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Robotics Research Laboratory,
Department of Advanced Information Technology,
Graduate Faculty of Information Science and
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Spanish Citizenship

Research Interests

Pattern Analysis and Recognition, Machine Learning, Artificial Intelligence, Autonomous Robotics, Artificial and Natural Vision, Cognitive Systems, Biosignal Analysis, Neuroscience.

Education

Ph.D. Student in Computer Science, February 2005 - July 2008.

University of Freiburg, Germany.

Dissertation title: *Semantic Labeling of Places with Mobile Robots*.

Published as *Semantic Place Labeling with Mobile Robots*, Springer Tracts in Advanced Robotics (STAR), Springer, 2010.

Advisor: Prof. Dr. Wolfram Burgard.

M.Sc. Applied Computer Science, September 2002 - February 2005.

University of Freiburg, Germany.

M.Sc. Bioengineering, September 1998 - September 2000.

Miguel Hernandez University, Spain.

M.Eng. Computer Science, October 1992 - June 1997.

University of Alicante, Spain.

Academic Positions

Kyushu University, Japan. November 2010 - Present

JSPS postdoctoral fellow at the Robotics Research Laboratory, Department of Advanced Information Technology, Graduate Faculty of Information Science and Electrical Engineering.

University of Zaragoza, Spain. January 2009 - September 2010

Researcher in the Robotics, Perception and Real Time Group, Department of Computer Science and System Engineering.

University of Freiburg, Germany. February 2005 - August 2008

Researcher in the Autonomous Intelligent Systems Group, Dept. of Computer Science.

Miguel Hernández University, Spain. January 1999 - June 2000.

Researcher at the Bioengineering Institute.

Non-Academic Positions

Caja de Ahorros del Mediterraneo (Savings Bank), Spain. October 2008 - January 2009.
Financial risk analyst.

Caja de Ahorros del Mediterraneo (Savings Bank), Spain. June 2000 - June 2002.
System analyst and software developer for online banking.

Torrematica S.L. Spain. June 1998 - December 1998
System analyst and software developer.

Applications Engineering (IDASA). Spain. June 1997 - June 1998
Internship. Software developer.

Achievements

Best student paper award finalist. IEEE International Conference on Robotics and Automation (ICRA), 2005. Paper title: *Supervised learning of places from range data using AdaBoost.*

Fellowship. JSPS-Postdoctoral Fellowships for Foreign Researchers for a research stay at Kyushu University, Fukuoka, Japan. November 2010 - October 2012.

Fellowship.. Postdoctoral fellowship (Juan de la Cierva) from the Spanish Government. 2009-2012.

Fellowship. Fellowship from Canon Foundation in Europe for a research stay at Kyushu University, Fukuoka, Japan. March - May 2008.

Fellowship. Spanish predoctoral Fellowship (FPI). Miguel Hernández University, Alicante, Spain. January 1999 - June 2000.

Participation in Research Projects

HYPER Hybrid Neuroprosthetic and Neurorobotic Devices for Functional Compensation and Rehabilitation of Motor Disorders, 2010-2014 Spanish Project. Ministerio de Educacin y Ciencia. Consolider Ingenio. ID: CSD2009-00067.
Position: researcher.

Neuro-control cognitivo de prótesis robóticas y de miembros humanos por estimulación eléctrica funcional para aplicaciones de rehabilitación, 2009-2011
Spanish national project from Ministerio de Educacion y Ciencia. ID: DPI2009-14732-C02-01.
Position: researcher.

Cognitive Systems for Cognitive Assistants - CoSy, February 2005 - September 2008.
European Union FP6 IST Cognitive Systems Integrated project.
Position: researcher.

SmartTer. Vehicle for Autonomous Navigation and Mapping in Outdoor Environments, 2007.
Joint project between the ETH Zurich, the EPLF in Lausanne, and the University of Freiburg.
Participating in the European Land-Robot Trial (ELROB), 2006.
Position: researcher.

