Antonio Tangaro

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Computer Engineer - AI & Robotics Student

Education

University of Padova — *Padova, Italy*
M.Eng in Computer Engineering - AI & Robotics — *Sep. 2024 – Dec. 2026*

- Thesis: Reinforcement Learning for Autonomous Racing at the Limit of Handling.

University of Padova — *Padova, Italy*
B.Eng in Computer Engineering — *Sep. 2021 – Sep. 2024*

- Thesis: Architecture of an audio streaming system on Raspberry Pi for controlling sonic microenvironments.

Professional Experience

SoundFood s.r.l. — *Padova, Italy*
Software Engineering Intern — IoT & Embedded Systems — *Jan. 2024 - Oct. 2024*

- Designed and implemented an IoT-based distributed audio system for restaurants, using Raspberry Pi Zero 2 W devices to provide independently controlled audio environments across multiple tables.
- Architected the audio pipeline around Mopidy and Snapcast, enabling synchronized multi-device playback and centralized control while supporting independent audio zones.
- Developed the system's control layer and web interface using React and Redux, integrating Mopidy via WebSocket and Snapcast via JSON-RPC to manage playback, volume, device state, asynchronous events, and communication failures.
- Optimized the embedded software stack on DietPi for resource-constrained hardware, maintaining CPU utilization below 30% and memory usage at approximately 150 MB during operation.

Embedded Systems | WebSocket | JSON-RPC | React | Redux | Python | JavaScript | IoT | Redux

Research & Projects

University of Padova - Department of Information Engineering — *Padova, Italy*
Master's Thesis Project — Reinforcement Learning for Autonomous Racing at the Limit of Handling — *Jan. 2026 - Present*

- Developed a model-free Reinforcement Learning framework based on PPO that learns to minimize lap time at the limit of handling on the Barcelona-Catalunya circuit.
- Formulated the racing task as a Markov decision process at 20 Hz: steering and longitudinal commands, observations of vehicle state and track curvature previewed at quadratically spaced distances ahead, a progress-based reward, and randomized dynamically feasible initial states, with separate actor and critic networks trained over 320 parallel environments.
- Built a nonlinear single-track vehicle model with Pacejka tires, inertial load transfer, aerodynamic drag and a wheel-power limit calibrated on a Porsche 718 Cayman GT4, with a vectorized simulation environment for massively parallel training over hundreds of millions of decisions per policy.
- Solved a minimum-time lap as an optimal control problem (CasADi/IPOPT) to benchmark the learned driving: the policies complete 49 of 50 laps from standing starts, on average within 4.5% of the optimal lap time.
- Studied robustness to vehicle variation through a front/rear grip-balance parameter, comparing nominal, domain-randomized and privileged-information (oracle) policies on interpolated, held-out and extrapolated vehicles: a single randomized policy drives every vehicle of its training range within 3.5–5% of that vehicle's optimal lap.

Reinforcement Learning | Safe RL | PPO | Imitation Learning | Behavior Cloning | Autonomous Driving | Vehicle Dynamics

Skills

Languages	Italian (Native), English (Fluent)
PLs	Java, Rust, Python, Elixir, JavaScript, C++
AI/ML	Machine Learning, Deep Learning,Reinforcement Learning, Computer Vision, PyTorch
Tech Stack	Armeria, JOOQ, Spring, Micrometer, Apache Thrift , Picocli, JUnit, Mockito, Testcontainers
Databases	PostgreSQL, MySQL, Redis, Elasticsearch
Platforms and Tools	Docker, Kubernetes, ROS 2, Prometheus, Grafana, Atlassian, Maven, Gradle, Linux
Other	Latex, Markdown, Git, HTML/CSS, Typst, GitHub Actions
Soft Skills	Leadership,Teamwork, Problem Solving, Communication, Adaptability, Attention to Detail, Initiative, Organization

I hereby give consent for my personal data included in the application to be processed for the purposes of the recruitment process in accordance with Art. 6 paragraph 1 letter a of the Regulation of the European Parliament and of the Council (EU) 2016/679 of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).