Curriculum Vitæ

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Name **Antonio Paolillo**

Nationality Italian

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Research interests

Robotics, machine learning and AI for robotics, robotic control, humanoid robots, visual servoing

Current position

May 2020 - present **Researcher at Dalle Molle Institute for Artificial Intelligence (IDSIA), USI-SUPSI, Lugano, Svizzera.**

Previous positions and education

Oct. 2019 - Apr. 2020 **Post-doc researcher at EPFL (École polytechnique fédérale de Lausanne, Switzerland), Laboratory of Intelligent Systems.**

Jan. 2018 - Aug. 2019 **Post-doc researcher at Idiap Research Institute, Martigny, Switzerland.** Visual servoing, linear quadratic regulator, model predictive control, Gaussian process regression.

Apr. 2015 - Dec. 2017 **Post-doc researcher at Laboratoire d'Informatique de Robotique et de Microélectronique de Montpellier (LIRMM), CNRS/University of Montpellier, France.** Visual estimation of articulated floating-based objects and dynamic perception for safe physical interaction.

Apr. 2015 - Nov. 2015 **Visiting researcher at the CNRS-AIST Joint Robotics Lab (JRL), Tsukuba, Japan.** Development of a vision-based algorithm for making the HRP-2 humanoid robot drive a real car.

Jun. 2015 **Member of the AIST-NEDO team at the DARPA Robotics Challenge Finals, Pomona, California.** Responsible for the driving task; design of a semi-autonomous driving strategy to make the humanoid HRP-2 successfully drive a car during the competition.

Dec. 2014 - Mar. 2015 **Researcher at Robotics Laboratory, Dipartimento di Informatica e Sistemistica (DIS), Sapienza University of Rome, Italy.** Development of vision-based algorithms for navigation purposes using optical-flow information.

Nov. 2011 - Nov. 2014 **PhD student in System Engineering at Robotics Lab of Dipartimento di Ingegneria Informatica, Automatica e Gestionale (DIAG), Sapienza University of Rome, Italy.** Development of vision-based algorithms for the navigation, localization and device-operation with humanoids. Simulations and real experiments carried out with NAO humanoid robot.

Defence March 16, 2015.

Thesis	Vision-based control of humanoid robots interacting with the real world.
Advisors	Prof. A. De Luca and Prof. M. Vendittelli
Jan. 2014 - Jul. 2014.	**Visiting researcher at Laboratoire d'Informatique de Robotique et de Microélectronique de Montpellier (LIRMM), University of Montpellier, France.** Development of a sensor-based framework for making the real HRP-4 humanoid robot drive a simulated car in a video game set-up.
Mar. 2011 - Oct. 2011	**Research collaborator at Robotics Laboratory, Dipartimento di Informatica e Sistemistica (DIS, now DIAG), Sapienza University of Rome, Italy.** Study and analysis of a footstep planner and a walking motion generation for humanoids.
Oct. 2008 - Jan. 2011	**Master degree in Electronic Engineering at Sapienza University of Rome, Italy**
Defence	January 2011.
Final grade	110/110 cum laude.
Thesis	Walking motion generation for a humanoid robot based on model predictive control
Advisors	Prof. A. De Luca (Sapienza University of Rome, Italy) and Dr. D. Dimitrov (Örebro University, Sweden).
May 2010 - Dec. 2010	**Visiting student at Mobile Robotics and Olfaction Lab of the Centre for Applied Autonomous Sensor Systems (AASS) laboratories of the Örebro University, Sweden.** Development of a walking motion generator for humanoids. Experiments carried out with NAO humanoid robot.

Personal skills

Language proficiency	– Italian (native) – English (fluent) – French (intermediate)
Managerial & Communication skills	– International working experience (Italy, Sweden, France, Japan, Switzerland). – Organization of international events, such as workshop and PhD school. – Co-supervision of Bachelor, Master and PhD students.
Technical skills	– Matlab, Python and C++ programming. – Expertise in robotic programming and simulation. – Hands-on experience with robotics platforms (humanoid robots NAO, HRP-2Kai, HRP-4; Panda robotic manipulator). – Familiar with LaTeX for scientific writing; programs for videos/pictures editing.
Hobbies	Drawing and watercolor painting, cooking, traveling, sport (football, running/trail running, hiking, ski).

