Zhigang Tu

Position: **Professor**

Affiliation: **Wuhan University, Wuhan, China**

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◆ Bio & CV

Zhigang Tu received the Master Degree in image processing at Wuhan University, China, 2008. In 2015, he received the Ph. D. degree in Computer Science from Utrecht University, Netherlands. From 2015 to 2016, he was a postdoctoral researcher at Arizona State University, US. Then from 2016 to 2018, he was a research fellow at Nanyang Technological University, Singapore. He is currently a professor with Wuhan University.

He has co-/authored more than 70 papers in international SCI-indexed journals and conferences. His current research interests include computer vision, video analytics, motion capture, human behavior recognition/reconstruction/generation, etc. He is the first organizer of the ACCV2020 Workshop on MMHAU, Japan. He received the Best Student Paper Award at the 4th Asian Conference on Artificial Intelligence Technology, and the Best Reviewer Award of IEEE Transactions on Circuits and Systems for Video Technology (IEEE T-CSVT) in 2022. He is the Area Chair of AAAI2023/2024 and VCIP2022. He is an Associate Editor of the SCI-indexed journals of CAAI Transactions on Intelligence Technology, Journal of Visual Communications and Image Representation, Visual Computer.

◆ Research Interests

Computer Vision: Motion Estimation, Human Action Analysis (Action Recognition, Localization, Prediction, Generation), Hand/Human Pose Estimation, Anomaly Detection
Artificial Intelligence: Deep learning, CNN, GCN, Transformer

◆ Education & Working

Dec. 2016–July 2018, Research Fellow
Nanyang Technological University, Singapore
Advisor: Prof. Junsong Yuan (IEEE Fellow)
Dec. 2015–Nov. 2016, Postdoctoral Scholar
Arizona State University, USA
Advisor: Prof. & Chair Baoxin Li
Sep. 2011–Nov. 2015, Ph.D.
Utrecht University, Netherlands
Supervisor: Prof. Remco Veltkamp
Sep. 2008–Aug. 2011, MS-PhD
Wuhan University, China.

◆ Representative Publications

1. Jiaxu Zhang, **Zhigang Tu***, Junwu Weng, Junsong Yuan, Bo Du. A Modular Neural Motion Retargeting System Decoupling Skeleton and Shape Perception. **IEEE Transactions on Pattern Analysis and Machine Intelligence**, 46(10): 6889-6904, 2024.

2. Jiaxu Zhang, Xin Chen, Gang Yu, **Zhigang Tu***. Generative Motion Stylization of Cross-structure Characters within Canonical Motion Space. In Proc. **ACM Multimedia**, 2024.

3. Jiaxu Zhang, Shaoli Huang, **Zhigang Tu***, Xin Chen, Xiaohang Zhan, Gang Yu, Ying Shan. TapMo: Shape-aware Motion Generation of Skeleton-free Characters. In Proc. **ICLR**, 2024.

4. Songlian Li, Min Hu, Xiongwu Xiao, **Zhigang Tu***. Patch Similarity Self-Knowledge Distillation for Cross-view Geo-localization. **IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)**, 2024.

5. **Zhigang Tu**, Zhisheng Huang, Yujin Chen, Di Kang, Linchao Bao, Bisheng Yang, Junsong Yuan. Consistent 3D Hand Reconstruction in Video via Self-Supervised Learning. **IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)**, 45(8): 9469-9485, 2023.

6. **Zhigang Tu**, Yuanzhong Liu, Yan Zhang, Qizi Mu, Junsong Yuan. DTCM: Joint Optimization of Dark Enhancement and Action Recognition in Videos. **IEEE Transactions on Image Processing (TIP)**, vol.32, pp.3507-3520, 2023.

7. **Zhigang Tu**, Jiaxu Zhang, Hongyan Li, Yujin Chen, Junsong Yuan. Joint-bone Fusion Graph Convolutional Network for Semi-supervised Skeleton Action Recognition. **IEEE Transactions on Multimedia (TMM)**, vol.25, pp.1819-1831, 2023.

8. Jiaxu Zhang, Junwu Weng, Di Kang, Fang Zhao, Shaoli Huang, Xuefei Zhe, Linchao Bao, Ying Shan, Jue Wang, **Zhigang Tu***. Skinned Motion Retargeting with Residual Perception of Motion Semantics & Geometry. In Proc. **CVPR**, pp.13864-13872, 2023.

