

Fabrizio Romanelli

Curriculum Vitae

Born in Viterbo – 18.12.1979

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Fields of Interest

Robotics, computer science, embedded systems, motion planning, human-robot interaction

Job Positions

- Since Oct 2017 Senior Engineer in the Advanced Robotics Research Line @ Istituto Italiano di Tecnologia (IIT) – Management of the software engineering team. Development and maintenance of robot real-time control frameworks and communication systems. Software architecture development with the integration of control modules in current frameworks making the robots capable of executing complex tasks. Open source code adaptation, ROS and ROS packages integration on the robots. Development of software related to locomotion, balancing, manipulation and perception. Development of software for safety to protect robot hardware and operators. Development and integration of GUI to simulate software in the research activities. Support on definition and development of software licenses. Test evaluation, report analysis. Cooperation with external work groups in the development of robot software. Students supervision in the laboratories, Genova (GE), Italy
- Mar 2016 – Sep 2017 Software Development Manager, Research & Development @ Comau Robotics S.p.A. – Tech Lead of the Next Generation Robotics Software team (10 people) – Software Engineering team – design, analysis, research on robot motion and system software architecture, mobile devices interfaces (Apple, Windows Phone, Android), PC Tools for simulation, 3D visualization, data analytics and configuration for robots, Grugliasco (TO), Italy
- Apr 2007 – Feb 2016 Software Engineer Specialist, Research & Development @ Comau Robotics S.p.A. – Motion Control and Robotics team – design, programming and study of robot motion planning, system software architecture, collision avoidance and human-machine interaction, Grugliasco (TO), Italy
- Oct 2006 – Apr 2007 Control software engineer at ICAP Automation – Integrated Robotics Solutions, programming of Comau and ABB robots, design of systems for Computer Vision, management and programming of Allen-Bradley PLCs, handling applications, Pomezia (RM), Italy
- Jun 2006 – Jul 2006 IT-consultant – Capgemini, programming of Perl scripts for the security and control of log files on Sun Solaris platform, C++ programming for billing and rating engines, Rome, Italy

Education

- Nov 2005 – Jun 2006 PhD student, Geometry and Probability for Motion and Action laboratory (eMotion) of Prof. C. Laugier, INRIA Rhône-Alpes, Grenoble, France
- Jan 2003 – May 2005 Master's degree in automation and robotics engineering from University "Tor Vergata", Rome, Italy. Emphasis in robotics, computer science, and control systems.
Thesis title: "Particle filters for localization and navigation of mobile robots in unknown environments without landmarks"
- Sep 1998 – Jan 2003 Bachelor's degree in computer engineering from University "Tor Vergata", Rome, Italy. Emphasis in robotics, computer science, and control systems.
Thesis title: "Development of integrated vision systems for mobile robots control based on feedback from cameras"

Awards and Distinctions

- 2014 Second place with "Efficient implementation of Iterative Inverse Kinematics in Real Time Control Architecture" for the EUnited Robotics Technology Award 2014
- 2009 Finalist with "Intuitive Robot Programming Through the Use of Manual Guidance Device Haptic Interface" for the EUnited Robotics Technology Award 2009

- 2006 Second place for the "Best Innovative Thesis" award, an Italian nationwide award for diploma theses sponsored by Altran Corporation, Rome, Italy
- 2005 Summa cum laude Master of Science graduation, University "Tor Vergata", Rome, Italy

Patents

- 2013 "Method for controlling at least two robots having respective working spaces including at least one region in common", United States US20130110288 A1
- 2008 "Robot system", Europe EP2194434 A1

