Xun Xu

Education Experience

2006.9 - 2010.6	**BEng in Automation**, *Sichuan University*, China
2010.9 - 2012.6	**MSc in Control Theory**, *Sichuan University*, China
2012.9-2016.12	**PhD in Computer Science**, *Queen Mary University of London*, UK

PhD Thesis

Title	*Semantic Spaces for Human Behaviour Analysis*
Supervisors	Prof. Shaogang Gong, Prof. Tao Xiang and Dr. Timothy Hospedales

Working Experience

2023.06 - Now	**Senior Scientist II**, *Infocomm Research (I2R), A-STAR, Singapore*
2022.04 - 2023.06	**Scientist III**, *Infocomm Research (I2R), A-STAR, Singapore*
2019.12 - 2022.03	**Scientist II**, *Infocomm Research (I2R), A-STAR, Singapore*
	Computer vision research towards fewer labelled data
2016.09 - 2019.11	**Research Fellow**, *National University of Singapore, Singapore*
	Develop motion segmentation algorithm for autonomous driving and deep learning for general multi-model fitting
2015.09 - 2016.06	**Consultant**, *Vision Semantics Ltd.*, London
	Person detection proposal

Programming Skills

Daily Use	Matlab, Python, PyTorch
Familiar with	C/C++, Tensorflow, PHP, Javascript, html

Publications

\# indicates equal contribution.

* indicates corresponding author.

Book Chapter
1. <u>**X. Xu**</u>, S. Gong and T. Hospedales. *Zero-Shot Crowd Behaviour Recognition*, In Murino, Shah, Cristani, Savarese (Eds.), Group and Crowd Behaviour Understanding in Computer Vision, Elsevier, 2016.

Journal

2. Y. Su#, **X. Xu**#* and K. Jia*, Weakly Supervised 3D Point Cloud Segmentation via Multi-Prototype Learning, IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2023

3. C. K. Joshi, F. Liu, **X. Xu**, J. Lin and C. S. Foo, On Representation Knowledge Distillation for Graph Neural Networks, IEEE Transactions on Neural Network and Learning Systems (**TNNLS**), 2023

4. **X. Xu**, C. M. Nguyen, Y. Yazici, K. Lu, H. Min, C. S. Foo, SemiCurv: Semi-Supervised Learning for Curvilinear Structure Segmentation, IEEE Transactions on Image Processing (**TIP**), 2022

5. Z. Jiang#, **X. Xu**#*, C. Zhang, C.S. Foo and C. Zhu*, MAGNet: a Multi-Attention Generative Adversarial Network for Defocus Blur Detection, IEEE Transactions on Image Processing (**TIP**), 2022

6. C. M. Nguyen, L. Zhang, **X. Xu**, K. Lu, B. Unnikrishnan and C. S. Foo, Semi-supervised Regression with Multi-view Diversity and Consistency, Machine Learning (**ML**) 2022

7. L. Cai, **X. Xu**, L. Zhang and C.S. Foo, Exploring Spatial Diversity for Region-based Active Learning, IEEE Transactions on Image Processing (**TIP**), 2021

8. **X. Xu,** L.F. Cheong, Z. Li and C. Zhu, Learning Clustering for Motion Segmentation, IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2021

9. C. Zhang, C. Zhu and **X. Xu**, Revisiting Image Ordinal Estimation: How to Deal with Ordinal Relationship in Deep Learning?, Journal of Electronic Imaging, 2019

10. **X. Xu**, L.F. Cheong, Z. Li, 3D Rigid Motion Segmentation with Mixed and Unknown Number of Models, IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2019.

11. C. Zhang, **X. Xu**, C. Zhu, Image Ordinal Classification with Deep Multi-View Learning, IET Electronics Letters, 2018.

12. C. Zhang, C. Zhu, **X. Xu**, Y. Liu, J. Xiao and T. Tillo, Visual aesthetic understanding: Sample-specific aesthetic classification and deep activation map visualization, Signal Processing: Image Communication, 2018

13. **X. Xu**, T. Hospedales, S. Gong, Zero-Shot Action Recognition by Word-Vector Embedding, International Journal of Computer Vision (**IJCV**), 2017.

14. **X. Xu**, T. Hospedales, S. Gong, Discovery of Shared Semantic Spaces for Multi-Scene Video Query and Summarization, IEEE Transactions on Circuits and Systems for Video Technology (**TCSVT**), 2017.

