Curriculum Vitae Stefano Rosa

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Qualification Summary

Research and working experience in estimation and optimization for autonomous navigation of mobile robots (SLAM, multi-robot localization, path planning, task allocation), artificial intelligence for human-robot cooperation, computer vision, human-machine interaction, assistive technologies.

Education

Jan. 2011 to Apr. 2014: Ph.D. in Mechatronics
Institution: IIT Istituto Italiano di Tecnologia, Genova, Italy and
Politecnico di Torino, Turin, Italy
Dissertation: Localization and Mapping for Service Robotics Applications

Sep. 2005 to Jan. 2008: M.Eng. in Computer Engineering
Institution: Politecnico di Torino, Turin, Italy

Sep. 2002 to Sep. 2005: B.Eng. in Computer Engineering
Institution: Politecnico di Torino, Turin, Italy

Employment

Aug. 2020 to now: Senior Researcher
Institution: Istituto Italiano di Tecnologia, Genova, Italy
Topics: Autonomous robot navigation in dynamic environments
Projects: - 5GTOURS

Oct. 2016 to Jan 2020: PostDoc Researcher, Senior PostDoc
Institution: University of Oxford
Topics: Learning intuitive physics for human-robot interaction and navigation. Long-term localization and navigation of robots and people in GPS denied environments using fusion of visual and non-visual opportunistic signals. Using robot navigation experiences to assist in human localization and navigation, and vice versa with cross-modality training.
Projects:
- ESPRC programme grant "Mobile Robotics: Enabling a Pervasive Technology of the Future" (EP/M019918/1) in collaboration with Oxford Robotics Institute
- DementiaUK Deep and Frequent Phenotyping (DFP)
- InnovateUK (in collaboration with Navenio Ltd)

Jan. 2012 to 2016: Research fellow

Institution: Politecnico di Torino - Telecom Italia Joint Open Lab, Turin, Italy

Topics: Robust Simultaneous Localization And Mapping (SLAM) for industrial service robotics, visual-based localization, object detection and pose estimation for pick and place

Projects:

- HOTBOT, an autonomous mobile robot for data center hotspot detection
- FLY4SMARTCITY, cloud-robotics for Unmanned Aerial Vehicles (UAVs)
- VIRGIL, a tele-presence museum tour-guide robot
- PARLOMA, a low-cost robotic hand for remote communication between deaf-blind users

Jan. 2011 to Apr. 2014: Ph.D. student in Mechatronics

Institution: Istituto Italiano di Tecnologia, Genova, Italy and
Politecnico di Torino, Turin, Italy

Topics: Laser-based long-term localization and SLAM for service robotics; 3D computer vision algorithms for space robotics applications

Projects:

- Development of a system for astronaut's body mass estimation using a vision sensor in microgravity environments
- Space debris detection using wide-baseline stereo cameras

Jan. 2008 to Dec. 2010: Research fellow

Institution: Politecnico di Torino, Turin, Italy

Topics: Design and implementation of algorithms for mobile robot localization, sensor fusion, vision-based SLAM, Wi-Fi based communication, path-planning and video surveillance

Projects:

- MACp4LOG: a mobile robotic platform, with on-board vision systems and sensors, integrating a flexible wireless communication solution, for monitoring and surveillance in logistic environments

May. 2005 to Dec. 2005: Java developer

Company: E-Mentor S.r.L.

