

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 Advisors	Vision-based control of humanoid robots interacting with the real world. 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 Defence Final grade Thesis Advisors	Master degree in Electronic Engineering at Sapienza University of Rome, Italy January 2011. 110/110 cum laude. Walking motion generation for a humanoid robot based on model predictive control 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	<ul style="list-style-type: none"> – Italian (native) – English (fluent) – French (intermediate)
Managerial & Communication skills	<ul style="list-style-type: none"> – 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	<ul style="list-style-type: none"> – 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	
Sep. 28, 2022	“Dynamical Systems-based Imitation Learning for Visual Servoing”, Talk at KUKA AG, Virtual.
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 Journées 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. 30, 2023	Interview at the RSI TV broadcast “Il Giardino di Hilbert”, about the activities on the VRHEM project funded by Innosuisse. Available at https://www.rsi.ch/la1/programmi/cultura/il-giardino-di-albert/Il-futuro-di-uomini-e-robot-16189303.html
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 [J2] (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 [C14] (see Publication list) available at https://elpais.com/elpais/2014/11/24/ciencia/1416846426_922222.html .

Scientific activities

Events organization	<p>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.</p> <p>Webpage (https://www.lirmm.fr/humanoids16workshop) not online anymore.</p> <p>Main organizer of the MEMMO Winter School. Responsible for the didactic program, social events, administrative and logistic aspects.</p> <p>Webpage available at: https://memmows.sciencesconf.org/</p>
Community service 2021-today	Associate Editor for the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Award, funding and grants

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).

Reviewer of the PhD thesis "Optimization-Based Methods for Real-Time Generation of Safe Motions in Mobile Robots," , Spyridon G. Tarantos, Sapienza University of Rome.

Voucher for project writing, granted by SUPSI, September 2022.

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 Foundation, 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 [\[C11\]](#) in the Publications list).

Publications*

Journal papers

- [J1] A. Paolillo, M. Forgione, D. Piga, E. Mingo Hoffman, "Fast Predictive Visual Servoing: a Reference Governor-based Approach," *Control Engineering Practice*, vol. 136, July 2023 (on-line since Apr. 2023)
- [J2] 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
- [J3] 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).
- [J4] 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).
- [J5] 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.
- [J6] 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).
- [J7] 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).
- [J8] 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).
- [J9] 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).
- [J10] 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).

*Authors equally contributed.

- [C1] A. Paolillo, P. Robuffo Giordano, M. Saveriano, "Dynamical System-based Imitation Learning for Visual Servoing using the Large Projection Formulation," *IEEE International Conference on Robotics and Automation*, 2023.
- [C2] A. Paolillo, M. Nava, D. Piga, A. Giusti, "Visual Servoing with Geometrically Interpretable Neural Perception," *IEEE International Conference on Intelligent Robots and Systems*, 2022.
- [C3] 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.
- [C4] A. Paolillo*, M. Saveriano*, "Learning Stable Dynamical Systems for Visual Servoing," *IEEE International Conference on Robotics and Automation*, pp. 8636–8642, 2022.
- [C5] G. Abbate, A. Giusti, A. Paolillo, L. M. Gambardella, A. E. Rizzoli, J. Guzzi, "Selecting Objects on Conveyor Belts Using Pointing Gestures Sensed by a Wrist-worn Inertial Measurement Unit," *IEEE 18th International Conference on Automation Science and Engineering*, pp. 633–640, 2022.
- [C6] 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.
- [C7] 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.
- [C8] 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.
- [C9] 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.
- [C10] 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.
- [C11] 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.
- [C12] 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.
- [C13] 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.
- [C14] 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.

International
workshop papers

- [C15] 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.
- [C16] 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.
- [C17] 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.
- [C18] 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.
- [C19] 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.
- [W1] G. Abbate, A. Giusti, L. Randazzo and A. Paolillo, "Rehabilitation of Hand Motor Impairment Through Combined Virtual Reality and Wearable Robotics," Workshop *Emerging paradigms for assistive robotic manipulation: from research labs to the real world* at ICRA 2023.
- [W2] 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.
- [W3] A. Paolillo, F. Flacco, and A. Kheddar, "The residual method for humanoid robots," *9th International Workshop on Human-Friendly Robotics*, Genoa, Italy, 2016.
- [W4] 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.