Pan ZHOU

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Research Interests: machine learning, optimization, computer vision

Employment

Senior Research Scientist at SEA AI Lab, Singapore Apr 2021 - present

Leader of a machine learning team, including directions of parameter optimization, self-supervised learning, network architecture design, generative models

- publication: 2 TPAMI, 2 TNNLS, 1 TKDE, 3 NeurIPS (1 oral, 1 spotlight), 3 ICLR (1 oral), 2 CVPR (1 oral), 2 ICCV, 3 ECCV, 1 EMNLP
- submission: 6 TPAMI, 1 TNNLS, 3 NeurIPS, 2 CVPR, 1 AAAI

Research Scientist at Salesforce, Singapore Oct 2019 - Mar 2021

1) Researcher for self-supervised learning, parameter optimization, network architecture design.

- publication: 2 ICML, 3 NeurIPS (1 oral), 1 ICLR, 1 UAI, 2 AAAI
- patent: 2 USA patents

2) Project leader for Optical Character Recognition (OCR): a new model deployed in company product.

- patent: 1 USA patents

Research Engineer at National University of Singapore Aug 2016 - Jan 2017

Researcher for unsupervised representation learning

- publication:1 CVPR, 1 TPAMI

Education

National University of Singapore Jan 2017 - Oct 2019

Ph.D. in Electrical and Computer Engineering with advisors Prof. Jiashi Feng and Shuicheng Yan

Princeton University May 2019 - Aug 2019

Visiting student hosted by Prof. Weinan E

Georgia Tech Jun 2018 - Sep 2018

Visiting student hosted by Prof. Huan Xu

Peking University Sep 2013 - Jun 2016

M.S. in Electronics Engineering & Computer Science with advisors Prof. Zhouchen Lin and Chao Zhang

China University of Geosciences (Wuhan) Sep 2009 - Jun 2013

B.S. in Computer Science

Teaching Experience

Teaching Assistant at National University of Singapore Jan - Jul 2018

NUS EE5904R/ME5404: Neural Network, Instructor: Prof. ChaoYu Chen

- Taught SVM and related knowledge, and prepared homework and solutions
- Designed SVM projects, and guided students to conduct projects and analysis

Teaching Assistant at National University of Singapore Sep 2017 - Jul 2018

NUS CG3207: Microprocessor System, Instructor: Dr. Rajesh Chandrasekhara Panicker

- Taught basic concepts of programming language Verilog, usage of FPGA, and ARM programming
- Guided students to conduct FPGA and ARM programming and analysis

Teaching Assistant at Peking University Sep - Dec 2012

PKU 04830320: Digital Image Processing, Instructor: Prof. Chao Zhang

- Taught basic image processing methods and their implementations through Matlab
- Guided students to conduct image processing project and analysis

Mentoring Experience (15 interns/students)

Interns

Yuxuan Liang, Ph.D. at National University of Singapore. Jun 2021 - Nov 2021
publication: 1 ECCV during internship.

Bowen Dong, Ph.D. at Harbin Institute of Technology. Sep 2021 - Sep 2022
publication: 1 ECCV and 1 ICLR during internship.

Weihao Yu, Ph.D. at National University of Singapore. Nov 2021 - May 2023
publication: 1 CVPR (oral), 1 NeurIPS (oral), submission: 2 TPAMI , 1 CVPR during internship.

Xingyu Xie, Ph.D. at Peking University. Sep 2021 - present
publication: 1 ICLR, submission: 2 TPAMI during internship.

Junbin Xiao, Ph.D. at National University of Singapore. Nov 2021 - May 2022
publication: 1 ECCV and 1 TPAMI during internship.

Jiachun Pan, Ph.D. at National University of Singapore. Jan 2022 - Nov 2022
publication: 1 ICLR during internship.

Shanghua Gao, Ph.D. at Nankai University. Feb 2022 - present
publication: 1 ICCV, submission: 1 TPAMI, an ongoing project (GitHub star 2k) during internship.

Jinpeng Wang, Ph.D. at National University of Singapore. Jul 2022 - Mar 2023
publication: 1 CVPR, submission: 1 TPAMI and 1 NeurIPS during internship.