Project:

- Development of graphical user interfaces for e-learning platforms and development of a role playing game for e-learning

Professional Activities

Speaker: Approcci innovativi e applicazioni della visione artificiale, Aosta, November, 2010; EuroScience Open Forum - ESOF, Turin, July, 2010; invited speaker at StrongMar Winter School, Edinburgh, 2018

Reviewer for int. journals and conferences: Topics editor for Sensors**; reviewer for** Transactions on Robotics T-RO, Transactions on Industrial Informatics TII, Journal of Intelligent & Robotic Systems; Intelligent Service Robotics; International Conference on Robotics and Automation - ICRA; International Conference on Intelligent RObots and Systems - IROS; Conference on Decision and Control - CDC

Co-Founder: Hotblack Robotics, 2016 (Open-Source Cloud Robotics solutions)

Teaching

Assistant lecturer for Automatic Control, Politecnico di Torino, 2013;
Basics of Automatic Control, Politecnico di Torino, 2012; Robotics, Politecnico di Torino, 2013-2015

Lecturer for Ph.D. course: Research topics in computer and control engineering - Introduction to probabilistic robotics, Politecnico di Torino, 2010-2012

Awards

National Award for Innovation - Premio Perotto Zucca
Startup Weekend Turin 2013 - Mind the Bridge grant

Languages

English: fluent (speaking, reading, writing), IELTS; **French**: basic

Publications

Journal papers

1. Saputra R.U., B. de Gusmao P.B., Lu X., Almalioglu Y., Rosa S. et al., **Deeptio: A deep thermal-inertial odometry with visual hallucination**, Robotics and Automation Letters RA-L, 2020

2. Yang B., Rosa S., Markham A., Trigoni N., Wen H., **Dense 3D Object Reconstruction from a Single Depth View**, Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2018, DOI: 10.1109/TPAMI.2018.2868195

3. Rosa S., Patane' A., Lu X., Trigoni N., **Semantic Place Understanding for Human-Robot Coexistence - Towards Intelligent Workplaces**, Transactions on Human-Machine Systems (THMS), 2018, DOI: 10.1109/THMS.2018.2875079

4. Rosa S., Toscana G., Bona B. **Q-PSO: Fast Quaternion-based Pose Estimation From RGB-D Images**, Journal of Intelligent and Robotic Systems, 2017, DOI: 10.1007/s10846-017-0714-3

5. Anjum M.L., Rosa S., Bona B. **Tracking a subset of skeleton joints - An effective approach towards complex human activity recognition**, Journal of Robotics, vol. 2017, DOI:10.1155/2017/7610417

6. Russo L.O., Rosa S., Maggiora M., Bona B. **A Novel Cloud Based Service Robotics Application to Data Center Environmental Monitoring**, Sensors, 2016, DOI: 10.3390/s16081255

7. Russo L.O., Farulla G., Pianu D., Salgarella A., Controzzi M., Cipriani C., Oddo C., Geraci C., Rosa S., Indaco M., **PARLOMA - a remote communication system for deafblind persons by means of gesture recognition**, International Journal of Advanced Robotic Systems, 2015, ISSN: 1729-8806, DOI: 10.5772/60416

8. Ermacora G., Rosa S., Toma A., **Fly4SmartCity: a Cloud Robotics Service for Smart City Applications**, Journal of Ambient Intelligence and Smart Environments, 2016, DOI: 10.3233/AIS-160374

9. Bona B., Carlone L., Indri M., Rosa S., **Supervision and monitoring of logistic spaces by a cooperative robotic team: methodologies, problems, and solutions**, Intelligent Service Robotics, 2014, DOI: 10.1007/s11370-014-0151-0

10. Abrate F., Bona B., Indri M., Rosa S., Tibaldi F., **Multirobot Localization in Highly Symmetric Environments,** Journal of Intelligent and Robotic Systems, 2013, DOI: 10.1007/s10846-012-9790-6

11. Abrate F., Bona B., Indri M., Rosa S., Tibaldi F., **Multi-robot map updating in dynamic environments**, in Springer Tracts in Advanced Robotics, Volume 83, 2013, DOI: 10.1007/978-3-642-32723-0

Conference papers

1. Hu Q., Yang B., Xie L., Rosa S., Guo Y., Wang Z., Trigoni N., Markham A, **RandLA-Net: Efficient Semantic Segmentation of Large-Scale Point Clouds,** Conference on Computer Vision and Pattern Recognition (CVPR) 2020

