

Ricardo Omar Chavez-Garcia

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Research Interests

I am interested in proposing and developing intelligent systems for robotic platforms that interact with the real world. I work on stochastic approaches for robotic perception and interaction. My research perspectives concern the environment understanding and learning of sensorimotor representations for decision-making tasks.

Research and Development Experience

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| <i>Developmental Robotics</i> 2015-Current | Research and Development of a Cognitive Perception System for Situation awareness and Semantic Scene Interpretation <i>Institut des Systèmes Intelligents et de Robotique (ISIR)</i> Proposal and development of an active cognitive perception system for modeling the environment by integrating action and perception processes. www.roboergosum.isir.upmc.fr |
| <i>Autonomous Vehicles</i> 2011-2014 | Responsible for the Perception Process in the <i>interactIVe (accident avoidance by active intervention for Intelligent Vehicles) IP European Project</i> Proposal and development of a multi-sensor fusion solution for vehicle frontal object perception applications. It involved: outdoor environment mapping and localization; and detection, tracking and classification of multiple objects of interest in different driving scenarios. www.interactive-ip.eu |
| <i>Robotic Platforms</i> 2012-2014 | Responsible for the Robotic Platforms --- <i>Machine Learning Team (AMA)</i> <i>Grenoble Informatics Laboratory (LIG)</i> Development of robotic drivers and sensor (mono-camera and 2D lidar scanner) data processing modules for Wifibot and Nao robotic platforms. |

Education

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| <i>Ph.D. in Mathematics and Computer Science</i> 2010-2014 | University of Grenoble 1 (Université Joseph Fourier), Grenoble, France Thesis: <i>Multiple Sensor Fusion for Detection, Classification and Tracking of Moving Objects in Driving Environments</i> Description: Two multi-sensor fusion approaches were proposed to include classification information from different sources of evidence in a whole perception solution. Uncertainty and imprecision from sensor measurements, object detections and object classification process were considered as key factors to improve the final perception output. Thesis Advisor: Olivier Aycard, Ph.D. |
| <i>Master in Computer Science</i> 2008--2010 | National Institute of Astrophysics, Optics and Electronics, Puebla, Mexico Thesis: <i>Re-ranking of retrieved images using a combination of visual and textual features</i> Description: A multiple modal approach was proposed to represent images using textual and visual features. This approach uses a multi-modal representation to re-rank a list of retrieved images by applying Markov Random Fields. Thesis advisors: Manuel Montes-y-Gomez, Ph.D. and Luis Enrique Sucar, Ph.D. |
| <i>Computer Engineer</i> 2001--2006 | Technological University of Mixteca, Oaxaca, Mexico Thesis: <i>Coordinated Construction of Ontologies for Documents Ranking</i> Description: Development of a software infrastructure for building knowledge repositories using ontological representations. Thesis advisor: M. Auxilio Medina, Ph.D. |

Publications

Discovering and Manipulating Affordances. R. Omar Chavez-Garcia, Mihai Andries, Raja Chatila and Pierre Luce-Vayrac. The 2016 International Symposium on Experimental Robotics (ISER 2016). - Accepted-.

Discovering Affordances Through Perception and Manipulation. R. Omar Chavez-Garcia, Raja Chatila and Pierre Luce-Vayrac. 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016). -Accepted-.

Multiple Sensor Fusion and Classification for Moving Object Detection and Tracking. Ricardo Omar Chavez-Garcia, Olivier Aycard. IEEE Transactions on Intelligent Transportation Systems, vol. 17, issue 2, pp. 252-534. September 2015.

Multiple Sensor Fusion for Detection, Classification and Tracking of Moving Objects in Driving Environments. R. Omar Chavez-Garcia. Ph.D Thesis, 2014. University of Grenoble1

Fusion at Detection Level for Frontal Object Perception. R. Omar Chavez-Garcia, Trung-Dung Vu, Olivier Aycard and Fabio Tango. IEEE Intelligent Vehicles Symposium (IV), 2014

Research Report on Sensor Data Fusion. Anastasia Bolovinou, Angelos Amditis, Nikos Floudas, Christina Kotsiourou, Trung-Dung Vu, R. Omar Chavez-Garcia, Olivier Aycard, Fabio Tango, Mario DallaFontana, Chris Benson, Nils Appenrodt, Markus Schutz, Sebastian Pangerl, Florian Janda, Erich Fuchse, Lali Ghosh, Mirko Meuter, Daniel Schuck and Christian Nunn. 7th Framework Programme ICT-2009.6.1: ICT for Safety and Energy Efficiency in Mobility Grant Agreement No. 246587 Large-scale Integrated Project. InteractIVe Project Consortium, 2013

Fusion framework for moving-object classification. R. Omar Chavez-Garcia, Trung-Dung Vu, Olivier Aycard and Fabio Tango. 16th International Conference on Information Fusion (FUSION), pp. 1159-1166, 2013

Multimodal Markov Random Field for Image Reranking Based on Relevance Feedback. R. Omar Chavez-Garcia, Hugo Jair Escalante and Luis Enrique Sucar. ISRN Machine Vision, vol. 2013, February 2013.

Frontal Object Perception Using Radar and Mono-Vision. R. Omar Chavez-Garcia, Julien Burlet, Trung-dung Vu and Olivier Aycard. IEEE Intelligent Vehicles Symposium (IV), pp. 159-164, 2012

Using a Markov Random Field for Image Re-ranking Based on Visual and Textual Features. R. Omar Chavez-Garcia, Manuel Montes and L. Enrique Sucar. Computación y Sistemas Vol. 14, No. 4, 2011.

