Yongming Rao

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Education

Department of Automation, Tsinghua University — Beijing, China
PhD student in Computer Vision — *2018-2023 (expected)*
Advisor: Prof. Jiwen Lu

Department of Electronic Engineering, Tsinghua University — Beijing, China
B.E. in Electronic Engineering — *2014-2018*

PBC School of Finance, Tsinghua University — Beijing, China
Minor in Finance — *2015-2018*

Publications

* indicates equal contribution

Selected Publications

[1] **Yongming Rao***, Wenliang Zhao*, Yansong Tang, Jie Zhou, Ser-Nam Lim, Jiwen Lu
HorNet: Efficient High-Order Spatial Interactions with Recursive Gated Convolutions
Thirty-sixth Conference on Neural Information Processing Systems (**NeurIPS**), 2022,
TL;DR: HorNet is a family of generic vision backbones that perform explicit high-order spatial interactions based on Recursive Gated Convolution.
Code (230 stars) / arXiv / Project Page

[2] Ziyi Wang*, Xumin Yu*, **Yongming Rao***, Jie Zhou, Jiwen Lu
P2P: Tuning Pre-trained Image Models for Point Cloud Analysis with Point-to-Pixel Prompting
Thirty-sixth Conference on Neural Information Processing Systems (**NeurIPS**), 2022, **Spotlight**
TL;DR: P2P leverages large-scale pre-trained image models to achieve state-of-the-art performance on 3D point cloud analysis tasks.
Code / arXiv / Project Page / Rank 1st on ScanObjectNN

[3] **Yongming Rao***, Wenliang Zhao*, Guangyi Chen, Yansong Tang, Zheng Zhu, Jie Zhou, Jiwen Lu
DenseCLIP: Language-Guided Dense Prediction with Context-Aware Prompting
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2022
TL;DR: DenseCLIP is a new framework for dense prediction by implicitly and explicitly leveraging the pre-trained knowledge from CLIP.
Code (310 stars) / arXiv / Project Page / 42 citations

[4] Xumin Yu*, Lulu Tang*, **Yongming Rao***, Tiejun Huang, Jie Zhou, Jiwen Lu
Point-BERT: Pre-training 3D Point Cloud Transformers with Masked Point Modeling
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2022
TL;DR: Point-BERT is a new paradigm for learning Transformers in an unsupervised manner by generalizing the concept of BERT onto 3D point cloud data.
Code (294 stars) / arXiv / Project Page / 43 citations

[5] **Yongming Rao**, Wenliang Zhao, Zheng Zhu, Jiwen Lu, Jie Zhou
Global Filter Networks for Image Classification
Thirty-fifth Conference on Neural Information Processing Systems (**NeurIPS**), 2021
TL;DR: Global Filter Networks is a transformer-style architecture that learns long-term spatial dependencies in the frequency domain with log-linear complexity.
Code (265 stars) / arXiv / Project Page / 84 citations

[6] **Yongming Rao**, Wenliang Zhao, Benlin Liu, Jiwen Lu, and Jie Zhou, Cho-Jui Hsieh
DynamicViT: Efficient Vision Transformers with Dynamic Token Sparsification
Thirty-fifth Conference on Neural Information Processing Systems (**NeurIPS**), 2021
TL;DR: We present a dynamic token sparsification framework to prune redundant tokens in vision transformers progressively and dynamically based on the input.
Code (389 stars) / arXiv / Project Page / 119 citations

[7] Xumin Yu*, **Yongming Rao***, Ziyi Wang, Zuyan Liu, Jiwen Lu, Jie Zhou
PoinTr: Diverse Point Cloud Completion with Geometry-Aware Transformers
IEEE International Conference on Computer Vision (**ICCV**), 2021, **Oral**
TL;DR: PoinTr is a transformer-based framework that reformulates point cloud completion as a set-to-set translation problem.
Code (307 stars) / arXiv / 104 citations

[8] **Yongming Rao**, Jiwen Lu, and Jie Zhou
Global-Local Bidirectional Reasoning for Unsupervised Representation Learning of 3D Point Clouds
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020
TL;DR: PointGLR is an unsupervised point cloud representation learning method based on global-local bidirectional reasoning, which largely advances the state-of-the-art of unsupervised point cloud understanding and outperforms recent supervised methods.
Code (108 stars) / arXiv / 62 citations

