

Jianhao ZHENG

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EDUCATION

École polytechnique fédérale de Lausanne (EPFL), Switzerland

Sep. 2020 - Present

- MSc in Robotics from 2020 Fall
- Selected courses: Model predictive control, Applied machine learning, Advanced algorithms, Computer vision, Aerial robotics, Vision Algorithms for Mobile Robotics

Shanghai Jiao Tong University (SJTU), Shanghai, China

Aug. 2016 - Jul. 2020

- B.E. in Mechanical Engineering, School of Mechanical Engineering; GPA: 3.63/4.0
- Awarded Academic Excellent Scholarship (Second-Class) of SJTU for three consecutive years

National University of Singapore (NUS), Singapore

Jun. 2019–Sept, 2019

- Summer Research Intern

PROJECTS

Absolute visual localization domain adaptation via domain decluttering techniques

Semester project

Sept, 2021 - Present

Advisor: **Dr. Doytchinov Iordan** Geodetic Engineering Laboratory, EPFL

- Intended to close the synthetic-real domain gap to improve the performance of the **absolute coordinate regression architecture**, which was trained on the synthetic data.
- Trained a depth estimation network, and achieved an accuracy of 6 m in both real and synthetic domain. Such network will be used as a form of **mid-level representation**.
- Attempted to adopt the concept of **Domain Decluttering**, which translate the RGB domain and remove (hard) out-of-domain regions in real images, to the coordinate regression model.

Distributed Model Predictive Control Architectures for Multi-Rotor Micro Aerial Vehicles

Semester project, obtained grade: 5.75/6

Feb. 2021 - Jun. 2021

Advisor: **Izzet Kagan Erunsal** and **Prof. Alcherio Martinoli**, Distributed Intelligent Systems and Algorithms Laboratory (DISAL), EPFL

- Conducted literature survey on multiple multiple MAVs' formation control and investigated into different types of **Distributed Model Predictive Control** (Distr-MPC) architectures.
- Theoretically formulated three most prominent Distr-MPC schemes and prototyped them in MATLAB to simulate a benchmark formation control problem. Performances regarding to the formation error, computational time and robustness to communication quality were compared.
- Implemented the best Distr-MPC architecture and a Decentralized MPC scheme in a high-fidelity framework consisting of the Webots simulator and the Robotic Operating Systems (ROS) with **ACADO Toolkit** as the MPC solver. The Distributed MPC has 37% less formation error than the Decentralized MPC. [[project web](#)][[slides](#)]

Crazyflie: Auto navigation and landing

Course project (Aerial Robotics), obtained grade: **5.88/6**

Apr. 2021 - Jun. 2021

Advisor: **Prof. Dario Floreano**, Laboratory of Intelligent Systems (LIS), EPFL

- Programmed based on Crazyflie 2.1 to auto-navigate through a broad region and avoid obstacle with sensor readings from multi-ranger deck.
- Implemented A* algorithm to control the Crazyflie to search an unknown landing pad with a z-range sensor and designed a robust algorithm to control the drone to fly back to the take-off pad after landing. [[code](#)] [[video](#)]

An Inverted Pendulum Controlled by UR Robot

Design and Practice of Mechatronic Systems Final Project (top 4 students)

Feb. 2019 - Jun. 2019

- Designed and manufactured an inverted pendulum installed with a **potentiometer** to match the **UR5e Robot**.
- Programed through **MoveIt Motion Planning Framework** in ROS to control the movement of **UR5e Robot** according to the situation of inverted pendulum.
- Managed to keep the inverted pendulum unfallen and stable under disturbance through our controller.

PUBLICATIONS & SUBMISSIONS

I.K. Erunsal, **J. Zheng**, R. Ventura, A. Martinoli, "Linear and Nonlinear Model Predictive Control Strategies for Trajectory Tracking Micro Aerial Vehicles: A Comparative Study", *IEEE International Conference on Robotics and Automation (ICRA) 2022*, submitted.

SELECTED HONORS

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| Excellent Graduates of Shanghai Jiao Tong University (5%) | <i>Jun. 2020</i> |
| Meritorious winner in Mathematical Contest in Modeling (13%) | <i>Feb. 2018</i> |
| Academic Excellent Scholarship (Second-Class) of SJTU (40 out of 420) | <i>Oct. 2017 - Oct. 2019</i> |
| The Most Popular Award at the Spring Works Exhibition (top 5%, departmental) | <i>Jun. 2018</i> |
| Merit Student of Shanghai Jiao Tong University (3 out of 40) | <i>Oct. 2017</i> |

SERVICE

Reviewer

- IEEE International Conference on Robotics and Automation (ICRA), 2022.

Teaching Assistant

- EE-477: Multivariable control and coordination systems (Fall 2021) @ EPFL.

SKILLS

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| Programming | proficient: MATLAB, Python; intermediate: C++ |
| Technical Tools | Linux, Git, PyTorch, ROS, Latex, Webots Arduino, Raspberry Pi, UG, SolidWorks |
| Language | English: TOEFL-105(R30,L28,S23,W24), GRE-322(V158,Q170,AW3.5) |