Sistema de percepción visual móvil y cooperativo como soporte para la realización de tareas con redes de robots, 2004-2007.
Spanish project from Ministerio de Educacion y Ciencia.
Position: researcher.

Mecanismos de degeneración, regeneración y reparación en un modelo experimental neurodegenerativo, June 1999 - June 2000.
Spanish project from Ministerio de Educacion y Ciencia.
Position: researcher.

Research Stays

Technische Universität München, Germany. February 2010 - July 2010.
 Intelligent Autonomous Systems Lab
 Computer Science Department
 Host: Professor Michael Beetz.

University of Freiburg, Germany. February 2009.
 Social Robotics Laboratory
 Department of Computer Science
 Host: Professor Kai O. Arras.

Kyushu University, Fukuoka, Japan. March 2008 - May 2008.
 Hasegawa Laboratory & Kurazume Laboratory
 Department of Intelligent Systems
 Graduate School of Information Science and Electrical Engineering
 Kyushu University
 Host: Professor Tsutomu Hasegawa, Professor Ryo Kurazume.

University of Ljubljana, Ljubljana, Slovenia. November 2005 - February 2006.
 Faculty of Computer and Information Science.
 Research topic: integration of vision and laser sensors for place labeling of autonomous robots in indoor environments.
 Host: Professor Ales Leonardis.

Kungl Tekniska Högskolan, Stockholm, Sweden. September 2005.
 Centre for Autonomous Systems.
 Research topic: integration of software for SLAM and place recognition for autonomous robots.
 Host: Professor Henrik I. Christensen.

Miguel Hernández University, Alicante, Spain. December 2006 - January 2007
 Automation, Robotics and Computer Vision Lab.
 Research topic: study of interest point detectors and descriptors for visual SLAM.
 Host: Professor Oscar Reinoso García.

Chairmanships / Editorial boards

- Co-Organizer of the ICRA 2009 Workshop on People Detection and Tracking, 2009.
- Guest editor of International Journal of Social Robotics (Special Issue on People Detection and Tracking), 2010.

Reviewing

- Reviewer for IEEE Transactions on Robotics (TRO) journal. Year 2009.
- Reviewer for The International Journal of Robotics Research (IJRR). Year 2010.
- Reviewer for Autonomous Robots (AR) journal. Year 2009.
- Reviewer for Robotics and Autonomous Systems (RAS) journal. Year 2009.
- Reviewer for IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI) journal. Year 2008.
- Reviewer for International Journal of Social Robotics (IJSR). Years 2009, 2010.
- Reviewer for Paladyn Journal of Behavioral Robotics. Year 2010.
- Reviewer for the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). Year 2007, 2008, 2009, 2010.
- Reviewer for the IEEE International Conference on Robotics and Automation (ICRA). Years 2006, 2007, 2008, 2009, 2010, 2011.
- Reviewer for the International Joint Conference on Artificial Intelligence (IJCAI). Year 2007.
- Reviewer for the European Conference on Mobile Robots (ECMR). Year 2007.

- Reviewer for IEEE International Symposium in Robot and Human Interactive Communication (RO-MAN). Year 2010.
- Reviewer for Robotics: Science and Systems Conference (RSS). Year 2011.

Membership

- IEEE Period 2005-2007.
- Bioengineering Institute, University Miguel Hernández, Spain. Period 1999-2000.

Languages

Spanish (Native), English, German, Catalan/Valencian, Japanese (beginner).

Teaching Experience

Technical University Munich, Germany:

- **Lecturer**, Summer term 2010.
Praktikum: Sensorgestützte intelligente Umgebungen (Intelligent Sensor Environments)
Language: English, German.