2. Lu X., Rosa S., Zhao P., Wang B., Chen C., Stankovic J., Trigoni N., Markham A., **See Through Smoke: Robust Indoor Mapping with Low-cost mmWave Radar**, Mobisys 2020

3. Chen C., Rosa S., Miao Y., Lu X., Wu W., Markham A., Trigoni N., **Selective Sensor Fusion for Neural Visual Inertial Odometry,** Conference on Computer Vision and Pattern Recognition (CVPR), Long Beach, 2019

4. Rosa S.*, Wang Z.*, Markham A., **Learning the Intuitive Physics of Non-Rigid Object Deformations,** NeurIPS Workshop: Modeling the Physical World: Perception, Learning, and Control, Montreal, 2018

5. Rosa S., Patanè A., Lu X., Trigoni N., **CommonSense: Collaborative Learning of Scene Semantics by Robots and Humans**, IoPARTS workshop, ACM MobySys 2018, Munich, DE

6. Wang Z.*, Rosa S.*, Wei B., Wang S., Markham A., Trigoni N., **3D-PhysNet: Learning the Intuitive Physics of Non-Rigid Object Deformations**, IJCAI 2018, Stockholm, SWE

7. Rosa S.*, Wang Z.*, Yang B., Linhai X., Wang S., Markham A., Trigoni N., **Defo-Net: Learning Body Deformation using Generative Adversarial Networks**, ICRA 2018, Brisbane, AU

8. Linhai X., Wang S., Rosa S., Trigoni N., **Learning with Training Wheels: Speeding up Training with a Simple Controller for Deep Reinforcement Learning**, ICRA 2018, Brisbane, AU

9. Lu X., Kan X., Rosa S., Wen H., Markham A., Trigoni N., **Towards Self-supervised Face Labeling via Cross-modality Association**, poster, SenSys 2017, Amsterdam, NL

10. Rosa S., Lu X., Wen H., Trigoni N., **Leveraging User Activities and Mobile Robots for Semantic Mapping and User Localization**. HRI 2017 Late Breaking Reports, Vienna

11. Rosa S., Toscana G. **Fast Feature-Less Quaternion-based Particle Swarm Optimization for Rigid and Articulated Pose Estimation From RGB-D Images**, R6D2016 Workshop, ECCV 2016, Amsterdam, NL

12. Toscana G., Rosa S., **Fast Feature-Less Quaternion-based Particle Swarm Optimization for Object Pose Estimation From RGB-D Images**, BMVC 2016, York, UK

13. Rosa S., Toscana G., **Fast Graph-Based Object Segmentation for RGB-D Images,** Intellisys 2016, London,UK

14. Rosa S., Russo L.O., Toscana G., Primatesta S., Kaouk Ng M., Bona B., **Leveraging the Cloud for Connected Service Robotics Applications**, Workshop on Robotics and Technology Transfer, ETFA 2015, Luxemburg, LU

15. B. de Gusmao P.B., Rosa S., Magli E., Lepsøy S., Francini L., **Robotics Navigation Using MPEG CDVS**, 17th International Workshop on Multimedia Signal Processing, MMSP 2015, Xiamen, China

16. Rosa S., Russo L.O., Bona B., **Towards A ROS-Based Autonomous Cloud Robotics Platform for Data Center Monitoring.** In: the 19th IEEE International Conference on Emerging Technologies and Factory Automation (ETFA), Barcelona, Spain, 2014

17. Lupetti M.L., Rosa S., Ermacora G., **From a Robotic Vacuum Cleaner to Robot Companion: Acceptance and Engagement in Domestic Environments**. HRI 2015 Late breaking reports, Christchurch NZ

18. Ermacora G., Toma A., Rosa S., Antonini R., **A cloud based service for management and planning of autonomous UAV missions in smartcity scenario.** MESAS-14, May 5 - 6, 2014, Roma, Italy

