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, Distributed intelligent systems

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
- Main Courses: Linear Algebra(95), Modeling Analysis and System Control(91), Principles and Practice Using C++ (91), Design and Practice of Mechatronic Systems (91), Robotics (90)

National University of Singapore (NUS), Singapore *Jun. 2019–Sept, 2019*

- Summer Research Intern

PROJECTS

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]

Cross-Modal Fusion between Data in SAXS and Cryo-EM
Research Assistant at National University of Singapore *Jun. 2019 - Sep. 2019*
Advisor: **Prof. Gregory Chirikjian**, Head of Department of Mechanical Engineering at NUS

- Proposed to fuse the information from cryo-electron microscopy **(cryo EM)** and small-angle X-ray scattering **(SAXS)**, in exploiting the synergies of both techniques for biomolecular structure determination.
- Simulated the SAXS-EM fusion on the data of **nucleosome-Chd1** from Protein Data Bank in **Matlab** and demonstrated an outperformance in biomolecular structure reconstruction accuracy by using the fusion of SAXS-EM, compared to EM alone.
- Contributed to the paper published in arXiv, Cross-Modal Fusion Between Data in SAXS and Cryo-EM for Biomolecular Structure Determination.[arXiv]

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.

SELECTED HONORS

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

SKILLS

Programming	proficient: MATLAB, Python; intermediate: C++
Technical Tools	Webots, ROS, Linux, Git, Latex, Arduino, Raspberry Pi, UG, SolidWorks
Language	Chinese (native), English (C1)