Zike Wu, master at Nanyang Technological University. Feb 2023 - present
submission: 1 NeurIPS during internship.

Zhongzhan Huang, Ph.D. at Sun Yat-sen University. Feb 2023 - present
submission: 1 NeurIPS during internship.

Co-supervised Students

Shuai Lin Nov 2020 - May 2021
master at Sun Yat-sen University, co-supervised with Prof. Xiaodan Liang
publication: 1 AAAI, 1 TNNLS, and 1 TKDE during mentorship.

Yubei Xiao Apr 2020 - Apr 2022
master at Sun Yat-sen University, co-supervised with Prof. Xiaodan Liang
publication: 1 AAAI, 1 EMNLP during mentorship.

Guolin Zheng Apr 2020 - Apr 2022
master at Sun Yat-sen University, co-supervised with Prof. Xiaodan Liang
publication: 1 AAAI, 1 EMNLP during mentorship.

Yichen Zhou Nov 2021 - present
Ph.D. at National University of Singapore, co-supervised with Prof. Teck Khim Ng
publication: 1 CVPR (oral), 1 NeurIPS (oral), 1 NeurIPS workshop, submission: 1 TPAMI, 1 AAAI during mentorship.

Jingyang Li Aug 2021 - present
Ph.D. at National University of Singapore, co-supervised with Prof. Toh Kim Chuan
publication: 1 NeurIPS workshop, submission: 1 TNNLS during mentorship.

Selected Honors and Awards

1. CVPR 2020 Outstanding Reviewer Award 2020
2. 2019 Chinese Government Award for Outstanding Self-Financed Students Abroad (500 students around the world) 2019
3. 2018 Microsoft Research Asia Fellowship Award (11 Ph.D. students in Asia) 2018
4. 2015 The Award for Scientific Research in Peking University 2015
5. The Second Prize in 2011 China Robot Contest 2011

Selected Talks

1. Optimization Acceleration for Faster Training Deep Networks Dec 2022
   Invited talk at Department of Computing, The Hong Kong Polytechnic University, Hongkong

Invited talk at Beijing Academy of Artificial Intelligence, Beijing

2. Adan: Adaptive Nesterov Momentum Algorithm for Faster Optimizing Deep Models — Oct 2022
   Invited talk at Workshop of Machine Learning and Its Applications, National University of Singapore
3. Hybrid Stochastic-Deterministic Minibatch Proximal Gradient — Jul 2020
   ICML2020, online
4. Efficient Meta Learning via Minibatch Proximal Update — Dec 2019
   NeurIPS 2019, Vancouver
5. Theoretical Understanding of Deep Learning and Meta Learning — Sep 2019
   Invited talk at School of Computer Science, CMU, Pittsburgh
6. Generalization Performance Analysis of Deep Learning — Jul 2019
   Invited talk at School of Electronics Engineering & Computer Science, Peking University, Beijing

Academic Service

Area Chair NeurIPS (2023)

Journal Reviewer IEEE TPAMI, IJCV, JMLR, Machine learning (ML), IEEE TIP, IEEE TNNLS, IEEE TKDE, IEEE TCSVT, Journal of Biomedical and Health Informatics.

Conference Reviewer ICML (2019-2022), NeurIPS (2018-2022), UAI (2019-2020), CVPR (2018-2022), ICCV (2019-2023), ECCV (2020), AAAI (2019), ACCV (2018-2020)

Research Interests

Machine Learning, Optimization, and Computer Vision with interests in the following five topics.

1) Parameter Optimizer
Target: design efficient optimizers to train networks and other models efficiently, making AGI efficient.
Publications: 2 TPAMI, 1 TNNLS, 1 ICML, 4 NeurIPS, 1 ICLR, 1 AISTATS, 1 IJCAI, 4 submissions
Achievements: 1) the proposed Adan optimizer is about 2× faster than SoTA optimizers, and achieves higher performance on a dozen kinds of models/tasks, e.g. ResNet, ViT, MAE, BERT, GPT2, LLaMA (7B). 2) the proposed Win acceleration can accelerate Adan/SGD/Adam/AdamW/LAMB by about 1.5×.