A Probabilistic Method for Ranking Refinement in Geographic Information Retrieval. Esau Villatoro-Tello, R. Omar Chavez-García, Manuel Montes-y-Gómez, Luis Villaseñor-Pineda, L. Enrique Sucar. Procesamiento de Lenguaje Natural, No. 44, pp. 123-130, April 2010.

Image Re-Ranking Based on Relevance Feedback Combining Internal and External Similarities. R. Omar Chavez-Garcia, Manuel Montes-y-Gómez, Luis Enrique Sucar. In proceeding of: Proceedings of the Twenty-Third International Florida Artificial Intelligence Research Society Conference. May 19-21, 2010, Daytona Beach, Florida.

RDF-Based Model For Encoding Document Hierarchies. Ma. Auxilio Medina J., Alfredo Sanchez and R. Omar Chavez-Garcia. Proceedings of the 17th International Conference on Electronics, Communications and Computers (CONIELECOMP). Puebla, Mexico, 2007.

Construction, Implementation and Maintenance of Ontologies of Records. Ma. Auxilio Medina, Alberto Chavez Aragon, and R. Omar Chavez-Garcia. In Proceedings of the Fourth Latin American Web Congress (LAWEB). Puebla, Mexico, May 2006.

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| 2014 | Multi-sensor Frontal Object Perception S105 - FOP - <i>Frontal Objects Perception (P032)</i> - IDDN.FR.001.180016.000.S.C.2014.000.20700 |
| 2014 | Multi-sensor Moving Object Classification S106 - MOC - <i>Moving Objects Classification (P033)</i> - IDDN.FR.001.180017.000.S.C.2014.000.20700 |

Conferences and Presentations

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| 2014 | Contributions to Perception for Intelligent Vehicles · National Institute of Astrophysics, Optics and Electronics, Puebla, Mexico |
| 2013 | Fusion Framework for Moving-object Classification · 16th International Conference on Information Fusion (FUSION), Istanbul, Turkey |
| 2012 | Frontal Object Perception Using Radar and Mono-Vision · IV Intelligent Vehicles Symposium, Alcalá de Henares, Spain |
| 2010 | Image Re-ranking Method Based on a Multimodal Markov Random Field · Automatic Image Annotation and Retrieval Workshop (AIARW), Puebla, Mexico |
| 2006 | Construction, Implementation and Maintenance of Ontologies of Records. · Fourth Latin American Web Congress, Puebla, Mexico |

Computer Skills

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| <i>Programming</i> | C++, Python, Javascript, PHP, Shell scripting, R, Java |
| <i>Laboratory Platforms</i> | ROS, Matlab |

Communication Skills

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| <i>Languages</i> | <i>English</i> · Professional proficiency |
| | <i>French</i> · Professional proficiency |
| | <i>Spanish</i> · Mother tongue |

Teaching Activities

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| <i>Co-supervisor Fall, 2016</i> | Integrative project "Stereo Vision Module for Parallel Architectures" for Master1 degree -- University Pierre and Marie Curie. Proposal and supervision of a Software-Hardware module for acquisition and processing of stereo data. |
| <i>Co-supervisor Spring, 2015</i> | Master2 internship: Sensori-motor representations for interactive robots -- University Pierre and Marie Curie. Association of perceptual elements from visual sensors and proprioceptive data to create sensori-motor representations. |
| <i>Teaching assistant Fall, 2012</i> | Informatique instrumentale et multimédia · Université Joseph Fourier Theory of Algorithms and Introduction to Programming for undergraduate students. |
| <i>Teaching formation Fall, 2012</i> | Le séminaire des Doctoriales · Doctoral Schools of University of Grenoble Didactic courses and seminars for teaching activities and methodologies. |

Affiliations and Awards

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| <i>April, 2016</i> | Member of the IEEE Technical Committee on Cognitive Robotics --- IEEE Robotics and Automation Society |
| <i>January, 2014</i> | Member of The International Society of Information Fusion |
| <i>November, 2010</i> | Best Master in Science thesis on Artificial Intelligence Award Granted by Mexican Society for Artificial Intelligence, for the thesis: 'Re-ranking of retrieved images using a combination of visual and textual features' |
| <i>November, 2009</i> | Best Student in Master in Computational Sciences Program Award Granted by the National Institute of Astrophysics Optics and Electronics, for an outstanding academic performance |
| <i>November, 2008</i> | Master in Science Scholarship Scholarship by the Mexican National Council of Science and Technology (CONACyT) |

Academic activities

Invited reviewer for:

- *Elsevier Computer Networks Journal* 2016
- *IEEE Transactions on Intelligent Transportation Systems* 2016
- *The Intelligent Vehicles Symposium* 2016
- *The Seventh International Conference on Social Robotics* 2015
- *The IEEE 18th International Conference on Intelligent Transportation Systems* 2015
- *The Intelligent Vehicles Symposium* 2015
- *The Intelligent Vehicles Symposium* 2014

Invited Program Committee Member for *The International Symposium on Intelligent Computing Systems* 2016

References

Raja Chatila, Ph.D. · *Director of Research* at the French National Center of Scientific Research (CNRS), and *Director* of the Institute of Intelligent Systems and Robotics (ISIR) at Pierre and Marie Curie University in Paris --- Architectures and Models for Adaptation and Cognition Research Group --- chatila@isir.upmc.fr

Olivier Aycard, Ph.D. · *Maître de Conférences - HDR* at University of Grenoble 1 (University Joseph Fourier) --- Data Analysis, Modeling and Machine Learning Research Group --- olivier.aycard@imag.fr

Enrique Sucar, Ph.D. · *Senior Research Scientist in the Department of Computational Sciences* at National Institute of Astrophysics, Optics and Electronics --- Robotics Research Group --- esucar@inaoep.mx

August 24, 2016