RICCARDO POLVARA

Name	Riccardo
Surname	Polvara
Address	Lincoln, England, United Kingdom
Website	http://pulver22.github.io
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Date of birth	22 September 1991
Nationality	Italian
Sex	Male

Profile

Mobile roboticist specialised in navigation for both ground and aerial autonomous systems. Passionate about robot control using machine learning techniques, in particular deep reinforcement learning. A background in Computer Engineering, Artificial Intelligence and Robotics. Experience working abroad in a multicultural environment. Strong motivation for developing intelligent systems.
Research interests: reinforcement learning (sim-to-real, exploration of large state spaces), robotics (navigation, path planning, reinforcement learning for control).

Work/Research Experience

2020-Present Associate member of the Autonomous Learning Robots Lab, Karlsruher Institut fur Technologie (KIT) (Germany).

2018-Present Post-doctoral Researcher. University of Lincoln. United Kingdom.
Member of the Lincoln Centre for Autonomous Systems, part of the EPSRC project "National Centre for Nuclear Robotics". Research topic on learning navigation and recovery policies for a mobile manipulator in hazardous environment.
Supervisors: Marc Hanheide and Gerhard Neumann.

2015-2018 Teaching assistant and demonstrator. Plymouth University. United Kingdom.
I prepared and presented the material for individual lessons on Robotics.

2015 Placement, Centre for Applied Autonomous Sensor Systems, Örebro University, Sweden.
I developed an on-line path planning algorithm for gas mapping with a mobile robot equipped with a remote gas sensor [video].
Supervisors: Francesco Amigoni, Erik Schaffernicht and Achim Lilienthal

2014-2015 Volunteer, First Lego League. Monza, Italy.
My duties involved supervising children in building a robot using the Mindstorm Lego platform and solving the challenges required by the competition.

Education

2015-2018	PhD student in Mobile Robotics. Plymouth University, School of Engineering. Plymouth, United Kingdom. Member of the "Autonomous Marine Systems" research group. During my PhD programme, I worked on Deep Reinforcement Learning strategies to increase the awareness of the environment for autonomous vessels via a flying robot feedback. In particular, I focused on the autonomous landing of the drone on the deck of the vessel using only raw visual inputs. Supervisors: Sanjay Sharma, Robert Sutton, Jian Wan, Andrew Manning
2013-2015	MSc in "Computer Engineering". Politecnico di Milano. Milano, Italy. Advanced preparation in: classic and cognitive robotics, reinforcement learning, soft computing, artificial intelligence, multi-agent systems. Dissertation title: "A Next-Best-Smell Approach for Remote Gas Detection with a Mobile Robot" Supervisors: Francesco Amigoni, Erik Schaffernicht and Achim Lilienthal
2010-2013	BSc in "Computer Engineering". Politecnico di Milano. Milano, Italy. Advanced preparation in: application development, databases, theoretical computer science, IT system architecture, electronics, telecommunication. Dissertation title: HorseFever – Implementing in Java a card based game focusing on different design pattern and testing aspects. Supervisor: Raffaela Mirandola
2005-2010	High School, "Liceo Scientifico, Piano Nazionale di Informatica" (Scientific Course, National Plan of Computer Science). Oggiono, Italy. It gives entry to university. Main subjects: computer science, mathematics, physics, biology, English, Latin.

Technical Skills

Robotics	- I developed libraries for the navigation and control of mobile wheel-equipped robots and unmanned aerial vehicles. - Experience with some of the most important software tools for Robotics: Robotic Operating System (ROS) and Gazebo simulator. - Good theoretical knowledge of machine learning and deep learning - Hands-on experience with LIDAR and TDLAS gas sensor. - Practical experience with reinforcement learning algorithms (DQN, Double DQN, PPO, TRO, etc.) and environments (OpenAI Gym, gym-gazebo) - Practical knowledge of ML/DL framework (Tensorflow, Keras)
Computer Science	- Advanced knowledge of Unix OS (Shell, Bash scripting, SSH) and related tools (gcc, g++, make, vi, git, etc). - Proficiency in C/C++ and Python - Familiarity with several programming languages (Java/Java EE, HTML, JavaScript, XML, Assembly x86 and Latex) and tools for debug (gdb, valgrind), software design (UML) and documentation (Doxygen). - Familiarity with SQL for database management. - Familiarity with parallel computing (openMP, openMPI, CUDA, HADOOP).

Languages

Italian:	Mother tongue
English:	Advanced
German:	Beginner

Certifications

2016-present	Multiple MOOC certificates for courses in: Deep Reinforcement Learning in Python [link], Reinforcement Learning in Python [link], Machine Learning [link]
04-2013	TOEIC (Test of English for International Communication): 720-990
06-2008	ECDL (European Computer Driving License)
06-2004	Goethe-Zertifikat A2: Start Deutsch 2

Awards, Fellowships and Scholarships

2017	Associate Fellowship, Higher Education Academy (HEA). Programme that supports early career researchers who have responsibility for teaching and learning.
2016	Travel grant given to a restricted amount of people based on merit, for attending a summer school about heterogeneity in multi-agents robotics system organised by the FP7 EU project TRADR and H2020 ERL Emergency.
2015-2018	Scholarship, project “An Intelligent Integrated Marine System”. Funded by School of Engineering, Plymouth University, England.

Talks, Conferences, Workshops, Media

2015-Present	(Reviewer) I have been the reviewer for different conferences and journal: ICRA (International Conference on Robotics and Automation), IROS (International Conference on Intelligent Robots and Systems), ICTAI (International Conference on Tools with Artificial Intelligence), CLAWAR (International Conference on Climbing and Walking Robots and Support Technologies for Mobile Machines), IFAC (International Federation of Automatic Control) World Congress, ISOPE (International Society of Offshore and Polar Engineers), International Journal of Control, Journal of Navigation, IEEE Autonomous and Auromation Letters, Autonomous Robots, Sensors, Robotics, Drones.
01-2018	(Participant) MarineUAS Winter school on deployment of autonomous system for marine surveillance.
08-2016	(Participant) ERL Emergency/TRADR Summer school on heterogeneity in Robotic Systems.

Selected Publications [scholar]

- **Polvara R**, Fernandez-Carmona M, Neumann G, Hanheide M (2020). Next-Best-Sense: a multi-criteria robotic exploration strategy for RFID tags discovery. *IEEE Robotics and Automation Letters.*
- **Polvara R***, Patacchiola M*, Hanheide M, Neumann G (2020). Sim-to-Real Quadrotor Landing via Sequential Deep Q-Networks and Domain Randomization. *Robotics.* *Co-first authors
- **Polvara R**, Sharma S, Wan J, Manning A, Sutton R (2019). Autonomous Vehicular Landings on the Deck of an Unmanned Surface Vehicle using Deep Reinforcement Learning, *Robotica*.
- **Polvara R**, Sharma S, Wan J, Manning A, Sutton R (2018). Vision-based Autonomous Landing of a Quadrotor on the Perturbed Deck of an Unmanned Surface Vehicle, *Drones.*
- **Polvara R**, Sharma S, Wan J, Manning A, Sutton R (2017). Obstacle Avoidance Approaches for Autonomous Navigation of Unmanned Surface Vehicles. *Journal of Navigation*.