Talks and seminars

Mar. 30, 2022	"Visual servoing", Seminar at USI Robotics course taken by Prof. A. Giusti, Lugano, Switzerland.
Aug. 25, 2021	"Visual servoing for navigation and manipulation", Lecture at the GMAR Summer School, Innsbruck, Austria.

Apr. 21, 2021	"Visual servoing", Seminar at USI Robotics course taken by Prof. A. Giusti, Lugano, Switzerland.
Dec. 20, 2019	"Vision-based robotic localization, navigation and interaction", talk at IDSIA, Lugano, Switzerland.
Dec. 12, 2019	"Localize, navigate, interact: the humanoid robotics experience", talk at the robotics group of CERN, Genève, Switzerland.
May 15, 2019	"Closed-loop robotic manipulation of articulated objects", talk at Larsen group, INRIA, Nancy, France.
Jun. 20, 2017	"Humanoid robot driving a car autonomously: a sensor-based approach", talk at the Journeés Nationales de la Robotique Humanoïde, Montpellier, France.
Oct. 27, 2016	"Vision-based control algorithms for humanoids performing everyday tasks", talk at IRCAD, University of Strasbourg, France.
Oct. 26, 2016	"Vision-based control algorithms for humanoids performing everyday tasks.", talk at the Humanoid Robots Lab, University of Bonn, Germany.
Aug. 28, 2015	"Vision-based control of humanoid robots interacting with the real world", talk at GVLab, Tokyo University of Agriculture and Technology, Japan.

Media

Apr. 15, 2022	"Study Ranks Jobs Threatened by Robots—and Offers Robot-Safe Options", by Abigail Eisenstadt, aaas.org. Article on the research carried out in the paper [J1] (see Publication list) available at `https://www.aaas.org/news/study-ranks-jobs-threatened-robots-and-offers-robot-safe-options`
Dec. 11, 2014	"El futuro robot conductor", by Ángel Luis Sucasas, El País. Article on the research carried out in the paper [C12] (see Publication list) available at `https://elpais.com/elpais/2014/11/24/ciencia/1416846426_922222.html`).

Scientific activities

Organization of scientific events	A. Paolillo, F. Flacco, and E. Yoshida, "The use of dynamics in the field of humanoid robots: identification, planning, perception and control," full-day workshop at the 2016 IEEE-RAS International Conference on Humanoid Robots, Cancun, Mexico, 2016. Webpage (`https://www.lirmm.fr/humanoids16workshop`) not online anymore.
	Main organizer of the MEMMO Winter School. Responsible for the didactic program, social events, administrative and logistic aspects. Webpage available at: `https://memmows.sciencesconf.org/`
Scientific service	Associate Editor for - 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) - 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
	In the international program committee of the 2016 IEEE/SICE International Symposium on System Integration (`http://www.si-sice.org/SII2016/committee.html`)

Reviewer of journal and conference papers: IEEE Robotics & Automation Magazine (RAM); IEEE Robotics and Automation Letters (RA-L); Journal of Computer Vision and Image Understanding (CVIU); IEEE International Conference on Robotics and Automation (ICRA); IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS); International Conference on Advanced Robotics (ICAR); IEEE-RAS International Conference on Humanoid Robots (Humanoids); IEEE/SICE International Symposium on System Integration (SII); CIRP Conference on Manufacturing Systems (CMS).

Award, funding and grants

Virtual Reality and Hand Exoskeleton for Mirror Therapy: a Feasibility Study (VRHEM), project approved by Swiss Innovation Council (Innolink: 100.533 IP-ICT) (62000.1 IP-ICT), May 2022.

Efficient Vision-based Robotic Control (EViRCo), project funded by Hasler Fundation, June 2021.

Swiss-European Mobility Program (SEMP), grant for training activities with an European partner in 2021/2022.

