Curriculum Vitae

Jiandong Tian, Ph.D., Professor

Robot/Computer Vision Group

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Professional Background

Education

2005.9- 2011.7   Ph.D., Pattern Recognition and Intelligent System.

Shenyang Institute of Automation, Chinese Academy of Sciences

2001.9-2005.7   B.S. degree, Automation, Heilongjiang University, China

Employment

2017.1-Present   Full professor, Shenyang Institute of Automation, Chinese Academy of Sciences

2015.6-2016.6   Visiting scholar, Center for Visual Computing, University of California, San Diego (UCSD)

2013.1-2016.12   Associate professor, Shenyang Institute of Automation, Chinese Academy of Sciences

2011.7-2013.1   Assistant professor, Shenyang Institute of Automation, Chinese Academy of Sciences

Research Interests：-My research interests focus on robot/computer vision in complicated illumination and meteorological conditions. Scopes includes,

1. **Illumination, reflectance, and imaging modelling.** Spectral power distribution calculations for direct sunlight and diffuse skylight; spectral reflectance recovery from a single image; imaging pipeline modelling; polarization, light field, and HDR/Multi-modal/3D cameras.

2. **Shadow and highlight Processing.** Shadow modelling and shadow features deriving; shadow detection and removal for a single color image; obtaining shadow-free image without shadow detection; highlight detection and removal.

3. **Vision in bad weather.** Desnowing and deraining; fog/scattering modelling and removal; underwater descattering.

4. **High-level vision tasks.** Tracking in 2D/3D; Object Detection with Domain Adaptation.

5. **Cameras for computer vision.** Designing a shadow-free, weather-free, and highlight-free camera; Under water camera; RGB-NIR camera; Polarization camera; Multi-modal camera; SWIR camera.

Selected Publications   (* means corresponding author paper)

1. **Jiandong Tian** *, Shijun Zhou, Baojie Fan, and Hui Zhang. "A Novel Image Formation Model for Descattering." **IEEE Transactions on Pattern Analysis and Machine Intelligence** (2024).

2. Liu, Yajing, Shijun Zhou, Xiyao Liu, Chunhui Hao, Baojie Fan, and **Jiandong Tian***. "Unbiased Faster R-Cnn for Single-Source Domain Generalized Object Detection." the Proceedings **IEEE Conference on Computer Vision and Pattern Recognition**. CVPR 2024.

3. Lu, Yang, **Jiandong Tian***, Yiming Su, Yidong Luo, Junchao Zhang, and Chunhui Hao. "A Hybrid Polarization Image Demosaicking Algorithm Based on Inter-Channel Correlation." **IEEE Transactions on Computational Imaging** (2024).

4. Zhou, Shijun, Zhen Zhang, Yajing Liu, and **Jiandong Tian***. "Restoration on High Turbidity Water Images under near-Field Illumination Using a Light-Field Camera." **IEEE Transactions on Computational Imaging** (2024).

5. Su, Yiming, Zhen Zhang, Yang Lu, Shiben Liu, Yandong Tang, and **Jiandong Tian***. "Underwater Descattering with Polarization Line Constraint." **Optics and Lasers in Engineering** 179 (2024): 108265.

6. Lu, Yang, Weihong Ren, Yiming Su, Zhen Zhang, Junchao Zhang, and **Jiandong Tian***. "Polarization Image Demosaicking Based on Homogeneity Space." **Optics and Lasers in Engineering** 178 (2024): 108179.

7. Ren, Weihong, Jinguo Luo, Weibo Jiang, Liangqiong Qu, Zhi Han, **Jiandong Tian**, and Honghai Liu. "Learning Self-and Cross-Triplet Context Clues for Human-Object Interaction Detection." **IEEE Transactions on Circuits and Systems for Video Technology** (2024).

