interaction (HCI). In recent years he has developed a strong interest in mobile and ubiquitous computing. He is particularly interested in the problems faced when trying to design, analyse and develop the human interaction for such heterogeneous contexts as those present in mobile and ubiquitous computing settings. He serves as Programme

Committee member in a number of conferences, including IFIP TC13 INTERACT, ACM EICS, and HCSE. He was programme co-chair of *Interacção 2008*, the third Portuguese HCI conference, and is currently tutorials co-chair of *INTERACT 2011*. José has led and participated in a number of funded research projects. For the last 8 years he has taught and been responsible for a number of HCI courses at the postgraduate level.

Paulo Novais is a lecturer of Computer Sciences at the Department of Informatics, in the University of Minho and he is a member of the Artificial Intelligence research group at CCTC (Sciences and Computing Technologies Centre), a research centre from the same university. In the last years he has taught and been responsible for a number of courses on Multiagent Systems and on Intelligent Systems at the graduate and postgraduate level. His current research directions span the fields of Knowledge Representation and Reasoning Systems, Agent and Multiagent Systems and Learning applied to Ambient Intelligence and AI and Law. He supervised 2 Ph.D. and 11 M.Sc. students with success and is now supervising 3 Ph.D. and 7 M.Sc. projects. He has led and participated in a number of funded research projects and also in the organization of several scientific meetings, national and international. He is Vice-president of APPIA, the Portuguese Association for Artificial Intelligence.

3. CV Rui José

Name	Rui João Peixoto José
Date of Birth	14th February 1970
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Academic Degrees, fields of study, award institutions, dates

in reverse chronological order

- 1997-2001: PhD in Computing (Distributed Systems) from Lancaster University (UK). Thesis title “An Open Architecture for Location-Based Services in Heterogeneous Mobile Environments”. Supervisors: Professors Nigel Davies and Geoff Coulson.
- 1993–1995: MSc in Computing, University of Minho, Portugal. Subject: Distributed Systems, Computer Communications and Computer Architectures. Dissertation title: “Adaptive access to Internet Information Services”
- 1988–1993: Five years degree in Software and Computer Engineering, University of Minho, Portugal

Synopsis of current research interests:

Rui José is the principal investigator of the Research Program on Situated Displays for Smart Places, a multi-disciplinary long-term initiative that is part of the efforts of the Algoritmi Research Centre in the area of Smart Places and aims to develop and evaluate a new concept of situated display that can serve as a general purpose and strongly situated information artefact. This work is based upon a vision of situated displays as shared, networked, and pro-active devices that are embodied into their environment and provide an execution environment for situated applications. Key research challenges include software design issues associated with this concept of situated displays, the exploration of the concept in various real world applications and domain-specific scenarios, the use of displays as enablers for embodied interaction in situated computing, and the understanding of how displays can provide an execution environment for situated applications.

Additional Information:

Rui José has been actively involved in Ubiquitous and Pervasive Computing for some years. He has been the Program Chair for first Portuguese Conference on Mobile and Ubiquitous Computing (CSMU2006) and he is regularly invited as reviewer for the main conferences and journals in the area of pervasive and ubiquitous computing, including:

- International Conference on Pervasive Computing (PERVASIVE)
- International Conference on Ubiquitous Computing (UBICOMP)
- IEEE Transactions on Mobile Computing,
- IEEE Pervasive Computing
- Mobile Computing and Communications Review (MC2R)

Rui José has also participated in the several Scientific Program Committees in this area, including (most recent):

- PC member 12th International Conference on Human-Computer Interaction with Mobile Devices and Services – MobileHCI. September 7th-10th 2010
- PC Member INForum 2010- Simpósio de Informática (Computação Móvel e Ubíqua), 10-11 Setembro de 2010, Braga, Portugal
- PC member International Symposium in Ambient Intelligence (ISAmI '2010), 6-18 de Junho 2010. Guimarães, Portugal.
- PC Member CISTI'2010 (5ª Conferência Ibérica de Sistemas e Tecnologias de Informação). 16 a 19 de Junho de 2010. Santiago de Compostela, Espanha.
- Membro da comissão científica para número especial da revista Journal of Universal Computer Science (ISI-JCR) dedicado ao tema “the Ambient Intelligence vision”. (in progress) 2010. Editorial board for a special issue of Journal of Universal Computer Science (ISI-JCR) on “*the Ambient Intelligence vision*”. (in progress) 2009
- IWAAL - International Workshop of Ambient Assisted Living. University of Salamanca, Spain. 10-12th June, 2009
<http://iwaal.usal.es>
- *Interacção 2008 – 3ª Conferência Interação Pessoa-Máquina* – Universidade de Évora, 15 a 17 de Outubro de 2008
<http://interacao2008.xdi.uevora.pt/>
- 13o Encontro Português de Inteligência Artificial - EPIA 2007 no âmbito do “*AmITA'2007 – Workshop on Ambient Intelligence Techniques and Applications*”, 3-7 Dezembro. Guimarães, Portugal.
<http://epia2007.appia.pt/>
- 7th International Workshop on Smart Appliances and Wearable Computing (IWSAWC 2007) within ICDCS 2007, 29 de June 2007, Toronto, Canada
- Workshop on Location Based Services for Health Care (LOCARE '06) within PervasiveHealth, Innsbruck, Austria. 29 November, 1 December 2006.
<http://www.pervasivehealth.org/>

- Artech 2006 – Third International Conference on Digital and Electronic Art, Pontevedra, Galiza, Spain, 17-18 November 2006
<http://artec2006.ccg.pt/>
- Interacao'2006 – 2^a Conferência Nacional em Interacção Pessoa-Máquina, Braga, de 16 a 18 de October 2006.
<http://interacao2006.di.uminho.pt/>
- Conferência sobre Sistemas Móveis e Ubíquos (CSMU 2006), Guimarães, 29-30 June 2006. (Program Chair)
<http://ubicomp.algoritmi.uminho.pt/csmu>
- Workshop on Pervasive Display Infrastructures, Interfaces and Applications, within Pervasive 2006, Dublin, Ireland, 7-10 May, 2006.
<http://ubicomp.algoritmi.uminho.pt/perdisplay>

He has also has a very extensive teaching experience in the area of ubiquitous and pervasive computing, at both graduate and undergraduate levels, including 3 editions of a course on Ubiquitous Computing in the MSc in Mobile Systems of the University of Minho (since 2004), and a similar one in the MSc in Communications Engineering. He has also been Director of the MSc in Mobile Systems (Since January 2004) of the Engineering School of University of Minho.