Co-author of the best student paper award at the *13th IEEE Conference on Automation Science and Engineering*, 2017 (see paper [C9] in the Publications list).

Publications*

Journal papers

[J1] A. Paolillo*, F. Colella*, N. Nosengo*, F. Schiano, W. Stewart, D Zambrano, I. Chappuis, R. Lalive, D. Floreano "How to compete with robots by assessing job automation risks and resilient alternatives," Science Robotics 7 (65), eabg5561, 2022

[J2] M. Nava, A. Paolillo, J. Guzzi, L. Gambardella, A. Giusti, "Learning Visual Localization of a Quadrotor Using its Noise as Self-Supervision," *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 2218-2225, Apr. 2022 (on-line since Jan. 2022).

[J3] M. Nava, A. Paolillo, J. Guzzi, L. M. Gambardella, A. Giusti, "Uncertainty-Aware Self-Supervised Learning of Spatial Perception Tasks," *IEEE Robotics and Automation Letters*, vol. 6, no. 4, pp. 6693-6700, Oct. 2021 (on-line since July 2021).

[J4] T.S. Lembono, A. Paolillo, E. Pignat, S. Calinon, "Memory of motion for warm-starting trajectory optimization," *IEEE Robotics and Automation Letters*, vol. 5, no. 2, pp. 2594–2601, 2020.

[J5] M. Ferro, A. Paolillo, A. Cherubini, M. Vendittelli, "Vision-based navigation of omnidirectional mobile robots," *IEEE Robotics and Automation Letters*, vol. 4, no. 3, pp. 2691-2698, July 2019 (on-line since 24 April 2019).

[J6] A. Paolillo, K. Chappellet, A. Bolotnikova, A. Kheddar, "Interlinked visual tracking and robotic manipulation of articulated objects," *IEEE Robotics and Automation Letters*, vol. 3, no. 4, pp. 2746–2753, Oct. 2018 (on-line since 11 May 2018).

[J7] A. Paolillo, P. Gergondet, A. Cherubini, M. Vendittelli, A. Kheddar, "Autonomous car driving by a humanoid robot," *Journal of Field Robotics*, vol. 35, no. 2, pp. 169–186, 2018 (on-line since 19 June 2017).

*Authors equally contributed.

[J8] A. Paolillo, A. Faragasso, G. Oriolo, M. Vendittelli, "Vision-based maze navigation for humanoid robots," *Autonomous Robots*, vol. 41, no. 2, pp. 293-309, 2017 (on-line since 27 January 2016).

[J9] G. Oriolo, A. Paolillo, L. Rosa, M. Vendittelli, "Humanoid odometric localization integrating kinematic, inertial and visual information," *Autonomous Robots*, vol. 40, no. 5, pp. 867–879, 2016 (on-line since 22 September 2015).

International conference papers

[C1] A. Paolillo, M. Nava, D. Piga, A. Giusti, "Visual Servoing with Geometrically Interpretable Neural Perception," *IEEE International Conference on Intelligent Robots and Systems*, 2022

[C2] A Paolillo, G Abbate, A Giusti, Š Trakić, H Dzafic, A Fritz, J Guzzi, "Towards the integration of a pointing-based human-machine interface in an industrial control system compliant with the IEC 61499 standard," *Procedia CIRP*, 107, 1077-1082, 2022.

[C3] A. Paolillo*, M. Saveriano*, "Learning Stable Dynamical Systems for Visual Servoing," *IEEE International Conference on Robotics and Automation*, pp. 8636–8642, 2022.

[C4] J. Guzzi, G. Abbate, A. Paolillo, A. Giusti, "Interacting with a Conveyor Belt in Virtual Reality using Pointing Gestures," *ACM/IEEE International Conference on Human-Robot Interaction*, pp. 1194–1195, 2022.

[C5] G. Abbate, A. Giusti, A. Paolillo, B. Gromov, L. Gambardella, A. E. Rizzoli, J. Guzzi, "PointIt: A ROS Toolkit for Interacting with Co-located Robots using Pointing Gestures," *ACM/IEEE International Conference on Human-Robot Interaction*, pp. 608-612, 2022.