Involvement in Funded Research Projects

- 2017-2019 INAIL - Rescue Robotics
Study, design and implementation of a robot system for the rescue of people in dangerous situations and to prevent injuries on workers.
- 2017-2019 Vodafone - 5G
Definition and management of two use cases (Agricultural and Disaster Recovery) for the integration of 5G communication on quadruped robots.
- 2012 – 2015 EU Project SMERobotics
SMERobotics – Small and Medium Enterprises Robotics. Involved in the project; development of C5G Open robot control system, installation and training to the Consortium partners
- 2012 – 2015 Italian Project COMPETE
COMPETE – Friction COMPensation and Trajectory generation for industrial manipulators. Currently involved in the coordination activity for the Collision Avoidance strategies research. In collaboration with Politecnico di Torino
- 2010 – 2013 EU Project ROBOFOOT
ROBOFOOT – Smart robotics for high added value footwear industry. Directly involved in the project; development of the ORL (Open Realistic robot Library) for the high-level programming of Comau robots
- 2011 – 2012 Italian project PLANROB
PLANROB – Motion planning, inverse kinematics and collision avoidance for industrial manipulators. Directly involved in the project with the development of the new and generic Iterative Inverse kinematics for anthropomorphic manipulators. In collaboration with Politecnico di Torino
- 2007 – 2009 EU Project SMERobot
SMERobot – Small and Medium Enterprises Robot. Involved in the project; development of Manual Guidance Device to facilitate robot programming
- 2005 – 2006 EU project BACS
BACS – Bayesian Approach to Cognitive Systems. Integrated project, funded by the European Commission. Employed and contributed to this project

Technical Skills

- Excellent competences with the following programming languages: C, Fortran, HTML, XML, CSS, JavaScript, Visual Basic, PDL2
- Excellent knowledge of software architectures
- Good competences with C++, Perl
- Basic knowledge of OpenCV & QT
- Basic knowledge of Python
- Excellent competences with Microsoft, Windows and Office software
- Excellent competences with Linux scripting language

- Excellent knowledge of Matlab and Maple scripting languages
- Deep knowledge of Windows-based operating systems and Linux (Ubuntu, Red Hat, Fedora, Debian)
- Excellent knowledge on real time operating systems (VxWorks, RTAI Linux, Xenomai Linux, RT PREEMPT), Kernel configuration, hacking
- Deep knowledge of mathematical libraries for optimal computation performance on x86 platforms (linear algebra operations, matrix decomposition, etc.)
- Good knowledge of Sun Solaris Unix, SGI Irix operating systems
- Excellent capability and competence in the manipulation of robot embedded hardware and software (experiences on Nomad mobile robots, Comau, ABB and Kuka)
- Good knowledge of VxWorks operating system (5.4, 5.5 and 6.9) with strong experience on cross-compilation for the development of applications on Windows, Linux and VxWorks embedded systems
- Good knowledge of Allen-Bradley PLC programming language
- Excellent knowledge of CVS, SVN, GIT and PLM (electronic library versioning system)
- Excellent knowledge of GNU toolchain, Makefile, build project management and Doxygen
- Excellent knowledge of Eclipse integrated development environment
- Good knowledge of UML process
- Good knowledge of Agile Scrum process

Leadership Skills

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| Since 2017 | HyQ Real quadruped robot project Management of the team (mechanical, electrical, software, firmware). Technical leadership of software engineers for the development of the system software architecture of the HyQ Real quadruped robot in the Dynamic Legged Systems lab |
| 2015 – 2017 | Internal Project NGRS NGRS – Next Generation Robotics Software Comau Controller. Technical responsibility for the robot System Software development – writing of the Description of Work related to the Next Robot Generation Comau Controller (10 people + offshore team involved) |
| 2012 – 2014 | Internal Project eMotion eMotion – enhanced Motion for Comau Robots. Technical leadership of the internal project for the development of the new motion trajectory planner (6 people involved) |

Co-Supervised Theses

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| 2014 | A. Fenucci. Master Thesis, co-supervisor with Prof. M. Indri, Politecnico di Torino, Italy. Title: "Development of software architecture for robot collision avoidance in industrial environment" |
| 2013 | L. Gallinaro. Master Thesis, co-supervisor with Prof. M. Indri, Politecnico di Torino, Italy. Title: "Kinematic redundancy for industrial manipulators – Application on a 7-axis robot" |

Languages

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| Italian | Mother tongue |
| English | Full professional working proficiency |
| Spanish | Professional working proficiency |
| French | Limited working proficiency – Certificate of attendance to intensive course of French, at Centre Universitaire d'Etudes Françaises (C.U.E.F.) de l'Université Stendhal, Grenoble 3, 2005 |