

Yao Wei

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SUMMARY

I am a Ph.D. student at Faculty of Geo-Information Science and Earth Observation (ITC) at University of Twente, The Netherlands, supervised by Prof. George Vosselman and Prof. Michael Ying Yang. My research interests include 3D scene understanding, generative models and multi-modal learning.

PUBLICATIONS

- [1] **Yao Wei**, Martin Renqiang Min, George Vosselman, Li Erran Li, Michael Ying Yang. **Planner3D: LLM-enhanced graph prior meets 3D indoor scene explicit regularization.** *IEEE Transactions on Pattern Analysis and Machine Intelligence (Under Review)*, 2024.
- [2] **Yao Wei**, George Vosselman, Michael Ying Yang. **BuilDiff: 3D building shape generation using single-image conditional point cloud diffusion models.** *IEEE/CVF International Conference on Computer Vision Workshops*, 2023.
- [3] **Yao Wei**, George Vosselman, Michael Ying Yang. **Flow-based GAN for 3D point cloud generation from a single image.** *British Machine Vision Conference*, 2022.
- [4] **Yao Wei**, Shunping Ji. **Scribble-based weakly supervised deep learning for road surface extraction from remote sensing images.** *IEEE Transactions on Geoscience and Remote Sensing*, 2021, 60: 1-12.
- [5] **Yao Wei**, Kai Zhang, Shunping Ji. **Simultaneous road surface and centerline extraction from large-scale remote sensing images using CNN-based segmentation and tracing.** *IEEE Transactions on Geoscience and Remote Sensing*, 2020, 58(12): 8919-8931.
- [6] **Yao Wei**, Kai Zhang, Shunping Ji. **Road network extraction from satellite images using CNN based segmentation and tracing.** *IEEE International Geoscience and Remote Sensing Symposium*, 2019.
- [7] Jingjing Yan, Shunping Ji, **Yao Wei**. **A combination of convolutional and graph neural networks for regularized road surface extraction.** *IEEE Transactions on Geoscience and Remote Sensing*, 2022, 60: 1-13.

RESEARCH EXPERIENCE

Istituto Italiano di Tecnologia

Visiting Scientist

Genoa, Italy

6/2024-Present

Principal Investigator: Dr. Alessio Del Bue

- **Vision-language modeling**

- Improve generative methods for 3D complex scene synthesis and interactive controllable editing with natural language based text prompts. (In Progress)

University of Twente

Ph.D. Candidate

Enschede, The Netherlands

9/2021-Present

Supervisor: Prof. George Vosselman, Prof. Michael Ying Yang

- **3D scene understanding**

- Propose methods for scene-level 3D multi-object synthesis. (cf. Publication [1])
- Propose methods for object-level 3D shape synthesis. (cf. Publication [2] [3])

- **Generative models**
 - Develop a conditional diffusion-based pipeline for generating 3D point clouds of buildings from single general-view images. (cf. Publication [2])
 - Develop a Normalizing Flow-based GAN for point cloud reconstruction that can generate an arbitrary number of points while maintaining detailed 3D structure. (cf. Publication [3])
- **Multi-modal learning**
 - Compositional 3D scene generation from scene graph. (cf. Publication [1])
 - 3D point cloud generation from single-view image. (cf. Publication [2] [3])

Wuhan University

Master Student

Supervisor: Prof. Shunping Ji

Wuhan, China

9/2018-6/2021

- **Road extraction from remote sensing images using deep learning techniques**
 - Present a weakly supervised learning approach for road surface extraction from remote sensing images under the weak supervision of centerline-like scribble annotations. (cf. Publication [4])
 - Present a multi-stage framework for simultaneous road surface segmentation and centerline tracing, advancing the automation and road extraction accuracy, especially in terms of road connectivity and completeness. (cf. Publication [5] [6])
 - Present a GNN-based framework for regularized road surface extraction. (cf. Publication [7])

EDUCATION

University of Twente

Ph.D. in Computer Science

Enschede, The Netherlands

9/2021-7/2025(*expected*)

Wuhan University

M.S. in Photogrammetry and Remote Sensing

Wuhan, China

9/2018-6/2021

China University of Petroleum

B.S. in Geographic Information Science

Qingdao, China

9/2014-6/2018

OTHER EXPERIENCE

Teaching Assistant

2/2022-4/2022

- Lecture: 2D and 3D Scene Analysis
- Practical and Exercise: Semantic Segmentation and Object Detection

PROGRAM COMMITTEES

Member, British Machine Vision Association.

Student Member, IEEE.

Conference Reviewer, ICLR; AAAI; NeurIPS; CVPR; ICCV; ECCV; BMVC; etc.

Journal Reviewer, ISPRS Journal of Photogrammetry and Remote Sensing; IEEE Sensors Journal; Geo-spatial Information Science; International Journal of Digital Earth; etc.

SKILLS

Professional experience: Machine Learning, Computer Vision, Remote Sensing

Programming: Python, Matlab, C/C++

Library: PyTorch, OpenCV, NumPy, Keras, Tensorflow

Software: ArcGIS, CloudCompare

Language: Chinese (native), English (fluent)

Other: Linux, Windows, Git, Microsoft Office, LaTeX