

MASSIMILIANO PATACCHIOLA

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Date of birth 25 June 1985
Nationality Italian
Sex Male

Profile

Researcher specialised in computational modelling through machine learning and deep learning techniques. A wide background based on a combination of experience in both academia and industry. Interdisciplinary skills in robotics, artificial intelligence, neuroscience and experimental psychology. Strong motivation for developing intelligent systems.

Education

- 2015-present PhD student in “Cognitive Robotics and Computational Modelling”. Plymouth University, School of Computing, Electronics and Mathematics. United Kingdom. Designing the social skills of three humanoid robots using approaches derived from Probabilistic Robotics, Machine Learning and Deep Learning. Supervisors: Angelo Cangelosi, Torbjorn Dahl, Giorgio Metta
www.thrive-project.org
- 2009-2011 MSc in “Cognitive Neuroscience”. La Sapienza University. Rome, Italy. Advanced preparation in: neural networks processing, cognitive models, neurobiology, neurophysiology. Dissertation title: Artificial neural networks for body perception in simulated robots. Supervisors: Stefano Puglisi Allegra, Gianluca Baldassarre, Domenico Parisi
- 2006-2009 BSc in “Experimental Cognitive Psychology”. La Sapienza University. Rome, Italy. Advanced preparation in: scientific methodology, analysis of cognitive processes, applied statistics, neurobiology and genetics. Dissertation title: Effects of perceptual load on visual search and visuospatial memory tasks. Supervisor: Marta Olivetti Belardinelli
- 1999-2004 Secondary School. Scientific Course: National Plan of Computer Science. Rieti, Italy. It gives entry to university. Main subjects: computer science, mathematics (linear algebra, pre-calculus, calculus), physics, biology, English, French.

Work/Research Experience

- 2015-present Teaching assistant and demonstrator. Plymouth University. United Kingdom.
I prepared and presented the material for individual lessons on Deep Learning, Bayesian Networks and Robotics. Moreover I followed students during the practical sessions of the following courses:
AINT252 Artificial Intelligence and Computational Theory
SOFT354 Parallel Computation and Distributed Systems
ROCO050 Robotics and Electronics
- 2012-2015 Robotics Engineer. Eurolink Systems group. Rome. Italy.
I was part of the R&D department. My duties involved creating algorithms and models for the control of UGV (Unmanned Ground Vehicle) and UAV (Unmanned Aerial Vehicle). I used ROS (Robotic Operating System) to implement SLAM (Simultaneous Localization And Mapping) in the Leopardo-Bee autonomous robot. I collaborated with the department of electronics and mechanics for designing the COBRA system, a micro tethered drone which has been used by the Italian Army. I collaborated with companies and research centre (e.g. Finmeccanica, La Sapienza University) in the European-founded projects ZEUS (Zonal Emergency management with Unmanned Systems) with the role of integrating a real-time DDS (Data Distribution System) in a swarm of robots as part of a large control system.
www.eurolinksystems.com
- 2011-2012 Internship, LARAL (Laboratory of Artificial Life and Robotics). Institute of Cognitive Sciences and Technologies. Rome, Italy.
My duties involved creating cognitive models for simulations in Evolutionary Robotics. During this period I developed libraries in C++ and Java for the implementation of Neural Networks and Genetic Algorithms. I used the iCub simulator and the Evorobot software. The results achieved during this internship were published in a journal.
<http://laral.istc.cnr.it>
- 2008-2009 Placement, ECONA (Research Centre for Cognitive Elaboration on Natural and Artificial Systems). La Sapienza University. Rome, Italy.
Research project on visual perception and memory. My duties involved planning the project, submission of test to subjects, elaboration and interpretation of data. The result obtained was presented in the final dissertation of my Bachelor.
<https://web.uniroma1.it/econa>

Technical Skills

- Machine Learning
- Programming experience with TensorFlow for Deep Learning applications.
 - Experience with Artificial Neural Networks (Perceptron, Multilayer Perceptron, Convolutional Neural Networks, Self-Organizing Maps) and the most recent Deep Learning techniques (dropout, adaptive gradient methods, ReLu).
 - Experience with supervised, unsupervised learning algorithms (linear and logistic regression, k-means clustering, anomaly detection, genetic algorithms), and reinforcement learning (Q-Learning, MC, SARSA, Deep RL, A3C).

-Experience with probabilistic graphical models (Bayesian networks).

Robotics

- I developed libraries for the control of humanoid robots (Aldebaran NAO, iCub, Scitov G5), drones and autonomous ground rover.
- Experience with the most important software tools for Robotics: ROS, YARP, NAOqi, Choregraphe, OpenAI Gym.
- Experience with the computer vision library OpenCV for object detection and tracking, pose estimation and basic stereo vision.
- Experience in developing web interfaces (HTML, PHP and JavaScript) and graphical user interfaces (Qt, PyQt, Visual Studio) for robot control .
- Experience in programming Atmel and Microchip microcontrollers. Experience in embedded programming (Raspberry Pi, Beagleboard, Pandaboard, Arduino, etc).
- Hands-on experience with LIDAR, motor controllers, inertial units, encoders, accelerometer, GPS, sensors (ultrasonic, infrared, temperature, pressure, etc).
- Hands-on experience in mechanical design (Solidworks) and 3D printing.