9. Zhisheng Huang, Yujin Chen, Di Kang, Jinlu Zhang, **Zhigang Tu***. PHRIT: Parametric Hand Representation with Implicit Template. In Proc. **ICCV**, pp.14974-14984, 2023.

10. **Zhigang Tu**, Xiangjian Liu, Xuan Xiao. A General Dynamic Knowledge Distillation Method for Visual Analytics. **IEEE Transactions on Image Processing (TIP)**, vol.31, pp.6517-6531, 2022.

11. Yuanzhong Liu, Junsong Yuan, **Zhigang Tu***. Motion-driven Visual Tempo Learning for Video-based Action Recognition. **IEEE Transactions on Image Processing (TIP)**, vol.31, pp.4104-4116, 2022.

12. Jinlu Zhang, **Zhigang Tu***, Jianyu Yang, Yujin Chen, Junsong Yuan. MixSTE: Seq2seq Mixed Spatio-Temporal Encoder for 3D Human Pose Estimation in Video. In Proc. **CVPR**, pp.13232-13242, 2022.

13. Jinlu Zhang, Yujin Chen, **Zhigang Tu***. Uncertainty-Aware 3D Human Pose Estimation from Monocular Video. **ACM Int. Conf. Multimedia (MM)**, pp.5102-5113, 2022.

14. Zhengbo Zhang, Chunlan Zhou, **Zhigang Tu***. Distilling Inter-Class Distance for Semantic Segmentation. In Proc. **IJCAI**, pp.1686-1692, 2022.

15. Jiaxu Zhang, Yifan Jia, Wei Xie, **Zhigang Tu***. Zoom Transformer for Skeleton-based Group Activity Recognition. **IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)**, vol.32, no.12, pp.8646-8659, 2022.

16. **Zhigang Tu**, Hongyan Li, Wei Xie, Yuanzhong Liu, Shifu Zhang, Baoxin Li, Junsong Yuan. Optical Flow for Video Super-Resolution: A Survey. **Artificial Intelligence Review**, vol.55, pp.6505-6546, 2022.

17. Songlian Li, **Zhigang Tu***, Yujin Chen. Multi-scale attention encoder for street-to-aerial image geo-localization. **CAAI Trans. Intelligence Tech.**, 8:166-176, 2023.

18. Yunpeng Chang, **Zhigang Tu***, Bin Luo, Junsong Yuan. Video Anomaly Detection with Spatio-Temporal Dissociation. **Pattern Recognition**, vol.122, pp.108213:1-12, 2022.

19. Yujin Chen[#], **Zhigang Tu**[#], Di Kang, Ruizhi Chen, Linchao Bao, Zhengyou Zhang, Junsong Yuan. Joint Hand-object 3D Reconstruction from a Single Image with Cross-branch Feature Fusion. **IEEE Transactions on Image Processing (TIP)**, vol.30, pp.4008-4021, 2021.

20. Yujin Chen, **Zhigang Tu***, Di Kang, Linchao Bao, Ying Zhang, Xuefei Zhe, Ruizhi Chen, Junsong Yuan. Model-based 3D Hand Reconstruction via Self-Supervised Learning. In Proc. **CVPR**, pp.10451-10460, **2021**.

21. Jiaxu Zhang, Gaoxiang Ye, **Zhigang Tu***, Yongtao Qin, Qianqing Qin, Jinlu Zhang, Jun Liu. A Spatial Attentive and Temporal Dilated (SATD) GCN for Skeleton-Based Action Recognition. **CAAI Transactions on Intelligence Technology**, 7(1): 46-55, 2022.

22. Long Tian, **Zhigang Tu***, Dejun Zhang, Jun Liu, Baoxin Li, Junsong Yuan. Unsupervised Learning of Optical Flow With CNN-based Non-Local Filtering. **IEEE Transactions on Image Processing (TIP)**, vol.29, pp.8429-8442, 2020.

23. Yunpeng Chang, **Zhigang Tu***, Wei Xie, Junsong Yuan. Clustering-driven Deep Autoencoder for Video Anomaly Detection. In Proc. **European Conference on Computer Vision (ECCV)**, pp.329-345, 2020.

24. Dejun Zhang*, Linchao He, **Zhigang Tu***, Shifu Zhang, Fei Han, Boxiong Yang. Learning Motion Representation for Real-Time Spatio-Temporal Action Localization. **Pattern Recognition**, vol.103, pp.107312, 2020.