Conference

15. Y. Li#, **<u>X. Xu</u>**#*, Y. Su and K. Jia, On the Robustness of Open-World Test-Time Training: Self-Training with Dynamic Prototype Expansion, IEEE/CVF Conference on Computer Vision (**ICCV**) 2023 (Oral Presentation)

16. K. Lu, M. C. Nguyen, **<u>X. Xu</u>** and C. S. Foo, On Adversarial Robustness of Audio Classifiers, International Conference on Acoustics, Speech, & Signal Processing (**ICCASP**), 2023

17. Y. Su#, **<u>X. Xu#*</u>**, K. Jia*, Revisiting Test-Time Training: Sequential Inference and Adaptation by Anchored Clustering, Neural Information Processing Systems (**NeurIPS**), 2022

18. X. Shi, **<u>X. Xu</u>***, W. Zhang, X. Zhu, K. Chen, C. S. Foo and K. Jia, Open-Set Semi-Supervised Learning for 3D Point Cloud Understanding, IEEE Conference on Pattern Recognition (**ICPR**), 2022 (Oral Presentation)

19. L. Cai, R. S. Pahwa, **<u>X. Xu</u>**, J. Wang, L. Zhang and C. S. Foo, Exploring Active Learning for Semiconductor Defect Segmentation, IEEE Conference on Image Processing (**ICIP**), 2022

20. R. S. Pahwa, R. Chang, J. Wang, **<u>X. Xu</u>**, M. Z. Oo, C. S. Foo, S. C. Chong and V. S. Rao, Automated Detection and Segmentation of HBMs in 3D X-ray Images using Semi-Supervised Deep Learning, IEEE Conference on Electronic Components and Technology Conference (**ECTC**), 2022

21. W. Zhang, **<u>X. Xu</u>***, F. Liu, L. Zhang, C. S. Foo, On Automatic Data Augmentation for 3D Point Clouds, British Machine Vision Conference (**BMVC**), 2021

22. K. Lu, C. M. Nguyen, **<u>X. Xu</u>**, K. Chari, Y. J. Goh and C. S. Foo, ARMOURED: Adversarially Robust MOdels using Unlabeled data by REgularizing Diversity, International Conference on Learning Representations (**ICLR**), 2021

23. S. Deng#, **<u>X. Xu</u>**#, C. Wu, K. Chen, K. Jia, 3D AffordanceNet: A Benchmark for Visual Object Affordance Understanding, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021

24. L. Cai, **<u>X. Xu</u>**, J. H. Liew, C. S. Foo, Revisiting Superpixels for Active Learning in Semantic Segmentation with Realistic Annotation Costs, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021

25. Z. Jiang, **<u>X. Xu</u>**, C. Zhang, X. Liu and C. Zhu, MultiANet: a Multi-Attention Network for Defocus Blur Detection, IEEE International Workshop on Multimedia Signal Processing (MMSP), 2020 (**Oral**)

26. **<u>X. Xu</u>**, G.H. Lee, Weakly Supervised Semantic Point Cloud Segmentation: Towards 10X Fewer Labels, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020

27. C. Zhang, S. Liu, **X. Xu** and C. Zhu, C3AE: Exploring the Limits of Compact Model for Age Estimation, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019

28. K. Lin, N. Jiang, L.F. Cheong, J. Lu and **X. Xu**, Robust Video Background Identification by Dominant Rigid Motion Estimation, Asian Conference on Computer Vision (**ACCV**), 2018

29. **X. Xu**, L.F. Cheong and Z. Li, Motion Segmentation by Exploiting Complementary Geometric Models, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018

30. C. Zhang, C. Zhu, J. Xiao, **X. Xu*** and Y. Liu, Image Ordinal Classification and Understanding: Grid Dropout with Masking Label, IEEE International Conference on Multimedia and Expo (**ICME**), 2018 (**Oral**)

31. **X. Xu**, T. Hospedales, and S. Gong. Multi-Task Zero-Shot Action Recognition with Prioritised Data Augmentation, European Conference on Computer Vision (**ECCV**), 2016

32. **X. Xu**, T. Hospedales, S. Gong, Semantic Embedding Space for Zero-Shot Action Recognition, International Conference on Image Processing (**ICIP**), 2015 (**Oral, Top 10% paper**)

33. **X. Xu**, S. Gong, T. Hospedales, Cross-Domain Traffic Scene Understanding by Motion Model Transfer, ACM International Conference on Multimedia (ACM MM), Workshop on Analysis and Retrieval of Tracked Events and Motion in Imagery Streams, 2013

34. **X. Xu**, Y. Liu, MEMS based Human-Machine Interaction System for virtual touring, International Conference on Computer Science and Network Technology (ICCSNT), 2011

Projects

Title: Towards Realistic Deep Learning for 3D Vision
Duration: Aug. 2023 – Jul. 2026
Grant Name: MTC Programmatic Funds
Funding Agency: A*STAR, Singapore
Amount: SGD $9.77M (SGD $1.1M allocated to Co-I)
Role: **Co-I**