University of Freiburg, Germany:

- **Tutor**, Summer term 2007.
Seminar: Raumkognition (Spatial Cognition).
Language: German.
- **Tutor**, Winter term 2006 - 2007.
Seminar: Robot Navigation.
Language: English, German.
- **Tutor**, Summer term 2006.
Seminar: Autonomous Intelligent Systems.
Language: English, German.
- **Teaching Assistant**, Summer term 2006.
Lecture: Introduction to Mobile Robotics.
Language: English.
- **Tutor**, Winter term 2005-2006.
Seminar: Autonomous Mobile Systems.
Language: English, German.
- **Tutor**, Summer term 2005.
Seminar: Autonomous Mobile Systems.
Language: English, German.

Miguel Hernández University, Spain

- **Lecturer**, October-November, 2000.
Course: Redes Telematicas Avanzadas (Advanced Networks).
Language: Spanish.

References

Professor Wolfram Burgard
Institut fuer Informatik
Albert-Ludwigs-Universitt Freiburg
Georges-Koehler-Allee, Geb. 079
D-79110 Freiburg
Germany
Email: burgard@informatik.uni-freiburg.de

Professor Michael Beetz

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Professor Henrik I. Christensen

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Professor Aleš Leonardis

Visual Cognitive Systems Laboratory
Faculty of Computer and Information Science
University of Ljubljana
Tržaška 25
SI-1001 Ljubljana
Slovenia
Email: ales.leonardis@fri.uni-lj.si

Professor Tsutomu Hasegawa

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Professor Ryo Kurazume

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Japan
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Publications

Books

- O. M. Mozos, *Semantic Place Labeling with Mobile Robots*. Springer Tracts in Advanced Robotics (STAR), Germany: Springer, 2010. ISBN: 978-3-642-11209-6.

Editorials

- K. O. Arras and O. M. Mozos, eds., Special issue on people detection and tracking, vol. 2. *International Journal of Social Robotics*, March 2010.
- K. O. Arras and O. M. Mozos, eds., *Proceedings of the Workshop on People Detection and Tracking*, International Conference on Robotics and Automation (ICRA), May 2009.

Book Chapters

- A. Pronobis, P. Jensfelt, K. Sjö, H. Zender, G.-J. M. Kruijff, O. M. Mozos, and W. Burgard, Semantic modelling of space, in *Cognitive Systems* (H. I. Christensen, A. Sloman, G.-J. M. Kruijff, and J. Wyatt, eds.), *Cognitive Systems Monographs*, pp. 165-221, Germany: Springer, 2010.
- M. Ballesta, A. Gil, O. Reinoso, and O. M. Mozos, Evaluation of interest point detectors for visual SLAM, in *Recent Advances in Control Systems, Robotics and Automation* (S. Pennacchio, ed.), pp. 190-199, Italy: InternationalSar, second ed., January 2008.
- O. M. Mozos, A. Gil, M. Ballesta, and O. Reinoso, Interest point detectors for visual SLAM, in *12th Conference of the Spanish Association for Artificial Intelligence, CAEPIA 2007* (D. Borrajo, L. Castillo, and J. M. Corchado, eds.), vol. 4788 of *Lecture Notes in Artificial Intelligence*, pp. 170-179, Germany: Springer, 2008.
- R. Triebel, O. M. Mozos, and W. Burgard, Relational learning in mobile robotics: An application to semantic labeling of objects in 2D and 3D environment maps, in *Proc. 31th Annual Conference of the Gesellschaft für Klassifikation* (C. Preisach, H. Burkhardt, L. Schmidt-Thieme, and R. Decker, eds.), *Studies in Classification, Data Analysis, and Knowledge Organization*, pp. 293-300, Germany: Springer, 2008.
- O. M. Mozos, C. Stachniss, A. Rottmann, and W. Burgard, Using adaboost for place labeling and topological map building., in *Robotics Research: Results of the 12th International Symposium ISRR* (S. Thrun, R. Brooks, and H. Durrant-Whyte, eds.), vol. 28 of *STAR Springer tracts in advanced robotics*, pp. 453-472, Germany: Springer, 2007.

