KAIYUE SHEN

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EDUCATION

Master in Electrical Engineering & Information Technology, ETH Zürich 2019 - present
Areas of Study: reinforcement learning, robotics, computer vision, deep learning, machine learning.
GPA: 5.68 / 6

Bachelor in Electronic Information Engineering, University of Electronic Science and Technology of China
GPA: 91.5 / 100, Rank: 1 / 285 2015 - 2019

SKILLS

Programming: Python (PyTorch, TensorFlow, Scikit-Learn, Keras), C++ (ROS), MATLAB
Others: Linux, Git, LaTex, Docker

PROJECTS

Learning to grasp with Humanoid Robot Hands
Visual Intelligence and Systems Group, Computer Vision Lab, ETHZ April 2021 - present
Supervisors: Prof. Fisher Yu, Dr. Alex Liniger

- Wrapped an OpenAI Gym environment based on openai_ros for grasping task using the combination of Shadow Dexterous Hand and Universal Robot Arm.
- Tested traditional grasping methods and tried a naive reinforcement learning method (current stage) on Shadow Dexterous Hand in Gazebo simulation.

Continual learning for autonomous mobile robots
Autonomous Systems Lab, ETHZ October 2020 - February 2021
Supervisors: Prof. Roland Siegwart, Dr. Abel Gawel

- Built a network that continually learns the foreground and background segmentation task using TensorFlow.
- Implemented several methods for continual learning: fine-tuning (baseline), feature distillation, output distillation, elastic weight consolidation, progress and compress.
- Conducted two experiments on NYU & CLA datasets to test the performance of all methods.

Gradual Transition From Model-Based to Model-Free
Course project of Deep Learning October 2020 - January 2021
Co-workers: Le Chen, Yunke Ao, Zheyu Ye

- Proposed a method that gradually transform a model-based RL framework to a model-free actor-critic architecture to combine their advantages using PyTorch.
- Developed a general RL training pipeline that goes through 3 stages: model-free pre-training, model-based imitation and model-free fine-tuning where the second stage is the most creative part of our work.
- Evaluated our algorithm on benchmark tasks in the OpenAI Gym and showed its faster convergence and higher final performance compared with other baselines: MVE, DDPG and modified Mb-Mf.

Simple Hexapod Robot Control
Course project of Computational Models of Motion May - June 2020
Co-workers: Chao Ni, Ji Shi

- Developed a locomotion control framework for Hexapod in simulation using C++.
- Implemented an inverse kinematics solver, and a gait controller that outputs target offsets for the IK solver.
- Achieved multiple gaits and transitions, basic navigation and obstacle avoidance, and complicated terrain test.

Object Reconstruction with Depth Error Compensation Using Azure Kinect
Course project of 3D Vision March - July 2020
Supervisor: Taein Kwon
Co-workers: Yunke Ao, Yifei Dong, Panayiotis Panayiotou

- Presented a method for creating object meshes based on existing SLAM frameworks, and a learning-based depth error compensation mechanism for Time-of-Flight cameras using Python and C++.
- Implemented an object reconstruction pipeline composed of five processes: point cloud generation, background removal, geometric registration, surface reconstruction and bias correction (in charge of last two parts).
- Demonstrated the effectiveness of our method using the Azure Kinect RGBD camera, and showed better performance compared with the depth correction method adopted by BADSLAM.

Intern in Institute of Image Processing, UESTC
Supervisor: Prof. Yang Hu July 2018 - June 2019

- Researched Virtual Try-on (fashion image synthesis) based on Generative Adversarial Networks using PyTorch.
- Reproduced and examined different ideas: FiNet, VITON, fashionGAN, CP-VTON, etc.
- Refined the performance of FiNet model by modifying the model framework and adding training techniques.
- Crawled 18,000+ pairs of images from the fashion website *Zalando* to make our own dataset.

AWARDS

- 2017-2018 National Scholarship *Ministry of Education of P.R.C*, 2018.
- 2016-2017 National Scholarship *Ministry of Education of P.R.C*, 2017.
- 2015-2016 National Scholarship *Ministry of Education of P.R.C*, 2016.
- The Meritorious Winner in MCM (Top 1%) *COMAP*, 2018.

HOBBIES

- Hiking, skating, skiing, badminton, cooking.