25. Yujin Chen, **Zhigang Tu***, Liuhao Ge, Dejun Zhang, Ruizhi Chen, Junsong Yuan. SO-HandNet: Self-Organizing Network for 3D Hand Pose Estimation with Semi-supervised Learning. In Proc. **ICCV**, pp.6961-6970, 2019.

26. **Zhigang Tu,** Hongyan Li*, Dejun Zhang, Justin Dauwels, Baoxin Li, Junsong Yuan. Action-Stage Emphasized Spatio-Temporal VLAD for Video Action Recognition. **IEEE Transactions on Image Processing (TIP)**, 28(6):2799-2812, **2019**.

27. **Zhigang Tu***, W. Xie, J. Dauwels, B. Li, J. Yuan. Semantic Cues Enhanced Multi-modality Multi-Stream CNN for Action Recognition. **IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)**, 29(5): 1423-1437, **2019**.

28. **Zhigang Tu***, Wei Xie*, Dejun Zhang, Ronald Poppe, Remco C. Veltkamp, Baoxin Li, Junsong Yuan. A survey of variational and CNN-based optical flow techniques. **Signal Processing: Image Communication**, vol.72, pp.9-24, **2019**.

29. **Zhigang Tu**, Wei Xie, Qianqing Qin*, Remco C. Veltkamp, Baoxin Li, Junsong Yuan. Multi-Stream CNN: Learning Representations Based on Human-Related Regions for Action Recognition. **Pattern Recognition**, vol.79, pp.32-43, **2018**.

30. **Zhigang Tu***, Zuwei Guo, Wei Xie, Mengjia Yan, Remco. C. Veltkamp, Baoxin Li, Junsong Yuan. Fusing disparate object signatures for salient object detection in video. **Pattern Recognition**, vol.72, pp.285-299, **2017.**
31. **Zhigang Tu***, WeiXie, JunCao, Coertvan Gemeren, Ronald Poppe, Remco C. Veltkamp. Variational Method for Joint Optical Flow Estimation and Edge-aware Image Restoration. **Pattern Recognition**, vol.65, pp.11-25, **2017**.
32. **Zhigang Tu***, R. Poppe, Remco C. Veltkamp. Weighted Local Intensity Fusion Method for Variational Optical Flow Estimation. **Pattern Recognition**, vol.50, pp.223-232, **2016**.

◆ Services

Associate Editor
CAAI Transactions on Intelligence Technology (IF=8.4)
Visual Computer (IF=3.5)
Journal of Visual Communication and Image Representation (IF=2.6)

SCI-Indexed Journal Special Issue Organizer
1. Organizer, Special Issue: Multi-Modality Human Activity Understanding, JVCIR
   https://www.journals.elsevier.com/journal-of-visual-communication-and-image-represent ation/call-for-papers/multi-modality-human-activity-understanding

Conference Organizer & Chair
1. Organizer, Workshop: Multi-visual-Modality Human Activity Understanding (MMHAU), ACCV 2020, Kyoto, Japan
   http://tuzhigang.cn/ACCV_Workshop.html
2. Organizer, Workshop: Multi-sensor for Action and Gesture Recognition, 5th Asian Conference on Pattern Recognition (ACPR) 2019, New Zealand.
   https://www.acpr2019.org/

Journal Reviewer
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
IEEE Transactions on Image Processing (TIP)
IEEE Transactions on Multimedia (TMM)
IEEE Transactions on Circuits and Systems for Video Technology (TCSVT)
IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
IEEE Transactions on Cybernetics (TCB)
IEEE Transactions on Artificial Intelligence (TAI)
IEEE Transactions on Industrial Informatics (TII)
IEEE Transactions on Systems Man Cybernetics-Systems (TSYST MAN CY-S)
International Journal of Computer Vision (IJCV)
Pattern Recognition (Elsevier)
Artificial Intelligence (Elsevier)
Artificial Intelligence Review (Springer)
Neurocomputing (Elsevier)
Visual Computer (Springer)

Conference Reviewer

IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)

IEEE/CVF International Conference on Computer Vision (ICCV)

Neural Information Processing Systems (NeurIPS)

International Conference on Learning Representations (ICLR)

International Conference on Machine Learning (ICML)

AAAI Conference on Artificial Intelligence (AAAI)

ACM Conference on Multimedia (ACM MM)

International Joint Conference on Artificial Intelligence (IJCAI)

European Conference on Computer Vision (ECCV)