He is also the coordinator of the 30 ECTS course on Mobile and Ubiquitous Computing in the MEI/MI: Masters in Informatics.

Projects (last 5 years)

- **PD-NET - TOWARDS FUTURE PERVASIVE DISPLAY NETWORKS**
→ Project Managet at UMinho (May 2010/Nov. 2012)
FP7 Programa Future Emerging Technologies (FET-OPEN)(244011-2)
- **WESP: Web Security and Privacy: Weaving Together Technology Innovation with Human and Policy considerations.**
→ Coordenador na UMinho (Março 2009/Fev. 2012)
Programa CMU-Portugal. (CMU-PT/SE/0028/2008). 382.106 €(Global) 81.670 €(UMinho).
Main Partners: Madeiro Tecnopolo; Carnegie Mellon University; Instituto Superior Técnico.

Situated web portal for local awareness and transient interaction

→ Principal Investigator (May 2005/April 2007)
Funding: Fundação para a Ciência e Tecnologia (POS-C/EIA/58832/2004), 75000€(Global) 69003€(UMinho).
Main partners: Associação Centro de Computação Gráfica - CCG/ZGDV.
<http://ubicomp.algoritmi.uminho.pt/situaction/>

USE-ME.GOV - USability-drivEn open platform for MobilE GOVernment

→ Senior Researcher (Jan.2004/ Mar. 2006)
Funding: European Commission-6FP Information Societies Technology (IST) Programme (IST-002294): Global budget: 1.350.250 € UMinho: 134.160 €
Main partners: Edisoft, S.A., Portugal (coordinator); Retevisión Móvil, S.A., Spain; Universidade do Minho, Portugal; Câmara de Vila Nova de Cerveira, Portugal; Indra Sistemas, S.A., Spain; Asociación Extremeña de Formación Tecnológica, Spain; The Poznan University of Economics, Poland; City Hall of Gdynia, Poland; Fraunhofer Institute for Applied Information Technology,

Germany; Arakne S.r.l., Italy; City Hall of Bologna, Italy; IntuiLab S.A., France.
<http://ubicomp.algoritmi.uminho.pt/usemegov/>

- **LOCAL - Location contexts for location-based services and applications**
→ Senior Reseracher (Fev. 2004/ Jan. 2006)
Funding: Fundação para a Ciência e Tecnologia (POSI/CHS/44971/2002), 46.092 €
<http://ubicomp.algoritmi.uminho.pt/local/>
Main partners: Associação Centro de Computação Gráfica - CCG/ZGDV

PhD Students

- **Jorge Carlos dos Santos Cardoso.** “*Place-awareness for situated interaction in public settings*”. October 2008.
- **Fernando Reinaldo Silva Garcia Ribeiro.** “Software Platforms for context-aware interactive spaces” July 2005.
- **Hélder Manuel da Silva Pinto.** “System support to localised activities in ubiquitous computing”. Completed in 2008.

Publications (last 5 years)

- Rui José, Helena Rodrigues and Nuno Otero. "Ambient Intelligence: Beyond the Inspiring Vision". J.UCS - The Journal of Universal Computer Science. Special issue on "Ambient Intelligence Vision: A Perspective". (Accepted for publication) Summer 2010.
- F. R. Ribeiro and R. José, "Autonomous and context-aware scheduling for public displays using place-based tag clouds," in International Symposium on Ambient Intelligence ISAMI2010, Springer-Verlag, Guimarães,
- F. R. Ribeiro and R. José, "Timely and Keyword-based Dynamic Content Selection for Public Displays," in Third International Workshop on Frontiers in Complex Intelligent and Software Intensive Systems - 4th International Conference on Complex, Intelligent and Software Intensive Systems, IEEE Computer Society Press, Cracóvia, Polónia, 2010.
- Nuno Otero, Rui José (2009). Worth and Human Values at the Centre of Designing Situated Digital Public Displays. International Journal of Advanced Pervasive and Ubiquitous Computing. Vol. 1, Issue 4.
- Fernando Reinaldo Ribeiro and Rui José. "Place-aware content selection from dynamic web sources for public displays". The 5th International Conference on Signal Image Technology and Internet Based Systems (SITIS'09). Marrakech, Morocco, November 29 - December 3, 2009. IEEE Computer Society
- Hugo Seixas, Nuno Salgado and Rui José. Wiinteraction: A study on smart spaces interaction using a wiimote. Inforum 2009. Lisboa, Portugal. 10-11 September 2009
- Jorge Cardoso and Rui José. “A framework for context-aware adaptation in public displays”. On the Move to Meaningful Internet Systems: OTM 2009. Lecture Notes in Computer Science. Volume 5872/2009. Springer Berlin /

Heidelberg. ISBN 978-3-642-05289-7. DOI 10.1007/978-3-642-05290-3_16. October 2009

