

Fangzhou Lin

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EDUCATION

Worcester Polytechnic Institute (WPI)

Visiting *Ph. D. Student in Electrical & Computer Engineering (VISLab)*

Worcester, MA, USA

Oct. 2021-Jan. 2024

TOHOKU UNIVERSITY

Doctor of Philosophy

Majors: Information Sciences and Data Sciences

- Cumulative GPA: **4.0/4.0**; Major GPA: **4.0/4.0**

Sendai, Japan

April. 2021-Jan. 2024

TOHOKU UNIVERSITY

Master of Information Sciences

Major: Information Sciences

- Cumulative GPA: **3.8/4.0**; Major GPA: **4.0/4.0**

Sendai, Japan

Apr.2020 -Mar. 2021

PAPER/PUBLICATION

1. **Lin F**, Liu H, Wang L, Yamada KD, Kolachalama VB, Zhang KH, Zhang Z, **SIMEX: Deep Similarity Learning for Set-to-Set Matching with Extreme Value Distribution Prior**. European Conference on Computer Vision (ECCV) 2024 (Under review)
2. **Lin F**, Liu H, Zhou H, Hou S, Yamada KD, Fischer G, Li Y, Zhang KH, Zhang Z, **Loss Distillation via Gradient Matching for Point Cloud Completion with Weighted Chamfer Distance**. International Conference on Intelligent Robots and Systems (IROS) 2024 (Under review)
3. **Lin F**, Gao S, Tang Y, Xu P, Ma X, Hou S, Zhang Z, Zhang KH, **Zero-Shot Hybrid: Photoacoustic Imaging Denoising with Noisy Data Only**. Medical Image Computing and Computer Assisted Intervention (MICCAI) 2024 (Under review)
4. Yue Y, **Lin F**, Guanyi Mou, Zhang Z, **Understanding Hyperbolic Metric Learning through Hard Negative Sampling**. In Proceeding of Winter Conference on Applications of Computer Vision (WACV), 2024.
5. **Lin F**, Yue Y, Zhang Z, Hou S, Yamada KD, Kolachalama VB, Saligrama V, **InfoCD: A Contrastive Chamfer Distance Loss for Point Cloud Completion**. In Proceeding of Advances in Neural Information Processing Systems (NeurIPS), 2023.
6. **Lin F**, Yue Y, Hou S, Yu X, Xu Y, Yamada KD, Zhang Z, **Hyperbolic Chamfer Distance for Point Cloud Completion**. In Proceeding of International Conference on Computer Vision (ICCV), 2023.
7. Yamada KD, Baladram MS, **Lin F**, **Relation is an option for processing context information**, Frontiers in Artificial Intelligence, Frontiers in Artificial Intelligence, 5:924688, 2022.
8. Gao C, Cai G, Jiang X, Zheng F, Zhang J, Gong Y, **Lin F**, Sun X, Bai X. **Conditional Feature Learning based Transformer for Text-Based Person Search**. IEEE Transactions on Image Processing. 2022 Sep 14.
9. **Lin F**, Xu Y, Zhang Z, Gao C, Yamada KD, **Cosmos Propagation Network: Deep Learning Model for Point Cloud Completion**, Neurocomputing, 507:221-234, 2022.
10. Yamada KD, Baladram MS, **Lin F**, **Progress in research on implementing machine consciousness**, Interdisciplinary Information Sciences, 28(1):95-105, 2022.
11. Xu Y, Arai S, Liu D, **Lin F**, Kosuge K, **FPCC: Fast Point Cloud Clustering-based Instance Segmentation for Industrial Bin-picking**. Neurocomputing, 2022, ISSN 0925-2312.
12. **Lin F**, Gao C, Yamada KD, **An effective convolutional neural network for visualized understanding transboundary air pollution based on Himawari-8 satellite images**, IEEE Geoscience and Remote Sensing Letters, 2021, 19, 1-5.
13. Yamada KD, **Lin F**, Nakamura T, **Developing a novel recurrent neural network architecture with fewer parameters and good learning performance**, Interdisciplinary Information Sciences, 27(1):25-40, 2021.
14. Xu Y, Arai S, Liu D, **Lin F**, Kosuge K, **FPCC: Fast Point Cloud Clustering for Instance Segmentation**. arXiv preprint arXiv:2012.14618.(2020).
15. Yue Y, **Lin F**, Yamada KD, Zhang Z, **Hyperbolic contrastive learning**. arXiv preprint arXiv:2302.01409. (2023).