Title: Learning with Less Data
Duration: Apr. 2021 – Mar. 2024
Grant Name: AME Programmatic Funds

Funding Agency: A*STAR, Singapore
Amount: SGD $8.94M (SGD $1.4M allocated to Co-I)
Role: **Co-I**

Title: Exploiting Unlabeled Data, Cheaper Labels and Efficient Annotation for 3D Point Cloud Deep Learning (**~25% acceptance**)
Duration: Apr. 2021 - Apr. 2024
Grant Name: Career Development Award (CDA)
Funding Agency: A*STAR, Singapore
Amount: SGD $238,000
Role: **PI**

Professional Activities

Members   IEEE Senior Member

Reviewer
Journals
International Journal of Computer Vision (IJCV)
IEEE Transactions on Neural Network and Learning Systems (TNNLS)
IEEE Transactions on Image Processing (TIP)
IEEE Transactions on Multimedia (TMM)
IEEE Transactions on Systems, Man and Cybernetics: Systems (TSMC)
IEEE Transactions on Cybernetics (TOC)
IEEE Transactions on Circuits System and Video Technology (TCSVT)
ACM Transactions on Knowledge Discovery from Data (TKDD)
Pattern Recognition (PR)
Transactions on Machine Learning Research (TMLR)

Conferences
Conference on Neural Information Processing Systems (NeurIPS)
International Conference on Machine Learning (ICML)
International Conference on Learning Representations (ICLR)
IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
European Conference on Computer Vision (ECCV)
IEEE International Conference on Computer Vision (ICCV)

AAAI conference on Artificial Intelligence (AAAI)

ACM Multimedia Conference (ACM MM)

British Machine Vision Conference (BMVC)
International Conference on Robotics and Automation (ICRA)
International Conference on Intelligent Robots and Systems (IROS)

Invited Talks

2022 International Conference on Digital Society and Intelligent Systems – Dec 2022

Southwest Jiaotong University – 7 Mar 2022

A*STAR – 9 Dec, 2019

Tongji University – 18 May, 2019

University of Electronic Science and Technology of China – 23rd, Nov, 2018

Soochow University - 10th Apr, 2018

Vision And Learning SEminer (VALSE) - 9th Aug, 2017

Sichuan University - 26th, Dec, 2017

University of Electronic Science and Technology of China - 27th, Dec, 2017

Awards

A*STAR Niche Skill Allowance (SGD$1600/month) 2021

Queen Mary Postgraduate Research Fund (£550) 2016

Top 10% paper in ICIP 2015

IEEE Signal Processing Society Travel Grant for ICIP ($600) 2015

QMUL Intelligent Sensing Summer School Challenge (3rd Prize) 2013

Students

PhD

Chengxin Liu, Sep 2023 – Now (HUST, co-supervised with Prof. Zhiguo Cao, visiting student)

Yongyi Su, Sep 2021 – Now (SCUT, co-supervised with Prof. Kui Jia, CSC visiting student)

Jianning Deng, Sep 2022 – May 2023 (University of Endiburgh, co-supervised with Prof. Chris Lu, ARAP scholarship)

Nanqing Liu, Jan 2023 – Now (Southwest Jiaotong University, CSC visiting student)

Rong Pang, Apr 2023 – Now (Southwest Jiaotong University, China Merchant's Group visiting student)

Chao Zhang, Sep 2014 – 2019 (PhD@UESTC, co-supervised with Prof. Ce Zhu)

Master Jinpeng Lin, Sep 2022 – Now (Master@SWJTU, co-supervised with Prof. Tianrui Li)

Yushu Li, Sep 2022 – Now (Master@SCUT, co-supervised with Prof. Kui Jia)

Yijin Chen, Sep 2021 – Now (Master@SCUT, co-supervised with Prof. Kui Jia)

Xian Shi, Sep 2020 – Now (Master@SCUT, co-supervised with Prof. Kui Jia)

Zeyu Jiang, Sep 2019 – Jun 2022 (Master@UESTC, co-supervised with Prof. Ce Zhu)

Qian Song, Aug 2017 - Apr 2018 (Master@NUS, co-supervised with Prof. Cheong Loong-Fah)

References

Prof. Shaogang Gong,
Queen Mary University of London,
E-mail: s.gong@qmul.ac.uk

Dr. Timothy Hospedales,
University of Edinburgh,
E-mail: t.hospedales@ed.ac.uk

Prof. Ce Zhu, FIEEE
University of Electronic and Science Technology of China,
E-mail: eczhu@uestc.edu.cn

Assoc. Prof. Gim Hee Lee,
National University of Singapore,
E-mail: elecf@nus.edu.sg