2) Self-Supervised Learning
Target: design effective self-supervised learning (SSL) framework that enables AI model to learn general vision knowledge and achieve human's data recognition and analysis ability, bringing AGI closer
Publications: 1 TPAMI, 2 CVPR, 2 ICLR, 1 NeurIPS, 2 TIP, 2 TNNLS, 1 PR, 1 Neurocomputing, 5 submissions
Achievements: 1) our PCL (citation 600+) is the first SSL approach that learns high-level discriminative semantic by learning semantic cluster structures, while traditional SSL methods fail; 2) our Mugs pursues multi-granular cluster structures in data to learn coarse- and fine-grained features for favoring more vision tasks, achieving SoTA linear probing and KNN results on ImageNet without extra data.

3) Generative Learning
Target: design generative models like diffusion models that empowers AI models with imagination and creativity akin to that of humans, bringing AGI closer.
Publications: 1 NeurIPS, 1 ICCV, 3 submission
Achievements: 1) our MDT enhances contextual relation learning of diffusion model, and achieves SoTA image synthesis performance on ImageNet with 3× faster learning speed than previous SoTAs. 2) our EditAnything model can edit image content with high flexibility, e.g., cross-image dragging (like try-on) and region-interactive editing (like hairstyle changing, object or person replacement). It uses contextual relations among image regions for overall harmonious editing, and attains 2.5k GitHub stars.

4) Network Architecture
Target: develop innovative network topology that posses high capacity and efficiency for acquiring vision knowledge, thereby improving the overall vision model capacity of AI/AGI.
Publications: 1 TPAMI, 1 ICML, 2 NeurIPS, 1 ICLR, 2 ECCV, 1 CVPR, 1 EMNLP, 1 WACV, 5 submissions

Achievements: 1) our MetaFormer replaces self-attention in ViT with pooling and achieves impressive performance. It breaks the slogan "self-attention is all you need" and is also used in WeChat for video classification. 2) our CAFormer network sets a new recording accuracy of 85.5% on ImageNet under supervised settings without extra data.

5) Meta In-Context Learning

Target: design new meta-learning and prompt learning methods to aid a (pretained) model in quickly learning from a few data, improving few-shot learning ability of AGI.
Publications: 1 ICML, 1 NeurIPS, 1 ICLR, 1 CVPR, 1 ECCV, 1 UAI, 2 AAAI
Achievements: 1) a new meta-learning method only needs gradient for training, avoids Hessian matrix computation in existing methods, enjoying great scalability on model and data. 2) a new prompt learning uses a few data to aid pretrained models for better handling downstream tasks.

Patents

1. **Pan Zhou**, Chu Hong Hoi, "System and method for differential architecture search for neural networks," **US patent**, 2022.
2. **Pan Zhou**, Caiming Xiong, Chu Hong Hoi, "Systems and methods for contrastive learning with self-labeling refinement," **US patent**, 2022.
3. **Pan Zhou**, Peng Tang, Ran Xu, Chu Hong Hoi, "Neural network based scene text recognition," **US patent**, 2022.

Publications (Google Citations 2796)

Accepted 4 TPAMI, 3 TNNLS, 2 TIP, 1TKDE, 1 PR, 1 NeuroComputing, 9 NeurIPS (2 oral, 2 spotlight), 3 ICML, 5 ICLR (1 oral), 3 CVPR (1 oral), 2 ICCV, 3 ECCV, 2 AAAI, 1 IJCAI, 1 AISTATS, 1 UAI, 1 EMNLP

Under-review 6 TPAMI, 1 TNNLS, 3 NeurIPS, 2 CVPR, 1 AAAI

1) Parameter Optimization

i) manuscripts in review

[16] **Pan Zhou**, Xingyu Xie, Zhouchen Lin, Kim-Chuan Toh, Shuicheng Yan, "Win: Weight-Decay-Integrated Nesterov Acceleration for Faster Network Training," submitted to *Journal of Machine Learning Research (**JMLR**)*, 2023.