19. Ermacora G., Toma A., Rosa S., Antonini R., **Leveraging open data for supporting a cloud robotics service in a smart city environment**. IAS-13, July 15 - 19, 2014, Padova, Italy

20. Rosa S., Russo L.O., Airò Farulla G., Antonini R., Gaspardone M., Carlone L., Bona B., **An Application of Laser-Based Autonomous Navigation for Data-Center Monitoring.** IAS-13, July 15 - 19, 2014, Padova, Italy

21. Yuan Z., Rosa S., Russo L.O., Bona B., **A Kinect-based Front-end for Graph-SLAM Using Plane Matching in Planar Indoor Environments.** IAS-13, July 15 - 19, 2014, Padova, Italy

22. Anjum M., Ahmad O., Rosa S., Yin J., Bona B., **Skeleton Tracking Based Complex Human Activity Recognition Using Kinect Camera.** In: Social Robotics / Beetz,Springer International Publishing, pp. 23-33. ISBN 9783319119724

23. Airo Farulla G., Russo L.O., Pintor C., Pianu D., Micotti G., Salgarella A.R., Camboni D., Controzzi M., Cipriani C., Oddo C.M., Rosa S., Indaco M., **Real-time single camera hand gesture recognition system for remote deaf-blind communication.** In: 1st International Conference on Augmented and Virtual Reality, Lecce, 17-20 September 2014.

24. Yin J., Carlone L., Rosa S., Anjum M.L., Bona B., **Scan Matching for Graph SLAM in Indoor Dynamic Scenarios,** 27th International FLAIRS Conference, May 21 - 23, 2014, Pensacola Beach, Florida, USA

25. Russo L.O., Rosa S., Matteucci M., Bona B., **A ROS Implementation of the Mono-SLAM Algorithm**, International Conference on Artificial Intelligence & Applications (ARIA-2014), 2014

26. Russo L.O., Airò farulla G., Indaco M., Rosa S., Rolfo D., Bona B., **Blurring prediction in Monocular SLAM**, 8th IEEE International Design & Test Symposium 2013 (IDT), 2013

27. L. Carlone, J. Yin, S. Rosa, Z. Yuan, **Graph optimization with unstructured covariance: fast, accurate, linear approximation.** In: Simulation, Modeling, and Programming for Autonomous Robots (SIMPAR 2012), 2012.

28. Rosa S., Paleari M., Ariano P., Bona B., **Object Tracking with Adaptive HOG Detector and Adaptive Rao-Blackwellised Particle Filter.** In: SPIE 8301, Intelligent Robots and Computer Vision XXIX: Algorithms and Techniques, 2012.

29. Paleari M., Margaria V., Rosa S., Ariano P., **HExEC: hand exoskeleton electromyographic control**, 4th International Workshop on Human-Friendly Robotics (HFR 2011), University of Twente, The Netherlands

30. Macchia V.; Rosa S; Carlone L; Bona B., **An Application of Omnidirectional Vision to Grid-based SLAM in Indoor Environments.** In: Workshop on Omnidirectional Robot Vision, International Conference on Robotics and Automation (ICRA 2010), 2010.

31. Abrate F; Bona B; Indri M; Rosa S.; Tibaldi F., **Map updating in dynamic environments.** In: ISR/ROBOTIK 2010

32. Brevi D., Fileppo F. , Scopigno R. , Abrate F., Bona B., Rosa S., Tibaldi F., **Hybrid localization solutions for robotic logistic applications.** In: Technologies for Practical Robot Applications (TePRA), 2009.

33. Abrate F; Bona B.; Indri M; Rosa S; Tibaldi F., **Three-State Multirobot Collaborative Localization in Symmetrical Environments.** In: ROBOTICA 2009

34. Abrate F; Bona B; Indri M.; Rosa S; Tibaldi F., **Switching Multirobot Collaborative Localization in Symmetrical Environments.** In: IROS 2008 2nd Workshop on Planning, Perception and Navigation for Intelligent Vehicles, 2008.

Links

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