Journal Articles

- O. M. Mozos, J.A. Bolea, J.M. Fernandez, P.K. Anhalt, E. Fernandez, V-Proportion: A Method Based on the Voronoi Diagram to Study Spatial Relations in Neuronal Mosaics of the Retina, *Neurocomputing* (To appear).
- A. Gil, O. M. Mozos, M. Ballesta, and O. Reinoso, A comparative evaluation of interest point detectors and local descriptors for visual SLAM, *Machine Vision and Applications (MVA)*, vol. 21, pp. 905-920, October 2010.
- O. M. Mozos, R. Kurazume, and T. Hasegawa, Multi-part people detection using 2D range data, *International Journal of Social Robotics*, vol. 2, pp. 31-40, March 2010.
- A. Pronobis, O. M. Mozos, B. Caputo, and P. Jensfelt, Multi-modal semantic place classification, *International Journal of Robotics Research*, vol. 29, pp. 298-320, February-March 2010.
- C. Stachniss, O. M. Mozos, and W. Burgard, Efficient exploration of unknown indoor environments using a team of mobile robots, *Annals of Mathematics and Artificial Intelligence (AMAI)*, vol. 52, pp. 205-227, March 2009.
- H. Zender, O. M. Mozos, P. Jensfelt, G.-J. M. Kruijff, and W. Burgard, Conceptual spatial representations for indoor mobile robots, *Robotics and Autonomous Systems (RAS)*, vol. 56, pp. 493-502, June 2008.

- O. M. Mozos, R. Triebel, P. Jensfelt, A. Rottmann, and W. Burgard, Supervised semantic labeling of places using information extracted from sensor data, *Robotics and Autonomous Systems (RAS)*, vol. 55, pp. 391-402, May 2007.
- M. Ballesta, A. Gil, O. Reinoso, and O. M. Mozos, Evaluation of interest point detectors for visual SLAM, *International Journal of Factory Automation, Robotics and Soft Computing*, vol. 4, pp. 86-95, 2007.
- C. Stachniss, G. Grisetti, O. M. Mozos, and W. Burgard, Efficiently learning metric and topological maps with autonomous service robots, *it-Information Technology*, vol. 49, no. 4, pp. 232-237, 2007.
- P. Ahnelt, E. Fernandez, O. Martinez, J. A. Bolea, and A. Kueber-Heiss, Irregular s-cone mosaics in felid retinas. Spatial interaction with axonless horizontal revealed by cross-correlation, *Journal of the Optical Society of America A (JOSAA)*, vol. 17, pp. 580-588, March 2000.

Journal Abstracts

- E. Fernandez, A. Alfaro, J.-M. Tormos, R. Climent, O. Martinez, M. Martinez, and A. Pascual-Leone, Neurophysiological evaluation of visual cortex excitability using image-guided transcranial magnetic stimulation, *Investigative Ophthalmology and Visual Science (IOVS)*, vol. 43, no. 12, pp. 4485-, 2002.
- E. Fernandez, P. Ahnelt, O. Martinez, J. A. Bolea, and A. Kueber-Heiss, Correlacion espacial entre mosaicos de conos azules y celulas horizontales sin axon en retinas de felinos, *Revista de Neurologia*, vol. 30, pp. 219-, February 2000.