8. Pei, Wenjie, Tongqi Xia, Fanglin Chen, Jinsong Li, **Jiandong Tian**, and Guangming Lu. "Sa²vp: Spatially Aligned-and-Adapted Visual Prompt." the Proceedings of the **AAAI Conference on Artificial Intelligence**, 2024.

9. Zhang, Jingwen, Zikun Zhou, Guangming Lu, **Jiandong Tian**, and Wenjie Pei. "Robust 3d Tracking with Quality-Aware Shape Completion." the Proceedings of the **AAAI Conference on Artificial Intelligence**, 2024.

10. Fan, Baojie, Wuyang Zhou, Yushi Yang, and **Jiandong Tian**. "Integrating Scaling Strategy and Central Guided Voting for 3d Point Cloud Object Tracking." **IEEE Robotics and Automation Letters** (2024).

11. Fan, Baojie, Kexin Chen, Guoping Jiang, and **Jiandong Tian***. "Two-Way Complementary Tracking Guidance." **IEEE Transactions on Circuits and Systems for Video Technology** (2023).

12. Fan, Baojie, Kexin Zhang, and **Jiandong Tian**. "Hcpvf: Hierarchical Cascaded Point-Voxel Fusion for 3d Object Detection." **IEEE Transactions on Circuits and Systems for Video Technology** (2023).

13. Liu, Jiawei, Qiang Wang, Huijie Fan, **Jiandong Tian**, and Yandong Tang. "A Shadow Imaging Bilinear Model and Three-Branch Residual Network for Shadow Removal." **IEEE Transactions on Neural Networks and Learning Systems** (2023).

14. Fan, Baojie, Hui Zhang, Yang Cong, Yandong Tang, Huijie Fan, and **Jiandong Tian***. "Dual Aligned Siamese Dense Regression Tracker." **IEEE Transactions on Image**

Processing 31 (2022): 3630-43.

15. Wu, Shuang, Wenjie Pei, Dianwen Mei, Fanglin Chen, **Jiandong Tian**, and Guangming Lu. "Multi-Faceted Distillation of Base-Novel Commonality for Few-Shot Object Detection." the **European Conference on Computer Vision**, 2022.

16. Pei, Wenjie, Shuang Wu, Dianwen Mei, Fanglin Chen, **Jiandong Tian**, and Guangming Lu. "Few-Shot Object Detection by Knowledge Distillation Using Bag-of-Visual-Words Representations." the **European Conference on Computer Vision**, 2022.

17. Fan, Baojie, Kai Wang, Hui Zhang, and **Jiandong Tian**. "Accurate 3d Single Object Tracker with Local-to-Global Feature Refinement." **IEEE Robotics and Automation Letters** 7, no. 4 (2022): 12211-18.

18. Ren, Weihong, Xinchao Wang, **Jiandong Tian**, Yandong Tang, and Antoni B Chan. "Tracking-by-Counting: Using Network Flows on Crowd Density Maps for Tracking Multiple Targets." **IEEE Transactions on Image Processing** 30 (2020): 1439-52.

19. Fan, Baojie, Yang Cong, Yandong Tang, **Jiandong Tian**, and Chenliang Xu. "Structured and Consistent Multi-Layer Multi-Kernel Subtask Correction Filter Tracker." **IEEE Transactions on Circuits and Systems for Video Technology** 31, no. 6 (2020): 2328-42.

20. Fan Baojie, Cong Yang, **Jiandong Tian***, Tang Yandong, "Dynamic and reliable subtask tracker with general schatten p-norm regularization", *Pattern Recognition*, Vol. 120, pp: 108129, 2021.

21. Fan Baojie, **Jiandong Tian**, Peng Yan, Tang Yandong, "Discriminative Siamese Complementary Tracker with Flexible Update", *IEEE Transactions on Multimedia*, 2021.

22. Li Pengyue, **Jiandong Tian***, Tang Yandong, Wang Guolin, Wu Chengdong, "Deep Retinex Network for Single Image Dehazing", *IEEE Transactions on Image Processing*, Vol. 30, pp: 1100-1115, 2020.

