UNIVERSITAT JAUME·I

Department of Computer Science and Engineering

Annual Reports
2003–2007

Preface

This document, published yearly by the Department of Computer Science and Engineering (hereafter DCSE) of the Universitat Jaume I (hereafter UJI), covers the academic years 2003–2007. The aim of this report is to explain what the deparment is, and the main research lines the members of the department are interested in.

This report is organized as follows: First, we give an introduction to the DCSE, its tasks and its staff. Then, we present each research group in the DCSE, its research lines and publications. Later, we will explain the courses that are being taught by this department. Finally, a list of the technical reports written by the department staff is given.

Contents

Chapter 1

The Department

1.1   The University Jaume I

The Universitat Jaume I, established in 1991, is a very young institution. The number of students is about 13000. Currently, the university is placed in a campus, Riu Sec, very close to Castelló.

1.1.1   Academic Organization

There are 3 colleges in the university: the faculty of Human and Social Sciences, the faculty of Law and Business, and the faculty of Technology and Experimental Sciences.

The activities of this university are organized so as to cover 30 different academic degrees and studies:

- Graduate in Translation and Interpretation (*Licenciatura en Traducción e Interpretación*)
- Industrial Engineering (*Ingeniería Industrial*)
- Graduate in Public Administration and Management (*Diplomatura de Gestión y Administración Pública*)

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- Graduate in Business Administration and Management (*Licenciatura en Administración y Dirección de Empresas*)

- Graduate in Laws (*Licenciatura en Derecho*)

- Graduate in Business and Administration (*Diplomatura de Ciencias Empresariales*)

- Course of Pedagogic Adaptation (*Curso de Adaptación Pedagógica*)

- Graduate in Labour Relationships (*Diplomatura de Relaciones Laborales*)

- Engineering in Computer Science (*Ingeniería en Informática*)

- Technical Engineering in Business Computer Science (*Ingeniería Técnica en Informática de Gestión*)

- Technical Engineering in Computer Systems (*Ingeniería Técnica en Informática de Sistemas*)

- Graduate in English Philology (*Licenciatura en Filología Inglesa*)

- Graduate in Psychology (*Licenciatura en Psicología*)

- Specific Couses (*Asignaturas de Estilo*)

- Graduate in Humanities (*Licenciatura en Humanidades*)

- Graduate in Teaching specialized in Children (*Diplomatura de Magisterio Infantil*)

- Graduate in Teaching for Primary Schools (*Diplomatura de Magisterio en Educación Primaria*)

- Graduate in Teaching specialized in Physical Education (*Diplomatura de Magisterio en Educación Física*)

- Graduate in Teaching specialized in Music (*Diplomatura de Magisterio en Música*)

- Chemical Engineering (*Ingeniería en Química*)

- Chemistry (*Licenciatura en Química*)

- Technical Engineering in Industrial Design (*Ingeniería Técnica en Diseño Industrial*)

- Graduate in Tourism (*Diplomatura en Turismo*)

- Technical Mechanical Engineering (*Ingeniería Técnica Industrial en Mecánica*)

- (*Ingeniería Técnica Agrícola en Hortofruticultura y Jardinería*)

- Graduate in Psicopedadogy (*Licenciatura en Psicopedagoía*)

- Graduate in Public Relations (*Diplomatura en Publicidad y Relaciones Públicas*)
- (*Licenciatura en Ciencias del Trabajo*)
- (*Arquitectura Técnica*)
- (*Licenciatura en Comunicación Audiovisual*)
- (*Graduado en Seguridad y Ciencias Policiales*)
- (*Graduado Superior en Matematica Computacional*)

1.2 Collaborations

This university is committed to the promotion of the transfer of Technology and Science to our society, helping the nearby industries and contributing to the implementation of the necessary social and industrial changes.

Moreover, the university is collaborating with many other universities from Spain and the rest of Europe through research projects (Spanish CICYT, European ESPRIT, etc.) and through academic projects (European ERASMUS, etc).

1.3 The Department of Computer Science and Engineering

This is a very young institution. This is the deparment in charge of teaching courses related with computer engineering and computer science. The current coordinator of the DCSE is Dr. J. M. Badia.

His address as well as the one for this deparment is:

Departament d'Enginyeria i Ciència dels Computadors
Universitat Jaume I
Campus Riu Sec, Edifici TI (ESTCE)
12.071 Castelló de la Plana
(Spain)

1.4 The Members

The current number of members is about 58. About 24 of them are doctors.

1.4.1 Administrative and Technical Staff

The list of current members is shown next by alphabetical order of the first lastname:

– Gustavo Edo Aparici, Laboratory Technician.

– Conchi López Berzosa, Adminstrative.

– Vicente R. Roca Sanz, Laboratory Technician.

– Tamara Tomàs Sebastià, Adminstrative.

1.4.2 Academic Staff

The list of current members is shown next by alphabetical order of the first lastname:

– Miguel Albert Soler, Graduate in PHYSICS (Universidad de Valencia, 1997).

– José Ignacio Aliaga Estellés, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1990), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1995).

– María José Aramburu Cabo, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1991), and Ph. D. in COMPUTER SCIENCE (University of Birmingham, 1998).

– José Manuel Badía Contelles, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1991), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1996).

– Sergio Barrachina Mir, Graduate in TELECOMMUNICATIONS ENGINEERING (Universidad Politécnica de Valencia, 1995), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 2003).

– Emilio Bueso Aparici, Technical Engineer in COMPUTER SCIENCE (Universidad Jaume I, 2001).

– Eduardo Calpe Marzá, Graduate in MATHEMATICS (Universidad de Valencia, 1986).

– María Asunción Castaño Alvarez, Technical Engineer in COMPUTER SCIENCE (Universidad de Oviedo, 1986), Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1990), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1998).

– María Isabel Castillo Catalán, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1991), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 2000).

– Enric Cervera Mateu, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1994), and Ph. D. in COMPUTER ENGINEERING (Universidad Jaume I, 1997).

– Eris Chinellato, Graduate in INDUSTRIAL ENGINEERING (Universidad de Padova, Italy, 1999), Master in ARTIFICIAL INTELLIGENCE (University of Edinburgh 2002), Ph.D. in COMPUTER ENGINEERING (Universidad Jaume I, 2008).

– Juan Darocha Huerta, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1997).

– Juan Echagüe Guardiola, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1991).

– María Teresa Escrig Monferrer, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1991), and Ph. D. in COMPUTER ENGINEERING (Universidad Jaume I, 1997).

– Germán Fabregat Llueca, Graduate in PHYSICS (Universidad de Valencia, 1989), and Ph. D. in COMPUTER ENGINEERING (Universidad de Valencia, 1996).

– Zoe Falomir Llansola, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 2004).

– Javier Felip León Technical Engineer in COMPUTER SCIENCE (Universidad Jaume I, 2004). Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 2007).

– Juan Carlos Fernández Fernández, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1999).

– Mercedes Fernández Redondo, Graduate in PHYSICS (Universidad de Valencia, 1988), and Ph. D. in COMPUTER ENGINEERING (Universidad Jaume I, 2001).

– Luis Amable García Fernández, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 2000).

– Amparo Gomez Villalonga,

– Cristina Gomis Escobar, Technical Engineer in TOPOGRAPHY (Universidad Politécnica de Valencia, 1995), and Graduate in GEODESY AND CARTOGRAPHY ENGINEERING (Universidad Politécnica de Valencia, 1998).

– Manuel Gonzalbo Escrig, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1999).

– José Pascual Gumbau Mezquita, Graduate in MATHEMATICS (Universidad Complutense de Madrid, 1989).

– Carlos Antonio Hernández Espinosa, Graduate in PHYSICS (Universidad de Valencia, 1990), and Ph. D. in PHYSICS (Universidad de Valencia, 1994).

– Jesüs Ibáñez Gual Graduate in COMPUTER SCIENCE (Universidad Jaume I, 1998).

– Germán León Navarro, Technical Engineer in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1988), and Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992).

– Javier Llach Mollón, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992).

– M. Angeles López Malo, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 1999).

– Mar Marcos López, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 1999).

– Raül Marín Prades, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 1996), and Ph. D. in COMPUTER ENGINEERING (Universidad Jaume I, 2002).

– M. Mercedes Marqués Andrés, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1990).

– José Vicente Martí Avilés, Graduate in PHYSICS (Universidad de Valencia, 1992).

– Alberto Francisco Martín Huertas, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 2005).

- Bernardo Martínez Díez, Graduate in INDUSTRIAL ENGINEER-ING (Universidad de Oviedo, 1988).
- Ester Martínez Martín Graduate in COMPUTER SCIENCE (Universidad Jaume I, 2004).
- Begoña Martínez Salvador, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1994), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 1999).
- Gloria Martínez Vidal, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1989), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1999).
- Rafael Mayo Gual, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1990), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 2001).
- Raul Montoliu Colás, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 1998).
- Antonio Morales Escrig, Graduate in COMPUTER ENGINEER-ING (Universidad Jaume I, 1996), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 2004).
- Juan Murgui García, Graduate in PHYSICS (Universidad de Valencia, 1986), and Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1999).
- Lidón Museros Cabedo, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 1998). Ph. D. in COMPUTER ENGINEER-ING (Universidad Jaume I, 2006).
- Patricio Nebot Roglá, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 2002). Ph. D. in COMPUTER ENGINEER-ING (Universidad Jaume I, 2008).
- Leonardo Nomdedeu Calvente Graduate in COMPUTER ENGI-NEERING (Universidad Jaume I, 2004). Master in INTELLIGENT SYSTEMS (Universidad Jaume I, 2007).
- Fernando E. Ochera Bagán, Graduate in PHYSICS (Universidad de Valencia, 1995), and Graduate in ELECTRONIC ENGINEERING (Universidad de Valencia, 1998).
- Maria del Carmen Ortiz Gomez,
- Julio Pacheco Aparicio, Graduate in MATHEMATICS (Universidad Complutense de Madrid, 1993).
- Angel Pasqual del Pobil y Ferré, Graduate in PHYSICS (Universidad de Navarra, 1986), and Ph. D. in INDUSTRIAL ENGINEER-ING (Universidad de Navarra, 1991).

– Miguel Pérez Francisco, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 1999).

– Alejandro Pérez Rubio, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 1996).

– Mario Prats Sánchez, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 2004).

– Enrique S. Quintana Ortí, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1992), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1996).

– Gregorio Quintana Ortí, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1989), and Ph. D. in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1995).

– María Pilar Ramo Alegre, Graduate in MATHEMATICS (Universidad de Valencia, 1989).

– Gabriel Recatalá Ballester, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 1996), and Ph. D. in COMPUTER SCIENCE (Universidad Jaume I, 2003).

– Alfredo Remón Gómez, Graduate in COMPUTER ENGINEERING (Universidad Politécnica de Valencia, 2001).

– Rafael Rubio Moreno, Graduate in MATHEMATICS (Universidad de Valencia, 1996).

– José Miguel Sanchiz Martí, Technical Engineer in Electronical Devices (Universidad Politécnica de Cataluña, 1985), Graduate in PHYSICS (Universidad Nacional de Educación a Distancia, 1993), and Ph. D. in COMPUTER ENGINEERING (Universidad Jaume I, 1997).

– Ismael Sanz Blasco, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 1997). Ph. D. in COMPUTER ENGINEERING (Universidad Jaume I, 2007).

– Jorge Sales Gil, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 2006). Master in INTELLIGENT SYSTEMS (Universidad Jaume I, 2007).

– Pedro José Sanz Valero, Graduate in PHYSICS (Universidad de Valencia, 1985), Master CAD/CAM (Universidad Politécnica de Valencia), and Ph. D. in COMPUTER ENGINEERING (Universidad Jaume I, 1996).

– Sergio Silvestre Batalla, Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 1998).

- – Vicent Solsona Pérez, Graduate in MATHEMATICS (Universidad de Valencia, 1980).

- – Lorenzo Tauste Martínez, Graduate in TELECOMMUNICATIONS ENGINEERING (Universidad Politécnica de Valencia, 1996), and Master in Management of Communications and Information Technology Business (School of Industrial Organization, Madrid, 1997).

- – Francisco Toledo Lobo, Graduate in MATHEMATICS (Universidad de Valencia, 1986), and Ph. D. in MATHEMATICS (Universidad de Valencia, 1990).

- – Vicente Ramón Tomás López, Graduate in COMPUTER SCIENCE (Universidad Politécnica de Valencia, 1998).

- – Joaquin Torres Sospedra, Graduate in COMPUTER ENGINEER-ING (Universidad Jaume I, 2003).s

- – Raul Wirz Graduate in COMPUTER ENGINEERING (Universidad Jaume I, 2005).

Chapter 2

Research Groups

The research activities of the department can be divided into the following interest groups:

- Computational Learning, Automatic Recognition and Translation of Speech.
- Temporal Knowledge Bases and their Applications.
- High-Performance Computing and Architectures.
- Robotic Intelligence.
- Computer Vision.
- Multimedia Research.
- Intelligent Control Systems.
- Communications and Systems.
- Neural Networks and Soft Computing.
- Applying Intelligent Agents.
- Knowledge Engineering.
- Cognition for Robotic Research.
- SoLiDo: Libre Software

2.1 Computational Learning, Automatic Recognition and Translation of Speech

The group is interested in pattern recognition problems, and mainly focused on speech recognition, language modeling, and translation.

2.1.1 Researchers

Asunción Castaño
Sergio Barrachina

Contact Person

Asunción Castaño (`castano@icc.uji.es`)

Collaborators from Other Departments

Pablo Aibar
Juan Carlos Amengual
Gustavo A. Casañ
Antonio Castellanos
Víctor Jiménez
David Llorens
Andrés Marzal
Federico Prat
Juan Miguel Vilar
Guillermo Peris

2.1.2 Research Lines

- PATTERN RECOGNITION:
  - Formal Transducers
  - Regular and Context-Free Grammars

- – String Processing
- – Nearest Neighbour Techniques

- SPEECH RECOGNITION:
  - – Acoustic Modeling
  - – Language Modeling
  - – Continuous Speech Recognition
  - – Translation using Formal Transducers
  - – Statistical Translation
  - – Corpora Generation
  - – Dialogue Systems

- NEURAL NETWORKS:
  - – Connectionist Translation
  - – Language Understanding using Neural Networks
  - – Finite-State Automata and Neural Networks

- COMPUTATIONAL LEARNING:
  - – Theory of Computational Learning
  - – Inductive Inference:
    - ∗ Grammatical Inference
    - ∗ Transduction Inference
  - – Stochastic Language Learning
  - – Estimation of Probabilities in Structural Models

- AUTOMATIC TRANSLATION:
  - – Corpus-Based Methods
  - – Applications to Natural Language
  - – Automatic Speech Translation

2.1.3 Research Projects

- "Redes neuronales y técnicas inductivas de categorización aplicadas a la traducción: NeuroTrad". Fundació Caixa Castelló–Bancaixa, P1A99–10, 2 years, Main Researcher: A. Castaño, 2000.

- "Sistemas Inductivos, Estadísticos y Estructurales para la Traducción Automática (SIEsTA)". Fundació Caixa Castelló–Bancaixa, P1.1B2002-1, 3 years, Main Researcher: F. Prat, 2002.

- "Colaboración proyecto TransType2". Instituto Tecnológico de Informática (UPV), 02I255.01/1, 2 years and 5 months, Main Researcher: J. M. Vilar, 2002.

2.1.4   Ph. D. Dissertations

- S. Barrachina. "Técnicas de agrupamiento bilingüe aplicadas a la inferencia de traductores". Depto. de Ingeniería y Ciencia de los Computadores, Universidad Jaume I, 2003.

2.1.5   Publications

International Journal Papers

- G. A. Casañ, and M. A. Castaño. "Generación Automática de Codificaciones de Vocabularios para Tareas de Traducción Automática". Inteligencia Artificial, Revista Iberoamericana de IA, pp. 175–186, 2003.

- G. A. Casañ, and M. A. Castaño. "Automatic Size Determination of Codifications for the Vocabularies of the RECONTRA Connectionist Translator". Lecture Notes in Computer Science. Artificial Neural Nets: Problem Solving Method, Springer-Verlag, pp. 766–773, 2003.

- G. A. Casañ, and M. A. Castaño. "Automatic Word Codification for the RECONTRA Connectionist Translator". Lecture Notes in Computer Science. Patern Recognition and Image Analysis, Springer-Verlag, pp. 168–175, 2003.

- F. Casacuberta, H. Ney, F. J. Och, E. Vidal, J. M. Vilar, S. Barrachina, I. García-Varea, D. Llorens, C. Martínez, S. Molau, F. Nevado, M. Pastor, D. Picó, A. Sanchís, and C. Tillman. "Some approaches to statistical and finite-state speech-to-speech translation". Computer Speech and Language, vol. 18, Elsevier, pp. 25–47, 2004.

- J. Civera, J. M. Vilar, E. Cubel, A. L. Lagarda, S. Barrachina, F. Casacuberta, E. Vidal, D. Picó, and J. González. "A syntactic Pattern Recognition Approach to Computer Assisted Translation". Lecture Notes in Computer Science, vol. 3138, Springer-Verlag, pp. 207–215, 2004.

Publications in International Proceedings with ISBN

- S. Barrachina, and R. Mayo. "A web tool for automatic test evaluation". Proc. of International Conference on ICT's in Education, Junta de Extremadura. Consejería de Educación, Ciencia y Tecnología, pp. 103–107, ISBN: 1-84-95251-77-9, Badajoz (Spain), 2002.

- S. Barrachina, and J. M. Vilar. "Incremental and iterative monolingual clustering algorithms". Proc. of the 8th Eurospeech, ISCA, pp. 241–244, ISBN: 1018-4074, Ginebra (Switzerland), 2003.

- S. Barrachina, and J. M. Vilar. "Automatic discovery of translation collocations from bilingual corpora". Proc. of the 16th European Conference on Artificial Intelligence, IOS Press, pp. 571–575, ISBN: 1-58603-452-9, Valencia, 2004.

- J. Civera, E. Cubel, A. L. Lagarda, D. Picó, J. González, E. Vidal, F. Casacuberta, J. M. Vilar, and S. Barrachina. "From machine translation to computer assisted translation using finite-state models". Proc. of the 42th Annual Meeting of the Association for Computational Linguistics, Association for Computational Linguistics, pp. 349–356, ISBN: 1-932432-34-5, Barcelona, 2004.

