


Saining Xie

Research Scientist
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Research Interests

Designing representation learning algorithms that help machine understand and utilize large-scale structured or unstructured information, with a focus on structural design decisions for deep neural networks to learn better representations and solve challenging tasks in computer vision and machine learning.

Education

University of California, San Diego September 2013 - June 2018
Ph.D. in Computer Science
Advisor: Zhuowen Tu
Thesis: Deep Representation Learning with Induced Structural Priors
Thesis Committee: Terry Sejnowski, Ravi Ramamoorthi, Lawrence Saul, David Kriegman

University of California, San Diego September 2013 - June 2015
M.Sc. in Computer Science

National University of Singapore October 2012 - April 2013
Exchange Student

Shanghai Jiao Tong University September 2009 - June 2013
B.S. in Computer Science (ACM Honors Class)

Research Experiences

Research Scientist Sept 2018 - Present
Facebook AI Research (FAIR)

Graduate Research Assistant October 2013 - June 2018
University of California, San Diego

Research Intern October 2017 - Jan 2018
DeepMind, London, UK

Research Intern June 2017 - September 2017
Google Research, Mountain View, CA

Research Intern June 2016 - September 2016
Facebook AI Research, Menlo Park, CA

Research Intern June 2015 - September 2015
Adobe Research, San Francisco, CA

Research Intern

NEC Labs America, Cupertino, CA

July 2014 - October 2014

Research Visiting Student

National University of Singapore

July 2012 - March 2013

Preprints

1. Z. Liu, H. Mao, C.Y. Wu, C. Feichtenhofer, T. Darrell and S.Xie. **"A ConvNet for the 2020s."** arXiv, 2022
2. N. Mu, A. Kirillov, D. Wagner and S. Xie. **"SLIP: Self-supervision meets Language-Image Pre-training."** arXiv, 2021
3. C. Wei, H. Fan, S. Xie, C.Y. Wu, A. Yuille, C. Feichtenhofer **"Masked Feature Prediction for Self-Supervised Visual Pre-Training."** arXiv, 2021
4. Y. Li, S. Xie, X. Chen, P. Dollár, K. He, R. Girshick **"Benchmarking Detection Transfer Learning with Vision Transformers."** arXiv, 2021
5. K. He, X. Chen, S. Xie, Y. Li, X. Chen, P. Dollár, K. He, R. Girshick **"Masked Autoencoders are Scalable Vision Learners."** arXiv, 2021
6. S. Xie, A. Galashov, S. Liu, S. Hou, R. Pascanu, N. Heess and Y.W. Teh. **"Transferring Task Goals via Hierarchical Reinforcement Learning."** Preprint, 2018

Proceedings

7. E. Mintun, A. Kirillov, S. Xie. **"On Interaction between Augmentations and Corruptions in Natural Corruption Robustness."** Neural Information Processing Systems (NeurIPS'21), 2021.
8. X. Chen*, S. Xie*, K. He. (*equal contributions) **"An Empirical Study of Training Self-Supervised Vision Transformers."** Proceedings of the International Conference on Computer Vision (ICCV'21), 2021 (Oral). *indicates equal contribution.
9. J. Hou, S. Xie, B. Graham, A. Dai, M. Nießner. **"Pri3D: Can 3D Priors Help 2D Representation Learning?"** Proceedings of the International Conference on Computer Vision (ICCV'21), 2021.
10. J. Hou, B. Graham, M. Nießner, S. Xie. **"Exploring Data-Efficient 3D Scene Understanding with Contrastive Scene Contexts."** Proceedings of the Conference on Computer Vision and Pattern Recognition (CVPR'21), 2021 (Oral).
11. S. Xie, J. Gu, D. Guo, C.R. Qi, L. Guibas, O. Litany. **"PointContrast: Unsupervised pre-training for 3D point cloud understanding."** Proceedings of the 15th European Conference on Computer Vision (ECCV'20), 2020 (Spotlight).
12. C. Liu, P. Dollár, K. He, R. Girshick, A. Yuille, S. Xie. **"Are Labels Necessary for Neural Architecture Search?."** Proceedings of the 15th European Conference on Computer Vision (ECCV'20), 2020 (Spotlight).
13. J. You, J. Leskovec, K. He, S. Xie. **"Graph Structure of Neural Networks."** The 37th International Conference on Machine Learning (ICML'20), 2020.