Computer Science

- Advanced knowledge of Unix OS (Shell, Bash scripting, SSH) and related tools (gcc, g++, make, vi, git, etc).
- Proficiency in C/C++, especially optimization using C++11.
- Proficiency in Python and related libraries (Numpy, SciPy, Matplotlib)
- Familiarity with several programming languages (C#, Java, Visual Basic, HTML, PHP, JavaScript) and tools for debug (gdb, valgrind), software design (UML), source code management (GitHub) and documentation (Doxygen).
- Familiarity with SQL and SQLite for basic database management.
- Familiarity with the statistical software R and Matlab for data analysis.

Languages

Italian: native speaker
English: advanced
French: intermediate

2014 TOEFL iBT English certification. Total Score: 88

Awards, Fellowships and Scholarships

03-2016 Academic Hardware Grant, NVIDIA corporation. I received a Tesla K40 GPU in support of a project on gaze detection through convolutional neural networks.

01-2016 Associate Fellowship, Marie Skłodowska-Curie programme. Project APRIL (Applications of Personal Robotics for Interaction and Learning).

2015-present Scholarship, project THRIVE (Trust in Human Robot Interaction). Funded by AFOSR (Air Force Office of Scientific Research, USA).

2012-present Member, Mensa International. Society for people with high intelligence quotient.

2006-2011 Scholarship, Laziodisu. Grant for students which every year offers a limited number of scholarships based on income and merit.

Talks, Conferences, Workshops, Media

- 27-07-2017 (Extra) BBC documentary. Hyper Evolution: Rise of the Robots. Episode 1 and 2, the iCub humanoid robot at CRNS lab.
- 06-11-2017 (Program Committee) ICTAI, International Conference on tools with Artificial Intelligence.
- 18-10-2016 (Participant) Hackathon, robot at your service. European robotics week. Amsterdam, Netherlands. Implemented a neuropsychological test on the Pepper humanoid robot.
- 2015-present (Reviewer) I have been the reviewer for different conferences and journals: ICRA (International Conference on Robotics and Automation), IROS (International Conference on Intelligent Robots and Systems), ACM Transactions on Interactive Intelligent Systems, IEEE ICDL-Epirob, IEEE Transactions on Cognitive and Developmental Systems.
- 20-11-2015 (Invited Speaker) How to use humanoid robots in Human-Robot Interaction Experiments. University of Messina, Messina, Italy.
- 08-2015 (Participant) 2nd Summer School on Social Human-Robot Interaction. Aland, Finland.
- 20-03-2014 (Invited Speaker) Introducing the ZEUS project, emergency management with unmanned robotic systems. AFCEA annual conference, Rome, Italy.

Publications

- [1] Polvara* R., **Patacchiola* M.**, Sharma, S., Wan J., Manning, A., Sutton R., Cangelosi, A. (under review). "Autonomous Quadrotor Landing using Deep Reinforcement Learning". *Co-first authors, <https://arxiv.org/abs/1709.03339>
- [2] Surace, L., **Patacchiola, M.**, Battini Sonmez, E., Spataro, W. Cangelosi, A. (2017). "Emotion Recognition in the Wild using Deep Neural Networks and Bayesian Classifiers". *In Proceeding of the Fifth Emotion Recognition in the Wild (EmotiW) Challenge*, Glasgow, United Kingdom.
- [3] **Patacchiola, M.**, Cangelosi, A. (2017). "Head Pose Estimation in the Wild using Convolutional Neural Networks and Adaptive Gradient Methods". *Pattern Recognition*, vol. 71, pp. 132-143.
- [4] **Patacchiola, M.**, Cangelosi, A. (2016). "A Developmental Bayesian Model of Trust in Artificial Cognitive Systems". *In Proceeding of the Sixth International Conference on Development and Learning on Epigenetic Robotics (ICDL-EpiRobt)*, Paris, France.
- [5] Zanatto, D., **Patacchiola, M.**, Goslin, J., Cangelosi, A. (2016). "Priming antropomorphism: Can the credibility of humanlike robots be transferred to non-humanlike robots?". *In Proceeding of the Eleventh Annual ACM/IEEE International Conference on Human Robot Interaction*, Christchurch, New Zeland, pp. 534-544
- [6] Paglieri, F., Parisi D., **Patacchiola, M.**, Petrosino, G. (2015). "Investigating intertemporal choice trough experimental evolutionary robotics". *Behavioural Processes*, vol. 115, pp. 1-18.