[15] Xingyu Xie*, **Pan Zhou***, Huan Li, Zhouchen Lin, Shuicheng Yan, "Adan: Adaptive Nesterov Momentum Algorithm for Faster Optimizing Deep Models," submitted to *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**)*, 2023. (* equal contribution)

[14] **Pan Zhou**, Xingyu Xie, Shuicheng Yan, "Towards Understanding Convergence and Generalization of AdamW," submitted to *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**)*, 2023.

[13] Jingyang Li, **Pan Zhou**, Kuangyu Ding, Kim-Chuan Toh, Yinyu Ye, "Dimension-reduced adaptive gradient method," submitted to *IEEE Trans. on Neural Networks and Learning Systems **(TNNLS)***, 2023.

[12] Zebang Shen*, **Pan Zhou***, Cong Fang, Alejandro Ribeiro, "A Stochastic Trust Region Method for Non-convex Minimization," arXiv:1903.01540. (* equal contribution)

ii) peer-reviewed publications

[11] **Pan Zhou**, Xingyu Xie, Shuicheng Yan, "Win: Weight-Decay-Integrated Nesterov Acceleration for Adaptive Gradient Algorithms," *Int'l Conf. on Learning Representations **(ICLR)***, 2023. (**oral**)

[10] **Pan Zhou**, Hanshu Yan, Xiaotong Yuan, Jiashi Feng, Shuicheng Yan, "Towards Understanding Why Lookahead Generalizes Better Than SGD and Beyond," *Neural Information Processing Systems (**NeurIPS**)*, 2020.

[9] **Pan Zhou**, Jiashi Feng, Chao Ma, Caiming Xiong, Steven Hoi, Weinan E, " Towards Theoretically Understanding Why SGD Generalizes Better Than ADAM in Deep Learning," *Neural Information Processing Systems (**NeurIPS**)*, 2020.

[8] **Pan Zhou**, Xiaotong Yuan, Zhouchen Lin and Steven Hoi, "A Hybrid Stochastic-Deterministic Minibatch Proximal Gradient Method for Efficient Optimization and Generalization," *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**)*, 2020.

[7] Fanhua Shang, Bingkun Wei, Hongying Liu, Yuanyuan Liu, **Pan Zhou**, Maoguo Gong, "Efficient Gradient Support Pursuit with Less Hard Thresholding for Cardinality-Constrained Learning," *IEEE Trans. on Neural Networks and Learning Systems (**TNNLS**)*, 2020.

[6] **Pan Zhou**, Xiaotong Yuan, "Hybrid Stochastic-Deterministic Minibatch Proximal Gradient: Less-Than-Single-Pass Optimization with Nearly Optimal Generalization," *Int'l Conf. on Machine Learning (**ICML**)*, 2020.

[5] **Pan Zhou**, Xiaotong Yuan, Jiashi Feng, and Shuicheng Yan, "'Faster First-order methods for stochastic non-convex optimization on Riemannian manifolds," *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**), 2019.*

[4] **Pan Zhou**, Xiaotong Yuan, and Jiashi Feng, "Efficient Stochastic Gradient Hard Thresholding," *Neural Information Processing Systems (**NeurIPS**)*, 2018.

[3] **Pan Zhou**, Xiaotong Yuan, and Jiashi Feng, "New Insight into Hybrid Stochastic Gradient Descent: Beyond With-Replacement Sampling and Convexity, " *Neural Information Processing Systems (**NeurIPS**)*, 2018.

[2] **Pan Zhou**, Xiaotong Yuan, and Jiashi Feng, "Faster First-order methods for stochastic non-convex optimization on Riemannian manifolds," *Int'l Conf. on Artificial Intelligence and Statistics (**AISTATS**)*, 2019.

[1] Hu Zhang, **Pan Zhou**, Yi Yang and Jiashi Feng, "Generalized Majorization-Minimization for Non-Convex Optimization," *Int'l Joint Conf. on Artificial Intelligence (**IJCAI**)*, 2019.

