Shaoting Peng

shaotingpeng.github.io | (267)226-2975 | pengsht@seas.upenn.edu

EDUCATION

University of Pennsylvania   Philadelphia, PA
Master of Science Candidate in Robotics | GRASP Lab | GPA 4.0/4.0   *Sep. 2022 - present*

- Core Coursework: Machine Learning, Linear System, Perception, Intro to Robotics, Learning in Robotics

University of California, Berkeley   Berkeley, CA
Exchange Student | Summer Sessions   *July 2019 – Aug. 2019*

ShanghaiTech University   Shanghai, China
B.Eng. in Computer Science | GPA 3.67/4.0, top 10%   *Sep. 2018 – June 2022*

- Scholarships & Awards: Magna Cum Laude; Third-class scholarship(2020-2021); Second-class scholarship(2019-2020); Merit Student(2019-2020); Third-class scholarship(2018-2019).

RESEARCH INTERESTS

Robust perception, learning from noisy/suboptimal data, cognitive theory-based human modeling, human-robot interaction (HRI), eldercare robots.

PUBLICATIONS

[1] **S. Peng**, X.M. Wang, J.A. Shah, and N. Figueroa, "Object Permanence Filter for Robust Tracking with Interactive Robots". *Under review at ICRA.*

[2] H.J. Choi[†], S. Das[†], **S. Peng**[†], R. Bajcsy and N. Figueroa, "On the Feasibility of EEG-based Motor Intention Detection for Real-Time Robot Assistive Control". *Under review at ICRA.*

(†: Equal contribution)

RESEARCH EXPERIENCE

EEG-based Real-Time Motor Intention Detection   Philadelphia, PA
Graduate Researcher | Co-advised by Prof. Nadia Figueroa and Prof. Ruzena Bajcsy   *April 2023 – Present*

- Investigated the feasibility of using electroencephalogram (EEG) to achieve binary motor intention classification for robot assistive control in real-time.
- Proposed two pipelines to perform data collection, training, and real-time robot testing. To deal with the noisy signals, the Riemannian manifold-based method and several filtering methods are implemented.
- Different combinations of parameters are examined, best results show a testing classification accuracy of 86.88% with SVM, and 70% accuracy for real-time robot experiments.

Object Permanence Filter for Robust Tracking with Interactive Robots   Philadelphia, PA
Graduate Researcher | Advised by Prof. Nadia Figueroa   *Nov. 2022 – Present*

- Proposed a set of assumptions and rules to computationally embed "object permanence" into a particle filter scheme to form the 6-DoF object permanence filter (OPF) for occlusion-aware robust perception.
- The OPF consists of occluder module, dynamics module, uncertainty module and feedback module, enabling trackers the robustness to heavy and prolonged occlusions in interactive tasks providing plausible tracking.
- Conducted PyBullet simulations experiments and hardware experiments on Franka Research 3. Evaluations show robust tracking performances under different kinds of occlusions agnostic to measurement types.

Cross-modal Weakly-supervised Segmentation for Myocardial Infarction   Shanghai, China
Undergraduate Research Assistant | PLUS Lab | Advised by Prof. Xuming He   *Aug. 2020 – Feb. 2022*

- Registered two myocardial image modalities, which are T2 weighted imaging (T2W) with edema regions and phase-sensitive inversion recovery (PSIR) with necrosis regions, and explored a weakly-supervised segmentation pipeline.
- Participated in RANSAC flow-based registration, nnUNet-based segmentation, and post-processing to reduce the segmentation uncertainty.
- The recorded Sørensen–Dice coefficient of 0.68 provides evidence of a correlation between myocardial necrosis and edema regions.

Camera-Lidar Fusion-based Pointcloud Segmentation in Auto-driving Shanghai, China
Research Intern | Shanghai AI Lab, OpenDriveLab | Advised by Prof. Hongyang Li *Feb. 2022 – June 2022*

- Explored effective methods of camera-Lidar fusion by combining the point cloud from Lidar with segmentation score from camera for point cloud segmentation, and investigated pseudo-Lidar depth estimation and multi-modal fusion.
- Our fusion-based method achieved an average mIOU (mean Intersection over Union) of 69.8% across 19 classes on the KITTI dataset, demonstrating a 6% improvement over the baseline model, Cylinder3D.

INDUSTRY EXPERIENCE

Software Development Intern Shanghai, China
Advanced Micro Devices(Shanghai) Co., Ltd. *July 2021 – Oct. 2021*

- Interned at SRDC(Shanghai Research and Development Center) BIOS department
- Developed a tool (in Python) to download register values from Database, read the values in the chip and compare them automatically. This tool accelerates and simplifies the validation process.

Product Manager Intern Shanghai, China
ByteDance Ltd. *March 2021 – June 2021*

- Interned at Lark VC(Video Conference) department, responsible for audio/video quality.
- Resolved the requirements about squeaking problem in RTC(Real-time Communication) for several Key Accounts, and participated in the design of a screen-sharing hardware.

TEACHING EXPERIENCE

Teaching Assistant Shanghai, China
Prof. Sören Schwertfeger's Computer Architecture Course(CS110) *March 2021 – July 2021*

- Designed a homework to implement a binary heap using RISC-V and a project to implement a dis-assembler using C. Authored several exam questions on RISC-V, C and VM.

SKILLS

Python, C/C++, MATLAB, PyTorch, PyBullet, OpenAI, ROS, Franka