- J. Civera, J. M. Vilar, Antonio L. Lagarda, E. Cubel, S. Barrachina, F. Casacuberta, E. Vidal. "A Computer-Assisted Translation Tool based on Finite-State Technology". 11th Annual Conference of the European Association for Machine Translation, ISBN: 82-7368-294-3, Oslo (Noruega), 2006.

Publications in National Proceedings with ISBN

- A. Castaño, S. Barrachina, G. A. Casañ, F. Prat, and J. M. Vilar. "Redes Neuronales y Técnicas Inductivas de Categorización Aplicadas a la Traducción (NeuroTrad)". Proc. of the I Jornadas en Tecnología del Habla, Mergablum, ISBN:84-9518-58-0, Sevilla (Spain), 2002.

- J. C. Amengual, S. Barrachina, G. Fabregat, and A. Marzal. "Desarrollo de sistemas de reconocimiento de voz para juguetes". Proc. of the I Jornadas en Tecnología del Habla, Mergablum, ISBN: 84-9518-58-0, Sevilla (Spain), 2002.

- J. Civera, E. Cubel, Antonio L. Lagarda, F. Casacuberta, E. Vidal, J. M. Vilar, S. Barrachina. "Computer-Assisted Translation using Finite-State Transducers". XXI Congreso de la Sociedad Española para el Procesamiento del Lenguaje Natural, ISBN: 1135-5948, Granada, 2005.

2.2 Temporal Knowledge Bases

The main research of this group is concerned with the emerging technology for the construction of Temporal Knowledge Bases. Specifically, we are working on the following topics:

- Formal data models
- Object-oriented data bases
- Temporal resolution strategies
- Temporal query languages

All these topics are addressed from the point of view of a set of real-world applications. These are, among others:

- Document management, storage and retrieval
- Digital libraries of newspapers and journals
- XML Databases and Applications
- Semantic Web

2.2.1 Researchers

María José Aramburu
Ismael Sanz

Contact Person

María José Aramburu (`aramburu@icc.uji.es`)

Collaborators from Other Departments

Rafael Berlanga
Dolores Llidó
Juan Manuel Pérez

2.2.2 Research Lines

Document Management: In this line, the group has mainly worked on the modeling, organisation and storage of structured documents. As a result, we have proposed several data models for the storage and retrieval of documents, as well as some indexing mechanisms. All this work has taken into account the temporal properties of documents such as their publication dates, and event-time periods. In this sense, our main proposal is TOODOR (Temporal Object-Oriented Document Organization and Retrieval), a new data model for the storage and retrieval of documents with conditions on their temporal properties.

Temporal Information Analysis: Current research lines include the exploitation of temporal information in digital libraries. We are studying new learning techniques as text mining to analyse the information in order to find tendencies, temporal sequences, frequent patterns, etc. Our main purpose is to obtain some modules to analyse the evolution of the information into a large repository of documents. Topics detection and their notification are two further tasks for these modules.

XML and The Semantic Web: XML (eXtensible Markup Language) is a standard language for the representation, interchange and storage of documents in the Web. The success of this language is a consequence of its simplicity and its benefits for the automatic manipulation of information. At the moment, the group is working on the following topics: query processing in XML repositories, native storage in XML, information retrieval in XML, object-oriented databases and XML; integration of sources of XML information, and the Semantic Web. This last item is related to the enrichment of the Web with knowledge about the information that it contains. At this respect, ontologies and new XML based languages are some of the techniques that we are considering.

2.2.3 Research Projects

The members of this group both have collaborated and are collaborating with the following projects:

- "Análisis Multidimensional de Documentos Semi-estructurados de la Web Semántica". CICYT, TIN2005-09098-C05-04. 3 years. Main

Researcher: Rafael Berlanga.

- "Desarrollo de un Sistema de Almacenamiento y Consulta de Documentos XML para la Aplicación de Técnicas OLAP". Fundació Bancaixa. 2 years. Main Researcher: María José Aramburu.

2.2.4   Ph. D. Dissertations

- I. Sanz. "Flexible techniques for heterogeneous XML data retrieval". Departament Llenguatges i Sistemes Informàtics, Director: R. Berlanga y M. Mesiti, Universitat Jaume I, 2007.

2.2.5   Publications

International Journal Papers

- I. Sanz, J. M. Pérez, R. Berlanga, and M. J. Aramburu. "XML Schemata Inference and Evolution". Lecture Notes in Computer Science, vol. 2736, Springer-Verlag, pp. 109–118, 2003.

- D. Llidó, J. M. Pérez, R. Berlanga, and M. J. Aramburu. "Recuperación de crónicas y patrones temporales en grandes colecciones de documentos". Revista Iberoamericana de Inteligencia Artificial, Asociación Española para la Inteligencia Artificial, pp. 165–176, 2003.

- R. Danger, I. Sanz, R. Berlanga, and J. Ruíz-Shulcloper. "A proposal for the automatic generation of instances from unstructured text". Lecture Notes in Computer Science, vol. 3287, Springer-Verlag, pp. 462–469, 2004.

- J. M. Pérez, R. Berlanga, and M. J. Aramburu. "A Document Model based on Relevance Modelling Techniques for Semi-Structured Information Warehouses". Lecture Notes in Computer Science, vol. 3180, Springer-Verlag, pp. 318–327, 2004.

- I. Navas, I. Sanz, J.F. Aldana, R. Berlanga. "Automatic Generation of Semantic Fields for Resource Discovery". LECTURE NOTES IN COMPUTER SCIENCE, vol. 3588 , pp. 705–715, 2005.

- I. Sanz, M. Mesiti, R. Berlanga, G. Guerrini. "Approximate Subtree Identification in Heterogeneous XML Document Collections". LECTURE NOTES IN COMPUTER SCIENCE, vol. 3671 , pp. 192–206, 2005.

- I. Sanz, M. Mesiti, G. Guerrini, R. Berlanga. "ArHeX: An Approximate Retrieval System for Highly Heterogeneous XML Document Collections". LECTURE NOTES IN COMPUTER SCIENCE, vol. 3896 , pp. 1186–1189, 2006.

- I. Sanz, M. Mesiti, G. Guerrini, R. Berlanga. "Highly Heterogeneous XML Collections: How to Retrieve Precise Results?". LECT NOTES COMPUT SC, vol. 4027 , pp. 232–244, 2006.

- E. Jimenez, R. Berlanga, I. Sanz, R. McClatchey, R. Danger, D. Manset, J. Paraire, A. Rios. "The Managament and Integration of Biomedical Knowledge: Application in the Health-e-Child Project (Position Paper)". LECTURE NOTES IN COMPUTER SCIENCE, vol. 4278 , pp. 1062–1067, 2006.

- E. Jiménez, R. Berlanga, V. Nebot, I. Sanz. "OntoPath: A Language for Retrieving Ontology Fragments". LECT NOTES COMPUT SC, vol. 4803 , pp. 897–914, 2007.

Chapters in International Books with ISBN

- J. M. Pérez, M. J. Aramburu, and R. Berlanga. "Interfaces to retrieve news considering topics and time". Digital Resources for the Humanities 2001-2002, Office for Humanities Communication, pp. 215–230, ISBN: 1-897791-17-8, London, 2003.

- G. Guerrini, M. Mesiti, I. Sanz. "An Overview of Similarity Measures for Clustering XML Documents". In Athena Vakali and George Pallis (eds.): Web Data Management Practices: Emerging Techniques and Technologies. Idea Group. ISBN 1-59904-228-2. Atenas, 2006.

Publications in International Proceedings with ISBN

- J. M. Pérez, R. Berlanga, and M. J. Aramburu. "Semi-structured Information Warehouses: An approach to a document model to support their construction". Proc. of ICEIS 2004, pp. 579–582, ISBN: 972-8865-00-7, Oporto (Portugal), 2004.

- J. M. Pérez, R. Berlanga, M. J. Aramburu, and T. B. Pedersen. "A Relevance-Extended Multi-dimensional Model for a Data Warehouse Contextualized with Documents". Proc. ACM Eighth International Workshop on Data Warehousing and OLAP, pp 19–28, ISBN 1-59593-162-7, Bremen (Germany), 2005.

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- E. Jimenez, R. Berlanga, I. Sanz, R. Danger. "A Methodology for Vertical Integration over Biomedical Knowledge". Ingenieria del software y Bases de Datos, ISBN: 84-95999-99-4, Sitges (Spain), 2006.

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- J. M. Pérez, R. Berlanga, and M. J. Aramburu. "Técnicas de Análisis en Almacenes de Información Semi-estructurada: Limitaciones y Requerimientos". Proc. of VIII Jornadas de Ingeniería del Software y Bases de Datos (JISBD 2003), Universitat d'Alacant, pp. 727–736, ISBN: 84-688-3836-5, Alicante (Spain), 2003.

- J. Paraire, I. Sanz, and R. Berlanga. "Propuesta de un controlador JDBC para la consulta de Web Services". Proc. of VIII Jornadas de Ingeniería del Software y Bases de Datos (JISBD 2003), Universitat d'Alacant, pp. 763–766, ISBN: 84-688-3836-5, Alicante (Spain), 2003.

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- I. Sanz, and R. Berlanga. "Self-organizing P2P data-sharing networks using representative-based clustering". Proc. of Jornadas de Ingeniería del Software y Bases de Datos, Universidad de Málaga, pp. 491–498, ISBN: 84-688-8983-0, Málaga (Spain), 2004.

- R. Berlanga, M. J. Aramburu, D. M. Llidó, I. Sanz, J. M. Pérez, R. Danger, J. Paraire, and E. Jiménez. "CRISOL, Generación automática de instancias ontológicas desde fuentes de datos semi-estructuradas". Jornadas de Seguimiento de Proyectos del Plan Nacional de I+D, JITEL 2005, pp. 225–226. ISBN 84-8408-346-2, Vigo (Spain), 2005.

Other International Publications

- E. Jiménez, V. Nebot, R. Berlanga, I. Sanz, A. Rios. "A Protégé Plug-in-Based System To Manage and Query Large Domain Ontologies". 10 th International Protégé Conference, Budapest, Hungary, 2007.

2.2.6   Research Activities

Participations in Congress Committees

- I Sanz. Conferencia IADIS Ibero-Americana, Lisboa (Portugal), 2005.

- I Sanz. IADIS International Conference, Lisboa (Portugal), 2005.

- M.J. Aramburu. X Jornadas en Bases de Datos e Ingeniería del Software, Granada (Spain), 2005.

- M.J. Aramburu. IX Jornadas en Bases de Datos e Ingeniería del Software, Málaga (Spain), 2004.

- M.J. Aramburu. VIII Jornadas en Bases de Datos e Ingeniería del Software, Alicante (Spain), 2003.

- M.J. Aramburu. 6TH International Conference on Business Information Systems, Colorado (USA), 2003.

- M.J. Aramburu. VII Jornadas en Bases de Datos e Ingeniería del Software, El Escorial (Spain), 2002.

2.3 High-Performance Computing and Architectures

The High Performance Computing & Architectures (HPCA) group was created in 2007 at the University Jaume I (Spain) from the merge of the Parallel Scientific Computing group and the Advanced Computer Architecture and Reconfigurable Computing group of this university.

The HPCA group is involved in the application of high-performance parallel computing techniques to the solution of problems arising in control theory, computational chemistry, electromagnetics, aeronautic engineering, and scientific and engineering applications in general.

The group pursues the optimization of numerical algorithms for general purpose processors (superscalar and VLIW) as well as specific hardware (GPUs and FPGAs), and the parallelization on both message-passing parallel systems (mainly clusters) and shared-memory multiprocessors (SMP, UMA multiprocessors, and CMPs).

Current interests of the group also include hardware-software codesign, reconfigurable architectures, and high-speed networks and QoS.

You can visit our web page at `http://www.hpca.uji.es`.

2.3.1 Researchers

José Ignacio Aliaga
José Manuel Badía
Sergio Barrachina
Maribel Castillo
Juan Carlos Fernández
Germán León
Mercedes Marqués
José Vicente Martí
Alberto F. Martín
Gloria Martínez
Rafael Mayo
Enrique S. Quintana (**group leader**)
Gregorio Quintana
Alfredo Remón

Francisco D. Igual Peña

Collaborators from Other Departments

Manuel Mollar

2.3.2   Research Lines

In particular, the group is currently working on:

- Heterogeneous architectures and multicore processors
- Hardware-software codesign
- Reconfigurable computing and architectures
- Hardware compiling
- High-speed networks and quality of service
- Solution of scientific applications
- Matrix computing on high-performance architectures
- Parallel solution of control problems
- Optimization of scientific and engineering applications

2.3.3   Research Projects

The members of our group collaborate(d) with the following research projects:

- "Mejora de las prestaciones y servicios ofrecidos por las redes de computadores personales. Desarrollo de aplicaciones multimedia distribuidas". Ministerio de Ciencia y Tecnología, TIC2000-1151-C07-06. Main Researcher: J. M. Claver Iborra. From 1/I/2001 till 31/XII/2003.
- "Desarrollo e implementación de algoritmos de procesado de señal y computación de altas prestaciones para sistemas de emulación de entornos acústicos virtuales". CICYT, TIC-2000-1683-C03-03, 3 years, Main Researcher: A. González, 2001.

- "Desarrollo de algoritmos paralelos para la reduccion de modelos de sistemas dinámicos lineales de gran dimensión sobre un cluster de computadores personales". Fundació Caixa Castelló-Bancaixa y UJI, PI-1B2001-14. Main Researcher: E. S. Quintana. From 1/XI/2001 till 31/X/2003.

- "Mejora de las prestaciones y servicios ofrecidos por las redes de computadores personales. Desarrollo de aplicaciones multimedia distribuidas". Ministerio de Ciencia y Tecnología, TIC2003-08154-C06-06, 3 years, Main Researcher: J. M. Claver, 2004.

- "Collaborative Research: A systematic approach to the derivation, representation, analysis, and correctness of dense and banded linear algebra algorithms for HPC architectures". National Science Foundation (EE.UU.) ACI-0305508. Main Researchers: Robert A. van de Geijn, A. Skjellum. From 1/VII/2003 till 30/VI/2006.

- "Automatic tools for deriving, analyzing, and implementing Linear Algebra libraries". National Science Foundation (EE.UU.) CCF-0342369. Main Researcher: Robert A. van de Geijn. From 1/III/2004 till 28/II/2007.

- "Desarrollo de una herramienta integrada de computación web para la reducción de modelos dispersos sobre sistemas de computadores híbridos". Fundació Caixa Castelló-Bancaixa y UJI, PI-1B2004-06. Main Researcher: E. S. Quintana. From 1/XII/2004 till 30/XI/2006.

- "COMPARHE: Computación en paralelo y sistemas heterogéneos" Ministerio de Educación y Ciencia, CICYT TIN2005-09037-C02-02. Main researcher: Enrique S. Quintana. From 31/XII/2005 till 30/XII/2008.

- "Parallel algorithms for large-scale sparse algebraic Riccati equations and applications in control", Acciones integradas Hispano-Alemanas HA2005-0081 Main researcher: E. S. Quintana, P. Benner. From 1/I/2006 till 31/XII/2007.

- "Foundations of programming Linear Algebra algorithms on SMP and multicore systems" National Science Foundation (EE.UU.) CCF-0540926 Main researchers: R. van de Geijn, K. Goto. From 1/II/2006 till 31/I/2009.

- "Foundations and applications of hierarchically stored matrices". National Science Foundation (EE.UU.) CCF-0702714. Main researchers: R. van de Geijn, K. Goto. From 1/II/2006 till 31/I/2009.

- "Diseño y desarrollo de una biblioteca de cálculo sobre GPUs". Fundació Caixa-Castelló/Bancaixa y UJI, P1-1B2007-32. Main researcher: R. Mayo. From 15/XII/2007 till 14/XII/2009.

- "Diseño y desarrollo de una nueva generación de bibliotecas paralelas de computación matricial para procesadores multinúcleo y de herramientas para su construcción y análisis semiautomáticos". Fundació Caixa-Castelló/Bancaixa y UJI, P1-1B2007-32. Main researcher: G. Quintana. From 15/XII/2007 till 14/XII/2009.

The group has also collaborated with other projects such as LAPACK project. Concretely, this research group has developed an application (containing several thousand lines) included in LAPACK release 3.0 to compute the QR factorization with column pivoting. Another application (containing thousands lines) included in LAPACK release 3.0 computes the linear least squares problem faster than previous LAPACK methods.

The research of this group has produced an application that is currently being used by Boeing Inc. in the design and manufacturing of the aircrafts.

Other applications are currently used by the research group "Magnetic Resonance Image" of the Hospital of the University of Chicago (USA) to process images of the human body.

2.3.4   Ph. D. Dissertations

- P. Alonso. "Algoritmos paralelos para la resolución de sistemas de ecuaciones y del problema lineal de mínimos cuadrados con matrices Toeplitz". Depto. de Sistemas Informáticos y Computación, Supervised by: J. M. Badía and A. M. Vidal, Universidad Politécnica de Valencia, 2003.

- R. Gil-Garcia. "'Algoritmos de agrupamiento de grafos y su paralelización". Depto. de Ingenieria y Ciencia de los Computadores, Supervised by: A. Pons and J. M. Badía Universitat Jaume I, 2005.

2.3.5   Publications

International Journal Papers

- J. Climente, J. H. Planelles, W. Jaskólski, and J. I. Aliaga. "Magneto-optical   transitions   in   multilayer   semiconductor nonocrystals".   Journal of Physics: Condensed Matter, vol. 15, no. 21, Institute of Physics Publishing, pp. 3593–3606, 2003.

- R. Gil, J. M. Badía, and A. Pons. "A parallel algorithm for incremental compact clustering". Lecture Notes in Computer Science, vol. 2790, Springer-Verlag, pp. 311–317, 2003.

- R. Gil, J. M. Badía, and A. Pons. "Extended Star Clustering Algorithm". Lecture Notes in Computer Science, vol. 2905, Springer-Verlag, pp. 480–487, 2003.

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- E. S. Quintana, and R. van de Geijn. "Formal derivation of algorithms: the triangular Sylvester equation". ACM Trans. on Mathematical Software, vol. 29, no. 2, ACM, pp. 218–243, 2003.