[9] **Yongming Rao**, Jiwen Lu, Ji Lin, and Jie Zhou
Runtime Network Routing for Efficient Image Classification
IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**, *IF: 24.31*), 2019
Conference Version: **Runtime Neural Pruning**, **NeurIPS** 2017
TL;DR: We propose a model acceleration framework that prunes the CNNs dynamically at the runtime.
Code / PDF / 417 citations

Peer-Reviewed Conference Publications

[10] **Yongming Rao**, Wenliang Zhao, Jiwen Lu, Jie Zhou
AMixer: Adaptive Weight Mixing for Self-Attention Free Vision Transformers
17th European Conference on Computer Vision (**ECCV**), 2022

[11] Yi Wei, Zibu Wei, **Yongming Rao**, Jiaxin Li, Jiwen Lu, Jie Zhou
LiDAR Distillation: Bridging the Beam-Induced Domain Gap for 3D Object Detection
17th European Conference on Computer Vision (**ECCV**), 2022

[12] Jinglin Xu*, **Yongming Rao***, Xumin Yu, Guangyi Chen, Jie Zhou, Jiwen Lu
FineDiving: A Fine-grained Dataset for Procedure-aware Action Quality Assessment
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2022, **Oral**

[13] Yi Wei , Shaohui Liu, **Yongming Rao**, Wang Zhao, Jiwen Lu , Jie Zhou
NerfingMVS: Guided Optimization of Neural Radiance Fields for Indoor Multi-view Stereo
IEEE International Conference on Computer Vision (**ICCV**), 2021, **Oral**

[14] **Yongming Rao***, Benlin Liu*, Yi Wei , Jiwen Lu , Cho-Jui Hsieh , Jie Zhou
RandomRooms: Unsupervised Pre-training from Synthetic Shapes and Randomized Layouts for 3D Object Detection
IEEE International Conference on Computer Vision (**ICCV**), 2021

[15] **Yongming Rao***, Guangyi Chen*, Jiwen Lu , Jie Zhou
Counterfactual Attention Learning for Fine-Grained Visual Categorization and Re-identification
IEEE International Conference on Computer Vision (**ICCV**), 2021

[16] Wenliang Zhao*, **Yongming Rao***, Ziyi Wang, Jiwen Lu , Jie Zhou
Towards Interpretable Deep Metric Learning with Structural Matching
IEEE International Conference on Computer Vision (**ICCV**), 2021

[17] Xumin Yu*,**Yongming Rao***, Wenliang Zhao, Jiwen Lu , Jie Zhou
Group-aware Contrastive Regression for Action Quality Assessment
IEEE International Conference on Computer Vision (**ICCV**), 2021

[18] Yi Wei*, Ziyi Wang*, **Yongming Rao***, Jiwen Lu , Jie Zhou
PV-RAFT: Point-Voxel Correlation Fields for Scene Flow Estimation of Point Clouds
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021

[19] Guangyi Chen*, **Yongming Rao***, Jiwen Lu, and Jie Zhou
Temporal Coherence or Temporal Motion: Which is More Critical for Video-based Person Re-identification?
16th European Conference on Computer Vision (**ECCV**), 2020

[20] Benlin Liu, **Yongming Rao**, Jiwen Lu, and Jie Zhou, Cho-Jui Hsieh
MetaDistiller: Network Self-Boosting via Meta-Learned Top-Down Distillation
16th European Conference on Computer Vision (**ECCV**), 2020

[21] Cheng Ma, **Yongming Rao**, Yean Cheng, Ce Chen, Jiwen Lu, and Jie Zhou
Structure-Preserving Super Resolution with Gradient Guidance
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020

[22] Cheng Ma, Zhengyu Jiang, **Yongming Rao**, Jiwen Lu, and Jie Zhou
Deep Face Super-Resolution with Iterative Collaboration between Attentive Recovery and Landmark Estimation
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020

[23] **Yongming Rao**, Jiwen Lu, and Jie Zhou
Spherical Fractal Convolution Neural Networks for Point Cloud Recognition
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019