Conference Papers

- E. Lopez Larraz and O.M. Mozos and J. M. Antelis and J. Minguez, Syllable-Based Speech Recognition Using EMG, *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, (Buenos Aires, Argentina), September 2010.
- E. L. Larraz, O. M. Mozos, J. M. Antelis, J. D. Tajada, and J. M. Zafra, Diseño de un sistema de reconocimiento del habla mediante electromiografía, in *Actas del XXVII Congreso Anual de la Sociedad Española de Ingeniería Biomedica (CASEIB)*, (Cadiz, Spain), pp. 601-604, November 2009. (In Spanish).
- O. M. Mozos, J. A. Bolea, E. Fernandez, and P. K. Ahnelt, V-proportion: A method based on the voronoi diagram to study spatial relations between neuronal mosaics, in *Proceedings of the XIII Encuentros de Geometria Computacional*, (Zaragoza, Spain), pp. 131-138, June 2009.
- A. Pronobis, O. M. Mozos, and B. Caputo, SVM-based discriminative accumulation scheme for place recognition, in *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, (Pasadena, CA, USA), pp. 522-529, May 2008.
- O. M. Mozos, A. Gil, M. Ballesta, and O. Reinoso, Interest point detectors for visual SLAM, in *Proceedings of the Conference of the Spanish Association for Artificial Intelligence (CAEPIA)*, (Salamanca, Spain), pp. 217-226, November 2007.
- M. Ballesta, A. Gil, O. Reinoso, L. Paya, and O. M. Mozos, Evaluacion de detectores de puntos de interes para SLAM visual, in *XXVIII Jornadas de Automatica*, (Huelva, Spain,), September 2007.
- H. Zender, P. Jensfelt, O. M. Mozos, G.-J. M. Kruijff, and W. Burgard, An integrated robotic system for spatial understanding and situated interaction in indoor environments, in *Proceedings of the Conference on Artificial Intelligence (AAAI)*, (Vancouver, British Columbia, Canada), 2007.
- R. Triebel, O. M. Mozos, and W. Burgard, Relational learning in mobile robotics: An application to semantic labeling of objects in 2D and 3D environment maps, in *Annual Conference of the German Classification Society on Data Analysis, Machine Learning, and Applications (GFKL)*, (Freiburg, Germany), 2007.

- K. O. Arras, O. M. Mozos, and W. Burgard, Using boosted features for the detection of people in 2D range data, in Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), pp. 3402-3407, 2007.
- R. Triebel, R. Schmidt, O. M. Mozos, and W. Burgard, Instance-based amn classification for improved object recognition in 2d and 3d laser range data, in Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI), (Hyderabad, India), pp. 2225-2230, 2007.
- O. M. Mozos and W. Burgard, Supervised learning of topological maps using semantic information extracted from range data., in IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), (Beijing, China), 2006.
- A. Gil, O. Reinoso, W. Burgard, C. Stachniss, and O. M. Mozos, Improving data association in rao-blackwellized visual SLAM, in Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), (Beijing, China), pp. 2076-2081, 2006.
- A. Gil, O. Reinoso, C. Fernandez, A. Vicente, A. Rottmann, and O. M. Mozos, Simultaneous localization and mapping in unmodified environments using stereo vision, in Proceedings of the International Conference on Informatics in Control, Automation and Robotics (ICINCO), (Setbal, Portugal), pp. 302-309, 2006.
- C. Stachniss, O. M. Mozos, and W. Burgard, Speeding-up multi-robot exploration by considering semantic place information, in Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), (Orlando, FL, USA), pp. 1692-1697, 2006.
- A. Rottmann, O. M. Mozos, C. Stachniss, and W. Burgard, Semantic place classification of indoor environments with mobile robots using boosting., in Proceedings of the National Conference on Artificial Intelligence (AAAI), (Pittsburgh, PA, USA), pp. 1306-1311, 2005.
- O. M. Mozos, C. Stachniss, and W. Burgard, Supervised learning of places from range data using AdaBoost, in Proceedings of the IEEE International Conference on Robotics and Automation (ICRA), (Barcelona, Spain), pp. 1742-1747, 2005. **Finalist Best Student Paper.**
- E. Fernandez, J. Tormos, A. Alfaro, R. Climent, O. Martinez, and A. Pascual-Leone, Neurophysiological evaluation of visual cortex excitability using image-guided transcranial magnetic stimulation, in Annual Spring Meeting of the Association for Research in Vision and Ophthalmology (ARVO), (Fort Lauderdale, USA), May 2002.
- J. Bolea, O. Martinez, P. Ahnelt, and E. Fernandez, Estudio de la correlacion espacial en mosaicos de retina: un nuevo metodo basado en el diagrama de voronoi, in IV Congreso Iberoamericano de Biofisica, (Alicante, Spain), October 2000.
- A. Alfaro, M. Martinez, O. Martinez, J. Perez, R. Climent, E. Fernandez, and J. Tormos, Exploracion funcional en corteza occipital: cartografia de la representacion cortical de fosfenos mediante estimulacion magnetica transcranial, in XVII Congreso Nacional de Estudiantes de Medicina, (Alicante, Spain), October 1999.
- M. Martinez, A. Alfaro, J. Perez, O. Martinez, R. Climent, E. Fernandez, and M. Aviles, Cambios inducidos por estimulacion luminosa en la distribucion retiniana de la proteina quinasa C, in XVII Congreso Nacional de Estudiantes de Medicina, (Alicante, Spain), October 1999.
- E. Fernandez, P. Ahnelt, O. Martinez, J. A. Bolea, and A. Kueber-Heiss, Correlacion espacial entre mosaicos de conos azules y celulas horizontales sin axon en retinas de felinos, in VII Congreso de la Sociedad Española de Neurociencias (SENC), (Murcia, Spain), September 1999.
- E. Fernandez, P. Ahnelt, O. Martinez, J. A. Bolea, and A. Kueber-Heiss, Raeumliche korrelation des irregulaeren blau-zapfen mosaiks in saeuger-retinae mit axon horizontalzellen, in Proceedings of the Meeting Austrian Neuroscience Association (ANA), (Salzburg, Austria), September 1999.