- Nuno Otero, Alberto Rego and Rui José. Considering the Inclusion of Worth and Values in the Design of Interactive Artifacts. First International Conference on Integration of Design, Engineering and Management for innovation IDEMI09. Porto, Portugal. ISBN 978-972-752-117-3. 14-15 September 2009
- Rui José, Nuno Otero, Shahram Izadi and Richard Harper. "Instant Places: Using Bluetooth for Situated Interaction in Public Displays". IEEE Pervasive Computing. Special issue on Pervasive User-Generated Content. Volume 7, Issue 4, Oct.-Dec. 2008 Page(s):52 – 57
Indexed by Scopus, Indexed by ISI, Impact Factor:2.293 (ISI-JCR2007), Ranked 2 out of 66 in Telecommunications (ISI rank by Impact Factor)
- F. Reinaldo Ribeiro and Rui José. "Timeliness for Dynamic Source Selection in Situated Displays". Proc. of the 5th International Conference on Web Information Systems and Technologies (WEBIST). Lisboa, Portugal. 23-26 March 2009
Indexed by ISI
- Rui José and Francisco Bernardo. "Extended Bluetooth naming for empowered presence and situated interaction with public displays". 3th Symposium of Ubiquitous Computing and Ambient Intelligence 2008.University of Salamanca, Spain. 22-24th October, 2008
Indexed by Scopus
- Richard Harper, Tom Rodden, Yvonne Rogers, Abigail Sellen (Eds). HCI 2020. A report on the future of HCI. Microsoft Research. March 2008. Contributor.
- The Mediterranean Journal of Computers and Networks (MEDJCN). Special Issue On Mobile and Ubiquitous Systems. Guest Editors: Adriano Moreira, Rui José and Carlos Bento. Volume 3, No. 1, January 2007. ISSN: 1744-2397
- Rui José and Carlos Baquero (Eds), Proceedings of the Conference on Mobile and Ubiquitous Systems. Universidade do Minho. ISBN 972-8692-29-3. July 2006.
- Helder Pinto, Rui José. "An Activity-Centered Ubiquitous Computing Framework for Public Spaces". The Mediterranean Journal of Computers and Networks. Special Issue on Mobile and Ubiquitous Computing. 2007
- Helder Pinto and Rui José. "ActivitySpot: activity-centered ubiquitous computing support to localized activities". Proceedings of the Conference on Mobile and Ubiquitous Systems (CSMU 2006). Guimarães, Portugal, 29-30 June, 2006.
- Helder Pinto, Rui José. "Pervasive location-based systems: the fundamental challenges between vision and reality". International Journal of Pervasive Computing and Communications. Special issue on Ubiquitous Computing. Vol.1, Nº1, pp. 7-12, ISSN 1742-7371.Troubador Publishing Ltd, Março 2005
- Arouca, David; Figueiredo, Carlos; José, Rui; Machado, Ricardo J.; Monteiro, Paula; Moreira, Adriano; Pascoe, Jason; Pinheiro, Luís; Rodrigues, Helena; Santos, Leonel; Santos, Maribel; Silva, Abílio; Tilsner, Dirk, Os Sistemas de Informação Geográfica no suporte a Serviços Móveis para o Cidadão, Actas do Encontro Português de Utilizadores de Sistemas de Informação Geográfica, 2 - 4

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- Alexandre Oliveira, Pedro M. Figueiredo, Adérito Marcos, Rui José, “Aplicações Móveis de Valor Acrescentado: um caso Prático”. Workshop de Sistemas de Informação Multimedia, Cooperativos e Distribuídos, COOPMEDIA 2003, Porto, 8 de Outubro de 2003.
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- Helder Pinto, Noé Vilas Boas, Rui José, “Utilização do UDDI no suporte à descoberta de serviços baseados na localização”, Workshop "XML: Aplicações e Tecnologias Associadas" (XATA 2003), 13 e 14 de Fevereiro, Braga, 2003.
<http://hdl.handle.net/1822/711>.
- Rui José, Adriano Moreira, Helena Rodrigues, and Nigel Davies, The AROUND architecture for dynamic location-based services, Mobile Networks and Applications (MONET), the Journal of Special Issues on Mobility of Systems, Users, Data and Computing. ISSN 1383-469X. Kluwer Academic Publishers, Special issue on Mobile & Wireless Data Management., Aug. 2003.
<http://hdl.handle.net/1822/2674>
- Rui José, Helder Pinto "Display-centred applications in Ubiquitous Computing". Workshop on System Support for Ubiquitous Computing at the 8th Annual Conference on Ubiquitous Computing (UbiComp 2006), Orange County California, USA. September 17-21, 2006
- Rui José. “Beyond Application-Led Research in Pervasive Display Systems”, Proceedings of the Workshop on pervasive display infrastructures, interfaces and applications at the 4th International Conference on Pervasive Computing (Pervasive 2006). Dublin, Ireland, 7 May, 2006.
- Helder Pinto and Rui José. "ActivitySpot: engaging, activity-centered experiences for occasional visitors". Proceedings of the Workshop on User Experience Design for Pervasive Computing at the 3rd International Conference on Pervasive Computing (Pervasive 2005). Munich, Germany, May, 2005.
<http://hdl.handle.net/1822/2240>
- Rui José, Filipe Meneses, Adriano Moreira, “Integrated Context Management for Multi-domain Pervasive Environments”, First International Workshop on Managing Context Information in Mobile and Pervasive Environments (MCMP-05). In conjunction with 6th International Conference on Mobile Data Management (MDM'05), May 9, 2005, Ayia Napa, CYPRUS.
<http://hdl.handle.net/1822/2878>.
Published on-line at <http://ceur-ws.org/Vol-165/>
- Rui José, “A Web portal for situated Interaction”, Workshop on Ubiquitous Display Environments. In association with UbiComp 2004, the Sixth International Conference on Ubiquitous Computing, Nottingham, England. 7 September, 2004.
<http://hdl.handle.net/1822/2871>
- Rui José, Pedro Coutinho "Situated web portal for local awareness and transient interaction", 2nd International Workshop on Ubiquitous Systems for Supporting Social Interaction and Face-to-Face Communication in Public Spaces. In association with UbiComp 2004, the Sixth International Conference on Ubiquitous Computing, Nottingham, England. 7 September 2004.
<http://hdl.handle.net/1822/2796>
- Helder Pinto and Rui José. “User-centered support to localized activities in

ubiquitous computing environments.” Workshop Computer Support for Human Tasks and Activities, Tuesday, April 20, Radisson SAS Palais Hotel. In association with Pervasive 2004, the Second International Conference on Pervasive Computing, April 18-23, Linz/Viena, Áustria. <http://hdl.handle.net/1822/698>

- Helder Pinto and Rui José, "Integrating local services and applications into external user home environments". International Workshop on Ubiquitous Computing (IWUC 2004) in association with 6th International Conference on Enterprise Information Systems (ICEIS2004), April 13-14, 2004 - Porto, Portugal.

<http://hdl.handle.net/1822/2209>

4. CV Ricardo Morla

Education

Ph.D. in Computing, Lancaster University, 2006.

