Chunwei Xing

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✤ Bändlistrasse 68, Zürich Personal Website



EDUCATION

Eidgenössische Technische Hochschule Zürich(ETHz) <i>MSc. in Robotics, Systems and Control</i>	Zürich, Switzerland Sep. 2020 - Present
Tsinghua University (THU))	Beijing, China
Major GPA & Rank: 3.68/4.0, 12/107	Aug. 2016 - Jul. 2020
Delft University of Technology (TUD)	Delft, Netherlands
Exchange Master's Program in Mechanical Engineering GPA: 8.81/10.0	Sep. 2018 - Feb. 2019
LANGUAGE & SKILLS	

German: beginner(A2). English: Fluent(C1) • Chinese(Mandarin): Native.

- Programming Languages: C++, Python, Bash, R, MATLAB/Octave, LaTex, STATA.
- Softwares/Tools: Linux, ROS, Docker, Visual Studio, Pycharm, Git, CMake.
- Machine Learning Frameworks: TensorFlow, Keras, PyTorch, Scikit-learn.

PUBLICATIONS

Chunwei Xing, Xinyu Sun, Andrei Cramariuc, Samuel Gull, Jen Jen Chung, Cesar Cadena, Roland Siegwart, and Florian Tschopp. Descriptellation: Deep learned constellation descriptors for slam. arXiv preprint arXiv:2203.00567, 2022

EXPERIENCE

- Learning-Based Timing Analysis Tools for Industrial Control Platforms **Baden**, Switzerland Software Development Intern | PyTorch/CMake/C++/InfluxDB
- ABB Corporate Research Center in Switzerland • Developed Physics-Informed Neural Networks(PINN) to fit the execution time distributions and predict the Worst-Case Execution Time(WCET) of applications running on ABB commercial motor drivers.

Learning Driven Pose Selection for Sampling-Based Planning Semester Project Student | PyTorch/CMake/C++

Robotic Systems Lab(RSL), ETHz

- Developed a base pose selector based on Reinforcement Learning Models (PPO) and trained policies for a wheeled-legged robot to ground on challenging terrains.
- Formulated evaluation metrics, experimented with reward shaping and improved the performances.
- Achieved a success rate of 80% at a grounding error of 0.05m on challenging terrains, e.g. Holes.
- Integrated the pose selector into the global planner (RRT*) and benchmark against brute force search.

Facebook AI Image Similarity Challenge

NeurlIPS21 Competition | PyTorch | AI Center, ETHz

• Implemented a self-distillation network by combining the DINO's backbone (Vision Transformer) and SimCLRv2's backbone, and improved the performances by 20% over the published baselines.

May. 2022 - Present

Zürich, Switzerland

Oct. 2021 - Feb. 2022

Zürich, Switzerland Aug. 2021 - Oct. 2021

Descriptellation: Deep Learned Constellation Descriptors for SLAM Course Project Student | PyTorch/Open3D

Autonomous Systems Lab (ASL), ETHz

- Implemented a semi-supervised triplet-loss-based graph convolution network modified from Deep-GCNs to learn a deep-learned descriptor for the objects constellation for global localization in SLAM.
- Introduced semantic embedding and graph attention layers into DeepGCNs for learning and improved the performance both on the simulation data and real data.
- Achieved over 95% top 5 ratio on simulation datasets and over 80% top 5 ratio on real datasets, and our descriptor outperforms SOTA learning-based and handcrafted descriptors, such as GOSMatch Vertex descriptor in global localization tasks.

Edge Detection of Densely Aligned Boxes using Bi-Directional Cascade Network Beijing, China Deep Learning Research Intern | TensorFLow/Keras/PyTorch

Mech-Mind Robotics Technologies Ltd.

- Jul. 2020 Sep. 2020 • Collected RGBD image data sets by manipulating robotic arms to grasp densely aligned medicines and food wrapper boxes in real scenarios and applied offline and online augmentation to data.
- Implemented Bi-Directional Cascade Network(BDCN) using Tensorflow/Keras based on the original paper, and tested different feature extraction convolution networks as the backbone and different network structures to improve performances.
- Improved the online detection speed by 10 times compared to the original network DexiNed, with the detection accuracy decreasing by only 5%.

Cervical Cancer Cells Screening Based on Instance Segmentation Bachelor Thesis Student | PyTorch

Biomanufacturing Center, Tsinghua University

- Collected a private data set for the instance segmentation task of cervical cancer screening based on the clinical medical data offered by cooperative hospitals.
- Implemented binary class and multi-class instance segmentation using Mask-RCNN model with ResNet50 and ResNet101 as the backbone to recognize and segment various cancer cells, including overlapping cytoplasm and nuclei, and visualized the results.
- Achieved an mAP of 0.866 for cytoplasm segmentation on the public data set, 0.825 for nuclei segmentation, and an mAP of 0.742 cytoplasm segmentation on the clinical data set respectively at the level of IoU = 0.5.

Wireless Capsuled Device for Real-time Detection for Gastroesophageal Reflux Hong Kong, China Undergraduate Student Researcher | C++/SolidWorks/CAD

Advanced Nanomaterials & Microrobotics Lab, CUHK

- Designed multi-scale prototype circuit boards and diminished their sizes to $5mm \times 8mm \times 30mm$.
- Tested the energy harvesting, signal transmission, and receiving efficiency of multi-scale prototype circuit boards, which were powered by DC power supply and copper-zinc primary battery respectively.
- Designed a mechanical reciprocating propulsion system installed on a stomach model to simulate the creeping of patients' stomachs.

AWARDS & ACHIEVEMENTS

National Scholarship for Encouragement

- Excellent Scholarship for top 20% students
- The Third Prize for National College Physics Olympiad

Nov.2019, Nov.2018, Nov.2017 Nov.2019, Nov.2017 Nov.2017

Zürich, Switzerland

Feb. 2021 - Jun. 2021

Beijing, China Feb. 2020 - Jun. 2020

Jul. 2019 - Sep. 2019