RESEARCH EXPERIENCE

Working on Photoacoustic (PA) image denoising

Worcester, MA, USA

Under the supervision of Prof. Haichong K. Zhang in Medical FUSION Lab

Jan.2024-Present

- Explored the possibility of Zero-shot and Data-free methods work together on PA image denoising.
- Proposed a novel algorithm for multi-frame PA image denoising in same interest-region.
- Observed feasible performance improvement on phantom, ex vivo, and in vivo data of PA image denoising.

Submission: *Zero-Shot Hybrid: Photoacoustic Imaging Denoising with Noisy Data Only. Medical Image Computing and Computer Assisted Intervention (MICCAI) 2024 (Under review)*

Working on solely diffusion model-based point cloud registration

Worcester, MA, USA

Under the supervision of Prof. Ziming Zhang in VISLab and Prof. Yamada

Nov.2023-Present

- Explored the possibility of diffusion model solely on point cloud registration task.
- Introduced straight Brownian Bridge Diffusion Model to this task without the usage of ICP.

Designing SIMEX for set-to-set matching

Worcester, MA, USA

Under the supervision of Prof. Ziming Zhang in VISLab and Prof. Yamada

Nov.2023- Present

- Explored the reasoning of set-to-set match and the possibility of removing the high cost EMD method.
- Proposed a novel framework for set-to-set match with Extreme Value Distribution Prior (SIMEX).
- Reached SOTA in both point cloud completion and Few-Shot Classification tasks.

Submission: *SIMEX: Deep Similarity Learning for Set-to-Set Matching with Extreme Value Distribution Prior. European Conference on Computer Vision (ECCV) 2024 (Under review)*

Designing loss distillation via gradient matching for point cloud completion

Worcester, MA, USA

Under the supervision of Prof. Ziming Zhang in VISLab and Prof. Yamada

May.2023-Mar.2024

- Explored the loss metric design without grid search in real data but only mathematic derivations.
- Proposed a novel loss function search pipeline, namely Loss Distillation via Gradient Matching.
- Found a loss function family and reached SOTA in several point cloud completion benchmarks.

Submission: *Loss Distillation via Gradient Matching for Point Cloud Completion with Weighted Chamfer Distance. International Conference on Intelligent Robots and Systems (IROS) 2024 (Under review)*

Designing contrastive loss for point cloud completion task

Worcester, MA, USA

Under the supervision of Prof. Ziming Zhang in VISLab and Prof. Yamada

May.2023- Sep.2023

- Explored the loss function design with contractive learning.
- Proposed a regularized CD metric which is robust and computationally efficient.
- Reached SOTA in several point cloud completion benchmarks.

Publication: *A Contrastive Chamfer Distance Loss for Point Cloud Completion. In Proceeding of Advances in Neural Information Processing Systems (NeurIPS), 2023.*

Designing hyperbolic loss for point cloud completion task

Worcester, MA, USA

Under the supervision of Prof. Ziming Zhang in VISLab and Prof. Yamada

Oct.2022-May.2023

- Explored the loss function design rather than Euclidean space but in Hyperbolic space.
- Analysis the gradient behavior of proposed loss function with in-depth comparisons.
- Reached SOTA in several point cloud completion benchmarks and visual superiority.

Publication: *Hyperbolic Chamfer Distance for Point Cloud Completion. In Proceeding of International Conference on Computer Vision (ICCV), 2023.*

Designing a novel network for point cloud completion task

Worcester, MA, USA

Under the supervision of Prof. Ziming Zhang in VISLab and Prof. Yamada

May.2021-Dec.2021

- Proposed a novel neural network architecture, CP-Net, for point cloud completion task.
- Reached SOTA in shapenet-part benchmark.

Publication: *Cosmos Propagation Network: Deep Learning Model for Point Cloud Completion, Neurocomputing, 2022*

SKILLS

- **Programming Languages:** Python, MATLAB, C/C++, CUDA
- **Engineering/System Skills:** Linux, Docker, ROS, SolidWorks
- **Language:** Chinese (Native or bilingual proficiency), English (Full professional proficiency), Japanese (N1 and N2, Good/conversational)