2) Self-Supervised Learning

i) manuscripts in review

[17] Jinpeng Wang, **Pan Zhou**, Xudong Lin, Mike Zheng Shou, "Image Linguistic Understanding," submitted to *Neural Information Processing Systems (**NeurIPS**)*, 2023.

[16] **Pan Zhou***, Yichen Zhou*, Chenyang Si*, Weihao Yu, Teck Khim Ng, Shuicheng Yan, "Mugs: A Multi-Granular Self-Supervised Learning Framework," submitted to *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**), 2023*. (* equal contribution)

[15] Shang-Hua Gao, **Pan Zhou**, Ming-Ming Cheng, Shuicheng Yan, "Towards Sustainable Self-supervised Learning," submitted to *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**), 2023.*

[14] Jinpeng Wang, **Pan Zhou**, Mike Shou, Shuicheng Yan, "Enhancing Visual Grounding in Vision-Language Pre-training with Position-Guided Text Prompts," submitted to *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**), 2023.*

ii) peer-reviewed publications

[13] Hanlin Zhang, Shuai Lin, Weiyang Liu, **Pan Zhou**, Jian Tang, Xiaodan Liang, Eric P Xing, " Iterative graph self-distillation," *IEEE Trans. on Knowledge and Data Engineering (**TKDE**), 2023.*

[12] Jinpeng Wang, **Pan Zhou**, Mike Zheng Shou, Shuicheng Yan, "Position-guided Text Prompt for Vision-Language Pre-training," *IEEE Conf. on Computer Vision and Pattern Recognition (**CVPR**)*, 2023.

[11] Jiachun Pan*, **Pan Zhou***, Shuicheng Yan, "Towards Understanding Why Mask Reconstruction Pretraining Helps in Downstream Tasks," *Int'l Conf. on Learning Representations **(ICLR)***, 2023. (* equal contribution)

[10] **Pan Zhou**, Caiming Xiong, Xiaotong Yuan, Steven Hoi, "A Theory-Driven Self-Labeling Refinement Method for Contrastive Representation Learning," *Neural Information Processing Systems (**NeurIPS**)*, 2022. (**spotlight**)

[9] Junnan Li, **Pan Zhou**, Caiming Xiong, Richard Socher, and Steven Hoi, "Prototypical Contrastive Learning of Unsupervised Representations," *Int'l Conf. on Learning Representations (**ICLR**)*, 2022.

[8] Lin Shuai, Liu Chen, **Pan Zhou**, Hu Zi-yuan, Wang Shuojia, Zhao Ruihui, Zheng Yefeng, Lin Liang, Xing Eric, Liang Xiaodan, "Prototypical Graph Contrastive Learning," *IEEE Trans. on Neural Networks and Learning Systems (**TNNLS**)*, 2022.

[7] **Pan Zhou**, Canyi Lu, Jiashi Feng, Zhouchen Lin and Shuicheng Yan, "Tensor LRR for Data Recovery and Clustering," *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**)*, 2019.

[6] **Pan Zhou** and Jiashi Feng, "Outlier-Robust Tensor PCA," *IEEE Conf. on Computer Vision and Pattern Recognition (**CVPR**)*, 2017.

[5] **Pan Zhou**, Zhouchen Lin, and Chao Zhang, "Integrated Low Rank Based Discriminative Feature Learning for Recognition,"*IEEE Trans. on Neural Networks and Learning Systems (**TNNLS**)*, 2016.

[4] **4. Pan Zhou**, Canyi Lu, Zhouchen Lin, and Chao Zhang, "Tensor Factorization for Low-Rank Tensor Completion," *IEEE Trans. on Image Processing (**TIP**)*, 2017.

[3] **Pan Zhou**, Zhouchen Lin, and Chao Zhang, "Bilevel Model Based Discriminative Dictionary Learning for Recognition," *IEEE Trans. on Image Processing (**TIP**)*, 2017.

[2] **Pan Zhou**, Cong Fang, Zhouchen Lin, Chao Zhang, and Edward Chang, "Dictionary Learning with Structured Noise," ***Neurocomputing***, 2017.

