Nino Cauli

Researcher

- 17 November 1984
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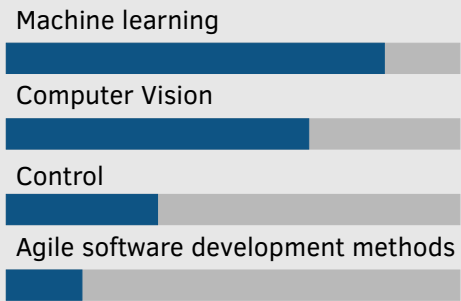- +39 0957383007
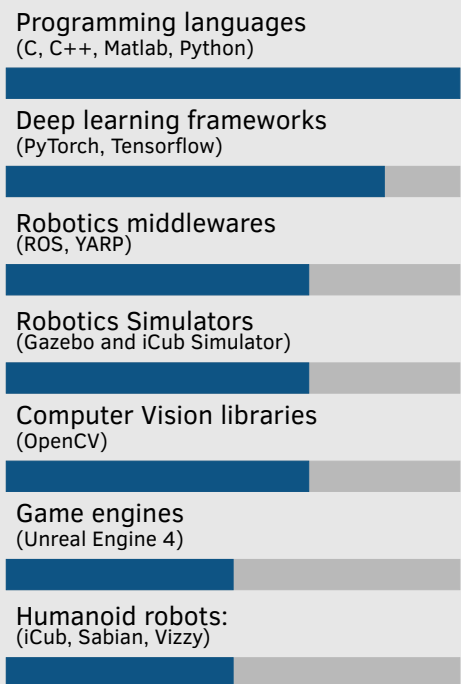- https://nigno17.github.io/
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Skills

General skills:

Machine learning

Computer Vision

Control

Agile software development methods

Technical skills:

Programming languages
(C, C++, Matlab, Python)

Deep learning frameworks
(PyTorch, Tensorflow)

Robotics middlewares
(ROS, YARP)

Robotics Simulators
(Gazebo and iCub Simulator)

Computer Vision libraries
(OpenCV)

Game engines
(Unreal Engine 4)

Humanoid robots:
(iCub, Sabian, Vizzy)

The skill scale is from 0 (Fundamental Awareness) to 6 (Expert).

Academic positions

Aug 2019-	Researcher (RTD-A)	University of Catania, Catania

He is investigating on privacy preservation in hard and soft biometrics recognition systems using deep learning.

2018-2019	Postdoctoral researcher	Ryerson Multimedia Research Laboratory, Toronto

He was working on novel vision-based 3D object recognition and pose estimation algorithms utilizing recent developments in deep learning.

2016-2018	Postdoctoral researcher	VisLab, ISR, Instituto Superior Técnico (IST), Lisbon

He developed deep neural network systems to control robots based on camera images.

2014-2015	Postdoctoral researcher	BioRobotics Institute, SSSA, Pisa

He was involved in the subproject "SP10 - Neurorobotics platform" of the Human Brain Project (HBP), contributing to develop the closed loop engine of a neurorobotic simulator.

VisLab, ISR, IST, Lisbon

Bringing on research studies on sensory prediction and anticipation on humanoid robots

2013	Visiting researcher	VisLab, ISR, IST, Lisbon

He developed an expected perception-based control for reaching a moving target

Education

2010-2014	Ph.D. Degree in Biorobotics cum laude	BioRobotics Institute, SSSA, Pisa

Title of the graduation thesis: "Modelling and implementation of sensory-motor anticipation: Internal Models and Expected Perception for humanoid robot".

2007-2010	M.Sc. in Computer Science (110/110)	University of Pisa, Italy

Title of the graduation thesis: "Study and implementation of a neural networks based system to calculate the Expected Perception of the optical flow".

2003-2007	B.Sc. in Computer Science	University of Cagliari, Italy

Title of the graduation thesis: "Gestures controlled virtual navigation".

2006	Visiting Student	Visual Computing Lab, CRS4, Pula, Italy

He developed a 3D navigation control system based on hand gestures.

Projects involvement

2016	Augmented Human Assistance (AHA)	CMU-Portugal

(CMUP-ERI/HCI/0046/2013)
Contribution to the implementation of a full body gesture recognition system based on Microsoft Kinect2 sensor.

2014-2015	Human Brain Project (HBP)	H2020 FET Flagship Project

Contribution to the implementation of the closed loop engine of a neurorobotic simulator in the subproject "SP10 - Neurorobotics platform".

2009-2013	RoboSoM "A robotic Sense of Movement"	European Commission

(ICT-2009.2.1/248366)
Contribution to the implementation of a sensory based predictive control system.

Publications

Journal papers

[1] J. Kim, N. Cauli, P. Vicente, B. Damas, A. Bernardino, J. Santos-Victor, and F. Cavallo, "Cleaning tasks knowledge transfer between heterogeneous robots: a deep learning approach," *Journal of Intelligent & Robotic Systems*, Aug 2019.

[2] J. Kim, A. K. Mishra, R. Limosani, M. Scafuro, N. Cauli, J. Santos-Victor, B. Mazzolai, and F. Cavallo, "Control strategies for cleaning robots in domestic applications: A comprehensive review," *International Journal of Advanced Robotic Systems*, vol. 16, no. 4, p. 1729881419857432, 2019.

