ALESSANDRO BENINI

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RESEARCH SCIENTIST

Technically sophisticated engineering professional with solid history of effective design and development of autonomous systems. Bilingual in Italian and English.

AREAS OF EXPERTISE

- Detail-oriented, innovative professional with a demonstrated record of driving the success of science and engineering projects.
- Analytical professional skilled in developing powerful business solutions to maximize value and support growth of companies.
- Proven expertise in spearheading all phases of project life cycle, from initiation to completion.
- Superior collaboration and leadership skills, with proven expertise in directing, motivating, and guiding cross-functional teams to peak performance in high energy, deadline driven environments.

TECHNICAL PROFICIENCIES

Languages:	C/C++, MatLab/Simulink, Object Oriented Programming
Embedded Platforms:	PixHawk autopilot, OMAP L-138, BeagleBone, XMOS, Sensors
Localization Systems:	Kalman Filter, Inertial Sensors, GPS, Ranging Sensors

PROFESSIONAL EXPERIENCE

GERMANDRONES GMBH, BERLIN, GERMANY

Research Scientist (October 2017 – Present)

Led development of the autopilot for the Songbird VTOL UAV. Management of Research Projects in collaboration with Universities and Research Institutes. Research in the field of autonomous navigation of UAVs.

Software Engineer (April 2017 – September 2017)

Key contributor in the design, development, and testing of embedded software for autonomous navigation of Unmanned Aerial Vehicles. Documented software defects using bug tracking system and collaborated with teammates to ensure efficient testing and bug fixing process.

Key Achievements:

- Designed, implemented and delivered embedded software solutions consistent with the product roadmap and released plan milestones.
- Organized and conducted extensive field-testing of new firmware features for autonomous navigation of UAVs.

UNIVERSITY OF DENVER, DENVER, CO, USA

Research Scientist (April 2015 – December 2016)

Led research and development for wide range of projects, utilizing analytical, communication, and collaboration skills to capture project success. Supported all phases of project lifecycle by guiding

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multidisciplinary project teams. Strategically developed hardware and software for embedded systems, exploiting specially designed algorithms.

Key Achievements:

- Directed autonomous landing algorithms for rotary wing UAVs project, integrating vision, inertial sensor, parallel computing, and embedded CPU/GPU systems.
- **Patent Applications:**
  - A. Benini, M. J. Rutherford, K. P. Valavanis - *Image Processing for Pose Estimation.*
  - A. Benini, M. J. Rutherford, K. P. Valavanis - *Design for a Visual Landing Target*.
- Designed modular HW/SW framework for development of unmanned systems, performing development and testing of mechanical structures, sensors, communication systems, algorithms, and communication protocols to ensure success and reliability.
- Provided hardware and software support by performing extensive tests to debug systems, preventing system errors or malfunctions.

Adjunct Professor (2016 – 2016)

Deliver exceptionally high-quality academic instruction and support to students at University of Denver. Prepare and deliver instruction for Computer Vision and Advanced Computer Vision classes. Collaborate with Computer Science Department leads and Student Advisors to ensure individual student goals were achieved.

Key Achievements:

- Taught ENCE 3620 and ENCE 4620 to Computer Science Majors enrolled at University of Denver during Winter Semester.
- Contributed to success of Computer Science Program by mentoring and guiding students.
- Supported University's vision and mission by modifying curriculum to accommodate diverse learning styles.

CIVITANAVI SYSTEMS, CIVITANOVA MARCHE, ITALY

Algorithm Engineer (February 2014 – March 2015)

Led design, development, and testing of algorithms necessary in providing quality software products. Collaborated with cross-functional team members in development of new products and functions while complying with Civitanavi System's policies and procedures.

Key Achievements:

- Developed Attitude Heading and Reference Systems (AHRS), Inertial Navigation Systems (INS) and North Finders Systems for Airborne applications, using Kalman Filter and embedded systems.
- Achieved project success using Civitanavi's proprietary Fiber Optic Gyroscope technology.

THALES ITALIA S.P.A., CHIETI, ITALY

Internship (January 2011 – December 2013)

Completed European Research Project ARTEMIS Joint Undertaking R3-COP (file number: ART-010000-2010-5). Achieved project goals of overcoming fragmentation of robotic sector through creation of cross-domain platform of methods and tools for design of usable autonomous systems. Additionally, contributed to research on Pedestrian Localization using MEMS IMU and UWB.