- P. Benner, E. S. Quintana, and G. Quintana. "Parallel algorithms for model reduction of discrete-time systems". Int. J. of Systems Science, vol. 34, no. 5/15, pp. 319–333, 2003.

- P. Benner, E. S. Quintana, and G. Quintana. "State-space truncation methods for parallel model reduction of large-scale systems". Parallel Computing, vol. 29, pp. 11701–1722, 2003.

- P. Benner, R. Mayo, E. S. Quintana, and G. Quintana. "Remote parallel model reduction of linear time-invariant systems made easy". Lecture Notes in Computer Sciences, vol. 2565, Springer-Verlag, pp. 255–268, 2003.

- R. Gil, J. M. Badía, and A. Pons. "Parallel Algorithm for Extended Star Clustering". Lecture Notes in Computer Science, vol. 3287, Springer-Verlag, pp. 402–409, 2004.

- X. Sun, and E. S. Quintana. "Spectral division methods for block generalized Schur decompositions". Mathematics of Computation, vol. 73, no. 248, pp. 1827–1847, 2004.

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- J. C. Fernández, L. Peñalver, V. Hernández, and J. Tornero. "High Performance Algorithm to Obtain Johansson Adaptive Control in Robot Manipulators". Communications in Nonlinear Science and Numerical Simulation, vol. 9, no. 2, Elsevier, pp. 167–176, 2004.

- J. M. Claver, M. d. Carmen, M. Canseco, M. Blanca, and F. José. "A New Hardware Efficient Link Scheduling Algorithm to Guarantee QoS on Clusters". Parallel Process. Lett., vol. 3648, pp. 1046–4056, 2005.

- P. Alonso, J. M. Badia, and A. M. Vidal. "Solving the block-Toeplitz least-squares problem in parallel". Concurrency and Computation: Practice and Experience, vol. 1(17) , pp. 49–67, 2005.

- P. Alonso, J. M. Badia, and A. M. Vidal. "An Efficient Parallel Algorithm to Solve Block-Toeplitz Systems". J SUPERCOMPUT, vol. 3(32) , pp. 251–278, 2005.

- P. Alonso, J. M. Badia, and A. M. Vidal. "An Efficient and Stable Parallel Solution for Non-symmetric Toeplitz Linear Systems". LECTURE NOTES IN COMPUTER SCIENCE, vol. 3402 , pp. 685–698, 2005.

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- R. Gil-Garcia, J. M. Badia, and A. Pons. "Dynamic Hierarchical Compact Clustering Algorithm". LECTURE NOTES IN COMPUTER SCIENCE, vol. 3773 , pp. 302–310, 2005.

- P. Bientinesi, J. A. Gunnels, M. Myers, E. S. Quintana, R. van de Geijn, "The science of deriving dense Linear Algebra algorithms", ACM Trans. on Mathematical Software, Vol. 31(1), pp. 1–26, 2005. ISSN: 0098-3500.

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- T. Joffrain, E. S. Quintana, Robert A. van de-Geijn. "Rapid Development of High-Performance Out-of-Core Solvers". LECTURE NOTES IN COMPUTER SCIENCE, vol. 3732 , pp. 413–422, 2006.

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- R. Gil-Garcia, J. M. Badia, A. Pons-Porrata. "Parallel Nearest Neighbour Algorithms for Text Categorization". LECT NOTES COMPUT SC, vol. 4641 , pp. 328–337, 2007.

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- B. Marker, Fiels G. Van Zee, K. Goto, G. Quintana, Robert A. van de-Geijn. "Toward Scalable Matrix Multiply on Multithreaded Architectures". LECT NOTES COMPUT SC, vol. 4641 , pp. 748–757, 2007.

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- P. Benner, M. Castillo, R. Mayo, E. S. Quintana, G. Quintana. "Stabilizing large-scale generalized systems on parallel computers using multithreading and message-passing". Concurrency and Computation: Practice and Experience, Vol. 19, pp. 531–542, 2007.

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- G. Quintana. "Aprende Microsoft Access". Publicacions de la U. Jaume I, 2003, ISBN: 84-8021-446-5, Castellón, 2003.

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- P. Benner, R. Mayo, E. S. Quintana, and G. Quintana. "A model reduction web environment for very large linear dynamical systems".

Advances in Computation: Theory and Practice, pp. 22–33, ISBN: 1-59033-965-8, 2004.

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- G. León, J. M. Claver, and G. Fabregat. "Optimizing Area on the Automatic Generation of Circuits in FPGAs for SIMD Applications". Proc. of XV Jornadas de Paralelismo, Universidad de Almería, Servicio de Publicaciones, pp. 438–443, ISBN: 84-8240-714-7, Almería (Spain), 2004.

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- R. Wirz, R. Marín, and E. S. Quintana, "Distributed system for remote programming of multiple network robots: system performance and parallelization issues", XVI Jornadas de Paralelismo, pp. 477–484, Granada (Spain), 2005. ISBN: 84-9732-430-7.

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- J. M. Claver, M. Canseco, P. Agusti, G. Leon. "Arquitectura e Implementacion de un Generador/Monitor de Trafico sobre una FPGA". XVII Jornadas de Paralelismo, ISBN: 84-690-0551-0, Albacete, 2006.

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- José M. Claver, G. León. "Utilización de inferencia de tipos en la generación de circuitos especificos para FPGAs". II Congreso español de Informática, ISBN: 978-84-9732-593-6, Zaragoza, 2007.

- J. Claver, P. Agusti, M. Canseco, G. León. "A Reprogrammable CBR and VBR Traffic Generator/Monitor on FPGA". II Congreso español de Informática, ISBN: 978-84-9732-593-6, Zaragoza, 2007.

- J. A. Traver, M. Angel, I. Bernabé, M. Marti, R. J. Garcia, C. Ballester, A. Fernández, L. Hernandez, A. M. Lluch, M. M. Marqués, M. T. Martinez, M. Monzó, M. J. Senent, M. Á. Tena, V. J. Traver.   "Millora Educativa Mitjançant Aprenentatge Cooperatiu". VII Jornada de millora educativa i VI Jornada d'harmonització europea de la Universitat Jaume I, ISBN: 978-84-8021-625-8, Universitat Jaume I, 2007.

Other International Publications

- J. M. Claver, M. I. Castillo, and R. Mayo. "Improving Instruction Set Architecture Learning Results". Proc. of Workshop on Computer Architecture Education, pp. 60–66, Munich (Germany), 2004.

Other National Publications

- P. Alonso, J. M. Badía, A. González, and A. M. Vidal. "A parallel solution of Toeplitz systems in an inverse filtering problem". International workshop on Numerical Linear Algebra, Madrid, 2003.

- R. J. Quirós, F. Pla, J. M. Badia, M. Chover. "Métodos Informáticos Avanzados". Castelló, 2007.

Technical Reports in other Research Centers

- P. Alonso, J. M. Badía, and A. M. Vidal. "Algoritmos paralelos para la resolución de sistemas lineales de ecuaciones Toeplitz". II-DSIC-04/2003. Dpto. de Sistemas Informáticos y Computación, Universidad Politécnica de Valencia, 2003.

2.3.6 Research Activities

Supervised Research Works

- R. Gil. "Algoritmos de agrupamiento paralelos". Ingeniería y Ciencia de los Computadores, Supervisors: J. M. Badía and A. M. Vidal, Universidad Jaume I, 2003.

Conference/Workshop Organizations

- J. M. Badía. Cinqué Congrés Català d'Intel.ligència Artificial, 2002.

- Gloria Martínez. Cinqué congrés català d'Inteligència Artificial, 2002.

Participations in Congress Committees

- E. S. Quintana. 4th Workshop on High Performance Scientific and Engineering Computing with Applications, Vancouver (Canada), 2002.

- E. S. Quintana. 3rd Workshop on Parallel and Distributed Scientific and Engineering Computing with Applications, Fort Lauderdale (USA), 2002.

Journal Referee Activities

- J. M. Claver. Parallel Computing, 2004.

2.4 Computer Vision

The work of the Computer Vision Group is addressed towards two main lines of research. These lines are based on diferents research projects funded by public and private entities, and they define the general work lines for the next few years. These general work lines are:

1. Visual inspection in quality control.
2. Robotic vision.

In this framework the different work lines that the Computer Vision Group is following and which have the following principal objetives:

- Formation in research of the non Ph. D. members of the group.
- Realization of a scientific and technological activity in the vanguard of the fields of Computer Vision and Pattern Recognition.
- Collaboration with other national and international groups.
- Cooperation with the industrial sector of the group environment.

2.4.1 Researchers

Angeles López
J. Miguel Sanchiz
Raúl Montoliu

Collaborators from Other Departments

Filiberto Pla
Jorge Badenas
J. Salvador Sánchez
Jorge Monfort
Pedro García
Isabel Gracia
V. Javier Traver
Javier Llach

2.4.2   Research Lines

Pattern recognition: In particular, the lines of study are the research on learning algorithms, more efficient for the classifiers based on feature selection, the method of the nearest neighbour and decision binary trees.

Colour image analysis: On one hand, looking for more discriminate colour features; on the other hand, colour segmentation and recognition methods.

Texture analysis: Developing aspects about characterization, classification and segmentation of textured images.

Motion analysis: Studing estimation and segmentation motion using optical flow feature, correspondence methods, and structure from motion.

Stereoscopic Vision: Studing hierarquical matching of features and new methods for calculating tridimensional models of static scenes.

2.4.3   Research Projects

The grants and projects obtained for the group in these years are:

- "Técnicas de análisis de imagen aplicadas al control de calidad en radioterapia". MCYT, TIC2003-06953. De 01-12-2003 a 30-11-2006. Inv principal: J. M. Sanchiz

- "Sistema sensor y de control de un vehículo industrial autónomo". Tecnopamic S.A. 03I039.01/1. Inv principal: J.M. Sanchiz. 2003

- "Monitorización remota de un vehículo autónomo guiado por láser y extensiones al sistema de control". Tecnopamic S.A. 03I039.01/2. Inv principal: J.M. Sanchiz. 2004

- "Sistema de múltiples vehículos autónomos, mejoras y extensiones al sistema AGV de Tecnopamic". Tecnopamic S.A. 05I017.01/1. Inv principal: J.M. Sanchiz. 2005

2.4.4 Ph. D. Dissertations

2.4.5 Publications

International Journal Papers

- N. A. Álvarez, J. Ruíz, and J. M. Sanchiz. "Typical segment descriptors: a new method for shape description and identification". Lecture Notes in Computer Science 2905, Springer-Verlag, pp. 512–520, La Habana (Cuba), 2003.

- R. Montoliu, and F. Pla. "Robust Techniques in Least Squares-Based Motion Estimation Problems". Lecture Notes in Computer Computer Science 2905, Progress in Pattern Recognition, Speech and Image Analysis, A. Sanfeliu and J. Ruiz-Schulcloper (Eds), Springer-Verlag, pp 62-70, ISBN 3-540-20590-X. 2003.

- R. Montoliu, and F. Pla. "Multiple segmentation of moving objects by quasi-simultaneous parametric motion estimation". Lecture Notes in Computer Computer Science 2652, Pattern Recognition and Image Analysis, F.J. Perales et al (Eds), Springer-Verlag, pp 572-579, ISBN 3-540-40217-9. 2003.

- N. A. Álvarez, and J. M. Sanchiz, "Image registration from mutual information of edge correspondences". Lecture Notes in computer Science 3773, Springer-Verlag, ISSN 0302-9743, pp 528–539. 2005

- N. A. Álvarez, J. M. Sanchiz, J. Badenas, F. Pla, and G. Casañ, "Contour-based image registration using mutual information". Lecture Notes in computer Science 3522, Springer-Verlag, ISSN 0302-9743, pp 227–234. 2005

- R. Montoliu, and F. Pla "An Iterative Region Growing Algorithm for Motion Segmentation and Estimation". International Journal of Intelligent Systems. Vol 20, Issue 5, pp 577-590. 2005.

- R. Montoliu, F. Pla, and A. C. Klaren. "Illumination Intensity, Object Geometry and Highlights Invariance in Multispectral Imaging" Lecture Notes in Computer Science 3522, pp 36-43, J.S. Marques et. al. (Eds), ISBN 3-540-26153-2. 2005.

- Y. Santiesteban, J. M. Sanchiz, J. Martinez. "A Method for Detection and Modeling of the Human Spine Based on Principal Curvatures". LECTURE NOTES IN COMPUTER SCIENCE, vol. 4225 , pp. 168–177, 2007.

National Books with ISBN

- O. Belmonte, J. Huerta, R. Quirós, C. Rebollo, I. Remolar, J. Ribelles, A. López, F. J. Abad, E. Camahort, P. Jorquera, J. Lluch, R. Mollá, and R. Vivó. "OpenGL en Fichas: Una Introducción Práctica". Publicacions de la Universitat Jaume I, ISBN: 84-8021-428-7, Castelló, 2003.

Chapters in International Books with ISBN

- R. Montoliu, and F. Pla. "Quasi-Simultaneous Motion Segmentation and Estimation Using an Iterative Region Growing Algorithm" Frontiers in Artificial Intelligence and Applications vol. 100, Artificial Intelligence Research and Development. Isabel Aguiló et al (Eds) IOS Press, pp 189-198. ISBN 1-58603-378-6. 2003.

Publications in International Proceedings with ISBN

- R. Montoliu, and F. Pla. "Comparing Brightness Constancy Assumption and Optic Flow Equation in Motion Estimation Algorithms". 3rd International Conference on Visualization, Imaging, and Image Processing. (VIIP'2003), pp 90-95, ISBN 0-88986-382-2. 8-10th September 2003. Benalmádena (SPAIN).

- J. M. Sanchiz, J. Badenas, and F. Pla. "Control system and laser-based sensor design of an autonomous vehicle for industrial environments". Unmanned ground vehicle technology VI, SPIE, the international society for optical engineering, pp. 608–615, ISBN: 0-8194-5345-5, Orlando (USA), 2004.

- R. Montoliu, F. Pla. "Accurate Image Registration by Combining feature-based Matching and GLS-based Motion Estimation". Second International Conference on Computer Vision Theory and Applications, ISBN: 978-972-8865-73-3, Barcelona, 2007.

Other National Publications

- J. Badenas, J. M. Sanchiz. "Sistema industrial de múltiples vehiculos autónomos guiados por láser". Castelló, 2007.

2.4.6 Research Activities

Participations in Congress Committees

- A. López. IASTED conference on Computers, Graphics and Imaging (CGIM 2003), Honolulu (USA) 2003.

- A. López. IASTED International Conference on Visualization, Imaging and Image Processing (VIIP 2003), Benalmádena (Spain), 2003.

- A. López. 2a Conferencia Iberoamericana en Sistemas, Cibernética e Informática (CISCI 2003), Orlando (USA), 2003.

- A. López. 7th World Multiconference on Systemics, Cybernetics and Informatics, Orlando (USA), 2003.

- A. López. 14th IASTED International Conference Modelling and Simulation (MS 2003), Palm Springs (USA), 2003.

- A. López. 6é Congrés Català d'Intel.ligència Artificial, Mallorca (Spain), 2003.

- A. López. 1st Iberian Conference on Pattern Recognition and Image Analysis (IbPRIA 2003), Mallorca (Spain), 2003.

- A. López. 7é Congrés Català d'Intel.ligència Artificial, Barcelona (Spain), 2004.

- A. López. 8é Congrés Català d'Intel.ligència Artificial, L'Alguer (Italy), 2005.

- 1st International Conference on Computer Vision Theory and Applications (VISAPP 2006), Setubal (Portugal), February, 2006.

2.5   Robotic Intelligence Group

This section describes current research activities of the Robotic Intelligence Laboratory at Jaume-I University. This group was established in 1991 at the very start of Jaume-I University. It groups together researchers that belong to the Department of Engineering and Computer Science and share a common interest: reasoning about space, manipulation, perception and motion in the framework of robotic systems and keeping an applied viewpoint always in mind.

2.5.1   Researchers

Angel Pasqual del Pobil
Enric Cervera
Eris Chinellato
Javier Felip
Juan Carlos Garcia Sanchez
Beata Joanna Grzyb
Pedro Sanz
Gabriel Recatalá
Antonio Morales
Raúl Marín
Leo Nomdedeu
Mario Prats
Patricio Nebot
Ester Martínez
Raul Wirz

2.5.2   Research Lines

A Complete Autonomous Manipulation System based on Data Fusion and Learning Techniques for Service Robots If the development of intelligence in human beings has been directly related to their capability of manipulating objects, among others, why not in robots?. Bearing this in mind, we think that it is time to integrate the results recently obtained in intelligent manipulation, that includes any kind of sensory input, control and learning techniques, design on multi-fingered hands, and so on, and go beyond including all these isolated contributions in a unique system. In particular,

this project is a follow-up of a previous one titled ÒDesign and implementation of a robotic system for object manipulation in 3D dynamic scenariosÓ. Now, we hope to offer some new contributions in the following aspects: the new architecture that will be experimented; the data fusion techniques that will be included in order to guide the grasping operation by means of force, tactile and vision information; the human-robot interface that will enable to use voice commands, and also a very simple dialogue, by means of voice synthesis; a collision avoidance module that will grant the safety of people around the robot; and finally, new grip 3D determination, evaluation including active learning, and execution techniques, by using a multi-fingered hand that will be validated in 3D real life scenarios. Summarizing, the project presented is considered, by the scientific community, one of the big robotic challenges, and we believe that extending previous research we could significantly advance towards its successful solution. P. Sanz, A. P. del Pobil, G. Recatalá, and A. Morales.

A mobile robot manipulator for service applications The aim of this project is the development of a prototype mobile manipulator for service applications. It will consist of a robot arm placed on a mobile platform and endowed with force, tactile and sonar sensors, as well as computer vision. It will be capable of working in ordinary environments such as factories, office-blocks, hotels, etc. It will accept human speech commands and will perform tasks such as translating in a partially known environment in search of objects -having a known or unknown shape-, provided only with their approximate location, grasp them and carry them to another place. The propotype will also be capable of incrementally learning to recognize objects, as well of performing simple insertion tasks under uncertainty.

A system for real-time collision avoidance between a robot arm and a moving person This project aims to develop and implement a system to detect collisions in real time between a robot arm and a person, both moving simultaneously in a shared environment. The system is based on tracking a person's movement by means of currently available technologies. The project has two stages: in the first one a real-time graphic simulation will be implemented; in the second one the system will be tested on one or two real robots and a moving person.