[3] E. Falotico, L. Vannucci, A. Ambrosano, U. Albanese, S. Ulbrich, J. C. Vasquez Tieck, G. Hinkel, J. Kaiser, I. Peric, O. Denninger, N. Cauli, *et al.*, "Connecting artificial brains to robots in a comprehensive simulation framework: The neurorobotics platform," *Frontiers in neurorobotics*, vol. 11, p. 2, 2017.

[4] G. Hinkel, H. Groenda, S. Krach, L. Vannucci, O. Denninger, N. Cauli, S. Ulbrich, A. Roennau, E. Falotico, M.-O. Gewaltig, *et al.*, "A framework for coupled simulations of robots and spiking neuronal networks," *Journal of Intelligent & Robotic Systems*, vol. 85, no. 1, pp. 71–91, 2017.

[5] E. Falotico, N. Cauli, P. Kryczka, K. Hashimoto, A. Berthoz, A. Takanishi, P. Dario, and C. Laschi, "Head stabilization in a humanoid robot: models and implementations," *Autonomous Robots*, vol. 41, no. 2, pp. 349–365, 2017.

[6] N. Cauli, E. Falotico, A. Bernardino, J. Santos-Victor, and C. Laschi, "Correcting for changes: expected perception-based control for reaching a moving target," *IEEE Robotics & Automation Magazine*, vol. 23, no. 1, pp. 63–70, 2016.

Conference papers

[7] N. Cauli, P. Vicente, J. Kim, B. Damas, A. Bernardino, F. Cavallo, and J. Santos-Victor, "Autonomous table-cleaning from kinesthetic demonstrations using Deep Learning," in *Joint IEEE International Conference on Development and Learning (ICDL) and Epigenetic Robotics (EpiRob)*, IEEE, 2018.

[8] J. Kim, N. Cauli, P. Vicente, B. Damas, F. Cavallo, and J. Santos-Victor, ""iCub, clean the table!" A robot learning from demonstration approach using deep neural networks," in *Autonomous Robot Systems and Competitions (ICARSC), 2018 IEEE International Conference on*, pp. 3–9, IEEE, 2018.

[9] L. Vannucci, A. Ambrosano, N. Cauli, U. Albanese, E. Falotico, S. Ulbrich, L. Pfotzer, G. Hinkel, O. Denninger, D. Peppicelli, *et al.*, "A visual tracking model implemented on the iCub robot as a use case for a novel neurorobotic toolkit integrating brain and physics simulation.," in *Humanoids*, pp. 1179–1184, 2015.

[10] G. Hinkel, H. Groenda, L. Vannucci, O. Denninger, N. Cauli, and S. Ulbrich, "A Domain-Specific Language (DSL) for Integrating Neuronal Networks in Robot Control. In 2015 Joint MORSE," in *VAO Workshop on Model-Driven Robot Software Engineering and View-based Software-Engineering*, 2015.

[11] L. Vannucci, N. Cauli, E. Falotico, A. Bernardino, and C. Laschi, "Adaptive visual pursuit involving eye-head coordination and prediction of the target motion," in *Proceedings of the 14th IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, pp. 541–546, 2014.

[12] N. Cauli, E. Falotico, A. Bernardino, J. Santos-Victor, and C. Laschi, "A robotic implementation of a reaching model based an a bio-inspired sensory anticipation system: the Expected Perception," in *IV Congresso Gruppo Nazionale Bioingegneria (GNB)*, 2014.

[13] E. Falotico, N. Cauli, K. Hashimoto, P. Kryczka, A. Takanishi, P. Dario, A. Berthoz, and C. Laschi, "Head stabilization based on a feedback error learning in a humanoid robot," in *RO-MAN, 2012 IEEE*, pp. 449–454, IEEE, 2012.

[14] N. Moutinho, N. Cauli, E. Falotico, R. Ferreira, J. Gaspar, A. Bernardino, J. Santos-Victor, P. Dario, and C. Laschi, "An expected perception architecture using visual 3d reconstruction for a humanoid robot," in *Intelligent Robots and Systems (IROS), 2011 IEEE/RSJ International Conference on*, pp. 4826–4831, IEEE, 2011.

Teaching Activities

2020   Teaching   University of Catania, Italy
the course of "Computer Architecture" at the Department of Mathematics and Computer Science.

2019   Laboratory teaching assistant   Ryerson University, Toronto, Canada
in the course of "Basics of Multimedia Systems" at the Department of Electrical and Computer Engineering.

2018   Co-supervisor M.Sc. thesis   VisLab, ISR, IST, Lisbon, Portugal
on autonomous UAV navigation using vision and deep reinforcement learning.

2017-2018   Co-supervisor M.Sc. thesis   VisLab, ISR, IST, Lisbon, Portugal
on UAV autonomous landing on a mobile base using vision.

2017-2018   Help in supervising Ph.D. thesis   VisLab, ISR, IST, Lisbon, Portugal
on learning from demonstration how to clean a table using deep neural networks.

2013   Laboratory assistant   University of Pisa, Italy
in the M.Sc. course of "Robotic Perception" at the School of Computer Science.