Curriculum Vitæ

Andrea Censi
Computing and Mathematical Sciences,
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EDUCATION

California Institute of Technology, Pasadena, CA, USA.
Ph.D. in Control & Dynamical Systems — 9/2007 – 6/2012
Thesis: *Bootstrapping Vehicles: a Formal Approach to Unsupervised Learning of Robotic Sensorimotor Cascades Based on Invariance* [5]
Advisor: Richard M. Murray

Università di Roma "La Sapienza", Rome, Italy.
Laurea magistrale (M.Sc.) in Control Engineering & Robotics, *cum laude* — 5/2005 – 5/2007
Thesis: *Robot Motion Planning with Uncertainty* [27] (advisors: G. Oriolo, A. De Luca)

Università di Roma "La Sapienza", Rome, Italy.
Laurea (B.Sc.) in Automation & Control Engineering, *cum laude* — 9/2001 – 5/2005
Thesis: *Scan Matching in the Hough Domain* [33] (advisor: D. Nardi)

EMPLOYMENT

University of Zurich Zurich, Switzerland.
Visiting researcher, AI Lab. Host: D. Scaramuzza. — 10/2012 –

California Institute of Technology, Pasadena, CA, USA.
Postdoctoral scholar in Computing and Mathematical Sciences — 10/2012 –

California Institute of Technology, Pasadena, CA, USA.
Research assistant — 9/2008 – 9/2012

Tokyo Institute of Technology, Tokyo, Japan.
Visiting student, Hirose Laboratory and Nissan Motors, Ltd. — 9/2005 – 1/2006

FUNDING

NSF (NRI) Improved safety and reliability of robotic systems by faults/anomalies detection from uninterpreted signals of computation graphs — $860k, 10/2012 – 10/2015

HONORS

- Best student paper finalist [11] at ICRA 2012.
- Best conference finalist [14] at ICRA 2011.

PROFESSIONAL SERVICE

- Reviewer for robotics conferences/journals: IEEE Transactions on Robotics, IJRR, ICRA, IROS, Robotics: Science and Systems (RSS) program committee (since 2010). Senior program committee member for IJCAI 2013.
- Reviewer for control conferences/journals: IEEE Transactions on Automatic Control, IEEE Transactions on Signal Processing, Automatica, CDC, ACC.

PUBLICATIONS

Legend: link to pdf; link to slides; link to website with source code and datasets.

Preprints

[1] A. Censi, J. Strubel, C. Brandli, T. Delbruck, and D. Scaramuzza. *Low-latency localization by Active LED Markers tracking using a Dynamic Vision Sensor*. Tech. rep. California Institute of Technology, 2013.

[2] A. Nilsson and A. Censi. *Accurate recursive learning of uncertain diffeomorphism dynamics*. Tech. rep. California Institute of Technology, 2013.

[3] L. Carlone and A. Censi. "From Angular Manifolds to the Integer Lattice: Guaranteed Orientation Estimation with Application to Pose Graph Optimization". In: *ArXiv e-prints* (Nov. 2012).

[4] A. Censi, A. Nilsson, and R. M. Murray. *Motion planning in observations space with learned diffeomorphism models*. Tech. rep. CaltechCDSTR:2012.004. To appear in ICRA 2013. California Institute of Technology, 2012.

Dissertation

[5] A. Censi. *Bootstrapping Vehicles: A Formal Approach to Unsupervised Sensorimotor Learning Based on Invariance*. Tech. rep. California Institute of Technology, 2012.

Journal papers

[6] A. Censi and D. Scaramuzza. "Calibration by correlation using metric embedding from non-metric similarities". In: *IEEE Transactions on Pattern Analysis and Machine Intelligence* (Mar. 2013) DOI.

[7] A. Censi*, A. D. Straw*, R. W. Sayaman, R. M. Murray, and M. H. Dickinson. "Discriminating external and internal causes for saccade initiation in freely flying *Drosophila*". In: *PLOS Computational Biology* (Jan. 2013). (To appear).

[8] A. Censi, A. Franchi, L. Marchionni, and G. Oriolo. "Simultaneous calibration of odometry and sensor parameters for mobile robots". In: *IEEE Transactions on Robotics* (Apr. 2013). (To appear).

[9] D. Calisi, A. Censi, L. Iocchi, and D. Nardi. "Design choices for modular and flexible robotic software development: the OpenRDK viewpoint". In: *Journal of Software Engineering for Robotics* 1 (3 2012).

[10] A. Censi. "Kalman filtering with intermittent observations: convergence for semi-Markov chains and an intrinsic performance measure". In: *IEEE Transactions on Automatic Control* (Feb. 2011). ISSN: 0018-9286 DOI.