Robotics and Artificial Intelligence E-Laboratory for the teaching/learning at a distance using real Robotic Systems and

Collaborative Techniques As long as the Information and Communication Technologies evolve new methods and applications in education and trainning can be performed. One of the areas that need more improvement within the E-Learning environments via Internet (in fact they suppose a very big effort to be accomplished) is allowing students to access and practice real experiments against a real laboratory, instead of using simulations. Real Laboratories allow students to adquire methods, habilities and experience related to real equipment, in a manner that is very close to the way they are being used in the industry. The purpose of the project is the study, development and implementation of an E-Learning environment to allow undergraduate students to practice subjects related to Robotics and Artificial Inteligence. The system, that will be based on Internet technology, will allow the remote experimentation with real robotic devices (i.e. robots, cameras, etc.). It will enable the student to learn in a collaborative manner (remote participation with other students) where it will be possible to combine the in-situ activities (perfomed presentially within the real lab during the normal practical sessions), with the "on-line" one (performed remotely from home via the Internet). Moreover, the remote experiments within the E-Laboratory to control the real robots can be performed by both, students and even scientist. In fact, some experiments of this kind could allow for example a researcher to discover new techniques of Remote Visual Servoing to manipulate objects remotely via web.

2.5.3   Research Projects

- "Diseño e Implementación de un Sistema Robotizado para la Manipulación de Objetos en Escenarios 3D Dinámicos". GENERALITAT VALENCIANA, GV01-244, 2 years, Main Researcher: P. J. Sanz, 2003.

- "Arquitectura Cooperativa para Robots Móviles Inteligentes (ACROMOVI)". Generalitat Valenciana, CTIDIA/2002/195, 2 years, Main Researcher: E. Cervera, 2003.

- "Tele-Laboratorio de Robótica e Inteligencia Arificial de la UJI: Aprendizaje y Control Colaborativo de Manipulaciones Robóticas por Internet". Universidad Jaume I. Fundación Bancaja, 3 years, Main Researcher: R. Marín, 2003.

- "Sistema Completo de Manipulación Autónoma basado en Fusión de Información Sensorial y Técnicas de Aprendizaje Orientado a la

Robótica de Servicios". MEC (Programa Nacional Diseño y Prod. Industrial), DPI2004-01920, 3 años, Main Researcher: P. J. Sanz, 2004.

- "E-RIADS: E-Laboratorio de Robótica e Inteligencia Artificial para el Aprendizaje colaborativo a distancia usando sistemas robóticos reales". Universidad Jaume I y Universidad Politécnica de Valencia (coordinador UJI), MEC-TSI2004-05165-C02-01, 3 años, Main Researcher: R. Marín, 2004.

- "TERRI: Tele-Laboratorio de Experimentación Remota para Sistemas Robóticos Industriales". Generalitat Valenciana, GV04A-698, 2 years, Main Researcher: R. Marín, 2004.

- "Tareas de servicios para un robot manipulador móvil", MCYT, DPI2001-3801, Diciembre 2001-Noviembre 2004, Angel Pascual del Pobil

- "EURON European Robotics Network of Excellence", Comisión Europea (Contract No. 507728), mayo 2004-mayo 2008, Angel Pascual del Pobil

- "RED VALENCIANA DE INVESTIGACION EN ROBOTICA (REVIRO)". GENERALITAT VALENCIANA (IIARC0/2004/228), 1/01/2004 – 1/01/2006. Main researcher: Pedro J. Sanz.

- "Teleoperación y control visual de alta confiabilidad para tareas robóticas cooperativas en aplicaciones médicas y quirurgicas". Universitat Jaume I and Universitat Miguel Hernandez (coordinated by UJI), DPI2005-08203-C02, 3 years, Main researcher: E. Cervera, 2005.

- "SARA: Sistema de manipulación con percepción avanzada". Generalitat Valenciana, GV05/137, 2 years, Main researcher: Gabriel Recatalá, 2005.

- "Vigilancia de grandes instalaciones mediante equipos de robots móviles". Fundació Caixa-Castelló (P1-1B2005-28), Dic 2005-Nov 2008, A. Pascual del Pobil.

- "GUARDIANS: Group of unmanned assistant robots deployed in aggregative navigation supported by scent detection". European Union 6th Framework Programme Project No: 045269. Main researcher: E. Cervera. 1/12/2006 – 31/1/2010.

- "GRASP: Emergence of Cognitive Grasping through Emulation, Introspection, and Surprise" European Commision (FP7 ICT-215821), P.I. Antonio Morales, 1.3.08–28.2.2012.

- "EYESHOTS: Heterogeneous 3-D Perception Across Visual Fragments". European Commision (FP7 ICT-217077), P.I. A.P. del Pobil, 1.3.08–28.2.2011.

2.5.4   Ph. D. Dissertations

- G. Recatalá. "Visual determination, tracking and execution of 2D grasps using a behavior-inspired approach". Departamento de Ingeniería y Ciencias de los Computadores, Director: P. J. Sanz, A. P. del Pobil y E. Cervera. Universitat Jaume I, 2003.

- A. Morales. "Learning to predict grasp reliability with a multifinger robot hand by using visual features". Departamento de Ingenieria y Ciencia de los Computadores, Director: A. P. del Pobil y P. J. Sanz, Universitat Jaume I, 2004.

2.5.5   Publications

International Journal Papers

- R. Marín, P. J. Sanz, and A. P. del Pobil. "The UJI Online Robot: An Education and Training Experience". Autonomous Robots, Special Issue on Internet and OnLine Robots, vol. 15, no. 3, 2003 Kluwer Academic Publishers, pp. 283–297, 2003.

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- E. Cervera. "A Cross-Platform Network-Ready Visual Servo Simulator". International Conference on Intelligent Robots and Systems, ISBN: 1-4244-0259-X, Beijing (China), 2006.

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- Jose M. Claver, R. Wirz, J. Fernandez, R. Marin, M. Ferre, R. Aracil. "End-To-End Congestion control protocols for internet telerobotics". Proceedings of the 13th IASTED international Conference on Robotics and Applications, ISBN: 976-0-88986-686-7, Wurzburg (Germany), 2007.

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- P. Nebot and E. Cervera. "La Arquitectura Acromovi: una Arquitectura para Tareas Cooperativas de Robots Móviles", Campus Multidisciplinar en Percepción e Inteligencia (CMPI 2006), Albacete (España), pp. 365–376, ISBN: 84-689-9560-6, 2006.

Other International Publications

- P. J. Sanz, R. Marín and S. Dabic. "Using Symmetry Evaluation to Improve Robotic Manipulation Performance". 20th European Workshop on Computational Geometry (EWCG2004), Seville (Spain), 2004.

- A. Morales, P. J. Sanz, and A. P. del Pobil. "How can I, robot, pick up that object with my hands?". European Conference on Artificial Intelligence (ECAI 2004), International Cognitive Robotics Workshop, Valencia (Spain), 2004.

- P. J. Sanz, R. Marín and S. Dabic. "Improving 2D Visually-Guided Grasping Performance by Means of new Geometric Computation Techniques". Proc. of Intelligent Manipulation and Grasping Int. Conference (IMG04), Rezia Molfino (Eds.), pp. 559–564, ISBN: 88-900426-1-3, Genoa (Italia), 2004.

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ciety, pp. 100–110, Helsinki University of Technology Espoo (Finland), 2004.

- P. Nebot, and E. Cervera. "Distributed optical flow navigation using Acromovi architecture". Proc. of the 15th International Symposium on Measurement and Control in Robotics (ISMCR 2005). Brussels (Belgium), 2005.
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2.5.6   Research Activities

Supervised Research Works

- P. Nebot. "Embedding Agent-Based Architecture for the Development of Collaborative Tasks for a Heterogeneous Team of Robots". Ingeniería y Ciencia de los Computadores, Director: E. Cervera, Universitat Jaume I, 2004.
- P. Nebot. "Remote Programming over the UJI Online Robot System: Architecture Extension and Performance". Ingeniería y Ciencia de los Computadores, Director: R. Marín, Universitat Jaume I, 2004.

Invited Researchers in this Department

- Christophe ACHARD,"Comparative Study of Different Control Algorithms using Force Sensor Information and Vision", (Diplomarbeit). Advisors Prof. G Farber (TUM) and Prof. P. J. Sanz (UJI), 2005.
- Johannes SPETH,"Grasping Unknown 3D-Objects Using Simple Geometric Features", (Diplomarbeit). Advisors Prof. G. Farber (TUM) a Prof. P. J. Sanz (UJI), 2005.
- Claudio Melchiorri, "Robotica Avanzada: Percepcion y Manipulacion". PhD Course, 2005.

Invited Talks

- P. J. Sanz. "Robotic Intelligence". IAT Workshop, 2004.

- Raúl Marín. "Técnicas de Manipulación Remota de dispositivos: Sistemas de Comunicación". 2004.

- R. Marín. "The Robotics Intelligence Lab at Jaume I University: A Case Study on Internet Telerobotics". 2004.

- A. P. del Pobil. "Intelligent Systems and Neuroscience",Innsbruck, Austria, 2004

- A. P. del Pobil. "Robótica", Curso Nacional de Neurociencia, Carmona, España, 2004

- A. P. del Pobil. "Representación del Entorno y Planificación del Movimiento", Universidad de Santiago de Compostela, 2004

- A. P. del Pobil. "Biological Inspiration in Intelligent Information Systems", Marbella, España. 2004

- A. P. del Pobil. "The UJI Librarian Robot", Fourth EURON International Summer School on Mobile Manipulators, 2004

- A. P. del Pobil. "Robotics and Neuroscience: Brain-Computer Interfaces and Social Interaction",Sendai, Japón.2004

- A. P. del Pobil. "Nuevas tendencias en robótica. Técnicas bioinspiradas". Universidad del País Vasco, 2005

- A. P. del Pobil. "Perception-Based Learning in Robotics", Universidad de Orebro, Suecia. 2005

- A. P. del Pobil. "Global Safety in Human-Robot Co-Existence", Nagoya, Japón, 2005

- A. P. del Pobil. "Robotics and Neuroscience", Seattle, USA, 2005

- A. P. del Pobil. "Robotics and Neuroscience", Edmonton, Canada. 2005

- A. P. del Pobil. "Perception-Based Learning in Robotics", Université Libre de Bruxelles, 2005

Conference/Workshop Organizations

- A. P. del Pobil. EURON International Summer School on Robotics and Neuroscience 2005

- A. P. del Pobil. 9th International Conference on Artificial Intelligence and Soft Computing 2005

- A. P. del Pobil and E. Chinellato. Workshop on Robotics and Neurobiology, International Conference on The Interplay between Natural and Artificial Computation 2005

- A. P. del Pobil. 8th International Conference on Artificial Intelligence and Soft Computing 2004
- A. P. del Pobil. 4th International Cognitive Robotics Workshop, at the European Conference on Artificial Intelligence (ECAIÕ04) 2004
- P. J. Sanz. EURON Summer School on Mobile Manipulators. Benicassim, SPAIN, 2004.
- P. J. Sanz. "Tutorial: Towards Autonomous Manipulation Capabilities for Service Robots". IEEE International Conference on Mechatronics and Automation, ICMA2005. Niagara Falls, Ontario, Canada, 2005.
- P. J. Sanz. "Workshop on Mobile Manipulators: Basic Techniques, New Trends and Applications". IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS2005. Edmonton, Alberta, Canada, 2005.

Participations in Congress Committees

- P. J. Sanz. IMG04: Workshop on Intelligent Manipulation and Grasping, Genoa (Italy), 2004.
- P. J. Sanz. 2004 IEEE/RSJ International Conference of Intelligent Robots and Systems (IROS2004), Sendai (Japan), 2004.
- E. Cervera. IEEE/RSJ Int. Conf. of Intelligent Robots and Systems (IROS2004), Sendai (Japan), 2004.
- E. Cervera. IASTED Int. Conf. on Artificial Intelligence and Soft Computing, Marbella, 2004.
- P. J. Sanz. IASTED Int. Conf. on Artificial Intelligence and Soft Computing (ASC 2004), Marbella (Spain), 2004.
- E. Cervera. IEEE/RSJ Int. Conf. of Intelligent Robots and Systems (IROS2005), Edmonton (Canada), 2005.
- P. J. Sanz. IEEE/RSJ Int. Conf. of Intelligent Robots and Systems (IROS2005), Edmonton (Canada), 2005.
- P. J. Sanz. IEEE International Conference on Robotics and Automation, Barcelona (Spain), 2005.
- E. Cervera. IASTED Int. Conf. on Artificial Intelligence and Soft Computing, (ASC 2005), Benidorm (Spain), 2005.
- P. J. Sanz. IASTED Int. Conf. on Artificial Intelligence and Soft Computing, (ASC 2005), Benidorm (Spain), 2005.

- A. P. del Pobil. 16TH European Conference on Artificial Intelligence (ECAI'04) Valencia, España, 2004

- A. P. del Pobil. 17th International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems, Ottawa, Canada, 2004

- A. P. del Pobil. Workshop on Anchoring Symbols to Sensor Data, at the 19th Conference of the American Association for Artificial Intelligence (AAAI-04), San Jose, California, 2004

- A. P. del Pobil. International Symposium on Robotics and Automation (ISRA'04), Queretaro, Mexico, 2004

- A. P. del Pobil. 4th International Cognitive Robotics Workshop, at the European Conference on Artificial Intelligence (ECAI'04), Valencia, España, 2004

- A. P. del Pobil. Agents in Dynamic and Real-Time Environments, Workshop at the European Conference on Artificial Intelligence (ECAI'04), Valencia, España, 2004

- P. Nebot, E. Cervera, "Agent-based Mobile Manipulation", 4th International UJI Robotics School on Mobile Manipulators: Basic Techniques, New Trends and Applications, Benicassim, Spain, 2004.

- A. P. del Pobil. 8th International Work-Conference on Artificial Neural Networks (IWANN'05), Vilanova i la Geltrú, Barcelona, España, 2005

- A. P. del Pobil. First International Work-Conference on the interplay between Natural and Artificial Computation (IWINAC'05), Las Palmas de Gran Canaria, 2005

- A. P. del Pobil. 18th International Conference on Industrial and Engineering Applications of Artificial Intelligence and Expert Systems (IEA/AIE-2005), Bari, Italia, 2005

- A. P. del Pobil. IEEE International Conference on Robotics and Automation (ICRA'05), Barcelona, España, 2005

- A. P. del Pobil. IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'05), Edmonton, Canada,2005

- A. P. del Pobil. Agents in Real-Time and Dynamic Environments, Workshop at the International Joint Conference on Artificial Intelligence (IJCAI'05), Edinburgh, Great Britain,2005

- A. P. del Pobil. International Conference on Informatics in Control, Automation and Robotics (ICINCO)), Barcelona, Spain, 2005

- A. P. del Pobil. The 4th IARP/IEEE-RAS/EURON Workshop on Technical Challenges for Dependable Robots in Human Environments, Nagoya, Japan,2005

- A. P. del Pobil. IEEE International Conference on Industrial Electronics, Technology and Automation (IEEE IETA 05), 2005

Journal Referee Activities

- P. J. Sanz. IEEE Transactions on Robotics and Automation, 2003.

- P. J. Sanz. IEEE Transactions on Systems, Man and Cybernetics, Part A, 2003.

- R. Marín. Autonomous Robots, Kluwer Academic Publishers, 2003.

- G. Recatalá. International Journal of Mechatronics, 2003.

- E. Chinellato. IEEE Transactions on Robotics and Automation, 2003.

- P. J. Sanz. IEEE Transactions on Systems, Man, and Cybernetics Part C, 2004.

- A. Morales. Robotics and Autonomous Systems, 2004.

- E. Cervera. IEEE/ASME Transactions on Mechatronics, 2004.

- E. Cervera. IEEE Transactions on Control Systems Technology, 2004.

- E. Cervera. IEEE Transactions on Robotics, 2004.

- E. Cervera. International Journal of Robotics and Automation, 2004.

- E. Cervera. Advanced Robotics, 2004.

- R. Marín. IEEE Transactions on Systems, Man, and Cybernetics Part C, 2004.

- R. Marín. Journal of Robotic Systems, 2004.

- E. Cervera. Robotica, 2005.

- E. Cervera. IEEE Transactions on Control Systems Technology, 2005.

- E. Cervera. IEEE Transactions on Robotics, 2005.

- P. J. Sanz. IEEE Robotics and Automation Magazine, 2005

2.6 Multimedia Research Group

Our grup is involved with several aspects inside the human computer interaction topic, all over three specific domains, the first focused on teaching and evaluation, by means of tutorial systems, in an educational environment, second and more recently, the multimedia software development for private and public institutions and finally, we are starting to work in certain aspects of the use of computers by people with disabilities.

2.6.1 Researchers

Pedro José Sanz
Raúl Marín
Miguel Albert
Sergio Silvestre

Group Leader:

Pedro José Sanz (`sanzp@icc.uji.es`)

Collaborators from Other Departments

Maria Raquel Agost
José Luis Llopis

2.6.2 Research Lines

- **Interactive Teaching and Learning Environments:** The main stimulus of this research has been to make easier the training period of the students, in our University, related with topics that intersect with different subjects from their curricula in the Computer Science studies. The actual goal is to improve the developed capabilities of these tutorial systems toward more sophisticated ones named "intelligent tutoring systems".

- **Multimedia Software Development for Service Applications:** Nowadays the company/institution requirements both

in marketing and general functionality, among others, are very dependent of the new information technologies, and among these those based on multimedia, including "world wide web" support, are dominating the situation by now. Therefore, we are forced to work on that direction while this type of demand is growing. In this sense we are collaborating with several institutions, in particular we are in permanent contact with the BYG company of multimedia software development (Nottingham, UK. Contact person: Joe Bennaton), and since last year several students have worked on different projects related with multimedia software in this company, partially supported by the Leonardo Program.

- **Human-Computer Interfaces for Handicapped People:** Our recent effort in this line is focused on assistive and augmentative communication for severely disabled people, with the aim to improve their potential capabilities by means of special computer interfaces. The challenge in this context it will be to make available the educational access and so to permit their social integration.