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EDUCATION AND TRAINING

POLYTECHNIC UNIVERSITY OF MARCHE, Ancona, Italy
Ph.D. Degree, Automation Engineering
Thesis: "Localization and Navigation of Autonomous Systems in Complex Scenarios"

POLYTECHNIC UNIVERSITY OF MARCHE, Ancona, Italy
Master Degree, Automation Engineering (Summa Cum Laude)
Thesis: "Designing of a Simulation Environment for Fast Prototyping of Cooperating Avionics Systems"

POLYTECHNIC UNIVERSITY OF MARCHE, Ancona, Italy
Bachelor Degree, Automation and Computer Engineering
Thesis: "Designing and Development of Response Plans to Cyber Attacks

LIST OF PEER REVIEWED PUBLICATIONS

Journals:

1. A. Benini, A. Mancini, R. Minutolo, S. Longhi, M. Montanari - *A modular framework for fast prototyping of cooperative unmanned aerial vehicles*. Journal of Intelligent & Robotic Systems, 2012, 10.1007/s10846-011-9577-1.
2. A. Benini, A. Mancini, S. Longhi - *An IMU/UWB/Vision-Based Extended Kalman Filter for mini-UAV Localization in Indoor Environment Using802.15.4a Wireless Sensor Network*. Journal of Intelligent & Robotic Systems, 2011, 10.1007/s10846-012-9742-1.

Conferences:

1. J. Dai, A. Benini, H. Lin, P.J. Antsaklis, M.J. Rutherford, K.P. Valavanis - *Learning-based Formal Synthesis of Cooperative Multi-agent Systems*. arXiv preprint arXiv:1705.10427
2. J. Dai, A. Benini, H. Lin, P.J. Antsaklis, M.J. Rutherford, K.P. Valavanis - *Learning-based formal synthesis of cooperative multi-agent systems with an application to robotic coordination*. 24th Mediterranean Conference on Control and Automation (MED), 2016, 1008-1013.
3. A. Benini, M. J. Rutherford, K. P. Valavanis - *Real-time, GPU-based pose estimation of a UAV for autonomous takeoff and landing*. IEEE International Conference on Robotics and Automation (ICRA), 2016, Pages 3463-3470.
4. A. Benini, A. Pizzarulli, R. Senatore, E. Quatraro, M. Verola - *A Closed-loop Procedure for the Modeling and Tuning of Kalman Filter for FOG INS*. On Defence Technology Asia (DTA) International Conferences & Exhibition Series, 2015.
5. A. Gaujens, A. Benini, A. Mancini, S. Longhi - *Testing of cooperative tasks for Unmanned Aerial and ground platforms*. Mechatronic and Embedded Systems and Applications (MESA), 2014 IEEE/ASME.
6. F. Cocchioni, V. Pierfelice, A. Benini, A. Mancini, E. Frontoni, P. Zingaretti - *Unmanned Ground and Aerial Vehicles in extended range indoor and outdoor missions*. International Conference on Unmanned Aircraft Systems (ICUAS), 2014.
7. L. Ciabattoni, G. Ippoliti, A. Benini, S. Longhi, M. Pirro - *Design of a home energy management system by online neural networks*. 11th IFAC International Workshop on Adaptation and Learning in Control and Signal Processing, 2013, 10.3182/20130703-3-FR-4038.00111.
8. A. Benini, A. Mancini, A. Marinelli, S. Longhi - *A Biased Extended Kalman Filter for Indoor Localization of a Mobile Agent using Low-Cost IMU and UWB Wireless Sensor Network*. IFAC Symposiums on Robot Control, 2012.

9. A. Benini, A. Mancini, E. Frontoni, P. Zingaretti, S. Longhi - *Adaptive Extended Kalman Filter for Indoor/Outdoor Localization using a 802.15.4a Wireless Network.* In Proceedings of the 5th European Conference on Mobile Robots ECMR, 2011.
10. A. Benini, A. Mancini, E. Frontoni, P. Zingaretti, S. Longhi - *Coalition formation for unmanned quadrotors.* In Proceedings of the 7th International ASME/IEEE Conference on Mechatronics & Embedded Systems & Applications, September 2011.
11. A. Benini, A. Mancini, E. Frontoni, P. Zingaretti, S. Longhi - *A simulation framework for coalition formation of unmanned aerial vehicles.* In Mediterranean Conference on Control Automation (MED), June 2011.
12. A. Giantomassi, F. Ferracuti, A. Benini, G. Ippoliti, S. Longhi, A. Petrucci - *Hidden markov model for health estimation and prognosis of turbofan engines.* In Proceedings of the ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE, 2011.