Workshop/Symposium Papers

- O. M. Mozos, R. Kurazume, and T. Hasegawa, Multi-layer people detection using 2D range data, in Proceedings of the ICRA 2009 Workshop: People Detection and Tracking, 2009.
- M. Ballesta, A. Gil, O. M. Mozos, and O. Reinoso, Local descriptors for visual SLAM, in Workshop on Robotics and Mathematics (ROBOMAT), (Coimbra, Portugal), September 2007.

- O. M. Mozos, P. Jensfelt, H. Zender, G.-J. M. Kruijff, and W. Burgard, From labels to semantics: An integrated system for conceptual spatial representations of indoor environments for mobile robots, in Proceedings of the IEEE/RSJ IROS 2007 Workshop: From Sensors to Human Spatial Concepts, (San Diego, CA, USA), 2007.
- O. M. Mozos, P. Jensfelt, H. Zender, G.-J. M. Kruijff, and W. Burgard, From labels to semantics: An integrated system for conceptual spatial representations of indoor environments for mobile robots, in Proceedings of the IEEE ICRA Workshop: Semantic information in robotics, pp. 33-40, 2007.
- O. M. Mozos, A. Rottmann, R. Triebel, P. Jensfelt, and W. Burgard, Semantic labeling of places using information extracted from laser and vision sensor data, in Proceedings of the IEEE/RSJ IROS Workshop: From sensors to human spatial concepts, (Beijing, China), pp. 2772-2777, 2006.
- C. Stachniss, O. M. Mozos, A. Rottmann, and W. Burgard, Semantic labeling of places, in International Symposium of Robotics Research (ISRR), (San Francisco, CA, USA), October 2005.

Magazines and Unrefereed Journal Articles

- O. M. Mozos, Apuntes de inteligencia artificial: Machine learning, Occams's Razor, pp. 14-16, January 2008. (In Spanish).

Invited Talks

- O. M. Mozos, Semantic labeling of places with mobile robots, March 2008. Invited talk at the ESF-JSPS Frontier Science Conference for Young Researchers. Robotics: Experimental Cognitive Robotics.
- O. M. Mozos, Semantic labeling of places with mobile robots, December 2005. Invited talk at the Meeting of the Slovenian Pattern Recognition Society (SPRS).

Theses

- O. M. Mozos, Semantic Place Labeling with Mobile Robots. PhD thesis, Dept. of Computer Science, University of Freiburg, July 2008.
- O. M. Mozos, Supervised learning of places from range data using Adaboost, Master's thesis, University of Freiburg, December 2004.