2.6.3　Research Projects

The members of our group are (and have been) collaborating with the following research projects:

- "Desarrollo de un Sistema Tutor Adaptativo en el Ámbito de la Educación Especial". Fundació Caixa-Castelló, P1-1B2003-15, 3 years, Main Researcher: P. J. Sanz, 2003.

2.6.4　Publications

Chapters in National Books with ISBN

- P. J. Sanz, R. Marín, and O. Coltell. "La Interfaz Hombre-Máquina". Manual de Informática Médica, CADUCEO MULTIMEDIA, S. L., pp. 143–164, ISBN: 84-933481-0-4, Barcelona (Spain), 2003.
- R. Marín, and P. J. Sanz. "Realidad virtual: introducción y aplicaciones en informática médica". Manual de Informática Médica, CADUCEO MULTIMEDIA, S. L., pp. 559–570, ISBN: 84-933481-0-4, Barcelona (Spain), 2003.

Publications in International Proceedings with ISBN

- R. Marín, and P. J. Sanz. "Distance Learning via the UJI Robotics Telelab". Proc. of Second International Conference on Multimedia and Information & Communication Technologies in Education, INFODEX, pp. 1632–1636, ISBN: 84-96212-09-2, Badajoz, 2003.

- R. Marín, P. J. Sanz, and M. Arregui. "Recent Educational Experiences by Using the UJI Online Robot". Proc. of International Conference on Network Universities and E-learning, Servicio Publicaciones UPV, ISBN: 84-9705-369-9, Valencia, 2003.

- J. Sales, R. Fernández, J. M. Jiménez, R. Marín and P. J. Sanz. "Telecontrol of an Industrial Robot Arm by Means of a Multimodal User Interface: A Case Study". Proc. of IEEE 2004 International Conference on Systems, Man and Cybernetics, IEEE Society, pp. 76–80, ISBN: 0-7803-8567-5, The Hague (The Netherlands), 2004.

- P. J. Sanz, F. Pont, I. Alfaro, S. Troncho and R. Marin. "Improving the UJI Online Robotics Course". Third International Conference on Multimedia and Information and Communication Technologies in Education, pp. 155–159 , ISBN: 609-5995-5, 2005.

- P. J. Sanz, O. Coltell, S. Dabic, D. Carreres and R. Marin. "An Online Tutoring System for Handicapped People". Third International Conference on Multimedia and Information and Communication Technologies in Education, pp. 38–42 , ISBN: 609-5995-5, 2005.

- M. Martinez, P. J. Sanz, R. Marin, and D. Carreres. "Desarrollo de un Sistema Tutor Distribuido, Adaptado al Ambito de la Educación Especial". Proceedings of IBERDISCAP 2006. pp. 307–310 , ISBN: 84-96023-45-1, 2005.

Publications in National Proceedings with ISBN

- F. Sancho, and P. J. Sanz. "Entorno para la enseñanza de visión en las asignaturas de Robótica en la UJI". Proc. of Education and Practice in Artificial Vision, Servicio de Publicaciones UPC, pp. 107–114, ISBN: 84-7653-830-8, Mallorca, 2003.

- R. Marín, and P. J. Sanz. "El Sistema Telerobótico de Aprendizaje por Internet en la UJI: Un Caso Práctico". Proc. of Experiencias de mejora e innovación de la docencia universitaria. Actas de la II

Jornada de mejora educativa de la Universidad Jaume I, Universidad Jaume I, pp. 352–362, ISBN: 84-8021-432-5, Castellón, 2003.

2.7 Communications and Systems Group

The group is involved with research on distributed systems. The main interest is concerned with a theoretical treatment of formal specifications. However, there is an emerging interest for more practical issues.

We are also involved in providing quality of service for distributed networks.

2.7.1 Researchers

Juan Echagüe
Juan Murgui

Collaborators from Other Departments

Vicente Cholvi
Juan Segarra
José Luis Llopis
Francisco Miquel

2.7.2 Research Lines

In particular, the group is currently working on:

- Analisys of Distributed Algorithms
- Formalization and Implementation of Memory Coherency Models
- Fault Tolerant Distributed Systems
- Communication Networks
- Quality of Service

2.7.3   Publications

International Journal Papers

- J. J. Echagüe, V. Cholvi, and A. Fernández. "Universal Stability Results for Low Adversaries in Packet Switched Networks". IEEE Communications Letters, vol. 7, no. 12, IEEE COMMUNICATIONS SOCIETY, pp. 578–580, 2003.

- V. Cholvi, J. J. Echagüe, and J. Y. Le Boudec. "On the Feasible Scenarios at the Output of a FIFO Server". IEEE COMMUN LETT, vol. 5(9) , pp. 397–399, 2005.

- V. Cholvi, J. J. Echague. "Stability of FIFO networks under adversarial models: State of the art". COMPUT NETW , vol. 51 , pp. 4460–4474, 2007.

Chapters in International Books with ISBN

- J. J. Echagüe, M. Prieto, J. Villadangos, and V. Cholvi. "A Distributed Algorithm to Provide QoS by Avoiding Cycles in Routes". Quality of Service in the Emerging Networking Panorama, Springer, pp. 224–236, ISBN: 3-540-23238-9/0302-9743, Germany, 2004.

Publications in International Proceedings with ISBN

- J. J. Echague, V. Cholvi. "Worst Case Burstiness Increase due to Arbitrary Aggregate Multiplexing". ACM International Conference on Performance Evaluation Methodologies and Tools, ISBN: 1-59593-504-5/06/10, Pisa Italy, 2006.

Publications in National Proceedings with ISBN

- J. J. Echagüe, M. Prieto, J. Villadangos, and V. Cholvi. "A Distributed Algorithm to Provide Network Stability". Proc. of XII Jornadas de Concurrencia y Sistemas Distribuidos, Servicio publicaciones Universidad Rey Juan Carlos, pp. 265–276, ISBN: 84-9772-320-1, Madrid (Spain), 2004.

2.8 Intelligent Control Systems

2.8.1 Researchers

Francisco Toledo

2.8.2 Research Lines

The group has been mainly working on applying Reasoning and Learning techniques to autonomous robots (mobile robots and sensor-based manipulators), traffic control, and automatic verification of algorithms. We are particularly interested in Qualitative Spatial and Temporal techniques from a logical framework and in Reinforcement Learning and Neural Networks. Currently, the main research line of this group is the application to Traffic Control.

This research line tryes to short cut the distance between the theorical definition of multiagent systems from its practical implementation about illnes definition execution domains. The first task done is to developt methods to deal with this kind of domains. The choosen model is temporal qualitative reasoning and the choosen first domain was urban traffic control. It has been developed a prototype that it has an individual agent devoted to every task to be done. Every agent of the prototype has the same software architecture. They interact by means of conversations. Every agent must look for every data needed for its execution. The overall control of the prototype is another experimental topic in the execution of this prototype. The prototype has also an open execution. This means that there are synchronisation primitives to cease agents and start up new agents. The prototype is executed in a high performance computational architecture: a Beowulf cluster.

2.8.3 Research Projects

- "Aplicación de técnicas de Razonamiento Espacial Cualitativo y Aprendizaje por Refuerzo a la navegación autónoma e inteligente de robots móviles reales con brazo manipulador". Fundació Caixa–Castelló Bancaixa, P1A98-11, 3 years, Main Researcher: M. T. Escrig, 2000.

- "Desarrollo e Implementación de una Arquitectura Multiagente para la Asistencia al Diseño de Productos. Aplicación al Diseño de Muebles". CICYT, DPI2002-04357-C03-02, Main Researchers: L. A. García, 2002.

- "Ayudas a grupos de investigación". Generalitat Valenciana, GR01-196, 30/11/2001, Main Researcher: F. Toledo, 2002.

- "Conjunto robots Koala per a aplicacions de robótica colaborativa". FEDER Ministerio, UNJM00-23-011, 31/12/2002, Main Researcher: F. Toledo, and M. T. Escrig, 2002.

- "Robot móvil tipo oruga con sensores sonar, infrarojos, cámara video y radio Ethernet". FEDER Ministerio, UNJM00-23-029, 31/12/2002, Main Researcher: F. Toledo, and M. T. Escrig, 2002.

2.8.4   Ph. D. Dissertations

2.8.5   Publications

International Journal Papers

- M. T. Escrig, and F. Toledo. "Qualitative Velocity". Lecture Notes in Artificial Intelligence, vol. 2504, Springer-Verlag, pp. 29–39, 2002.

- M. T. Escrig, Ll. Museros, J. Pacheco, and F. Toledo. "Several Models on Qualitative Motion as instances of the CSP". Inteligencia Artificial. Revista IberoAmericana de Inteligencia Artificial, vol. I, no. 17, pp. 55–71, 2002.

- J. Pacheco, M. T. Escrig, and F. Toledo. "The First Steps towards Reasoning on 3-D Qualitative Orientation". Inteligencia Artificial, Revista Iberoamericana de inteligencia Artificial, vol. 15, EPIA, pp. 39–48, 2002.

- J. Pacheco, M. T. Escrig, and F. Toledo. "Integrating 3D Orientation Models". Lecture Notes in Artificial Intligence, vol. 2504, Springer-Verlag, pp. 88–100, 2002.

National Journal Papers

- M. T. Escrig, and F. Toledo. "Representing and Reasoning with Qualitative Veolicty". Boletín del ACIA, ACIA, pp. 100–106, 2002.

- J. Pacheco, M. T. Escrig, and F. Toledo. "Integrating Coarse and Fine 3D Orientation Models". Boletín del ACIA, ACIA, pp. 129–136, 2002.

Edited International Books with ISBN

- M. T. Escrig, F. Toledo, and E. Golobardes. "Topics in Artificial Intelligence". Lecture Notes in Artificial Intelligence vol. 2504, Springer-Verlag, ISBN: 3-540-00011-9, Alemania, 2002.

Chapters in International Books with ISBN

- M. T. Escrig, and F. Toledo. "Qualitative Velocity: How to represent it?". Sistemas Cualitativos y Diagnosis. Automatización del Razonamiento Cualitativo y Aplicaciones, Digital @tres S. L. L., pp. 59–62, ISBN: 84-95499-62-2, 2002.
- J. Pacheco, M. T. Escrig, and F. Toledo. "Qualitative Spatial Reasoning on Three-Dimensional Orientation Point Objects". Sixteenth International Workshop on Qualitative Reasoning. Qualitative Reasoning 2002, Digital @tres S. L. L., pp. 113–124, ISBN: 84-95499-60-6, Sevilla (Spain), 2002.
- J. Pacheco, M. T. Escrig, and F. Toledo. "Three dimensional coarse qualitative spatial models". Sistemas Cualitativos y Diagnosis. Automatización del Razonamiento Cualitativo y Aplicaciones. J. A. Ortega, X. Parra, and B. Pulido (eds.), Digital @tres S. L. L., pp. 81–90, ISBN: 84-95499-62-2, Sevilla (Spain), 2002.

Other International Publications

- M. T. Escrig, and F. Toledo. "Qualitative Velocity". Proc. of the Workshop at the European Conference on Artificial Intelligence 2002, pp. 77–80, 2002.

Other National Publications

- E. AlcOn, F. Toledo. "Universidad y economIa en Europa". Madrid, 2006.

Conference/Workshop Organizations

- F. Toledo. V Congreso Catalán de Inteligencia Artificial, 2002.

Participations in Congress Committees

- F. Toledo. V Congreso Catalán de Inteligencia Artificial, Castelló, 2002.

2.9 Neural Networks and Soft Computing

The main research interest of this group is on Neural Networks. We carry out basic and applied research on Neural Networks. Some concrete examples of basic research are:

- Generalization capability.
- Input selection.
- Rule extraction from trained Neural Networks.
- Structure selection.
- Training Algorithms.

Under the point of view of applications:

- Time series prediction.
- Applications in Medicine.
- Applications in Signal Processing.

The group is also planning to start research works on Fuzzy Logic and Genetic Algorithms in the near future

2.9.1 Researchers

Mercedes Fernández
Carlos Hernández
María Carmen Ortiz
Joaquín Torres Sospedra

Contact Person

Carlos Hernández (`espinosa@icc.uji.es`)

2.9.2   Research Lines

- Neural Networks
- Soft Computing
- Genetic algorithms
- Fuzzy logic
- Pattern recognition

2.9.3   Research Projects

- "MAPACI: Modelado y clasificación automática de patrones de voz patológica para su aplicación clínica sobre Internet". Universidad Jaume I, Universidad Politécnica de Madrid, Universidad de Alcalá de Henares, TIC2002-02273, 3 years, Main Researcher: Dr. P. Gómez, 2003.

- "Análisis y Desarrollo de Métodos de Diseño de Conjuntos de Redes Neuronales". UJI-Bancaja, P11B2004-03, 3 años, Main Researcher: C. Hernández, 2004.

2.9.4   Publications

International Journal Papers

- C. Hernández, M. Fernández, and M. C. Ortiz. "Ensemble Methods for Multilayer Feedforward: An Empirical Study". Lecture Notes in Computer Science, vol. 2687, no. 2687, Springer-Verlag, pp. 137–144, 2003.

- M. C. Ortiz, M. Fernández, and C. Hernández. "An Empirical Comparison of Training Algoritms for Radial Basis Functions". Lecture Notes in Computer Science, vol. 2687, no. 2687, Springer-Verlag, pp. 129–136, 2003.

- C. Hernández, M. Fernández, and M. C. Ortiz. "Rule Extraction from a Multilayer Feedforward Trained Network via Interval Arithmetic Inversion". Lecture Notes in Computer Science, vol. 2686, no. 2686, Springer-Verlag, pp. 622–629, 2003.

- C. Hernández, M. Fernández, and M. C. Ortiz. "Inversion of a Neural Network via Interval Arithmetic for Rule Extraction". Lecture

Notes in Computer Science, vol. 2714, no. 2714, Springer-Verlag, pp. 670–677, 2003.

- M. Fernández, C. Hernández, M. Ortiz, and J. Torres. "Training Radial Basis Functions by Gradient Descend". Lecture Notes in Artificial Intelligence, vol. 3070, Springer-Verlag, pp. 184–189, 2004.

- C. Hernández, M. Fernández, and J. Torres. "Experiments on Ensembles of Radial Basis Functions". Lecture Notes in Artificial Intelligence, vol. 3070, Springer-Verlag, pp. 197–202, 2004.

- C. Hernández, M. Fernández, and J. Torres. "First Experiments on Ensembles of Radial Basis Functions". Lecture Notes in Computer Science, vol. 3077, Springer-Verlag, pp. 253–262, 2004.

- C. Hernández, M. Fernández, and J. Torres. "Ensembles of RBFs Trained by Gradient Descent". Lecture Notes in Computer Science, vol. 3173, Springer-Verlag, pp. 223–228, 2004.

- M. Fernández, C. Hernández, M. Ortiz, and J. Torres. "Gradient Descent Training of Radial Basis Functions". Lecture Notes in Computer Science, vol. 3173, Springer-Verlag, pp. 229–234, 2004.

- M. Fernández, C. Hernández, and J. Torres. "Classification by Multilayer Feedforward Ensembles". Lecture Notes in Computer Science, vol. 3173, Springer-Verlag, pp. 852–856, 2004.

- C. Hernández, M. Fernández, and J. Torres. "Some Experiments with Ensembles of Neural Networks for Classification of Hyperspectral Images". Lecture Notes in Computer Science, vol. 3173, Springer-Verlag, pp. 912–917, 2004.

- M. Fernández, C. Hernández, M. Ortiz, and J. Torres. "Some Experiments on Training Radial Basis Functions by Gradient Descent". Lecture Notes in Computer Science, vol. 3316, Springer-Verlag, pp. 428–433, 2004.

- C. Hernández, M. Fernández, and J. Torres. "Multilayer Feedforward Ensembles for Classification Problems". Lecture Notes in Computer Science, vol. 3316, Springer-Verlag, pp. 744–749, 2004.

- C. Hernández, M. Fernández, and J. Torres. "Some Experiments on Ensembles of Neural Networks for Hyperspectral Image Classification". Lecture Notes in Artificial Intelligence, vol. 3316, Springer-Verlag, pp. 677–684, 2004.

- J. Torres, C. Hernández, and M. Fernández. "Ensembles of Multilayer Feedforward: Some New Results" Lecture Notes in Computer Science, vol. 3512, Springer-Verlag, pp. 604–611, 2005.

- J. Torres, C. Hernández, and M. Fernández "Ensembles of Multilayer Feedforward: A New Comparison" WSEAS Transactions on Systems, vol. 4, no. 4, pp. 468–473,April 2005.

- J. Torres, M. Fernández, and C. Hernández "Combination Methods for Ensembles of Multilayer Feedforward" WSEAS Transactions on Systems, vol. 4, no. 4, pp. 474–479,April 2005.

- C. Hernández, J. Torres, and M. Fernández "Combination Methods for Ensembles of RBF Networks" WSEAS Transactions on Circuits and Systems, vol. 4, no. 4, pp. 389–394,April 2005.

- J. Torres, C. Hernández, and M. Fernández. "New Results on Ensembles of Multilayer Feedforwad" Lecture Notes in Computer Science, vol. 3697, Springer-Verlag, pp. 139–144, 2005.

- J. Torres, M. Fernández, and C. Hernández "Combination Methods for Ensembles of MF" Lecture Notes in Computer Science, vol. 3697, Springer-Verlag, pp. 133–138, 2005.

- C. Hernández, J. Torres, and M. Fernández "Combination Methods for Ensembles of RBFs" Lecture Notes in Computer Science, vol. 3697, Springer-Verlag, pp. 121–126, 2005.

- C. Hernández, J. Torres, and M. Fernández "New Experiments on Ensembles of MF" International Journal on Information Technology, vol. 11, no. 6, pp. 10–19,April 2005, ISSN: 0218-7957.

- Maria de las Mercedes Fernandez Redondo, J. Torres, C. A. Hernandez. "Improving the Expert Networks of a Modular Multi-Net System for Pattern Recognition". LECT NOTES COMPUT SC, vol. 4131 , pp. 293–302, 2006.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "An Experimental Study on Training Radial Basis Functions by Gradient Descent". LECT NOTES COMPUT SC, vol. 4087 , pp. 81–92, 2006.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Combining MF Networks: A Comparison Among Statistical Methods and Stacked Generalization". LECT NOTES COMPUT SC, vol. 4087 , pp. 210–220, 2006.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Improving Adaptive Boosting with k-Cross-Fold Validation". LECT NOTES COMPUT SC, vol. 4113 , pp. 397–402, 2006.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "The Mixture of Neural Networks Adapted to Multilayer Feedforward Architecture". LECT NOTES COMPUT SC, vol. 4113 , pp. 488–493, 2006.

