

WENYU HAN

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EDUCATION

New York University

Ph.D. Candidate in AI4CE Lab, Mechanical Engineering, Advisor: Chen Feng

Thesis: Representation learning for vector content generation and mobile manipulation planning

Specialization: Robotics, Deep Learning, and Reinforcement Learning

New York, USA

Sept 2019 - Present

Northwestern University

M.S. in Integrated Design Automation Lab, Mechanical Engineering, Advisor: Wei Chen

Thesis: Deep adversarial neural network for composite material microstructure design

Evanston, USA

Sept 2017 - June 2019

Engineering Mechanics, Dalian University of Technology

B.S. in Engineering Mechanics Department

Dalian, China

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

Learning Simultaneous Navigation and Construction in Grid Worlds

June 2020 - Sep 2022

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
- Adapted 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

May 2020 - Now

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

Sep 2019 - Apr 2020

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

Deep Adversarial Neural Network for Composite Material Microstructure Design

Dec 2017 - June 2019

Northwestern University, Integrated Design Automation Laboratory

- Implemented three models: DCGAN, WGAN and WGAN-GP for synthesizing composite material microstructure images
- Applied Gaussian-Process Meta-model and Bayesian optimization method for composite material microstructure design

TECHNICAL SKILLS

Languages: Fluent in Python; Course level for Matlab, C, C++

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