[24] Yansong Tang, Dajun Ding, **Yongming Rao**, Yu Zheng, Danyang Zhang, Lili Zhao, Jiwen Lu, and Jie Zhou
COIN: A Large-scale Dataset for Comprehensive Instruction Video Analysis
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019

[25] **Yongming Rao**, Dahua Lin, Jiwen Lu, and Jie Zhou
Learning Globally Optimized Object Detector via Policy Gradient
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018, **Spotlight**

[26] Ji Lin*, **Yongming Rao***, Jiwen Lu, and Jie Zhou
Runtime Neural Pruning
The Thirty-first Annual Conference on Neural Information Processing Systems (**NeurIPS**), 2017

[27] **Yongming Rao**, Ji Lin, Jiwen Lu, and Jie Zhou
Learning Discriminative Aggregation Network for Video-Based Face Recognition
IEEE International Conference on Computer Vision (**ICCV**), 2017, **Spotlight**

[28] **Yongming Rao**, Jiwen Lu, and Jie Zhou
Attention-aware Deep Reinforcement Learning for Video Face Recognition
IEEE International Conference on Computer Vision (**ICCV**), 2017

Peer-Reviewed Journal Publications

[29] **Yongming Rao**, Jiwen Lu, and Jie Zhou
PointGLR: Unsupervised Structural Representation Learning of 3D Point Clouds
IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**, *IF: 24.31*), 2022

[30] Cheng Ma, **Yongming Rao**, Jiwen Lu, and Jie Zhou
Structure-Preserving Image Super-Resolution
IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**, *IF: 24.31*), 2021

[31] **Yongming Rao**, Jiwen Lu, and Jie Zhou
Learning Discriminative Aggregation Network for Video-based Face Recognition and Person Re-identification
International Journal of Computer Vision (**IJCV**, *IF: 13.37*), 2019

Honors and Awards

- **Chinese National Scholarship** *2022*
- **1st place in the MVP Point Cloud Completion Challenge (ICCV 2021 Workshop)** *2021*
- **Baidu Top 100 Chinese Rising Stars in AI** *2021*
- CVPR 2021 Outstanding Reviewer *2021*
- ECCV 2020 Outstanding Reviewer *2020*
- 2nd place in Semi-Supervised Recognition Challenge at FGVC7 (CVPR 2020 Workshop) *2020*
- **2019 CCF-CV Academic Emerging Award** *2019*
- **Chinese National Scholarship** *2019*
- ICME 2019 Best Reviewers Award *2019*
- NeurIPS 2019 Top 50% High-Scoring Reviewer *2019*
- 1st prize in Beijing University Academic Forum on Artificial Intelligence *2019*
- 1st place in Momenta Lane Detection Challenge *2018*
- 2017 SenseTime Undergraduate Scholarship *2017*
- 1st place in 17th Electronic Design Contest of Tsinghua University *2016*
- Huawei Innovation Prize in 2016 Tsinghua Challenge Cup *2016*
- EMC Innovation Prize in 2016 Tsinghua Challenge Cup *2016*

Academic Services

Co-Organizer

- Tutorial on Deep Reinforcement Learning for Computer Vision at CVPR 2019.

Conference Senior PC Member

- International Joint Conference on Artificial Intelligence (IJCAI), 2021

Conference Reviewer / PC Member

- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2018-2023
- International Conference on Computer Vision (ICCV), 2019, 2021
- European Conference on Computer Vision (ECCV), 2020, 2022
- International Conference on Machine Learning (ICML), 2019-2022
- Conference on Neural Information Processing Systems (NeurIPS), 2019-2022
- International Conference on Learning Representations (ICLR), 2021-2023
- SIGGRAPH Asia 2022
- IEEE Winter Conference on Applications of Computer Vision (WACV), 2020-2022
- IEEE International Conference on Multimedia and Expo (ICME), 2019-2022

Journal Reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)
- International Journal of Computer Vision (IJCV)
- IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)
- IEEE Transactions on Image Processing (T-IP)
- IEEE Transactions on Multimedia (T-MM)
- Pattern Recognition (PR)
- Transactions on Machine Learning Research (TMLR)