23. Ren Weihong, Wang Xinchao, **Jiandong Tian**, Tang Yandong, Chan Antoni B, "Tracking-by-counting: Using network flows on crowd density maps for tracking multiple targets", *IEEE Transactions on Image Processing*, Vol. 30, pp: 1439-1452, 2020.

24. Fan Baojie, Chen Wei, Cong Yang, **Jiandong Tian**, "Dual refinement underwater object

detection network", "*ECCV*, pp: 275-291,2020.

25. Fan Baojie, Cong Yang, **Jiandong Tian**, Tang Yandong, "Reliable Multi-Kernel Subtask Graph Correlation Tracker", *IEEE Transactions on Image Processing*, Vol. 29,pp: 8120-8133,2020.

26. Fan Baojie, Cong Yang, Tang Yandong, **Jiandong Tian**, Xu Chenliang, "Structured and Consistent Multi-Layer Multi-Kernel Subtask Correction Filter Tracker", *IEEE Transactions on Circuits and Systems for Video Technology,* Vol. 31,No. 6,pp: 2328-2342,2020.

27. Ren Weihong, **Jiandong Tian***, Wang Qiang, Tang Yandong, "Dually Connected Deraining Net Using Pixel-Wise Attention", *IEEE Signal Processing Letters*, Vol. 27,pp: 316-320,2020.

28. Pengyue Li, Mengshen Yun, **Jiandong Tian***, Yandong Tang, Guolin Wang, Chengdong Wu, "Stacked Dense Networks for Single-Image Snow Removal", *Neurocomputing,* Vol. 367, No. 20, pp: 152-163, November 2019.

29. **Jiandong Tian**, Zhi Han, Weihong Ren, Yandong Tang, "Snowflake removal for videos by foreground and background decomposition via low rank factorization", *IEEE Trans. Multimedia* , Vol. 20, No. 10, pp: 2659-2669, 2018.

30. **Jiandong Tian**, Zak Murez, Tong Cui, Zhen Zhang, David Kriegman, Ravi Ramamoorthi,"Depth and Image Restoration from Light Field in a Scattering Medium", *ICCV*, pp. 2401-2410, 2017.

31. Weihong Ren, **Jiandong Tian***, Zhi Han, Yandong Tang,"Video Desnowing and Deraining Based on Matrix Decomposition", IEEE International Conference on Computer Vision and Pattern Recognition (*CVPR*), pp. 4210-4219, 2017.

32. Liangqiong Qu, **Jiandong Tian***, Shengfeng He, Yandong Tang, Rynson Lau, "DeshadowNet: A Multi-context Embedding Deep Network for Shadow Removal", IEEE International Conference on Computer Vision and Pattern Recognition (*CVPR*), pp. 4067-4075,2017.

33. Weihong Ren, **Jiandong Tian***, Yandong Tang,"Specular Reflection Separation with Color-Lines Constraint", *IEEE Transactions on Image Processing*，Vol. 26, Issue 5, pp. 2327-2337, 2017.

34. Liangqiong Qu, Shengfeng He, Jiawei Zhang, **Jiandong Tian**, Yandong Tang, and Qingxiong Yang, "RGBD Salient Object Detection via Deep Fusion", *IEEE Transactions on Image Processing*，Vol. 26, Issue 5, pp. 2274-2285, 2017.

35. Zhi Han, **Jiandong Tian**, Liangqiong Qu, and Yandong Tang, "A New Intrinsic-Lighting Color Space for Daytime Outdoor Images", *IEEE Transactions on Image Processing*，Vol. 26, Issue 2, pp. 1031-1039, 2017.

36. **Jiandong Tian**, Zhigang Duan, Weihong Ren, Zhi Han, Yandong Tang, "Simple and Effective Calculations about Spectral Power Distributions of Outdoor Light Sources for Computer Vision", *Optics Express*, Vol. 24, Issue 7, pp. 7266-7286, 2016.

