

Luigi Russo

Curriculum Vitæ et Studiorum

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Research interests

Reinforcement Learning, Unsupervised Learning, Optimal Control, Model Predictive Control, Computer Vision, Autonomous Driving, Mixed Integer Optimization

Education

- 2020 – Present **University of Sannio** – Benevento, Italy
PhD in Information Technologies for Engineering
Expected Graduation date 2022
Mentors: Professor Luigi Glielmo
- April 18, 2019 **University of Sannio** – Benevento, Italy
Master degree in Electronic Engineering for Automation and Telecommunication
Thesis Title: '3D CNN environment Reconstruction and drone navigation with RGB monocular camera'; *Thesis Supervisors:* Professors Luigi Glielmo and Bálint Vanek.
Final degree mark: 110/110 cum laude
- 28 Aprile 2016 **University of Sannio**– Benevento, Italy
Bachelor degree in Electronic Engineering for Automation and Telecommunication
Thesis Title: Analisis of an autonomous vehicle;
Thesis Supervisor: Professor Giovanni Fiengo
Final Degree Mark: 107/110.

Honors and scholarships

- 2020 Winner of Mathworks Minidrone Competition (IFAC)
Design of a line follower algorithm for a minidrone in Simulink using Model-Based-Design and deploying the algorithm to hardware.
- 2022 Scholarship for research work with the Model Predictive Control Laboratory of U.C. Berkeley in the area of learning and distributed predictive control applied to large scale systems.
- 2022 Winner of Scholarship for Ph.D. Mobility in Extra-EU Universities.

Publications

- 2023 **Learning for Online Mixed-Integer Model Predictive Control with Parametric Optimality Certificates**
Luigi Russo, Siddharth Nair, Luigi Glielmo, Francesco Borrelli.
U/R for IEEE Annual Conference on Decision and Control (CDC 2023).
- 2021 **A comparison of envelope and statistical analyses for bearing diagnosis in hot steel rolling mill lines**
Kisan Sarda, Antonio Acernese, **Luigi Russo**, Mirko Mazzoleni.
Annual Conference of the IEEE Industrial Electronics Society (IECON 2021).
- 2021 **Fault Detection and Diagnosis in Steel Industry: a One Class-Support Vector Machine Approach**
Luigi Russo, Kisan Sarda, Luigi Glielmo, Antonio Acernese.
IEEE System Man and Cybernetics (IEEE SMC 2021).
- 2021 **A Reinforcement Learning approach for pedestrian collision avoidance and trajectory tracking in autonomous driving systems**
Luigi Russo, Mario Terlizzi, Massimo Tipaldi, Luigi Glielmo.
5th International Conference on Control and Fault-Tolerant Systems (SysTol 2021).
- 2021 **A Novel Algorithm for Lane Detection based on Iterative Tree Search**
Mario Terlizzi, **Luigi Russo**, Enrico Picariello, Luigi Glielmo.
IEEE International Workshop on Metrology for Automotive 2021 (IEEE MetroAutomotive 2021).
- 2021 **A Vision-Based Algorithm for a Path Following Problem**
Mario Terlizzi, Giuseppe Silano **Luigi Russo**, Muhammad Atif, Amin Basiri, Valerio Mariani, Luigi Iannelli, Luigi Glielmo.
2021 International Conference on Unmanned Aircraft Systems (ICUAS 2021).

Research visits

- April 2022-
March 2023 **UC Berkeley Mechanical Engineering, Model Predictive Control Laboratory**
Mentors: Professor Francesco Borrelli.
Research activity in the field of fast Learning Based Model Predictive Control solutions for Mixed Logical Dynamical Systems with safety guarantees for real time applications.
- 2018 **MTA STAKI Research institute for computer science and automation-Budapest, Hungary.**
Mentors: Professor Balint Vanek (BME).
Research activity in the field of Machine learning based Computer Vision algorithms for enhanced perception in autonomous navigation of a monocular RGB camera equipped quad-copter.

Teaching experience

- 2021-
March 2023 **Teaching assistant, ING-INF/04 : Advanced automatic control and application (University of Sannio)**
Complements on the theory of dynamical systems, i.e. Markov's chains, and a series of tool for the design of control systems, many based on optimization methods, static and dynamic, others on algebraic or geometrical methods.
- 2020-
March 2023 **Teaching assistant, ING-INF/04 : Dynamic systems (University of Sannio)**
Mathematical modelling, analysis and simulation techniques for linear and nonlinear, continuous time and discrete time, systems.

Industry experience

- Summer 2021 **Nesynt-Networks System Technologies Spinoff S.R.L.** – Benevento, Italy
Definition and implementation of a test campaign for data acquisition and design of an anomaly detection algorithm for a steel production plant based on advanced unsupervised learning techniques.

Talks and tutorials

- October 2021 A Reinforcement Learning approach for pedestrian collision avoidance and trajectory tracking in autonomous driving systems
5th International Conference on Control and Fault-Tolerant Systems (SysTol 2021), St.Raphael, France
- October 2021 Fault Detection and Diagnosis in Steel Industry: a One Class Support Vector Machine Approach.
IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC 2021), Melbourne, Australia (Virtual)

Technical skills

Programming languages

Proficient in: Matlab, Python, Java, C.
Familiar with: C++, VHDL, LADDER

Software and Libraries

LaTeX, Git, Matlab Simulink, QUARTUS II, ROS, OpenCV, CasADi, Gurobi, SCIP, Mosek, CVXOPT, CVXPY.

Languages

Italian (Native), English (Fluent), French (Basic)