Conference papers

[11] A. Censi, M. Håkansson, and R. M. Murray. "Fault detection and isolation from uninterpreted data in robotic sensorimotor cascades". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Best student paper finalist. May 2012.

[12] A. Censi and R. M. Murray. "Learning diffeomorphism models of robotic sensorimotor cascades". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Saint Paul, MN, May 2012 DOI.

[13] P. Puente and A. Censi. "Dense Map Inference with User-Defined Priors: From Priorlets to Scan Eigenvariations". In: *Spatial Cognition VIII*. Ed. by C. Stachniss, K. Schill, and D. Uttal. Vol. 7463. Lecture Notes in Computer Science. Springer Berlin Heidelberg, Aug. 2012, pp. 94–113. ISBN: 978-3-642-32731-5 DOI.

[14] A. Censi and R. M. Murray. "Bootstrapping bilinear models of robotic sensorimotor cascades". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Best conference paper finalist. Shanghai, China, May 2011.

[15] A. Censi and R. M. Murray. "Bootstrapping sensorimotor cascades: a group-theoretic perspective". In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. San Francisco, CA, Sept. 2011 DOI.

[16] A. Censi and R. M. Murray. "Uncertain semantics, representation nuisances, and necessary invariance properties of bootstrapping agents". In: *Joint IEEE International Conference on Development and Learning and Epigenetic Robotics*. Frankfurt, Germany, Aug. 2011 DOI.

[17] D. Scaramuzza, A. Censi, and K. Daniilidis. "Exploiting motion priors in visual odometry for vehicle-mounted cameras with non-holonomic constraints". In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. San Francisco, CA, Sept. 2011 DOI.

[18] S. Han, A. Censi, A. D. Straw, and R. M. Murray. "A bio-plausible design for visual pose stabilization". In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Taipei, Taiwan, Oct. 2010, pp. 5679–5686 DOI.

[19] S. Carpin and A. Censi. "An experimental assessment of the HSM3D algorithm for sparse and colored data". In: *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. St. Louis, MO, Oct. 2009, pp. 3595–3600 DOI.

[20] A. Censi. "On achievable accuracy for pose tracking". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Kobe, Japan, May 2009 DOI.

[21] A. Censi. "On the performance of Kalman filtering with intermittent observations: a geometric approach with fractals". In: *Proceedings of the American Control Conference (ACC)*. St. Louis, Missouri, June 2009 DOI.

[22] A. Censi and S. Carpin. "HSM3D: Feature-Less Global 6DOF Scan-Matching in the Hough/Radon Domain". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Kobe, Japan, May 2009 DOI.

[23] A. Censi, S. Han, S. B. Fuller, and R. M. Murray. "A bio-plausible design for visual attitude stabilization". In: *Proceedings of the 48th IEEE Conference on Decision and Control*. Shanghai, China, Dec. 2009 DOI.

[24] A. Censi and R. M. Murray. "Real-valued consensus over noisy quantized channels". In: *Proceedings of the American Control Conference (ACC)*. St. Louis, Missouri, June 2009 DOI.

[25] D. Calisi, A. Censi, L. Iocchi, and D. Nardi. "OpenRDK: A Modular Framework for Robotic Software Development". In: *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Nice, France, Sept. 2008 DOI.

[26] A. Censi. "An ICP variant using a point-to-line metric". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Pasadena, CA, May 2008 DOI.

[27] A. Censi, D. Calisi, A. D. Luca, and G. Oriolo. "A Bayesian framework for optimal motion planning with uncertainty". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Pasadena, CA, May 2008 DOI.

[28] A. Censi, L. Marchionni, and G. Oriolo. "Simultaneous maximum-likelihood calibration of robot and sensor parameters". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Pasadena, CA, May 2008 DOI.

[29] A. Censi and G. D. Tipaldi. "Lazy Localization using the Frozen-Time Smoother". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Pasadena, CA, May 2008 DOI.

[30] A. Censi. "An accurate closed-form estimate of ICP's covariance". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Rome, Italy, Apr. 2007, pp. 3167–3172 DOI.

[31] A. Censi. "On achievable accuracy for range-finder localization". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Rome, Italy, Apr. 2007, pp. 4170–4175 DOI.

[32] A. Censi. "Scan matching in a probabilistic framework". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Orlando, Florida, May 2006, pp. 2291–2296 DOI.

[33] A. Censi, L. Iocchi, and G. Grisetti. "Scan matching in the Hough domain". In: *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*. Barcelona, Spain, 2005, pp. 2739–2744 DOI.