14. B. Kang, S. Xie, M. Rohrbach, Z. Yan, A. Gordo, J. Feng, Y. Kalantidis. **“Decoupling Representation and Classifier for Long-tailed Recognition.”** International Conference on Learning Representations (ICLR’20), 2020.
15. K. He, H. Fan, Y. Wu, S. Xie, R. Girshick. **“Momentum Contrast for Unsupervised Visual Representation Learning.”** Proceedings of the Conference on Computer Vision and Pattern Recognition (CVPR’20), 2020 (Oral).
16. A. Wan, X. Dai, P. Zhang, Z. He, Y. Tian, S. Xie, B. Wu, M. Yu, T. Xu, K. Chen, P. Vajda, J. E. Gonzalez. **“FBNetV2: Differentiable Neural Architecture Search for Spatial and Channel Dimensions.”** Proceedings of the Conference on Computer Vision and Pattern Recognition (CVPR’20), 2020.
17. S. Xie, A. Kirillov, R. Girshick, K. He. **“Exploring Randomly Wired Neural Networks for Image Recognition.”** Proceedings of the International Conference on Computer Vision (ICCV’19), 2019 (Oral).
18. I. Radosavovic, J. Johnson, S. Xie, W.Y. Lo, P. Dollár. **“On Network Design Spaces for Visual Recognition.”** Proceedings of the International Conference on Computer Vision (ICCV’19), 2019.
19. Z. Chen, D. Guo, T. Xiao, S. Xie, X. Chen, et al. **“Order-Aware Generative Modeling Using the 3D-Craft Dataset.”** Proceedings of the International Conference on Computer Vision (ICCV’19), 2019.
20. S. Xie, C. Sun, J. Huang, Z. Tu and K. Murphy. **“Rethinking Spatiotemporal Feature Learning: Speed-Accuracy Trade-offs in Video Classification.”** Proceedings of the 14th European Conference on Computer Vision (ECCV’18), 2018.
21. S. Xie*, S. Liu*, Z. Chen and Z. Tu. (*equal contributions) **“Attentional ShapeContextNet for Point Cloud Recognition.”** Proceedings of the Conference on Computer Vision and Pattern Recognition (CVPR’18), 2018. *indicates equal contribution.
22. S. Xie, R. Girshick, P. Dollár, Z. Tu and K. He. **“Aggregated Residual Transformations for Deep Neural Networks.”** Proceedings of the Conference on Computer Vision and Pattern Recognition (CVPR’17), 2017
23. S. Xie*, X. Huang* and Z. Tu **“Top-Down Learning for Structured Labeling with Convolutional Pseudoprior.”** Proceedings of the 14th European Conference on Computer Vision (ECCV’16), 2016. *indicates equal contribution.
24. S. Xie and Z. Tu. **“Holistically-nested Edge Detection.”** Proceedings of the International Conference on Computer Vision (ICCV’15), 2015. (Oral, Marr Prize Honorable Mention Award)
25. C.Y. Lee*, S. Xie*, P. Gallagher, Z. Zhang and Z. Tu **“Deeply-Supervised Nets.”** Proceedings of the 18th International Conference on Artificial Intelligence and Statistics (AISTATS’15), 2015. *indicates equal contribution.
26. S. Xie, T. Yang, X. Wang, Y. Lin. **“Hyper-class Augmented and Regularized Deep Learning for Fine-grained Image Classification.”** Proceedings of the Conference on Computer Vision and Pattern Recognition (CVPR’15), 2015.
27. S. Xie, J. Feng, S. Yan and H. Lu. **“Perception Preserving Projections.”** Proceedings of the British Machine Vision Conference (BMVC’13), 2013 (Oral).
28. S. Xie, H. Lu and Y. He. **“Multi-task Co-clustering via Nonnegative Matrix Factorization.”** Proceedings of the 21st International Conference on Pattern Recognition (ICPR’12), 2012.