MSc in Optoelectronics and Lasers, Faculty of Sciences of the University of Porto, 2001

Licenciatura in Electrical Engineering, Faculty of Engineering of the University of Porto, 1998

Appointments

Assistant Professor [2007-present], ECE Department, Faculty of Engineering of the University of Porto

Project Leader [2007-present], INESC Porto

Post-doc Researcher [2006-2007], Bren School of Information and Computer Sciences, UC Irvine

Lecturer [2007], Bren School of Information and Computer Sciences, UC Irvine

Honors

- “Sentient Future Competition” Award [2006], Deutsche Telekom and Embedded Wisents European Project
- “Engenheiro António de Almeida” Award [1998]
- Merit Scholarship [1993-1994]

Research Projects

- SHHC: Safe Home Health Care [2010-2012]. Funded by the Portuguese Foundation for Science and Technology. Principal Investigator.
- Fast Prototyping of Pervasive Applications [2007-2009]. Funded by FLAD-NSF. Principal Investigator.
- vVJ – Virtual Vital Jacket [2008]. Funded by the Portuguese Agency for Innovation (ADI). Principal Investigator.
- FP5 European project METAVISION [2000-2003]. Investigator.
- ORBIT: Object Reconfigurable Broadcast Infrastructure Trial [1999-2002]. Direct contract with BBC. Investigator.

PhD Students

- Chen Wang, CMU-Portugal ECE program. Co-supervisor. Starting Fall 2010.
- Justing Wagner, CMU-Portugal ECE program. Co-supervisor. Starting Fall 2010.
- Ajmal Azad, PDEEC doctoral program in ECE, U.Porto. Supervisor. 2010-present.
- Dossa Massa, MAP-Tele Doctoral Program. Supervisor. 2009-present.
- Nuno Salta, MAP-Tele Doctoral Program. Co-supervisor. 2008-present.
- Saravanan Kandasamy, MAP-Tele Doctoral Program. Co-supervisor. 2008-present.

Selected Publications

- D.Massa, R.Morla. “Modeling 802.11 AP Usage through Daily Keep-alive Event Counts”. IEEE NBIS, Sep 2010.
- N.Salta, R.Morla, M.Ricardo. “Improving P2P Video Streaming in Wireless Mesh Networks”. IEEE Med-Hoc-Net, Jun 2010.

- M. Ferreira, R.Morla. “Second Life In-World Action Traffic Modeling”. ACM NOSSDAV, Jun 2010.
- M. Ferreira, J. Queirós, R. Morla. “Automatic Retrieval of Network Traffic Data for Analysis of Network-In-world Action Relations in MMOGs”. CRC, Oct 2009.
- C. Antunes, R. Morla. “Performance Analysis of a Hybrid Flooding-Probabilistic DTN Protocol using Logged Contact Data”. ConfTele, May 2009.
- C.V.Lopes, L.Kan, A.Popov, and R.Morla. "PRT Simulation in an Immersive Virtual World", SIMUTools 2008.
- O.Lemos, S.Bajracharya, J.Ossher, R.Morla, P.Masiero, P.Baldi, and C.V.Lopes. “CodeGenie: using test-cases to search and reuse source code.”, IEEE/ACM Int. Conf. Automated Software Engineering Demo, Atlanta, November 2007.
- R.Morla and C.V.Lopes. “Blurring the Line Between Simulation and Real-World Prototypes Using Second Life”, Int. Conf. Ubiquitous Computing LBR, Innsbruck, September 2007.
- R.Morla and N.Davies. “Informing the Design of User Studies on Conceptual Interference Frameworks”, IEEE Ubiquitous Computing and Intelligence Symposium, Niagara Falls, May 2007.
- B.Gaspar, C.Pinho, R.Campos, and R.Morla. “A New Approach for Slideshow Presentations at Working Meetings”, ConfTele 2007, Peniche, May 2007.
- R.Morla. “Sentient Future Competition: Vision of Congestion-Free Road Traffic and Cooperating Objects”, EWSN Competition Paper, Zurich, February 2006.
- R.Morla and N.Davies. “A Framework for Describing Interference in Ubiquitous Computing Environments”, IEEE PerCom Conference, Pisa, March 2006.
- R.Morla and N.Davies, “Evaluating a Location-based Application: A Hybrid Test and Simulation Environment”, IEEE Pervasive Computing Magazine, 3(3):48-56, July 2004

5. CV José Creissac Campos

Name	José Francisco Creissac Freitas de Campos
Date of Birth	31st July, 1967
Nationality	Portuguese
Current position	Assistant Professor Informatics Department Engineering School University of Minho Gualtar 4710-057 Braga Portugal
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Academic Degrees

- Doctor of Philosophy – University of York, Computer Science, 2000.
- MSc – University of Minho, Computer Science, 1993.
- Licentiate – University of Minho, Computer Science and Systems Engineering, 1991.

Research Interests

- Main topic: Human-Computer Interaction
- Other topics: Software Engineering, Formal Methods, Automated reasoning

Professional experience

- [08/2000-] Assistant Professor, Departamento de Informática, Universidade do Minho.
- [12/1993-07/2000] Teaching Assistant, Departamento de Informática, Universidade do Minho.
- [10/1991-11/1993] Junior Teaching Assistant, Departamento de Informática, Universidade do Minho.
- [06/1991-09/1991] Software Designer & Programmer, F3M - Engenharia de Sistemas e Informática Lda., Braga, Portugal.

Fellowships and Honours

- 11/2007- Member of IFIP Working Group 2.7/13.4 on User Interface Engineering.
- 04/2007-12/2007 EPSRC Visiting Research Fellow, Informatics Research Institute / School of Computing Science, Newcastle University, UK.
- 01/2006-12/2007 Member of the Scientific Committee of APROJE (Portuguese Association of Electronic Games Producers).

- 09/2005 Socrates/Erasmus Visiting Scholar, Escola Superior de Enxeñaría Informática, University of Vigo, Spain.

Teaching Experience

- [2007/08] Taught lectures on the System Software and Applications for Ambient Intelligence course of the MAP-I doctoral programme.
- [2007/08] Taught lectures on the Model Driven Software Engineering course of the MAP-I doctoral programme.
- [2000/01-] Several courses in Computer Science topics (different programming paradigms, software engineering, and human-computer interaction) at the University of Minho, both at undergraduate and post-graduate levels.
- [2002/03] Short course (8h) on Usability Engineering given to undergraduate students at FEUP (Faculty of Engineering of the Universidade of Porto).
- [2001/02-2002/03] Intensive course (20h) on UML for Information Systems Development lectured to Enabler employees. (Enabler is a leading provider of retail solutions in Europe)
- [2000/01] Intensive course (20h) on Object Oriented Programming lectured to software industry professionals.
- [1997/98] Practicals on Pascal Programming (MSc in Information Technology Business Management and Language), and Mathematics for Computer Science (BSc in Computer Science/Mathematics) at the University of York, UK.