[1] Cong Fang, Zhengyu Zhao, **Pan Zhou**, and Zhouchen Lin, "Feature Learning via Partial Differential Equation with Applications to Face Recognition," *Pattern Recognition (**PR**)*, 2017.

3) Generative Models

i) manuscripts in review

[5] Shanghua Gao, **Pan Zhou**, Xingyu Xie, Zhijie Lin, Mingming Chen, Shuicheng Yan, "EditAnything via Text Command," ongoing project, see it at `https://github.com/sail-sg/EditAnything`.

[4] Zike Wu, **Pan Zhou**, Kenji Kawaguchi, Hanwang Zhang, "Fast Diffusion Model," submitted to *Neural Information Processing Systems (**NeurIPS**)*, 2023.

[3] Zhongzhan Huang, **Pan Zhou**, Shuicheng YAN, Liang Lin, "Towards More Stable Training of Diffusion Model via Scaling Network Long Skip Connection," submitted to *Neural Information Processing Systems (**NeurIPS**)*, 2023.

ii) peer-reviewed publications

[2] Shang-Hua Gao, **Pan Zhou***, Ming-Ming Cheng*, Shuicheng Yan, "Masked Diffusion Transformer is a Strong Image Synthesizer," *Int'l Conf. on Computer Vision (**ICCV**)*. (∗ Corresponding authors, **SoTA Image generation result on ImageNet, FID 1.73**))

[1] Yue Wu, **Pan Zhou**, Andrew Gordon Wilson, Eric Xing, Zhiting Hu, "Improving GAN Training with Probability Ratio Clipping and Sample Reweighting," *Neural Information Processing Systems (**NeurIPS**)*, 2020.

4) Network Architecture

i) manuscripts in review

[15] Weihao Yu, **Pan Zhou**, Shuicheng Yan, Xinchao Wang, "InceptionNeXt: When Inception meets ConvNeXt," submitted to *IEEE Conf. on Computer Vision and Pattern Recognition (**CVPR**)*, 2024.

[14] Meng Wei, Long Chen, Wei Ji, Xiaoyu Yue, **Pan Zhou**, Min Xu, Tat-Seng Chua, "In Defense of Clip-based Video Relation Detection," submitted to *IEEE Conf. on Computer Vision and Pattern Recognition (**CVPR**)*, 2024.

[13] Yichen Zhou, **Pan Zhou**, Chenyang Si, Weihao Yu, Zhijie Lin, Qizhe Xie, Teck Khim Ng, Shuicheng YAN, "Learning Kernel Representation for Dynamic Networks," submitted to *AAAI Conf. on Artificial Intelligence (**AAAI**)*, 2023.

[12] Weihao Yu, Chenyang Si, **Pan Zhou**, Mi Luo, Yichen Zhou, Jiashi Feng, Shuicheng Yan, Xinchao Wang, "MetaFormer Baselines for Vision," submitted to *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**)*, 2022.

ii) peer-reviewed publications

[11] Ming Li, Xiangyu Xu, Hehe Fan, **Pan Zhou** Jun Liu, Jia-Wei Liu, Jiahe Li, Jussi Keppo, Mike Zheng Shou, Shuicheng Yan , "STPrivacy: Spatio-Temporal Privacy-Preserving Action Recognition," *Int'l Conf. on Computer Vision (**ICCV**)*, 2023.

[10] Junbin Xiao, **Pan Zhou**, Angela Yao, Yicong Li, Richang Hong, Shuicheng Yan, Tat-Seng Chua, "Contrastive Video Question Answering via Video Graph Transformer," *IEEE Trans. on Pattern Analysis and Machine Intelligence (**TPAMI**)*, 2022.

[9] Chenyang Si, Weihao Yu, **Pan Zhou**, Yichen Zhou, Xinchao Wang, Shuicheng Yan, "Inception Transformer," *Neural Information Processing Systems (**NeurIPS**)*, 2022. (**oral**)

[8] Yuxuan Liang, **Pan Zhou**, Roger Zimmermann, Shuicheng Yan, "DualFormer: Local-Global Stratified Transformer for Efficient Video Recognition," *European Conf. on Computer Vision (**ECCV**)*, 2022.