Journal Articles

29. L. Wang, S. Xie, T. Li, R. Fonseca, Y. Tian. “**Sample-Efficient Neural Architecture Search by Learning Action Space.**” IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2020.
30. S. Xie and Z. Tu “**Holistically-nested Edge Detection**”, International Journal of Computer Vision (IJCV), 2017.
31. Y. He, H. Lu, L. Huang, S. Xie “**Pairwise Constrained Concept Factorization for Data Representation.**”, Neural Networks, 2013

Workshop Papers

32. S. Xie, C. Sun, J. Huang, Z. Tu and K. Murphy. “**Submission to the Kinetics Human Action Recognition Challenge.**”, CVPR’17 ActivityNet Large Scale Activity Recognition Challenge Workshop, 2017
33. S. Xie, R. Girshick, P. Dollár, Z. Tu and K. He. “**Aggregated Residual Transformations for Deep Neural Networks.**”, Beyond ImageNet Large Scale Visual Recognition Challenge Workshop, 2017
34. S. Xie, T. Yang, X. Wang, Y. Lin. “**Hyper-class Augmented and Regularized Deep Learning for Fine-grained Image Classification.**”, International Workshop on Large Scale Visual Recognition and Retrieval (BigVision), 2015
35. C.Y. Lee*, S. Xie*, P. Gallagher, Z. Zhang and Z. Tu. “**Deeply-Supervised Nets.**”, NIPS’14 Deep Learning and Representation Learning Workshop, 2014 (Oral). *indicates equal contribution.
36. T. Chen, L. Tang, Q. Liu, D. Yang, S. Xie, X. Cao, C. Wu, E. Yao, Z. Liu, Z. Jiang, C. Cheng, W. Kong and Y. Yu. “**Combining Factorization Model and Additive Forest for Collaborative Followee Recommendation.**”. KDD’12, KDD Cup Workshop, 2012.

Patent Publications

37. Hertzmann, A.P., Xie, S. and Russell, B.C., Adobe Systems Inc, 2017. **Training Data to Increase Pixel Labeling Accuracy.** U.S. Patent Application 15/013,641.
38. Yang, T., Wang, X., Lin, Y. and Xie, S., NEC Laboratories America Inc, 2016. **Hyper-class augmented and regularized deep learning for fine-grained image classification.** U.S. Patent Application 14/884,600.

Awards and Honors

CVPR’20 Outstanding Reviewer	2020
CVPR’20 Best Paper Nominee (Top 30)	2020
Google PhD Fellowship in Machine Perception	2017-2019
CVPR’18 Doctoral Consortium Travel Award	2018
ICCV’15 Marr Prize Honorable Mention	2015
UCSD Research Travel Grant (CVPR’15, ICCV’15)	2015
IBM China Excellent Student Scholarship	2012
Toshiba Academic Scholarship	2011
SJTU Academic Excellence Scholarship	2010-2012

Challenges and Competitions

4th Place in Activity-Net <i>Kinetics</i> Action Recognition Challenge	2017
2nd Place in ILSVRC ImageNet Classification Task	2016
1st place in KDD Cup 2012 Data Mining Contest, Track 1	2012
NUS ACM-Chapter <i>Developer Hackathon</i> Coding Competition, Winner	2012