Projects

- REVVIS – Network of Experts in Software Verification and Validation (507AC0326)
Position: University of Minho's group coordinator; Funding (2007): e34.615,00 (CYTED); Start/Duration: 01/2007 / 4 years; Partners: 18 partners from 8 ibero-american countries; lead by University of Coimbra.
- IVY – A model based usability analysis tool (POSC/EIA/56646/2004)
Position: Principal investigator; Funding: e74.000,00 (FCT/FEDER); Start/Duration: 07/2005 / 3 years; Partners: DI/CCTC (University of Minho), FEUP (University of Porto), and INESC Porto.
- SCAPS – Safety Control of Automated Production Systems (POCTI/EME/61425/2004)
Position: Researcher; Funding: e33.600,00 (FCT/FEDER); Start/Duration: 07/2005 / 2 years; Partners: DEM (Principal researcher: José Mendes) and DI/CCTC of the University of Minho.
- AudioBrowser – A web accessibility tool for blind and visual ly impaired users (POSI/SRI/41952/2001)
Position: Researcher; Funding: e29.000,00 (FCT); Start/Duration: 05/2003 / 1 year; Partners: DI/CCTC (University of Minho); FEUP (University of Porto).
- XtrmSWING – Reverse Engineering of Java/Swing code
Position: Principal investigator; Funding: e12.220,55 (Algoritmi Center, University of Minho); Start/Duration: 01/2002 / 1 year
- Sistema Integrado de Acesso à Internet para Pessoas com Deficiências Visuais (Proc. 22/1/sub prog 1)
Position: Researcher; Funding: e15.762.00 (SNRIPD-CITE 2001); Start/Duration: 09/2001 / 1 year

Supervising Experience (PhD)

- João Carlos Silva. Métodos Formais e Engenharia Reversa Aplicados à Manutenção e Usabilidade de Sistemas Interactivos. Departamento de Informática, Universidade do Minho (Started March 2005). Co-supervision with Alexandre Saraiva (DI/UM).
- José Luís Silva. An infrastructure for experience centred agile prototyping of ambient intelligence. Departamento de Informática, Universidade do Minho (started April/2008). Co-supervision with Michael Harrison (Newcastle University).
-

Program Committees

- [EICS 2009] ACM Symposium on Engineering Interactive Computing Systems.
- [Interacção 2004-] Conferência Nacional de Interacção Pessoa-Máquina.
- [DSV-IS 2005-] International Workshop on Design, Specification and Verification of Interactive Systems.
- [Interact 2005-] IFIP TC13 International Conference on Human-Computer Interaction.
- [FMIS 2006-] International Workshop on Formal Methods for Interactive Systems.
- [HCSE 2007-] IFIP WG 13.2 Conference on Human Centred Software Engineering.
- [EPCG 2007-] 15o Encontro Português de Computação Gráfica. Porto Salvo, Portugal, Outubro de 2007.
- HCI Educators 2007 International conference of Human-Computer Interaction Educators. Aveiro, Portugal, Março de 2007.
- iDig 2006 International Digital Games Conference. Portalegre, Set.2006.

Other reviewing work

- **Journals** – Human Technology; Innovations in System and Software Engineering; ACM Crossroads; Cognition Technology and Work; IEEE Software; ACM Transactions in Human-Computer Interaction.
- **Conferences** – CHI 2008/2007/2005/2003 (ACM Conference on Human Factors in Computing Systems); IDC 2007/2006 (Interaction Design and Children); IBM CASCON 2006 Dublin symposium; CSMU 2006 (Conference on Mobile and Ubiquitous Systems); ICTAC 2004 (First International Colloquium on Theoretical Aspects of Computing); CLIHC 2003 (Congresso Latino-americano de Interacção Humano-Computador).

Organizing Committees

- Co-chair and editor for Interacção 2006 – 2nd Portuguese Human-Computer Interaction Conference. Braga, Portugal, October 2006.
- Organizing co-chair for the 6th Eurographics Workshop on Design, Specification and Verification of Interactive Systems, DSV-IS'99. Braga, Portugal, June 1999.
- Member of the local organizing committee for the Portuguese Informatics Meeting '96. Braga, Portugal, September 1996.
- Member of the organizing committee for the 6th Portuguese Conference on

Selected Recent Publications

- J.C. Campos and M.D. Harrison. Interaction engineering using the IVY tool. In ACM Symposium on Engineering Interactive Computing Systems (EICS 2009). (accepted)
- J.C. Campos, J. Machado. Pattern-based Analysis of Automated Production Systems. In INCOM 2009. (accepted)
- M.A. Barbosa, L.S. Barbosa, J.C. Campos. A coordination model for interactive components. In FSEN 2009. (accepted)
- J.C. Silva, J. Saraiva and J.C. Campos. A Generic Library for GUI Reasoning and Testing. In Proceedings of the 2009 ACM Symposium on Applied Computing (SAC 2009). (to appear)
- M. Harrison and J. C. Campos. Analysing Human Aspects of Safety-Critical Software. In ERCIM News, 75:18 October, 2008.
- J. Doherty, J. C. Campos, and M. D. Harrison. Resources for situated actions. In Interactive Systems, number 5136 of Lecture Notes in Computer Science. Springer-Verlag, 2008.
- J.C. Campos and M.D. Harrison. Systematic analysis of control panel interfaces using formal tools. In Interactive Systems, number 5136 of Lecture Notes in Computer Science, pages 72-85. Springer-Verlag, 2008.
- J.C. Campos and M.D. Harrison. Considering context and users in interactive systems analysis. In Engineering Interactive System volume 4940 of Lecture Notes in Computer Science, pages 193-209. Springer-Verlag 2008.
- M.D. Harrison, J.C. Campos, and K. Loer. Formal analysis of interactive systems: opportunities and weaknesses. In P. Cairns and A. Cox, editors, Research Methods in Human Computer Interaction, chapter 5. Cambridge University Press, 2008.
- M. Harrison, C. Kray, and J.C. Campos. Exploring an option space to engineer a ubiquitous computing system. In P. Curzon and A. Cerone, editors, 2nd International Workshop on Formal Methods for Interactive Systems (FMIS 2007), volume 208 of Electronic Notes in Theoretical Computer Science, pages 41-55. 2008.
- J.L. Silva, J.C. Campos, and A. Paiva. Model-based user interface testing with Spec Explorer and ConcurTaskTrees. In P. Curzon and A. Cerone, editors, 2nd International Workshop on Formal Methods for Interactive Systems (FMIS 2007), volume 208 of Electronic Notes in Theoretical Computer Science, pages 77-93. 2008.
- M. D. Harrison, J. C. Campos, G. Doherty, and K. Loer. Connecting rigorous system analysis to experience centred design. In E. Law, E. Hvannberg, and G. Cockton, editors, Maturing Usability: Quality in Software, Interaction and Value, Human-Computer Interaction Series, chapter 3, pages 56. Springer, 2007.
- H. Pinto, R. José, and J. C. Campos. An interaction model and infrastructure for localized activities in pervasive computing environments. In IEEE International Conference on Pervasive Services 2007 (ICPS'07), pages 232-241. IEEE Computer Society Press, 2007.
- J. C. Silva, J. C. Campos, and J. Saraiva. Combining formal methods and functional strategies regarding the reverse engineering of interactive applications. In Interactive Systems, volume 4323 of Lecture Notes in Computer