- Maria de las Mercedes Fernandez Redondo, J. Torres, C. A. Hernandez. "Gradient Descent and Radial Basis Functions". LECT NOTES COMPUT SC, vol. 4113 , pp. 391–396, 2006.

- C. A. Hernandez, J. Torres, Maria de las Mercedes Fernandez Redondo. "Improving the Combination Module with a Neural Network". LECT NOTES COMPUT SC, vol. 4113 , pp. 146–155, 2006.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Adaptive Boosting: Dividing the Learning Set to Increase the Diversity and Performance of the Ensemble". LECT NOTES COMPUT SC, vol. 4232 , pp. 688–697, 2006.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Mixture of Neural Networks: Some Experiments with the Multilayer Feedforward Architecture". LECT NOTES COMPUT SC, vol. 4232 , pp. 616–625, 2006.

- Maria de las Mercedes Fernandez Redondo, J. Torres, C. A. Hernandez. "Training RBFs Networks: A Comparison among supervised and not supervised Algorithms". LECT NOTES COMPUT SC, vol. 4232 , pp. 477–486, 2006.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Improving Adaptative Boosting with a Relaxed Equation to Update the Sampling Distribution". LECT NOTES COMPUT SC, vol. 4507 , pp. 119–126, 2007.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Averaged Conservative Boosting: Introducing a New Method to Build Ensembles of Neural Networks". LECT NOTES COMPUT SC, vol. 4668 , pp. 309–318, 2007.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Stacking MF Networks to Combine the Outputs Provided by RBF Networks". LECT NOTES COMPUT SC, vol. 4668 , pp. 450–459, 2007.

Publications in International Proceedings with ISBN

- M. C. Ortiz, C. Hernández, and M. Fernández. "A Comparison of Training Algoritms for Radial Basis Functions". Proc. of International Conference On Artificial Neural Networks and Neural Information Processing (ICANN/ICONIP'2003), Okyay Kaynak, Ethem Alpaydin, Erkki Oja, Lei Xu, pp. 25–28, ISBN: 975-518-209-8, Istambul (Turkia), 2003.

- C. Hernández, M. Fernández, and M. C. Ortiz. "Ensemble Methods for Multilayer Feedforward: A Empirical Comparison". Proc. of International Conference On Artificial Neural Networks and Neural Information Processing (ICANN/ICONIP'2003), Okyay Kaynak, Ethem Alpaydin, Erkki Oja, Lei Xu, pp. 204–207, ISBN: 975-518-209-8, Istambul (Turkia), 2003.

- C. Hernández, M. Fernández, and M. C. Ortiz. "Ensemble Methods for Multilayer Feedforward". Proc. of European Simposium on Artificial Neural Networks (ESANN'2003), D-Facto, pp. 261–266, ISBN: 2-930307-03-X, Brujas (Belgica), 2003.

- C. Hernández, M. Fernández, and M. C. Ortiz. "A New Rule Extraction Algorithm based on Interval Arithmetic". Proc. of European Simposium on Artificial Neural Networks (ESANN'2003), D-Facto, pp. 155–160, ISBN: 2-930307-03-X, Brujas (Belgica), 2003.

- C. Hernández, and M. Fernández. "A comparison of ensemble methods for Multilayer Feedforward networks". Proc. of International Joint Conference On Neural Networks (IJCNN'2003), IEEE, pp. 2655–2660, ISBN: 0-7803-7898-9, USA, 2003.

- C. Hernández, and M. Fernández. "Interval arithmetic inversion: A new rule extraction algorithm". Proc. of International Joint Conference On Neural Networks (IJCNN'2003), IEEE, pp. 1752–1756, ISBN: 0-7803-7898-9, USA, 2003.

- M. Fernández, C. Hernández, and J. Torres. "Hyperspectral Image Classification by Ensembles of Multilayer Feedforward Networks". Proc. of International Joint Conference on Neural Networks (IJCNN'2004), IEEE, pp. 1145–1149, ISBN: 0-7803-8359-1, Budapest (Hungary), 2004.

- J. Torres, C. Hernández, and M. Fernández "Ensembles of Multilayer Feedforward: A New Comparison" Proc. of the 6th WSEAS International Conference on Neural Networks (WSEAS 2005), pp. 152–157, ISBN: 960-8457-24-6, Lisboa (Portugal), 2005.

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- Maria de las Mercedes Fernandez Redondo, J. Torres, C. A. Hernandez. "Training Radial Basis Functions by Gradient Descent". International Conference on Neural Networks, IJCNN 2006, ISBN: 0-7803-9490-9, Vancouver, Canada, 2006.

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- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Mixing Aveboost and Conserboost to Improve Boosting Methods". International Conference on Neural Networks, IJCNN 2007, ISBN: 1-4244-1380-X, Orlando, FL, USA, 2007.

- J. Torres, C. A. Hernandez, Maria de las Mercedes Fernandez Redondo. "Designing a Multilayer Feedforward Ensemble with the Weighted Conservative Boosting Algorithm". International Conference on Neural Networks, IJCNN 2007, ISBN: 1-4244-1380-X, Orlando, FL, USA, 2007.

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- C. Hernández, M. Fernández, and J. Torres "Nuevos Experimentos sobre Conjuntos de RNAs", I Congreso Español de Informática, CEDI'05, Actas del I Simposio de Inteligencia Computacional, SICO'05, pp. 19–25, ISBN: 84-9732-444-7, 2005.

- J. Torres, C. Hernández, and M. Fernández "Combinacion de Conjuntos de Redes Multilayer Feedforward", I Congreso Español de Informática, CEDI'05, Actas del I Simposio de Inteligencia Computacional, SICO'05, pp. 11–18, ISBN: 84-9732-444-7, 2005.

- M. Fernández, J. Torres, and C. Hernández "Combinacion de Conjuntos de Redes Radial Basis Functions", I Congreso Español de Informática, CEDI'05, Actas del I Simposio de Inteligencia Computacional, SICO'05, pp. 515–520, ISBN: 84-9732-444-7, 2005.

Other International Publications

2.9.5   Research Activities

Participations in Congress Committees

- J. Torres. Advanced Intelligent Computed Theories and Applications. Tsing Dao, Shadong Province, China, 2007.

- J. Torres. International Joint Conference on Neural Networks (IJCNN 2007). Orlando, Florida, USA, 2007.

Journal Referee Activities

- C. A. Hernández. IEEE Trans. on Neural Networks, 2003.

- C. A. Hernández. Physics Letter A, 2003.

- C. A. Hernández. ICANN/ICONIP'2003, 2003.

- M. Fernández Redondo. Neurocomputing, 2003.

- J. Torres. Lecture Notes in Computer Science, 2006.

2.10 Applying Intelligent Agents

2.10.1 Researchers

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2.10.2 Research Lines

The group works on Intelligent Agents: autonomous, social and pro-active software. We work on both: Theory and Applications on Intelligent Agents, but the emphasis is on the Applications topic. The research work on Intelligent Agents Theory is focused on the design of Intelligent Agents software architectures, methods to deal with ontology (capturing, agreement and use) and methods to deal with competitive and cooperative behaviours between Intelligent Agents. The group is mainly applying Intelligent Agents to four application domains: Road Traffic Control, Industrial Designs, Web Services and Intelligent Robotics.

- **ROAD TRAFFIC CONTROL**

  Road Traffic Control is an application domain with a great economical and social impact, but it is a very hard one: Data, information and knowledge are intrinsically distributed, scarce, uncertain and, even sometimes, unreliable. These features makes it suitable to be deal with Intelligent Agents. We work with two types of Road Traffic Control Systems: Urban Traffic Control (UTC) and Non-urban Traffic Control (NTC). Both use qualitative temporal

reasoners (QTR) to calculate the present behaviour and the envision tree of future behaviours of the road traffic. The QTR applied to UTC has to deal with interrupted flow of vehicles, so it is very different of the QTR applied to NTC (where there is a continuum flow of vehicles).

The main objective of an UTC System is to calculate the optimum traffic-light timing to minimize the present and future (prospective) congestion degree. We have developed two prototypes with Intelligent Agents: the MASHGREEN SM and DM. In the MASHGREEN SM prototype, the agents perform its actions based on the traffic data, information and knowledge stored in a shared blackboard. The agents are semi-autonomous, because there is a control agent that tries to direct the execution of the overall system. The agents in the MASHGREEN DM prototype are fully autonomous. Every agent has its private data, information and knowledge space. There is a yellow pages agent that informs which agent to ask for specific tasks, data or information. Both prototypes were implemented (and evaluated with true historical urban traffic data of the city centre of Castelløn) in a high performance computer: a Beowulf cluster of PCs.

We are working now in the developing of NTC Systems. The management of a non-urban road can involves several decision making nodes (traffic control centres, traffic police, road administrators ...etc.) geographically distributed and with some overlapping competences. So, these nodes must use rational methods for the automatic negotiation of the resources devoted to deal with the traffic status and to organize which control traffic actions must be done, its order of execution and who must execute them. These rational methods must use a shared and dynamic ontology of road traffic that it is in progress of develop.

- **INDUSTRIAL DESIGNS** There is a need of new techniques to manage the knowledge used in the design of industrial products in small and micro enterprises. We are developing a Intelligent Agent prototype (a Knowledge Based Engineering System) to help the designer in the decision making stages to short-cut the developing time of a product design. This prototype applies several techniques: ontology integration (to describe the function, behaviour and structure of the object to design between its components), general design theories (to describe common features of the design process) and specific design theories (to describe the particularities of a particular object to design). All the knowledge and information used for the design of a product is stored in knowledge bases structured by product type.

- **WEB SERVICES** The group is a partner of the AGENTC-ITIES.ES Spanish research network. The main objective of this network is the developing of an innovator environment to experiment with dynamic composition of heterogeneous on-line services. This environment is built with standards and technology that allow the interoperation and communication of Intelligent Agents. There are several proposed services in the network: road traffic, hospital resources management and tourist information. Our main interest is in the developing of an intelligent agent platform to road traffic.

- **INTELLIGENT ROBOTICS** There are two main research lines in this application domain. The first one is the definition of a Intelligent Agent software architecture suitable to be applied to different physical robots (different sensors, capabilities, manufacturer). This is the aim of the Ontology based Component Oriented Architecture (OCOA). The second research line is the application of the theory of grammar systems to generate emergence behaviour in teams of robots. The emergence takes place when the cooperative rules and information exchange between the robots allows the team to do a new surprising task (not knew by the individual robots until they meet).

2.10.3 Research Projects

- "Modelado y gestión del conocimiento para la ayuda al diseño de productos en la pequeña y mediana empresa". Funded by Universitat Jaume I & Fundació Caixa Castelló (P1 1B2003-36). Decembre 2003–Noviembre 2005. Main Researcher: L. A. García.

- "AGENTCITIES.ES Research Spanish Network". Funded by McyT. 2003–2005 Network Coordinator: A. Moreno.

2.10.4 Publications

International Journal Papers

- V. R. Tomás, and L. A. García. "Freeway Traffic Qualitative Simulation". LEC. NOTES COMPUT. SCI., vol. 3533 , pp. 360–362, 2005.

- V. R. Tomás, and L. A. García. "Agent-Based Management of Non Urban Road Meteorological Incidents". LEC. NOTES COMPUT. SCI., vol. 3690 , pp. 213–222, 2005.

- A. Cervera, V. R. Tomás, and J. J. Samper. "Freight and fleet management using GIS and GPS technologies", Journal of advanced technology on Automation, Control and Instrumentation, vol. 1, no. 1, pp. 78–81, September 2005.

- V. R. Tomás, J. F. Garcia, L. A. García, and J. J. Martinez. "Using multiagent systems in automated traffic management plans", Journal of advanced technology on Automation, Control and Instrumentation, vol. 1, no. 2, pp. 78–81, December 2005.

National Journal Papers

- E. Belda, V. R. Tomás, and C. Cambres. "Sistemas Inteligentes de Transporte en la red TransEuropea dentro del marco de la Comunidad Valenciana". Carreteras, vol. Sep/Oct 03, no. 129, Asociación Española de Carreteras, pp. 130–137, 2003.

- J. A. Lacort, A. Saez, and M. Herrero. "Los simuladores de tráfico como soporte al desarrollo de sistemas inteligentes de transporte". Ingenieria Municipal, no. 207, pp. 52–58, 2005.

- J. J. Samper, E. Carrillo, V. R. Tomás. "Detalles en el desarrollo de una ontologia sobre tráfico rodado". REV DIGIT UNIV, vol. 3 (8) , pp. vol 8—, 2007.

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- A. L. Jiménez, and V. R. Tomás. "The importance of information exchange in traffic management plans". Proc. of 11th World Congress on Intelligent Transport Systems, ITS Japan, ISBN: 4-9902236-4-8, Nagoya (Japan), 2004.

- V. R. Tomás, L. A. García. "A Qualitative Simulator for Traffic Monitoring". Control and Applications, ISBN: 0-88986-500-0, Cancun, Mexico, 2005.

- V. R. Tomás, L. van der Berg, J.J. Samper, E. Carrillo. "An Extensible Graphic Container With Integrated Ontological Layer For Transportation systems". The 6th International Conference on Computer-Aided Industrial Design & Conceptual Design, ISBN: 7-5062-7444-2, Delft (The Netherlands), 2005.

- V. R. Tomás, L. A. García. "A COOPERATIVE MULTIAGENT SYSTEM FOR TRAFFIC MANAGEMENT AND CONTROL". Autonomuos Agents & Multi Agent Systems, ISBN: 1-59593-150-2, The Netherlands, 2005.

- V. R. Tomás, J. A. Lacort, J. F. García, L. A. García. "ENHANC-ING THE LEARNING EXPERIENCE USING AN INNOVATIVE METHODOLOGY". Technological Advances applied to Theoretical and Practical Teaching, ISBN: 84-933971-6-4, Biarritz France, 2005.

- D. Carmelo, R. Vidal, E. Mulet, and L. A. García. "Convergence approach on experimental results". IX Intenational Congress on project Engineering, ISBN: 84-89791-08-2, Malaga, Spain, 2005.

- A. Saez, and V. R. Tomás. "A multimedia framework to develop research projects". Congress on Multimedia and Computer vision MICV 05, ISBN: 84-933971-5-6, Madrid, Spain, 2005.

- V. R. Tomás, J. F. García, L. A. García, and J. Samper "A system to automate traffic management plans". International Conference on automation, control and instrumentation, ISBN: 84-933971-2-1, Bilbao, Spain, 2005.

- A. Cervera, V. R. Tomás, G. Ruiz, and J. Martinez "GIS and GPS integration to improve fleet vehicle management". International Conference on automation, control and instrumentation, ISBN: 84-933971-2-1, Bilbao, Spain, 2005.

- J. Javier Samper, V. R. Tomás, R.P. do Nascimiento, Juan J. Martinez. "Proposal of an Architecture to Retrieve Information from Multiple Devices using Matchmaking Algorithms". The Fourth European Conference on Universal Multiservice Networks, ISBN: 978-0-7695-2768-0, Toulouse, France, 2007.

- E. Belda, V. R. Tomás. "New technologies to improve road safety". Abstracts booklet International Conference on Road Safety and Simulation, ISBN: 978-88-548-1357-1, Roma, Italia, 2007.

- A. Serrano, V. R. Tomás, M. Herrero. "The importance of information in road safety: the special operation Pao del Estrecho". Abstracts booklet International Conference on Road Safety and Simulation, ISBN: 978-88-548-1357-1, Roma, Italia, 2007.

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- A. L. Jiménez, E. Belda, A. Mozota, V. R. Tomás, J. Martínez, and J. J. Martínez. "La gestión del tráfico frente a incidentes en túneles". Proc. of III Simposio nacional de túneles, Asociación Técnica de Carreteras, pp. 707–716, ISBN: 84-95641-04-6, Pamplona, 2003.

- V. R. Tomás, J. F. García, and J. J. Samper. "Las nuevas tecnologías y su influencia en el tráfico". Proc. of V Jornadas de Informática y Sociedad - JIS2004, Universidad de Deusto, pp. 69–75, ISBN: 84-7485-927-1, Bilbao (Spain), 2004.

- L. A. García, V. R. Tomás, and R. V. Nadal. "La gestión del conocimiento como soporte al diseño de productos". Proc. of V Jornadas de Informática y Sociedad - JIS2004, Universidad de Deusto, pp. 189–196, ISBN: 84-7485-927-1, Bilbao (Spain), 2004.

- E. Belda, and V. R. Tomás. "Evaluación de los ITS y de las estrategias de gestión de tráfico". Proc. of VI Congreso de Ingeniería del Transporte - CIT 2004, pp. 1965–1970, ISBN: 84-609-1360-0, Zaragoza (Spain), 2004.

- A. L. Jiménez, and V. R. Tomás. "Sistemas Inteligentes de Transporte: La integración e intercambio de información en el marco del proyecto Euro Regional ARTS". Proc. of VI Congreso de Ingeniería del transporte - CIT 2004, pp. 1971–1976, ISBN: 84-609-1360-0, Zaragoza (Spain), 2004.

Other International Publications

- V. R. Tomás, A. L. Jiménez, C. Cambres, F. Soriano, and J. J. Samper. "Harmonic Motion". Traffic Technology International, vol. 2003 International Review on Advanced Traffic Management, UK & International press, pp. 182–186, 2003.

Other National Publications

- E. Belda, and V. R. Tomás. "Intelligent Transport Systems and Emergencies Management: a practical approach in the Valencian Community framework". Proc. of 10th World congress on Intelligent Transport Systems and Services, ERTICO-ITS Europe, Madrid, 2003.

Invited Researchers in this Department

- J. J. Samper. "Traffic Ontology". 2003.
- J. F. Garcia. "Sistemas Multiagentes aplicados a la ingenieria del trafico". 2005.

Conference/Workshop Organizations

- L. A. García. V Congreso Catalán de Inteligencia Artificial, 2002.

