Chao Ni

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EDUCATION

ETH Zürich, Zürich, Switzerland
Master of Science In Robotics, System and Control, 2019-2021
Master thesis:
Learning to Walk over Structured Terrains by Imitating MPC

Peking University, Beijing, China
Bachelor of Science
College of Engineering, 2015-2019
Bachelor thesis:
Exploiting Effective Representation via Cooperative Learning of Multi-Sensory Robotics Data
Bachelor of Economics
National School of Development, 2016-2019

Johns Hopkins University, Baltimore, American
Visiting Student, Advised by Gregory Chirikjian, 2018.6-2018.9
The Laboratory for Computational Sensing and Robotics

Tsinghua University, Beijing, China
Research Assistant, Advised by Chongjie Zhang, 2019.1-2019.9
The Machine Intelligence Group

RESEARCH INTERESTS

- Learning to Control
- Perception for Robotics

PUBLICATION

- Schmid, L.*, **Ni, C.***, Zhong Y., Srinivasan, S., Cadena, C., Siegwart, R., and Andersson, O. (2021). *Learning Sampling-based Exploration Planning.* Unpublished manuscript, ETH Zurich, Zurich, Switzerland.
- **C. Ni**, A. Reske, T. Miki, J. Carius, R. Grandia and M. Hutter. (2021). *Learning to Walk Over Structured Terrains by Imitating MPC.* Unpublished manuscript, ETH Zurich, Zurich, Switzerland.

RESEARCH EXPERIENCE

Learning to Walk Over Structured Terrain by Imitating MPC
Advisor: Takahiro Miki, Alexander Reske, Marco Hutter 2021.3 - 2021.9

- Leveraged demonstrations from MPC expert and trained a neural-network-based controller for robot locomotion.
- Utilized learning-by-cheating two stage training schedule to cope with noisy elevation map information.
- Developed simulation environment for MPC expert walking over structured terrains and achieved sim-to-real transfer.

Learning Sampling-Based Exploration Planning
Advisor: Lukas Schmid, Olov Andersson, Roland Siegwart 2021.3 - 2021.9
In progress

- Proposed a framework to learn the sampling distribution from next-best-view samples and bias the exploration towards the frequently visited area.
- Utilized Conditional Variational Autoencoder to generate samples given the local occupancy map.

- Evaluated the generalization ability of our learned planner on multiple test environments and realized sim-to-real transfer.

MPC-feedback Trajectory Optimization for Wheeled-legged Robots
Advisor: Marko Bjelonic, Ruben Grandia, Marco Hutter 2020.3 - 2020.6

- Created a motion primitive library for the wheeled-legged robots with trajectories generated by modulizable optimizers and use Model Predictive Control (MPC) to track the trajectory.
- Developed the interface for MPC solver to receive the primitive trajectory and verified it on the real robot.

Exploiting Effective Representation via Cooperative Learning of Multi-Sensory Robotics Data
Advisor: Chongjie Zhang **Collaborator:** Guangxiang Zhu 2019.1 - 2019.9

- Proposed a self-supervised cooperative network utilizing synchronization between images and vectors using contrastive loss to learn effective representations.
- Implemented and applied the learned representations in multiple downstream RL tasks.

WORKING EXPERIENCE

SLAM Engineer
Formula Student, AMZ Driverless Racing 2020.10 - 2021.2

- Investigated and maintained the simultaneous localization and mapping (SLAM) module of the driverless car.
- Developed key performance indicator of the SLAM module.
- Implemented the interface for the SLAM module and integrated novel features into the pipeline.

Student Lab Assistant (15hrs/wk)
Course: Introduction to Robotics and Mechatronics 2021.2 - 2021.6
Course: Information System for Engineers 2020.10 - 2021.1

SKILLS

Robotics: C++, ROS, MATLAB;
Learning: Python, PyTorch, TensorFlow
Language: English (Fluent), Chinese (Native), German (B1)

AWARDS

- ETH Scholarship for international students ($6000, 2020)
- Chen Overseas Exchange Scholarship (1%) ($3000, Peking University)
- 2017 & 2018 Academic Excellence Awards (5%) (Peking University)
- First Prize for the Mathematical Modeling Contest ($800, Peking University)