Science, pages 137{150. Springer-Verlag, 2007.

- M. A. Barbosa, L. S. Barbosa, and J. C. Campos. Towards a coordination model for interactive systems. In A. Cerone and P. Curzon, editors, Proc. of the First Int. Workshop in Formal Methods for Interactive Systems (FMIS 2006), n. 183 in Electronic Notes in Theoretical Computer Science, p.73. Elsevier, 2007.

6. CV de Paulo Novais

1. Identification

Name	Paulo Jorge Freitas de Oliveira Novais
Place and Date of birth	Guimarães, Portugal, 1967 November 13 th
Nationality	Portuguese
Institutional address	Universidade do Minho Departamento de Informática Campus de Gualtar 4710 - 057 Braga - Portugal
Telephone	+351 253 604437/30
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E-mail	pjon@di.uminho.pt
URL	http://www.di.uminho.pt/~pjn

2. Academic degrees

- PhD in Computer Science at the University of Minho, School of Engineering, 2003.
- Msc in Computer Science at the University of Minho, School of Engineering, 2003.
- Graduation in Systems and Informatics Engineering, University of Minho, School of Engineering, Department of Informatics, 1992.

3. Present position

- Assistant professor, at the University of Minho, since 2003.

4. Previous position

- Assistant Lecturer, at the University of Minho, between 1992 and 2002.

5. Main scientific area of research

- Knowledge Representation and Reasoning, Agent and Multi-Agent Systems, AI and The Law, Ambient Intelligence.

6. Other scientific areas of interest

- Knowledge Based Systems, Collaborative Networks Organizations, Negotiation, Argumentation, Intelligent Techniques in E-Commerce, Web Intelligence.

7. Research projects

- *TIARAC - Telematics and Artificial Intelligence in Alternative Conflict Resolution*, FCT Ref^a PTDC/JUR/71354/2006, Budget: 124,342.00 Eur, Start in 1-9-2008.
- *Hermes - Aprendizagem e Povoamento de Ontologias a partir de Fontes Textuais*, FCT Referência: FCT/CAPES - 2010-2011, Start in 1-2-2010.
- *Intelligent Agents and Legal Relations*., Ref^a POCI/JUR/57221/2004. Coordinator, FCT, Budget: €25,000, 2006-2009.
- *ArgEmotionAgents – Agentes Argumentativos com Modelação de Comportamento Emocional para apoio a Participantes em Reuniões de Tomada de Decisão em Grupo*, Ref^a POSI/EIA/56259/2004, Researcher, CCTC, FCT. Budget : €71,000, 2005.
- Um Sistema de Informação com base na Web para acesso à Jurisprudência, POSI/EEI/13096/2000, Janeiro 2001, Researcher, Budget: €59,855.77.

8. Supervision of post-graduate students

- Luís Lima, Ph.D. thesis finished in 23/Mar/2010. Title: Apoio à Tomada de Decisão em Grupo na Área da Saúde (Co-supervision with José Bulas Cruz, Universidade de Trás-os-Montes e Alto Douro).
- Ricardo André Costa, Ph.D. thesis finished in 6/Nov/2009. Title: Collaborative Networks in Ambient Assisted Living (Co-supervision with José Neves, Universidade do Minho).
- Ângelo Costa, Ph.D. thesis started in Mar/2010. Title: Memory Assist: an Intelligent Agenda Organizer.
- Davide Carneiro, Ph.D. thesis started in Jan/2010. Title: An Agent-based Architecture for Online Dispute Resolution Services (Co-supervision with José Neves, Universidade de Minho) (FCT: SFRH/BD/64890/2009).
- Manuel Rodrigues, Ph.D. thesis started in Jan/2009. Title: Intelligent Tutoring (Co-supervision with Florentino Riverola, Universidade de Vigo).
- Supervision of more than 15 students in master project.

9 Selected Publications (2010-05)

9.1 Books

- Novais P., Rabelo R., Karvonen I., Guest Editors Special Issue in Modeling and management of knowledge in collaborative networks, International Journal of Services and Operations Management - (IJSOM), Inderscience , Vol. 6, No. 3, 2010.

- Novais P., Analide C., Henriques P., *Simpósio Doutoral em Inteligência Artificial 2009 (SDIA 2009)*, APPIA, ISBN 978-989-95618-2-3, 2009.
- Analide C., Novais P., Henriques P., *Proceedings Simpósio Doutoral em Inteligência Artificial (SDIA 2007)*, APPIA, ISBN 978-989-95618-1-6, 2007.
- Camarinha-Matos L., Afsarmanesh H., Novais P., Analide C., *Establishing the foundation of Collaborative Networks*, Proceedings IFIP TC 5 WG 5.5 Eighth IFIP Working Conference on VIRTUAL ENTERPRISES (PRO-VE 2007), Guimarães, Portugal, Springer, ISBN 0-387-28259-9, 2007.