Selected Talks

◇ Model Robustness: Corruptions, Augmentations, and Representations	
VisDA-2021 NeurIPS Workshop: Universal Visual Adaptation Challenge	Nov 2021
◇ Transfer3D: Learning Transferrable Representations of 3D Scenes	
3rd ScanNet Indoor Scene Understanding Challenge, CVPR'21	June 2021
◇ Visual Representation Learning: A Tutorial	
CVPR 2020 Tutorial on Visual Recognition	June 2020
◇ Graph Structure of Neural Networks	
CVPR 2020 Tutorial on Learning Representations via Graph-structured	August 2020
ECCV 2020 Tutorial on Visual Recognition	August 2020
◇ Randomly Wired Neural Networks	
ICCV 2019, Seoul	Oct 2019
◇ Deep Representation Learning with Induced Structural Priors	
Robotics Institute, Carnegie Mellon University	May, 2018
Google Brain, Mountain View	May, 2018
Pinterest, San Francisco	May, 2018
OpenAI, San Francisco	May, 2018
Salesforce AI, Palo Alto	April, 2018
Facebook AI Research, Menlo Park	April, 2018
Computational Science Research Center, SDSU	March, 2018
CogSci Student Association Talk Series, San Diego	Feb, 2018
◇ ResNeXt: Aggregated Residual Transformations	
Microsoft Research Asia, Beijing	Jan 2017
Tsinghua University, Beijing	Jan 2017
Chinese Academy of Sciences, Beijing	Jan 2017
◇ Deep Learning with Structured Feedback	
Shanghai Jiao Tong University, Shanghai	September, 2016
◇ Parsing Graphic Designs with CNN	
UCSD Pixel Cafe, San Diego	Jan 2016
Adobe Research, San Francisco	October 2015
◇ Holistically-Nested Edge Detection	
Center for Computer Vision, UCSD	December 2015

ICCV'15, Santiago, Chile

December 2015

Professional Experience

Area Chair

European Conference on Computer Vision (ECCV) 2020, 2022

Conference on Computer Vision and Pattern Recognition (CVPR) 2021, 2022

International Conference on Computer Vision (ICCV) 2021

Tutorial and Workshop

Organizer of the Tutorial on Visual Recognition for Images, Video, and 3D, ECCV 2020.

Organizer of the Tutorial on Visual Recognition for Images, Video, and 3D, CVPR 2020.

Co-organizer of the Tutorial on Learning Representations via Graph-structured Networks, CVPR 2020.

Co-organizer of the Workshop on NAS and Beyond for Representation Learning, CVPR 2020.

Conference Reviewer

CVPR 2016-2020, ICCV 2017-2019, NIPS 2016-2018, ECCV 2016-2018, ICML 2018, 2019, CogSci 2018

Journal Reviewer

Journal of Machine Learning Research, IEEE Trans. on Pattern Analysis and Machine Intelligence, International Journal of Computer Vision, IEEE Trans. on Image Processing, IEEE Trans. on Circuits and Systems for Video Technology, IEEE Trans. on Knowledge and Data Engineering, Neurocomputing, Journal of Visual Communication and Image Representation

Teaching Experience

Guest Lecturer, UC Merced

Graduate Course on Advanced Topics in Deep Learning.

Fall 2021

Teaching Assistant, Facebook AI

Intro to Computer Vision.

Spring 2020

Teaching Assistant, UCSD COGS 260

Graduate Course on Image Recognition.

Spring 2017

Teaching Assistant, UCSD COGS 185

Undergraduate Course on Advanced Machine Learning Methods.

Spring 2016

Teaching Assistant, UCSD COGS 181

Undergraduate Course on Neural Networks and Deep Learning.

Winter 2016

Advising Activities

Zhuang Liu, Intern/Student researcher, UC Berkeley

2021-2022

Norman Mu, Student researcher, UC Berkeley

Spring 2021

Eric Mintun, AI Resident, The University of British Columbia

Spring 2021

Ji Hou, Intern, Technical University of Munich

Summer 2020

Justin Lazarow, Intern, UC San Diego

Summer 2020

Demi Guo, Undergrad Student, Harvard

2019-2020

Bingyi Kang, Intern, NUS

Summer 2019

Jiaxuan You, Intern, Stanford University

Summer 2019

Chenxi Liu, Intern, Johns Hopkins University

Summer 2019

Sainan Liu, Master Student, UC San Diego

2017-2018

Xun Huang, Undergrad Intern, UC San Diego

2016-2017