Pietro Dardano

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Robotics engineer interested in robot control and AI integration.

Experience

- **Research Intern - University of Trento [🌐] - Supervisor: Prof. A. Del Prete** *Trento | Jun. '24 - present*

  Tools: Python, Pytorch, SKRL, Nvidia IsaacSim, IsaacLab, OpenAI Gymnasium, GIT [🐙]

  ◦ Reinforced Learning: inspired by papers [P1,P2], implemented PPO (SKRL and RSL_RL) for Walk and Stop policies for quadruped robot Unitree's AlienGo, with training on Nvidia IsaacSim and IsaacLab. Related **paper** in writing for submission to IROS 25.

- **Master Thesis Intern - TXT E-TECH [🌐] - Supervisor: Prof. P. Rocco** *Milan | Sept. '23 - Oct. '24*

  Tools: C++, Python (Pandas, Numpy, Tensorflow, Scikit-Learn, PyWt), UR_RTDE, ROS, ROS2, MoveIT2, GIT [📄, 📄]

  ◦ Tactile-Driven validation for cobot in aeronautical environment. Application framework migration from ROS1 to ROS2. Signal processing and Wavelets. Supervised Deep Learning: multi-classification with Hybrid Covolutional Neural Nets and eXplanable AI feature. Achieved +96% F1-score, up to 99.2% . Related **paper** [T1, T2] in peer-review for ERF25, serving as reviewer.

- **Student Researcher - Politecnico di Milano [🌐] - Supervisor: Prof. L.M. Fagiano** *Milan | Sept. '23 - present*

  Tools: C++, Python, Fusion360, Matlab, Simscape, Arduino [🐙]

  ◦ Designed, assembled and controlled an actuated rig for safely testing stability algorithms of large autonomous drones and gliders, able to simulate wind and collision disturbances. Implementing sensor fusion of IMU, gyroscope and Hall effect sensors and developing open and closed-loop control strategies with Extended Kalman Filter (EKF) for behaviour prediction.

- **Head of Projects ('21), Vice & President ('22-'23), Arbitrator ('24) - AEA [🌐]** *Milan | Sept. '20 - present*

  ◦ Recognizing the lack of robotics projects and initiatives for students, I co-founded the Automation Engineering Association (AEA) at Politecnico di Milano. Today AEA has over 380 members, with 8 projects engaging more than 110 students. While serving as president, I initiated a program for national expansion and then led it while being arbitrator establishing a branch at Politecnico di Bari.

Education

- **MSc. Automation and Control Engineering** - ***Politecnico di Milano*** *Milan, Italy* | Sept. '21 - Oct. '24

  ◦ GPA: 3.78/4.00 | Main courses: Advanced Control, Machine Learning, Robotics, Autonomous Vehicles, IoT, Power Electronics. | Erasmus+ at Univ. Politecnica de Madrid (a.y. '22-'23).

- **BSc. Automation Engineering** - ***Politecnico di Milano*** *Milan, Italy* | Sept. '18 - Sept. '21

  ◦ GPA: 3.4/4.0 | Main courses: Control, Electronics, Programming (**C, Java**), Mechanics, Optimization.

Selected Projects

- **Control of a Magnetic Levitation system - Supervisor Prof. G. Cazzulani** *Feb. '23 - Jun. '23*

  Tools: Fusion360, FEMM, Matlab, Simulink [📄]

  ◦ Control strategies: PI+Stabilizing Regulator, Pole Placement, PI+LQR, Backstepping, Feedback Linearization, Static & Dynamic SMC. Extended Kalman and notch filters implemented for signals estimation, behaviour prediction and noise removal.

- **Odometry and SLAM for mobile robot - Supervisor Prof. M. Matteucci** *Apr. '22 - Jul. '22*

  Tools: C++, Python, ROS, GIT [🐙]

  ◦ ROS architecture, interfaces for LiDAR, ultrasound sensors and motors controlled via PWM. Odometry: sensorfusion, TF transform. | SLAM: **gmapping** for map creation and **amcl** for localization.

- **IEEE VTS Challenge 2020 at PoliMi [🌐]** *Feb. '21 - Jun. '21*

  Tools: Matlab, Simulink

  ◦ Designed and modeled a hybrid electric vehicle truck's control system integrating lead-acid batteries, ultracapacitors and hydrogen fuel cells. Implemented PID and switching-based energy management strategy, achieving 87% relative efficiency and placing 4th in the Politecnico di Milano competition.

Extra

- Lead The Future - Mentee : mentorship program for STEM student with acceptance rate below 13%.
- Competitive programming: ITACPC, AdventOfCode, Reply Code: C, C++, Python.
- Hackathon Finalist: MVA Driving Innovation '22; A2A All4Climate '21.