[C6] E. Mingo Hoffman, A. Paolillo*, "Exploiting visual servoing and centroidal momentum for whole-body motion control of humanoid robots in absence of contacts and gravity," *IEEE International Conference on Robotics and Automation*, pp. 2979–2985, 2021.

[C7] A. Paolillo, T.S. Lembono, S. Calinon, "Using a memory of motion to efficiently achieve visual predictive control tasks", *IEEE International Conference on Robotics and Automation*, Paris, France, 2020.

[C8] A. Paolillo, A. Bolotnikova, K. Chappellet, A. Kheddar, "Visual estimation of articulated objects configuration during manipulation with a humanoid," *2017 IEEE/SICE International Symposium on System Integration*, pp. 330–335, Dec. 2017.

[C9] A. Bolotnikova, K. Chappellet, A. Paolillo, A. Escande, G. Anbarjafari, A. Suarez-Roos, P. Rabaté, A. Kheddar, "A circuit-breaker use-case operated by a humanoid in aircraft manufacturing," *13th IEEE Conference on Automation Science and Engineering*, pp. 15–22, Aug. 2017.

[C10] F. Flacco, A. Paolillo, A. Kheddar, "Residual-based contacts estimation for humanoid robots," *IEEE-RAS International Conference on Humanoid Robots*, Cancun, Mexico, pp. 409–415, Nov. 2016.

[C11] M. Ferro, A. Paolillo, A. Cherubini, M. Vendittelli, "Omnidirectional humanoid navigation in cluttered environments based on optical flow information," *2016 IEEE-RAS International Conference on Humanoid Robots*, Cancun, Mexico, pp. 75–80, Nov. 2016.

[C12] A. Paolillo, A. Cherubini, F. Keith, A. Kheddar, and M. Vendittelli,"Toward autonomous car driving by a humanoid robot: A sensor-based framework," *2014 IEEE-RAS International Conference on Humanoid Robots*, Madrid, Spain, pp. 451–456, Nov. 2014.

[C13] M. Bellacini, L. Lanari, A. Paolillo, and M. Vendittelli, "Manual Guidance of Humanoid Robots without Force Sensors: Preliminary Experiments with NAO," *2014 IEEE International Conference on Robotics and Automation*, Hong Kong, China, pp. 1184–1189, 2014.

[C14] G. Oriolo, A. Paolillo, L. Rosa, and M. Vendittelli, "Vision-based trajectory control for humanoid navigation," *2013 IEEE-RAS International Conference on Humanoid Robots*, Atlanta, GA, pp. 118–123, 2013.

[C15] A. Faragasso, G. Oriolo, A. Paolillo, and M. Vendittelli, "Vision-based corridor navigation for humanoid robots," *2013 IEEE International Conference on Robotics and Automation*, Karlsruhe, Germany, pp. 3190–3195, 2013.

[C16] G. Oriolo, A. Paolillo, L. Rosa, and M. Vendittelli, "Vision-based odometric localization for humanoids using a kinematic EKF," *12th IEEE-RAS International Conference on Humanoid Robots*, Osaka, Japan, pp. 153–158, 2012.

[C17] D. Dimitrov, A. Paolillo, and P.-B. Wieber, "Walking motion generation with online foot position adaptation based on ℓ_1- and ℓ_∞-norm penalty formulation," *2011 IEEE International Conference on Robotics and Automation*, Shanghai, China, pp. 3523–3529, 2011.

International workshop papers

[W1] M. Saveriano and A. Paolillo, "Towards Combined Action-Perception: Learned Dynamical Systems for Visual Servoing," *15th International Workshop on Human-Friendly Robotics*, Delft, The Netherlands, 2022.

[W2] A. Paolillo, F. Flacco, and A. Kheddar, "The residual method for humanoid robots," *9th International Workshop on Human-Friendly Robotics*, Genoa, Italy, 2016.

[W3] M. Bellacini, L. Lanari, A. Paolillo, and M. Vendittelli, "Manual guidance of the humanoid NAO without force measurements," *6th International Workshop on Human-Friendly Robotics*, Rome, Italy, 2013.