9.2 Papers in Journals with peer review

- Lima L., Novais P., Costa R., Bulas Cruz J., Neves J., *Group Decision Making and Quality-of-Information in e-Health Systems*, Logic Journal of the IGPL, Oxford University Press, 2010 (to appear).
- Novais P., Costa R., Carneiro D., Neves J., *Inter-Organization Cooperation for Ambient Assisted Living*, in *Journal of Ambient Intelligence and Smart Environments*, IOS Press, Vol. 2, No. 2, pp.179–195, 2010.
- Andrade F., Novais P., Machado J., Neves J., *Software agents and virtual organisations: consent and trust*, *Int. J. Services and Operations Management*, Inderscience, Vol. 6, No. 3, pp.227–229, 2010.
- Novais P., Rabelo R., Karvonen I., *Modeling and Management of Knowledge in Collaborative Networks*, Preface of the special Issue in *Modeling and management of knowledge in collaborative networks*, *Int. J. Services and Operations Management*, Inderscience, Vol. 6, No. 3, pp.352–361, 2010.
- Machado J., Abelha A., Novais P., Neves J., *Quality of Services in Healthcare Units*, in *International Journal of Computer Aided Engineering and Technology (IJCAET)*, Vol. 2, No. 4, pp 436-449, 2010.
- Andrade F., Novais P., Machado J., Neves J. *Contracting Agents: legal personality and representation*, *Artificial Intelligence and Law*, Volume 15, N° 4, ISSN 0924-8463, pp 357-373, Springer-Verlag, 2007.
- Novais P., Brito L., Neves J., *Pre-Argumentative Reasoning*, *The Knowledge-Based Systems Journal*, vol. 18 N° 2-3, ISSN 0950-7051, pp 79-88, Elsevier Science BV, 2005.

9.3 Chapters in Books with peer review

- Novais P., Andrade F., Machado J., Neves J., *Agents, Trust and Contracts*, in *Information Communication Technology Law, Protection and Access Rights: Global Approaches and Issues*, Portela I., Cunha M. (Eds), IGI Global, (To appear 2010).
- Andrade F., Novais P., Carneiro D., Neves J., *Conflict Resolution In Virtual Locations*, in *Information Communication Technology Law, Protection and Access Rights: Global Approaches and Issues*, Portela I., Cunha M. (Eds), IGI Global, (2010).
- Costa R., Novais P., Lima L., Bulas-Cruz J. and Neves J., *VirtualECare: Group Support in Collaborative Networks Organizations for Digital Homecare*, in *Handbook of Digital Homecare*, Springer Series: Series in Biomedical

- Engineering, Yogesan, K.; Bos, L.; Brett, P.; Gibbons, M.C. (Eds.), ISBN: 978-3-642-01386-7, 2009.
- Andrade F., Novais P., Neves J., Software Agents and Contracting, Encyclopedia of Networked and Virtual Organizations, Goran Putnik and Manual Cunha (Eds), Idea Group Reference, ISBN 978-1-59904-885-7, 2008.
 - Analide C., Novais P., Machado J., Neves J., Quality of Knowledge in Virtual Entities, Encyclopedia of Communities of Practice in Information and Knowledge Management, Elayne Coakes and Steve Clarke (Eds), Idea Group Reference, ISBN 1-59140-556-4, pp 436-442, 2006.
 - Andrade F., Novais P., Carneiro D., Zeleznikow J., Neves J., Using BATNAs and WATNAs in Online Dispute Resolution, in Post-Proceedings JURISIN 2009 (Third International Workshop on Juris-informatics), Springer LNAI 2010 (to appear).
 - Carneiro D., Novais P., Costa R., Neves J., Enhancing the Role of Multi-agent Systems in the Development of Intelligent Environments, in Trends in Practical Applications of Agents and Multiagent Systems, Yves Demazeau et al. (eds), in Advances in Intelligent and Soft Computing, Vol. 71, Springer- Verlag, ISBN 978-3-642-12432-7, pp. 123-130, (PAAMS 10 - The 8th International Conference on Practical Applications of Agents and Multi-Agent Systems, University of Salamanca, Spain, 26-28th April/2010), 2010.
 - Costa A., Novais P., Costa R., Corchado J.M., Neves J., Multi-Agent Personal Memory Assistant, in Trends in Practical Applications of Agents and Multiagent Systems, Yves Demazeau et al. (eds), in Advances in Intelligent and Soft Computing, Vol. 71, Springer- Verlag, ISBN 978-3-642-12432-7, pp. 97-104, (PAAMS 10 - The 8th International Conference on Practical Applications of Agents and Multi-Agent Systems, University of Salamanca, Spain, 26-28th April/2010), 2010.
 - Carneiro D., Novais P., Costa R., Gomes P., Neves J., EMon: Embodied Monitorization, in Ambient Intelligence European Conference - AmI 2009, Tscheligi M., Ruyter B., Markopoulos P., Wichert R., Mirlacher T., Meschtscherjakov A., Reitberger W. (Eds.), LNCS 5859, Springer-Verlag, ISBN 978-3-642-05407-5, pp 133-142, 2009.
 - Costa R., Novais P., Costa A., Neves J., Memory Assist in Ambient Assisted Living , in Levering Knowledge for Innovation in Collaborative Networks, Luís Camarinha-Matos, Iraklis Paraskakis and Hamideh Afsarmanesh (eds), Springer-Verlag, Series: IFIP International Federation for Information Processing, ISBN 978-3-642-04567-7, pp 745-752, 2009.
 - Costa A., Novais P. Costa R., Machado J., Neves J., A Memory Assistant for The Elderly, in Intelligent Distributed Computing III, George Papadopoulos and Costin Badica (eds), Springer-Verlag, Series: Studies in Computational Intelligence, ISBN 978-3-642-03213-4 pp 209-214, 2009.
 - Carneiro D., Novais P., Costa R., Neves J., Case-Based Reasoning Decision Making in Ambient Assisted Living, in Distributed Computing, Artificial Intelligence, Bioinformatics, Soft Computing and Ambient Assisted Living, Omatu S., et al. (Eds.) LNCS 5518, Springer-Verlag, ISBN 978-3-642-02480-

