WENYU HAN

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EDUCATION

New York University	New York, USA
Ph.D. Candidate in AI4CE Lab, Mechanical Engineering, Advisor: Chen Feng	Sept 2019 - Present
Thesis: Towards automation design and construction using representation learning on structured data	
Specialization: Deep Learning, Computer Vision, Robotics, and Reinforcement Learning	
Northwestern University	Evanston, USA
M.S. in Integrated Design Automation Lab, Mechanical Engineering, Advisor: Wei Chen	Sept 2017 - June 2019
Dalian University of Technology	Dalian, China
B.S. in Engineering Mechanics Deparment	Sept 2012 - June 2016

PUBLICATIONS

[IEEE/CVF CVPR 2020] Wenyu Han*, Siyuan Xiang*, Chenhui Liu, Ruoyu Wang, Chen Feng, SPARE3D: A Dataset for SPAtial REasoning on Three-View Line Drawings. (* = equal contribution) [PDF|Project]

[ICLR 2023] Wenyu Han, Haoran Wu, Eisuke Hirota, Alexander Gao, Lerrel Pinto, Ludovic Righetti, Chen Feng, Learning Simultaneous Navigation and Construction in Grid Worlds. [OpenReview | Project]

[Under review on ISPRS] Wenyu Han, Congcong Wen, Lazarus Chok, Yan Liang Tan, Sheung Lung Chan, Hang Zhao, Chen Feng, Simplified City Generation Using Auto-Encoding Tree. [Project]

RESEARCH EXPERIENCE

Representation learning for mobile rearrangement in indoor environment (Ongoing) Sep 2022 - Present New York University, AI4CE lab

- Proposed a transformer-based localization module to enable explicit agent pose estimation in a dynamic environment
- Designed a hierarchical reinforcement learning method for learning a long-term policy for rearrangement tasks
- Developed a 3D indoor environment simulator for mobile rearrangement tasks using Pybullet

Learning Simultaneous Navigation and Construction in Grid Worlds

New York University, AI4CE lab

- Designed and implemented a Deep Recurrent Q-Network (DRQN) with explicit LSTM-based position estimation module for solving the proposed mobile construction tasks
- Adpated a family of model-free and model-based reinforcement learning baseline methods: DQN, DQN+MCTS, DRQN, DRQN+Hindsight, SAC, Rainbow, and PPO
- Developed a grid-world simulation environment based on OpenAI.Gym framework, which supports multi-processing for high-efficiency training

Simplified City Generation Using Auto-Encoding Tree

New York University, AI4CE lab

- Designed and implemented a tree-structured autoencoder (AETree) to learn the hidden representations of real-city geometric data, showing usefulness for urban planning applications
- Applied learned decoder for generating novel data by randomly sampling from Gaussian Mixture Model
- Adapted SketchRNN and PointNet as baselines for evaluating AETree's performance on city layouts generation

SPARE3D: A Dataset for SPAtial REasoning on Three-View Line Drawings

New York University, AI4CE lab

- Designed three types of tasks for evaluating the spatial reasoning skills of intelligent systems
- Adapted CycleGAN and PointNet baselines for evaluating the 2D and 3D generative capabilities of AI systems
- Adapted three baselines: ResNet, VGG, and BagNet for testing the agent's spatial reasoning skills on 2D line drawings
- Implemented multi-processing data generation scripts for each spatial reasoning task based on ABC dataset

TECHNICAL SKILLS

Languages: Python, C++, Matlab Libraries: PyTorch, OpenCV, OpenAI.Gym, Stable-baselines, Pybullet, OpenGL, PyTorch3D, Open3D Software: ANSYS, AutoCAD, FreeCAD

AWARDS

Dean's PhD Fellowship in the Department of MAE at the NYU Tandon School of Engineering	2019
Outstanding Graduate Student of DUT (Rank 9/71)	2016
2nd Class Academic Excellence Scholarship of DUT	2013-2014
"Liheng" Scholarship for Engineering Mechanics Major Students	2013-2014

TEACHING EXPERIENCE

Graduate Teaching Assistant for ECE-GY 6143, Machine Learning, ROB-GY 6203, Robot Perception, New York University

June 2020 - Sep 2022

Sep 2019 - Apr 2020

May 2020 - Present