

PIETRO ZULLO

Mechanical Engineer

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📍 Zurich, Switzerland

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EDUCATION

MSc in Mechanical Engineering:
Department of Robotics, Systems, and Control

ETH Zurich
GPA 5.7/6.00

📅 September 2020 – Ongoing

📍 Zurich, Switzerland

Relevant Courses

- Dynamic Programming and Optimal Control
- Probabilistic Artificial Intelligence
- Control Systems I
- Microrobotics
- Physical Human Robot Interaction
- Robot Dynamics
- Perception and Learning for Robotics
- Introduction to Machine Learning
- Model Predictive Control
- Planning and Decision Making for Autonomous Robots

Exchange Program - BSc in Mechanical Engineering

Boston University
GPA 4.00/4.00

📅 January 2020- May 2020

📍 Boston, US (MA)

BSc in Mechanical Engineering

Università Degli Studi di Padova
Graduation Magna cum Laude
GPA 29.03/30.00

📅 October 2017 - July 2020

📍 Padova, Italia

WORK EXPERIENCE

Research Engineer Intern @ [MOTIONAL](#)

Planning and Control - Data-Driven Trajectory Scoring

📅 Feb 2022 - July 2022

📍 Singapore, Singapore

Implemented several Data Driven algorithms based on the state of the art driving data-set [NuPlan](#) to discover the preference and cost structure of human drivers in driving scenarios and utilize it in the trajectory scoring module of an autonomous driving stack. Buzzwords: Bayesian Optimization, Machine Learning, Preference Learning, Lexicographical Order, Trajectory Scoring.

PROJECTS

📅 2021

AlterEgo: an avatar based size recommendation system (Python/JavaScript/HTML/CSS)

I was responsible of developing the entire stack of AlterEgo, an innovative project which aims at reducing the impact of the on-line fashion retail business. The development included several challenges that spanned several topics from computer vision and graphics to web development. The website of the project can be found at [AlterEgo](#).

Model Predictive Control for high performance driving (MATLAB & SIMULINK)

On behalf of [IDSC Zurich](#) I collaborated with [UniPD](#) and [UniNA](#) to conduct an analysis on a commercial software to control vehicles in high performance driving, successfully improving its accuracy and overall performance. I refined the work done by previous developers which used the MATLAB tool [MATMPC](#) to develop a NMPC controller for high performance driving. This was used to control highly accurate virtual vehicles' in a cosimulation environment. ([Vi-Grade](#))

Uncertainty Aware Learning Algorithm (Python/Pytorch/C++)

In collaboration with Autonomous Systems Lab of ETH I implemented state of the art learning algorithms (Deep Kernel Learning, DeepGPs) to improve the dynamical model of a 6 propeller's drone ([Omav Drone](#)). The learning algorithm was used to learn the

mismatch, coming from the propellers' aerodynamical interactions, between the commanded wrench and the actual one acting on the drone. The learnt mismatch was then included in the control architecture.

📅 2020

Drone Path Planning in Urban Environment (MATLAB)

Implemented a MATLAB program to find optimal path (collision avoidance, danger avoidance) of a drone in a grid world, utilizing infinite horizon planning algorithms.

Teleoperation - Haptic Devices (LabView)

In a team of 4 students, I worked at the realization of a teleoperated haptic device. We exchanged data over a UDP connection between two identical haptic paddles and implemented a symmetric controller that made each of the devices mirror the behaviour of the other. As a result of our work, we were able to let the user recognize objects of different stiffnesses by touching them with the haptic device from another city.

Reinforcement Learning (PyTorch)

Tested my RL skills on a number of problems coming from OpenAI's [Gym](#) environments such as Lunar Lander and Self Balancing Cart Pole which I solved with an A2C algorithm.

📅 2019

Wheeled Path Tracking Robot (ROS/Python)

Development of a two wheeled robot based on Raspberry Pi SBC featured with Picamera. I implemented a lane tracking system successfully and adapted cascade Face recognition algorithm on the platform.

Structural Analysis of truss structures (Python)

As my Bachelor's Theses I developed a program to compute displacements under different load configurations of customisable planar truss structures, using the Direct Stiffness Method.

ACTIVITIES

Finalist @ RedBull Basement

📅 December 2021

📍 Zurich, Switzerland

My project AlterEgo (see Projects) won a national selection in Switzerland for a world wide competition hosted by RedBull focused on sustainability. Together with 44 other project out of 4000 initial participants me and my team were selected to attend a global final.

Hackathon @ UNOX Ovens

Realization and testing of a Neural Network Algorithm for Speech Recognition (TensorFlow)

📅 May 2018

📍 Padova, Italia

CERTIFICATIONS

Graduate Record Examination (GRE)

Overall Grade : 329/340

- Quantitative 163 (87th percentile)
- Verbal 166 (92nd percentile)

📅 2019

English Language Certificate IELTS

Overall Band Score 7.0 (C1)

📅 2018

SKILLS

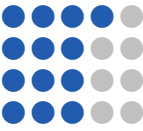
Programming

MATLAB SIMULINK
Python



Softwares

- Office
- CAD (Fusion 360 , OnShape, CREO)
- LabView
- Github



LANGUAGE

- Italian
- English
- Spanish
- German