- 1, pp. 566-573 (Proceedings of the International Workshop of Ambient Assisted Living (IWAAL 2009), Salamanca, Spain, 2009), 2009.
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- Ribeiro J., Novais P., Neves J., Delgado M., Wine Vinification prediction using Data Mining tools, in Proceedings of the European Computing Conference (ECC 09)/3rd International Conference on Computational Intelligence (CI 09), ISBN: 978-960-474-088-8, pp 62-70, 2009.
- Ribeiro J., Neves J., Sanchez J., Delgado M., Machado J., Novais P., Quality of the Information: The application in the winification process in wine production, in Proceedings of the European Computing Conference (ECC 09)/3rd International Conference on Computational Intelligence (CI 09), ISBN: 978-960-474-088-8, pp 78-85, 2009.
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- Marreiros G., Novais P., Machado J., Ramos C., Neves J. A formal approach to Argumentation in Group Decision, in Knowledge and Decision Technologies, Vale Z., Ramos C. and Faria Luiz (Eds), ISBN 972-8688-39-3, pp 135-141 (ICKEDS'06 - the 2nd International Conference on Knowledge Engineering and Decision Support, Lisboa, Portugal), 2006.
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- Martins F., Belo O., Novais P., Avaliação de Algoritmos para a Selecção de Vistas Materializadas em Ambientes de Data Warehousing, Proceedings of the Data Gadgets 2005 Workshop. X Jornadas de Ingeniería del Software y Bases de Datos (JISBD 2005), 1º Congreso Español de Informática, Granada, Espanha, Novembro, ISBN 972-9210-06-3, pp 75-88, 2005.
- Rodrigues M., Novais P., Santos M., Future Challenges in Intelligent Tutoring Systems – A Framework, Recent Research Developments in Learning Technologies: Proceedings of the 3rd International Conference on multimedia and Information & Communication Technologies in Education (m-ICTE2005), A. Méndez Villas, B. Gonzalez Pereira, J. Mesa González, J.A. Mesa González (Eds), Publishers Formatex, ISBN 609-5994-5, pp 929-934, 2005.
- Andrade F., Novais P., Neves J. Will and declaration in acts performed by intelligent software agents – preliminary issues on the question, Proceedings of the LEA 2005 - The Law of Electronic Agents, Oskamp A., and Cevenini C. (eds), IAAIL series, Wolf Legal Publishers, ISBN 90-5850-505-7, pp 53-56, 2005.

10. Membership in Program Committee of scientific meetings (2010-2009)

- PRO-VE'10 – 11st IFIP Working Conference on Virtual Enterprises, Nancy, France, 2010.
- AITAmI'10 - 5th Workshop on Artificial Intelligence Techniques for Ambient Intelligence, Kuala Lumpur, Malaysia, 2010.
- DCAI 2010 - International Symposium on Distributed Computing and Artificial Intelligence 2010.
- MINES 2010 - International Conference on Multimedia Information Networking and Security, Nanjing, China.
- EC-Web '10 - 11th International Conference on Electronic Commerce and Web Technologies , Bilbao, Spain, 2010.
- IAT4EB - Intelligent Agents and Technologies for e-Business, workshop of the ECAI 2010 – 9th biennial European Conference on Artificial Intelligence, Lisboa, Portugal, 2010.

- IWAAL'10 - International Workshop of Ambient Assisted Living 2010, Valencia, Spain, 2010.
- IWEA - 4th IEEE International Workshop on e-Activity, Yamagata, Japan, 2010.
- MABS 2010 - 11th International Workshop on Multi-Agent-Based Simulation (Co-located with the 9th International Joint Conference on Autonomous Agents and Multiagent Systems AAMAS 2010), Toronto, Canada, 2010.
- ESM2010 - European Simulation and Modelling Conference, Hasselt, Belgium, 2010.
- ISC 2010 - Industrial Simulation Conference, Budapest, Hungary, 2010.
- AGEmap 2010 - Workshop on Roadmaps towards a strategic research agenda for ICT in active ageing (Co-located with the 4th International Conference on Pervasive Computing Technologies for Healthcare), Munich, Germany, 2010.
- ICAART 10 - 2nd International Conference on Agents and Artificial Intelligence, Valencia, Spain, 2010.
- PRO-VE'09 – 10th IFIP Working Conference on Virtual Enterprises, Thessaloniki, Greece, 2009.
- IWAAL'09 - International Workshop of Ambient Assisted Living 2009, Salamanca, Spain, 2009.
- EAC - Emotional and Affective Computing, Special Track of the EPIA 2009 – 14th Portuguese Conference on Artificial Intelligence, Aveiro, Portugal, 2009.
- MASTA – Multi-Agent Systems: Theory and Applications, Special Track of the EPIA 2009 – 14th Portuguese Conference on Artificial Intelligence, Aveiro, Portugal, 2009.
- MABS 2009 - tenth International Workshop on Multi-Agent-Based Simulation (Co-located with the eighth International Joint Conference on Autonomous Agents and Multiagent Systems AAMAS 2009), Budapest, Hungary, 2009.
- International Program Committee of the ISC 2009 - Industrial Simulation Conference, Loughborough, United Kingdom, 2009.

11. Membership in Organization teams of scientific meetings

- Organization Chair ISAmI 2010 - International Symposium on Ambient Intelligence, Guimarães, Portugal, 2010.
- Organization Chair SOCO 2010 - International Workshop on Soft Computing Models in Industrial Applications, Guimarães, Portugal, 2010.
- Organization Chair Special Session on Multiagent Systems for Health Care and Bioinformatics, at PAAMS 10 - 8th International Conference on Practical Applications of Agents and Multi-Agent Systems, University of Salamanca, Spain, 2010.
- Organization Committee of the TeIA - Tertúlias em Inteligência Artificial (TeIA) - Direito e Inteligência Artificial, Braga, Portugal, 2009.

- Organization Committee of the SDIA 2009 - Doctoral Symposium on Artificial Intelligence, EPIA 2009 – 14th Portuguese Conference on Artificial Intelligence, Aveiro, Portugal, 2009.
- Organization Chair PRO-VE 07 - 8 IFIP Working Conference on Virtual Enterprises, Guimarães, Portugal, 2007.
- Organization Committee Special Session on E-Contracting in Collaborative Network Scenarios (co-located with the 8th IFIP Working Conference on VIRTUAL ENTERPRISES (PRO-VE'07), Guimarães, Portugal, 2007.
- Organization Committee of the MASTA - 4th Workshop on Multi-Agent Systems: Theory and Applications, EPIA 2007 – 13th Portuguese Conference on Artificial Intelligence, Guimarães, Portugal, 2007.
- Organization Committee of the SDIA 2007 - Doctoral Symposium on Artificial Intelligence, EPIA 2007 – 13th Portuguese Conference on Artificial Intelligence, Guimarães, Portugal, 2007.
- Organization Committee of the EAIA 2007 - Escola Avançada em Inteligência Artificial, Lisboa, Portugal, 2007.
- Member of the APPIA – Portuguese Association for Artificial Intelligence (vice-president) 2010-11.