[7] Junbin Xiao, **Pan Zhou**, Tat-Seng Chua, Shuicheng Yan, "Video Graph Transformer for Video Question Answering," *European Conf. on Computer Vision (**ECCV**)*, 2022.

[6] Weihao Yu, Mi Luo, **Pan Zhou**, Chenyang Si, Yichen Zhou, Xinchao Wang, Jiashi Feng, Shuicheng Yan, "MetaFormer is Actually What You Need for Vision," *IEEE Conf. on Computer Vision and Pattern Recognition (**CVPR**)*, 2022. (**oral**)

[5] **Pan Zhou**, Caiming Xiong, Richard Socher, Steven Hoi, "Theory-Inspired Path-Regularized Differential Network Architecture Search," *Neural Information Processing Systems (**NeurIPS**)*, 2020 (**oral**)

[4] Guolin Zheng, Yubei Xiao, Ke Gong, **Pan Zhou**, Xiaodan Liang and Liang Lin "Wav-BERT: Cooperative Acoustic and Linguistic Representation Learning for Low-Resource Speech Recognition," *Finding of Conf. on Empirical Methods in Natural Language Processing (**EMNLP**)*, 2021.

[3] Jianshu Li, **Pan Zhou**, Yunpeng Chen, etc., "Task Relation Networks," *IEEE Winter Conf. on Applications of Computer Vision (**WACV**)*, 2019.

[2] **Pan Zhou** and Jiashi Feng, "Understanding Generalization and Optimization Performance of Deep CNNs,"*Int'l Conf. on Machine Learning (**ICML**)*, 2018.

[1] **Pan Zhou** and Jiashi Feng, "Empirical Risk Landscape Analysis for Understanding Deep Neural Networks," *Int'l Conf. on Learning Representations (**ICLR**)*, 2018.

5) Meta In-Context Learning

i) peer-reviewed publications

[8] Bowen Dong, **Pan Zhou**, Shuicheng Yan, Wangmeng Zuo, "LPT: Long-tailed Prompt Tuning for Image Classification," *Int'l Conf. on Learning Representations (**ICLR**)*, 2023.

[7] Bowen Dong, **Pan Zhou**, Shuicheng Yan, Wangmeng Zuo, "Self-Promoted Supervision for Few-Shot Transformer," *European Conf. on Computer Vision (**ECCV**)*, 2022.

[6] Yu Bai, Minshuo Chen, **Pan Zhou**, Tuo Zhao, Jason Lee, Sham Kakade, Huan Wang, Caiming Xiong, "How Important is the Train-Validation Split in Meta-Learning?," *Int'l Conf. on Machine Learning (**ICML**)*, 2021.

[5] **Pan Zhou**, Yingtian Zou, Xiaotong Yuan, Jiashi Feng, Caiming Xiong, Steven HOI, "Task Similarity Aware Meta Learning: Theory-inspired Improvement on MAML," *Int'l Conf. on Uncertainty in Artificial Intelligence (**UAI**)*, 2021.

[4] Shuai Lin, **Pan Zhou**, Xiaodan Liang, Jianheng Tang, Ziliang Chen, Liang Lin, Eric Xing , " Meta Low-Resource Medical Dialogue Generation," *AAAI Conf. on Artificial Intelligence (**AAAI**)*, 2021.

[3] Yubei Xiao, Ke Gong, **Pan Zhou**, Guolin Zheng, Xiaodan Liang, Liang Lin, "Multilingual Low-Resource Speech Recognition," *AAAI Conf. on Artificial Intelligence (**AAAI**)*, 2021.

[2] **Pan Zhou**, Xiaotong Yuan, Huan Xu, Shuicheng Yan, Jiashi Feng, "Efficient Meta Learning via Minibatch Proximal Update," *Neural Information Processing Systems (**NeurIPS**)*, 2019 (**spotlight**).

[1] **Pan Zhou**, Yunqing Hou and Jiashi Feng, "Deep Adversarial Subspace Clustering," *IEEE Conf. on Computer Vision and Pattern Recognition (**CVPR**)*, 2018.