Participations in Congress Committees

- L. A. García. Sexto Congreso Catalán de Inteligencia Artificial, Islas Baleares, 2003.
- L. A. García. Internet, e-com and Artificial Intelligence. Second Workshop on Practical Applications of Agents and Multiagent Systems, Valladolid, 2003.

2.11   Knowledge Engineering Group

The present section describes the research carried out within the Knowledge Engineering Group at Jaume-I University. This group has been recently set up, as a consolidation of the research activities initiated in collaboration with other universities and research centers at the european level.

The Knowledge Engineering Group investigates on the construction of knowledge-based systems, with a special emphasis on practical applications. An aspect we have payed attention to is the verification and validation of knowledge-based systems, with the aim of ensuring their quality. Another issue we are interested in is the development of knowledge-based systems from reusable components (e.g. problem-solving methods and ontologies). The research interests of the group can be summarised by the following topics:

- Knowledge-based systems
- Applications of knowledge-based systems
- Verification and validation of knowledge-based systems
- Development of knowledge-based systems from components (e.g. problem-solving methods and ontologies)

2.11.1   Researchers

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2.11.2   Research Lines

Currently, the main research line the group is working on deals with the application of Artificial Intelligence and Software Engineering technologies

to the medical domain, as well as with related quality assurance aspects:

Quality improvement of clinical practice guidelines Guidelines are documents issued by medical organisations containing recommendations about diagnosis tests or interventions to perform under particular clinical circumstances. These recommendations are based on the best empirical evidence available at the moment. A crucial condition for the success of guidelines is that they fulfill strong quality requirements. However, in general guidelines are written in natural language and hence they are often error-prone. Recent efforts have been made to tackle this problem. However, these initiatives are not sufficient since they still rely on informal procedures and notations. The approach we take relies on formal representation languages for guidelines which allow for a systematic verification and validation thereof. M. Marcos in collaboration with Prof. F. van Harmelen (Vrije Universiteit Amsterdam), Dr. P. Lucas (Katholieke Universiteit Nijmegen), Prof. S. Miksch (Vienna University of Technology), Prof. W. Reif (University of Augsburg) and K. Rosenbrand (Dutch Institute for Healthcare CBO).

2.11.3 Publications

International Journal Papers

- M. Marcos, M. Balser, A. ten Teije, F. van Harmelen, and C. Duelli. "Experiences in the formalisation and verification of medical protocols". LNAI, Springer-Verlag, pp. 132–141, 2003.

- M. Geldof, A. ten Teije, F. van Harmelen, M. Marcos, and P. Votruba. "Informal and formal medical guidelines: Bridging the gap". LNAI, Springer-Verlag, pp. 173–178, 2003.

- M. Marcos. "Book review-Safe and Sound: Artificial Intelligence in Hazardous Applications". Artificial Intelligence in Medicine, vol. 27, no. 1, pp. 103–106, 2003.

- R. Serban, A. ten Teije, M. Marcos, C. Polo, K. Rosenbrand, J. Wittenberg, and J. van Croonenborg "Design patterns for modelling Guidelines". LNAI, Springer-Verlag, vol. 3581, pp. 121–125, 2005.

- A. Seyfang, S. Miksch, C. Polo, J. Wittenberg, M. Marcos, and K. Rosenbrand "MHB - A Many-headed Bridge Between Informal

and Formal Guideline Representations". LNAI, Springer-Verlag, vol. 3581, pp. 146–150, 2005.

- R. Serban, A. ten Teije, F. van Harmelen, M. Marcos, and C. Polo "Ontology-Driven Extraction of Linguistic Patterns for Modelling Clinical Guidelines". LNAI, Springer-Verlag, vol. 3581, pp. 191–200, 2005.

- A. ten, Maria del Mar Marcos Lopez, M. Balser, J. van, C. Duelli, F. van, P. Lucas, S. Miksch, W. Reif, K. Rosenbrand, A. Seyfang. "Improving medical protocols by formal methods". ARTIF INTELL MED , vol. 36 , pp. 193–209, 2006.

- J. Schmitt, A. Hoffman, M. Balser, W. Reif, Maria del Mar Marcos Lopez. "Interactive Verification of Medical Guidelines". LECT NOTES COMPUT SC, vol. 4085 , pp. 32–47, 2006.

- A. Seyfang, B. Martinez, R. Serban, J. Wittenberg, S. Mikstch, A. ten, Maria del Mar Marcos Lopez, K. Rosenbrad. "Maintaning Formal Models of Living Guidelines Efficiently". LECT NOTES COMPUT SC, vol. 4594 , pp. 441–445, 2007.

- R. Serban, A. ten, F. van, Maria del Mar Marcos Lopez, C. Polo. "Extraction and use of linguistic patterns for modelling medical guinelines". ARTIF INTELL MED , vol. 39 , pp. 137–149, 2007.

Publications in International Proceedings with ISBN

- M. Balser, O. Coltell, J. van Croonenborg, C. Duelli, F. van Harmelen, A. Jovell, P. Lucas, M. Marcos, S. Miksch, W. Reif, K. Rosenbrand, A. Seyfang, and A. ten Teije. "Protocure: Supporting the Development of Medical Protocols through Formal Methods". Proceedings of the Symposium on Computerized Guidelines and Protocols (CGP 2004), ISBN: 1-58603-412.

- A. Seyfang, S. Miksch, Maria del Mar Marcos Lopez, J. Wittenberg, C. Polo, K. Rosenbrand. "Bridging the Gap between Informal and Formal Guideline Representations". ECAI 2006 17th European Conference on Artificial Intelligence, ISBN: 1-58603-642-4, Riva del Garda (Italy), 2006.

Publications in National Proceedings with ISBN

- J. C. Galán, M. Marcos, J. Wittenberg, J. van, and K. Rosenbrand. "A Business Process Model of Evidence-Based Guideline

Development". XI Conferencia de la Asociación Española para la Inteligencia Artificial, ISBN: 84-96474-13-5, Santiago de Compostela (España), 2005.

- C. Polo, M. Marcos, A. Seyfang, J. Wittenberg, S. Miksch, and K. Rosenbrand. "Assessment fo MHB: an intermediate language for the representation fo medical guidelines". XI Conferencia de la Asocación Española para la Inteligencia Artificial, ISBN: 84-96474-13-5, Santiago de Compostela (España), 2005.

Other International Publications

- Maria del Mar Marcos Lopez, J. C. Galan, J. Wittenberg, J. van, K. Rosenbrand, B. Martinez. "Construction of a Process Model for the Integration of Formal Methods in the Development fo Medical Guidelines". Amsterdam (Netherlands), 2006.

- A. Hommerson, P. Groot, P. Lucas, Maria del Mar Marcos Lopez, B. Martinez. "A Constraint-based Approach to Medical Guidelines and Protocols". Workshop on AI techniques in healthcare: evidence-based guidelines and protocols, Riva del Garda (Italy), 2006.

2.11.4   Research Activities

Participations in Congress Committees

- M. Marcos. Symposium on Computerized Guidelines and Protocols, Prague (Czech Republic), 2004.

2.12   Cognition   for   Robotic   Research Group

2.12.1   Researchers

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Javier Martínez

2.12.2   Research Lines

The group is mainly focusing on the development of theoretical qualitative models for reasoning with time and space and their integration into a unique model for their application to autonomous smart robot path planning and navigation, cognitive maps construction, cognitive vision, and robot sensor integration. We are also interested in the use of learning methodologies for fixing the reasoning mechanisms used by the robots. We are also working with multiagent systems in two different lines: cooperation among robots and the definition of a brain implemented with an agent for each ability developped for the robots.

The research lines are the following:

- **DEVELOPMENT OF THEORETICAL QUALITATIVE MODELS OF SPACE AND TIME**

    The aim of this basic research line is the development of a model for automatically reasoning in an integrated and uniform way with different spatial features such as relative orientation, cardinal directions, naming and comparing distances, topological relationships, size and shape of objects, velocity, acceletation, topology extended with time, and so on, in a way similar to the one used by humans, that is, managing cognitively the uncertainty and imprecise knowledge received by any kind of sensors. We are also interested in the integration of this knowledge at different levels of hierarchy and granularity. For managing uncertainty we used qualitative and hybrid (qualitative and quantitative) models. The uniformity of representation and reasoning is obtained by using a logical framework (Constraint Logic Programming and Constraint Handling Rules). This research line is the basic research needed for the research project TIC2003-07182 supported by the Spanish Ministerio de Ciencia y Tecnología.

- **AUTONOMOUS ROBOT PATH PLANNING AND NAVIGATION USING QUALITATIVE TECHNIQUES**

    The aim of this research line is to allow real mobile robots to autonomously plan the path to follow and navigate in indoor, structured and initially unknown environments, by developing representation, reasoning and learning abilities from their own limited and imprecise sensorial information. To achieve this objective we use the qualitative (and hybrid) spatio-temporal reasoning models which we are obtaining in the above research line. We are also studying the application of learning techniques for recognizing the shape of structured environment (we use qualitative pattern recognition) and the situation of important landmarks in the environment. This research line is currently supported by the research project TIC2003-07182.

- **COGNITIVE VISION**

    In this research line we are working on the qualitative shape recognition which focus only in those image points which are distinctive, and in the concept of persistence which implies that two consecutive images taken by a camera on a robot, the environment has not change substantially, and we expect that things are almost equal, therefore we should study only

litle changes. The aim of this research is increase the speed of image processing using congitive techniques.

- **QUALITATIVE SENSOR FUSION**

    The robot gets information about it sorrounding environment through sensors which always contain a lot of uncertainty and errors. In this research line we are studying the way to integrate the information captured by different kind of sensors which provide information simultaneusly to the robot for managing inconsistent information. We are using qualitative interpretation of sensor information to afford the integration.

- **MULTIAGENT SYSTEMS**

    We are working with the multiagent systems methodology for two different aims: the first aim is for robot cooperation; and the second one for the development of a robot "brain" composed by agents, each one of them has one kind of ability developed for the robot. In this second line, we are also working on the development of agents for adapting to each one of the features of the physical robots, therefore we will obtain a software which will be independent of the physical platform, that is, we will be able to run the same "brain" in different kind of robots.

- **COGNITIVE MAPS CONSTRUCTION AND RECOGNITION**

    Beside path planning and navigation, robot needs to construct a map of the environment using learning techniques for avoiding repeating the reasoning process once and again when it walks trough the same environment. The second phase of constructing a map is to efficiently use the information stored in it, by the use of retrieval techniques.

- **AUTOMATIC VERIFICATION OF ALGORITHMS USING A LOGIC FRAMEWORK**

    This research line aims to develop a theoretical and practical tool for automatic verification of algorithms, by means of behavioral equivalence, using logic for the deductive layer.

2.12.3   Research Projects

- "Integración de modelos de razonamiento cualitativos y cuantitativos espacio-temporales para su aplicación en robótica". CICYT, TIC2003-07182, Main Researchers: M.Teresa Escrig, 2003.

2.12.4   Publications

Edited International Books with ISBN

- I. Aguiló, Ll. Valverde, and M. T. Escrig. "Artificial Intelligence. Research and Development". IOS-Press Frontiers in Artificial Intelligence and Applications, ISBN: 1586033786, Amsterdam, 2003.

Chapters in International Books with ISBN

- M. T. Escrig, and F. Toledo. "Qualitative Velocity: How to represent it?". Sistemas Cualitativos y Diagnosis. Automatización del Razonamiento Cualitativo y Aplicaciones, Digital @tres S. L. L., pp. 59–62, ISBN: 84-95499-62-2, 2002.

- L. Museros, and M. T. Escrig. "Integrating Qualitatively Time and Topology for Spatial Reasoning". Sixteenth International Workshop on Qualitative Reasoning. Qualitative Reasoning 2002, Digital @tres S. L. L., pp. 105–112, ISBN: 84-95499-60-6, Sevilla (Spain), 2002.

- M. T. Escrig, and P. Felip. "Qualitative Spatial Reasoning for Robot Path Planning". Artificial Intelligence. Research and Development, IOS-Press Frontiers in Artificial Intelligence and Applications, 100, pp. 99–110, ISBN: 1586033786, Amsterdam, 2003.

- Ll. Museros, and M. T. Escrig. "A Qualitative Theory for Shape Matching Applied to Autonomous Robot Navigation". Frontiers in Artificial Intelligence and Applications. Recent Advances in Artificial Intelligence REsearch and Development, IOS Press, pp. 243–250, ISBN: 1586034669, Netherlands, 2004.

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- Ll. Museros, and M. T. Escrig. "A Qualitative Theory for Shape Representation and Matching for Design". Proceedings ECAI 2004, IOS Press, pp. 858–862, ISBN: 0922-6389, Valencia (Spain), 2004.

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- J. C. Peris, and M. T. Escrig. "Cognitive Maps for Mobile Robot Navigation: A Hybrid Representation Using Reference Systems". 19th International Workshop on Qualitative Reasoning (QR-05), ISBN: 3-9502019-0-4, Graz (Austria), 2005.

- David A. Graullera, S. Moreno, M. T. Escrig. "Cognitive Vision for AIBO Robots Based on Qualitative Modeling of Visual Textures". International Conference on Automation, Control and Instrumentation, ISBN: 84-933971-8-0, Valencia (Spain), 2006.

- D. Graullera, S. Moreno, M. T. Escrig. "Cooperative Map Building Using Qualitative Reasoning for Several AIBO Robots". Third International Conference on Informatics in Control, Automation and Robotics, ISBN: 972-8865-60-0, Setubal (Portugal), 2006.

Publications in National Proceedings with ISBN

- Z. Falomir, and M. T. Escrig. "Qualitative multi-sensor data fusion". Proc. of 7è Congrés Català d'Intel.ligència Artificial, Frontiers in Artificial Intelligence and Applications, IOS Press, pp. 259–266, ISBN: 1-58603-466-9, Barcelona (Spain), 2004.

- M. T. Escrig, and J. C. Peris. "The use of a Reasoning process to solve the almost SLAM Challenge at the Robocup legged League". Vuitè Congrés Català d'Inteligència Artificial (CCIA 2005), ISBN: 1-58603-560-6, L'Alguer (España), 2005.

- M. T. Escrig, and J. C. Peris. "The use of Qualitative Spatial Reasoning to solve the Simultaneous Localization and Map Building problem in non-structured environments". VII Jornadas ARCA. Sistemas Cualitativos y Diagnosis, Benalmadena (Málaga), 2005.

- M. L. Museros, M. T. Escrig. "Extracting Relevant Features from an Image for Qualitative Shape Matching". VII Jornadas ARCA Sistemas Cualitativos y Diagnosis, Benalmadena (Málaga), 2005.

- E. Martinez, M. T. Escrig. "A general approach for qualitative reasoning models based on intervals". VIII Jornadas ARCA. Razonamiento Cualitativo y Aplicaciones. RobOtica, EconomIa, Diagnosis y ClasificaciOn, ISBN: 84-611-1401-9, PeNYiscola (EspaNYa), 2006.

- J.V. Alvarez-Bravo, J.J. Alvarez-Sanchez, F.J. Gonzalez-Cabrera, J. C. Peris, M. T. Escrig. "A Qualitative Representation Model about Trajectories in 2-D". VIII Jornadas ARCA. Razonamiento Cualitativo y Aplicaciones. RobOtica, EconomIa, Diagnosis y ClasificaciOn, ISBN: 84-611-1401-9, PeNYiscola (EspaNYa), 2006.

- J. Pacheco, M. T. Escrig. "3-D Coarse Qualitative Orientation Model". VIII Jornadas ARCA. Razonamiento Cualitativo y Aplicaciones. RobOtica, EconomIa, Diagnosis y ClasificaciOn, ISBN: 84-611-1401-9, PeNYiscola (EspaNYa), 2006.

- Z. Falomir, M. T. Escrig. "A Fuzzy-Qualitative Approach to Laser and Sonar Data Fusion". VIII Jornadas ARCA. Razonamiento Cualitativo y Aplicaciones. RobOtica, EconomIa, Diagnosis y ClasificaciOn, ISBN: 84-611-1401-9, PeNYiscola (EspaNYa), 2006.

- David. A. Graullera, S. Moreno, M. T. Escrig. "PredicciOn del entorno en un robot AIBO mediante integraciOn cualitativa plurisensorial". VIII Jornadas ARCA. Razonamiento Cualitativo y Aplicaciones. RobOtica, EconomIa, Diagnosis y ClasificaciOn, ISBN: 84-611-1401-9, PeNYiscola (EspaNYa), 2006.

- Z. Falomir, M. Arregui, J. GarcIa-Fortanet, P. Carrasco, D. Corella, O. Coltell. "INBIOMED- SIREN: Un Website Piloto para la GestiOn de Cuestionarios en EpidemiologIa Nutricional: AplicaciOn al Estudio PREDIMED". IX Congreso Nacional de Informatica de la Salud, INFORSALUD 2006, ISBN: 84-689-7412-9, Madrid, 2006.

- Z. Falomir, M. T. Escrig, J. C. Peris, V. Castelló. "Sensor Data Integration for a Qualitative and Robust Interpretation of the Robot Enviroment". IX Jornadas de ARCA. Sistemas Cualitativos y Diagnosis, ISBN: 978-84-8458-231-1, Girona (España), 2007.

Other International Publications

- Ll. Museros, and M. T. Escrig. "A Qualitative Theory for Shape Description". Inteligencia Artificial. Revista IberoAmericana de Inteligencia Artificial, vol. 8, no. 23, AEPIA, pp. 139–147, 2004.

- Ll. Museros and M. T. Escrig. "Recognition of objects without holes, with holes and curves". Proc. of WorkShop Notes of the Spatial and Temporal Reasoning WorkShop inside ECAI 2004. 16th European Conference on Artificial Intelligence 2004, pp. 3–11, Valencia (Spain), 2004.

- Z. Falomir, and M. T. Escrig. "A hybrid model for multi-sensor data fusion". Proceedings on Spatial and Temporal Reasoning Workshop, European Conference on Artificial Intelligence (ECAI), Valencia (Spain), 2004.

- J. Pacheco, M. T. Escrig. "Coarse Qualitative Model of 3-D Orientation". Amsterdam (Netherlands), 2006.

- E. Martinez, M. T. Escrig. ' 'A general approach for qualitative reasoning models based on intervals". Amsterdam (Netherlands), 2006.

- J.V. Alvarez Bravo, J. C. Peris, M. T. Escrig, J.J. Alvarez Sanchez, F.J. Gonzalez Cabrera. "A Qualitative Representation Model about Trajectories in 2-D". Amsterdam (Netherlands), 2006.

- Z. Falomir, J. C. Peris, M. T. Escrig. "Building a Local Hybrid map from Sensor Data Fusion". Amsterdam (Netherlands), 2006.

- Z. Falomir, M. T. Escrig, J. C. Peris, V. Castelló. "Distance Sensor Data Integration and Prediction". Amsterdam (The Netherlands), 2007.

2.13 SoLiDo: Libre Software

The group is interested in Libre (Free and Open Source) Software, one of our main objectives is to promote the use of libre software for teaching and researching. The group is also interested in the study of libre software development, a field which benefits from the availability of a huge quantity of public information, which can be retrieved automatically. Starting with the study of data from the development processes used in the production of libre software (and of software in general, when that is possible) are analyzed and modelled.

The group is also involved in the study of sensor network simulators.

2.13.1 Researchers

Miguel Pérez Francisco

Contact Person

Miguel Pérez Francisco (mperez@icc.uji.es)

Collaborators from Other Departments

Pablo Boronat

2.13.2 Research Lines

In particular, the group is currently working on:

- Data analysis of libre software projects
- Developing and promotion of libre software
- Software projects management techniques
- Libre sotware for e-learning
- Sensor networks

- Ad hoc networks
- Simulation

2.13.3 Research Projects

The members of our group are (and have been) collaborating with the
following research projects:

- "Desarrollo de software libre (análisis y herramientas)", CICYT,
  2004, 1 Year. Main researcher: J. González Barahona.
- "Estudio de mejora sobre simuladores de redes inalámbricas de sen-
  sores", 2004, 2 años, Fundación Bancaixa, Main researcher: Pablo
  Boronat
- "Diseño de las tecnologías software y hardware fundamentales para
  el uso de las redes inalámbricas ad hoc para la computación ubicua",
  CICYT (TIN2004-03678-C02-01). Main researcher: Pietro Man-
  zonni.

2.13.4 Publications

International Journal Papers

- B. Martínez, M. Pérez, and A. P. del Pobil. "Collision Detection be-
  tween Robot Arms and People". Journal of Intelligent and Robotic
  Systems, vol. 38, no. 1, Kluwer Academic Publishers, pp. 105–119,
  2003.

Publications in International Proceedings with ISBN

- P. Boronat and V. Cholvi."A Transformation to Provide Deadlock-
  free Programs". Lecture Notes in Computer Science, ISSN: 0302-
  9743, Volumen 2658, pp. 935-944, 2003
- M. Perez, P. Boronat, G. Robles. "Correlaion between u notifica-
  tions, messages and participants in Debian's bug tracking system".
  First International Symposion on Emperical Software Engineering
  and Measurement, ISBN: 0-7695-2886-4/07, Madrid, 2007.

Publications in National Proceedings with ISBN

- C. Alvariño, P. Boronat and M. Pérez. "Unoweb-S una herramienta simple para la transferencia de información a los alumnos". I Congreso de la Red Estatal de Docencia Universitaria y III Jornada de Millora Educativa de la Universitat Jaume I.ISBN: 84-8021-482-1. Castellón, 2003.

- P. Boronat, M. Marqués and M. Pérez. "Ampliación y mejora de una herramienta para el diseño de páginas web de asignaturas". IV Jornada de Millora Educativa de la Universitat Jaume I y III Jornada de harmonización Europea. ISBN: 84-8021-534-8. Castellón, 2004.

- P. Boronat, J.C. Amengual, J. López and J. C. Fernández. "Incorporación de prácticas de administración de sistemas informáticos a la asignatura Análisis y Diseño de Sistemas Informáticos". IV Jornada de Mejora Educativa de la Universitat Jaume I y III Jornada de harmonización Europea. ISBN: 84-8021-534-8. Castellón, 2004.

- M. Pérez, P. Boronat, and E. Sánchez. "Unoweb-s: un proyecto de Software Libre para la educación", I Congreso de las Tecnologías del Software Libre, ISBN: 84-609-6216-4, A Coruña, Julio 2005

- M. Perez, P. Boronat. "370.000 bugs del Proyecto Debian pueden ser analizados usando btsextract". XVII Congreso Español de Informática Gráfica, ISBN: 978-84-9732-595-0, Zaragoza, 2007.

Other National Publications

- M. Perez, P. Boronat, E. Rodriguez Fernandez. "Utilización de GForge en docencia". Castelló, 2007.

- E. Rodriguez-Fernandez, P. Boronat, M. Perez. "Una carga de prueba sintética para simuladores de redes ad hoc de sensores. Análisis de parámetros". Castelló, 2007.

Conference/Workshop Organizations

- M. Pérez, P. Boronat, XI Jornadas de Concurrencia, 2003
- M. Pérez, P. Boronat, Summer School on Libre Software, 2005

Chapter 3

Courses

3.1 Undergraduate Courses

In the following tables, **ThC** stands for Theoretical Credits, **PrC** stands for Practical Credits, **LaC** stands for Laboratory Credits, **TtC** stands for Total Credits, **tro** means main course, **obl** means compulsory course, **opt** means optative course, **lc** means free election. 1 credit is 10 hours.

Licenciatura en Traducción e Interpretación							
Code	Name	Type	Year	ThC	PrC	LaC	TtC
108	Informática I	obl	1st	0	0	3	3
123	Informática II	obl	2nd	0	0	3	3

Licenciatura en Derecho							
Code	Name	Type	Year	ThC	PrC	LaC	TtC
RB96	Informática Básica para las Ciencias Jurídicas	obl	2nd	0	0	4.5	4.5
RB98	Informática Básica para las Ciencias Jurídicas (II)	lc		0	0	4.5	4.5

| Ingeniería en Informática | | | | | | | |
Code	Name	Type	Year	ThC	PrC	LaC	TtC
E13	Automática	opt	3rd	2.5	0	2.5	5
E16	Diseño de Sistemas de Bases de Datos	opt	3rd	4	0	3.5	7.5
E20	Estructuras de Datos II	opt	2nd	2.5	0	2.5	5
E31	Robótica	opt	3rd	2.5	0	2.5	5
E34	Sistemas Operativos II	opt	3rd	2	2	1	5
E36	Teoría de Sistemas	opt	3rd	2.5	0	2.5	5
E44	Ficheros y Bases de Datos	tro	3rd	4	0	3.5	7.5
E45	Teoría de Autómatas y Lenguajes Formales	tro	3rd	7	0	3	10
E48	Estancias en Prácticas I	obl	3rd	0	25	0	25
E51	Inteligencia Artificial e Ingeniería del Conocimiento	tro	4th	5	4	0	9
E52	Redes Informáticas	tro	4th	5	0	4	9
E54	Estancias en Practicas II	obl	4th	0	15	0	15
E65	Lenguajes de Programación III	opt	4th	2.5	0	5	7.5
E66	Nuevas Tecnologías Aplicadas a la Gestión	opt	4-5th	3	0	1	4
E67	Proyectos Inteligentes	opt	4-5th	2.5	0	2.5	5
E69	Sistemas Basados en el Conocimiento	opt	4-5th	2.5	0	2.5	5
E71	Sistemas de Control de Procesos	opt	4th	3	0	2	5
E72	Sistemas Distribuidos	opt	4-5th	2.5	0	2.5	5
E73	Teleinformática	opt	4-5th	4	0	1	5
E75	Tratamiento de Imágenes	opt	4-5th	3	0	2	5
E76	Arquitectura e Ingeniería de Computadores	tro	5th	4	2	3	9
E80	Proyectos Informáticos	tro	5th	0	15	0	15

Ingeniería en Informática (Planes 2001)							
Code	Name	Type	Year	ThC	PrC	LaC	TtC
II01	Informática Básica	lc	1st	2.5	0	2	4.5
II09	Introducción a los Computadores	tro	1st	6	0	3	9
II11	Sistemas Operativos	tro	2nd	4.5	1.5	1.5	7.5
II13	Estructuras de Datos y de la Información	tro	2nd	4.5	3	4.5	12
II16	Tecnología de Computadores	tro	2nd	4.5	0	1.5	6
II18	Bases de Datos	obl	2nd	4.5	0	4.5	9
II19	Arquitectura de Computadores I	obl	2nd	6	0	3	9
II20	Teoría de Autómatas y y Lenguajes Formales	tro		9	0	0	9
II22	Sistemas Operativos II	obl		6	0	3	9
II23	Introducción a las Redes Informáticas	obl		4.5	0	1.5	6
II25	Redes	tro	4th	4.5	0	4.5	9
II28	Inteligencia Artificial e Ingeniería del Conocimiento	tro	4th	4.5	0	4.5	9
II29	Arquitectura e Ingeniería de Computadores	tro	4th	7.5	0	3	10.5
II36	Electrónica Digital	opt		3	0	1.5	4.5
II37	Arquitectura y Tecnología de Ordenadores Personales	opt		3	0	1.5	4.5
II43	Administración de Sistemas Operativos	opt		3	0	1.5	4.5
II44	Sistemas de Adquisición y de Entrada/Salida	opt		3	0	1.5	4.5
II45	Programación Lógica	opt		3	0	1.5	4.5
II46	Programación Funcional	opt		4.5	0	1.5	6
II47	Diseño y Gestión de Bases de Datos	opt		6	0	1.5	7.5
II48	Diseño de Sistemas Basados en Microprocesador	opt		1.5		3	4.5
II51	Redes de Area Local	opt	4th	3	0	1.5	4.5
II52	Bases de Datos Avanzadas	opt	4th	3	0	3	6
II54	Transmisión de Datos	opt	4th	3	0	1.5	4.5

Ingeniería Técnica en Informática de Gestión							
Code	Name	Type	Year	ThC	PrC	LaC	TtC
F14	Automática	opt	3rd	2.5	0	2.5	5
F21	Estructura de Datos II	opt	1-3rd	2.5	0	2.5	5
F29	Inteligencia Artificial	opt	1-3rd	2.5	0	2.5	5
F37	Redes Informáticas	opt	1-3rd	2.5	0	2.5	5
F38	Robótica	opt	1-3rd	2.5	0	2.5	5
F40	Sistemas Distribuidos	opt	1-3rd	2.5	0	2.5	5
F41	Sistemas Operativos II	opt	1-3rd	2.5	0	2.5	5
F43	Teoría de Sistemas	opt	1-3rd	2.5	0	2.5	5
F49	Sistemas Operativos I	tro	2nd	4	3	0.5	7.5
F55	Estancias en Prácticas I	obl	3rd	0	30	0	30

Ingeniería Técnica en Informática de Gestión (Planes 2001)							
Code	Name	Type	Year	ThC	PrC	LaC	TtC
IG01	Informática Básica	lc	1st	2.5	0	2	4.5
IG09	Introducción a los Sistemas Informáticos	tro	1st	7.5	0	3	10.5
IG13	Estructuras de Datos y de la Informaciíon	tro	2nd	4.5	3	4.5	12
IG18	Bases de Datos	obl	2nd	4.5	0	4.5	9
IG30	Estancia en Prácticas	obl		0	12	0	12
IG31	Proyectos Informáticos de Gestión	obl		3	0	9	12
IG43	Administración de Sistemas Operativos	opt		3	0	1.5	4.5
IG45	Programación Lógica	opt		3	0	1.5	4.5
IG46	Programación Funcional	opt		4.5	0	1.5	6
IG47	Diseño y Gestión de Bases de Datos	opt		6	0	1.5	7.5
IG52	Bases de Datos Avanzadas	opt		3	0	3	6
IG70	Programación Distribuida	opt		3	0	1.5	4.5

Ingeniería Técnica en Informática de Sistemas							
Code	Name	Type	Year	ThC	PrC	LaC	TtC
IS01	Informática Básica	lc	1st	2.5	0	2	4.5
IS04	Introducción a la Programación	tro	1st	6	3	6	15
IS09	Introducción a los Computadores	tro	1st	6	0	3	9
IS11	Sistemas Operativos	tro	2nd	3	1.5	1.5	6
IS16	Tecnología de Computadores	tro	2nd	4.5	0	1.5	6
IS17	Teoría de Automátas y Lenguajes Formales	tro	2nd	6	0	3	9
IS18	Redes II	obl	3rd	3	0	1.5	4.5
IS19	Arquitectura de Computadores I	obl	2nd	6	0	3	9
IS20	Redes	tro	2nd	4.5	0	1.5	6
IS23	Mantenimiento de Instalaciones Informáticas	opt	2nd	3	0	3	6
IS24	Introducción a las Bases de Datos	obl	2nd	3	0	1.5	4.5
IS36	Electrónica digital	opt	2nd	3	0	1.5	4.5
IS37	Arquitectura y Tecnología de Ordenadores Personales	opt	2nd	3	0	1.5	4.5
IS22	Sistemas Operativos	obl		4.5	0	1.5	6
IS30	Estancias en Prácticas	obl		0	12	0	12
IS31	Proyectos Informáticos de Sistemas	obl		3	0	9	12
IS43	Administración de Sistemas Operativos	opt		3	0	1.5	4.5
IS44	Sistemas de Adquisición y de Entrada/Salida	opt		3	0	1.5	4.5
IS48	Diseño de Sistemas Basados en Microprocesador	opt		1.5	0	3	4.5
IS51	Redes de Área Local	opt		3	0	1.5	4.5
IS67	Robótica	opt		4	0	1.5	6
IS70	Programación Distribuida	opt		3	0	1.5	4.5

Ingeniería Industrial						
Code	Name	Type	Year	ThC	PrC	LaC	TtC
301	Fundamentos de la In-formática	tro	1st	3	0	3	6
329	Métodos Informáticos	obl	3rd	2	0	2.5	4.5
349	Control y Ordenación de Tráfico Urbano	opt	5th	2	0	2.5	4.5

Licenciatura en Psicología						
Code	Name	Type	Year	ThC	PrC	LaC	TtC
I09	Informática	obl	1st	0	0	3	3

Licenciatura en Humanidades						
Code	Name	Type	Year	ThC	PrC	LaC	TtC
K16	Informática I	obl	1st	1	0	2	3
K35	Informática II	obl	2nd	1	0	2	3

Profesorado en Música						
Code	Name	Type	Year	ThC	PrC	LaC	TtC
611	Informática	obl	1st	0	0	6	6

Common Courses						
Code	Name	Type	Year	ThC	PrC	LaC	TtC
J42-J32	Herramientas In-formáticas para la Documentación	lc	2nd	1.5	0	3	4.5
J51	Competición de Robots	lc	1st	0	0	6	6

Licenciatura en Gestión y Administración Pública						
Code	Name	Type	Year	ThC	PrC	LaC	TtC
455	Informática Básica	lc	1st	0	3	0	3

Graduado en Seguridad y Ciencias Policiales						
Code	Name	Type	Year	ThC	PrC	LaC	TtC
SE28	Informática I	lc	1st	1.5	0	3	4.5

Ingeniería Técnica en Mecánica							
Code	Name	Type	Year	ThC	PrC	LaC	TtC
902	Fundamentos de Informática	tro	1st	3	0	3	6
933	Mantenimiento de Sistemas Informáticos	opt	3rd	3	0	3	6

3.2   Ph. D. Courses

The number of Ph. D. students in this department is currently about 30. The Ph. D. program is shared by our department and by the Department of Computer Languages and Systems. The Ph. D. courses of both departments are the following:

Code	Name	Cr	Professor
1241101	Metodología y Documentación Científica	3	R. Berlanga, M. Marcos and G. Quintana
1241102	Fundamentos de Visión por Computador	4	F. Pla and J. M. Sanchiz
1241103	Técnicas Avanzadas de Visión por Computador	4	F. Pla and N. Pérez
1241104	Principios y Técnicas de la Inteligencia Robótica	4	E. Cervera and A. P. del Pobil
1241105	Robótica Avanzada: Percepción y Manipulación	4	C. Melchiorri and P. J. Sanz
1241106	Computación y Comunicaciones de Altas Prestaciones	4	J. M. Badía, E. S. Quintana and G. Quintana
1241107	Arquitecturas y Redes de Computadores Avanzadas	6	J. M. Claver, V. Cholvi and J. Duato
1241108	Reconocimiento de Formas I. Principios y Técnicas	6	C. Hernández, A. Marzal and J. S. Sánchez
1241109	Reconocimiento de Formas II. Aplicaciones Industriales	3	C. Hernández A. Marzal and J. S. Sánchez
1241110	Síntesis de Imagen y Realidad Virtual	4	M. Chover and R. Vivó
1241111	Representación, Razonamiento, Acción e Interacción aplicado a la Robótica	3	M. T. Escrig and F. Toledo
1241112	Integración de Sistemas de Información	6	R. Berlanga and M. Gould
1241113	Introducción a la Red Semántica	4	L. A. García and M. Marcos

Chapter 4

Technical Reports

The technical reports of this department are the following:

Informe ICC 2002-01-1 L. Museros, and M. T. Escrig. "Modeling Motion Qualitatively: the integration of topology and qualitative time".

Informe ICC 2002-02-2 R. J. Gil-García, and J. M. Badía. "Algoritmos de agrupamiento".

Informe ICC 2002-05-3 A. Morales. "A sensor-based grasping system for the UMass Torso".

Informe ICC 2004-07-1 G. Casañ, and M. A. Castaño. "Inferencia de Gramáticas Regulares Estocásticas mediante Redes Neuronales Recurrentes".

Informe ICC 2004-07-2 G. Casañ, and M. A. Castaño. "Estudios Preliminares sobre Codificaciones de Vocabularios en el Traductor Conexionista Recontra".

Informe ICC 2005-07-1 M. Martínez, P. J. Sanz, and R. Marín. "La Comunicación Alternativa y Aumentativa: Estado del Arte".

Informe ICC 2005-07-2 M. Martínez, P. J. Sanz, and R. Marín. "Comunicación Alternativa y Aumentativa: Comunicadores".

Informe ICC 2006-10-01 Z. Falomir. "Ontología del Mapa de la Planta de un Edificio con Protégé-OWL".

Informe ICC 2006-10-02 Z. Falomir. "Neuro-Robótica".

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Informe ICC 2006-10-03 Z. Falomir. "Robots Humanoides".

Informe ICC 2006-10-04 Z. Falomir. "Sensores de Identificación por Radio-Frecuencia (RFID)".