37. Weihong Ren, **Jiandong Tian***,Yandong Tang, "Blind Deconvolution with Non-local Similarity and l0 Sparsity for Noisy Image", *IEEE Signal Processing Letters*, Vol. 23, Issue 4, pp:439-443, 2016.

38. **Jiandong Tian***, Xiaojun Qi, Liangqiong Qu, and Yandong Tang, "New Spectrum Ratio Properties and Features for Shadow Detection", *Pattern Recognition*, Volume 51, Issue 3, pp: 85–96, 2016.

39. Liangqiong Qu, **Jiandong Tian**, Zhi Han, and Yandong Tang, "Pixel-wise Orthogonal Decomposition for Color Illumination Invariant and Shadow-free Image", *Optics Express*,Vol.23, Issue3, pp: 7266-7286, 2015.

40. Denglu Wu，**Jiandong Tian***, Yandong Tang, Optimized basis function for spectral reflectance recovery from tristimulus values, *Optical Review*，Vol. 21, Issue 2, pp: 117-126, 2014.

41. **Jiandong Tian** and Yandong Tang, Wavelength-sensitive-function controlled reflectance reconstruction, *Optics Letters*, Vol. 38, Issue 15, pp. 2818-2820, 2013.

42. Denglu Wu，**Jiandong Tian***，Bingfeng Li, Yandong Tang, Recovering Sensor Spectral Sensitivity from Raw Data, *Journal of Electronic Imaging*, Vol. 22, Issue2, pp: 1-8, 2013.

43. **Jiandong Tian** and Yandong Tang, Linearity of each channel pixel values from a surface in and out of shadows and its applications, 24th IEEE Conference on Computer Vision and Pattern Recognition (*CVPR*), 985-992, 2011.

44. **Jiandong Tian**, Jing Sun, and Yandong Tang, Short-baseline binocular vision system for

a humanoid ping-pong robot, *Journal of Intelligent and Robotic Systems*, Vol.64, Issue3, pp:643-560, 2011.

45. **Jiandong Tian**, Wei Dong, and Yandong Tang, Finding passable regions for robots from a single still image, *International journal of robotics and automation*, Vol. 24, Issue 3, pp. 228-234, 2009.

46. **Jiandong Tian**, Jing Sun, and Yandong Tang, Tricolor attenuation model for shadow detection, *IEEE Transactions on image processing*, Vol. 18, Issue 10, pp. 2355-2363, 2009.

Research Grant (Role in project)

1. 2020.01-2022.12:"Research and development of emergency robot equipment inside dangerous buildings at disaster sites", (Grant Number: SQ2019YFC150037), **Principal Investigator**, National Key R&D Program of China, RMB:176,500,00.

2. 2021.01-2024.12:"Vision-based robot sensing and targets recognition in complex outdoor conditions", (Grant Number: U2013210), **Principal Investigator**, Key Program of National Natural Science Foundation of China, RMB: 279,000,0.

3. 2018.01-2021.12:"All weather computer vision", (Grant Number: Y8A1065101), **Principal Investigator**, Chinese Academy of Sciences. RMB: 180, 000,0.

4. 2023.01-2023.12:" Robot visual perception in complex environments", (Grant Number: 2023JH6/100500005), **Principal Investigator**, the LiaoNing Science Fund for Distinguished Young Scholars, RMB: 100, 000,0.

5. 2017.01-2020.12:" Multimode perception system for Tri-Co robots on complicated illuminations and weather", (Grant Number: 91648118), **Principal Investigator**, National Natural Science Foundation of China, RMB: 680,000.

6. 2015.01-2018.12:" Illumination modeling and its invariant algorithms for computer vision", (Grant Number: 61473280), **Principal Investigator**, National Natural Science Foundation of China, RMB: 800,000.

7. 2016.1-2018.12: "Deep learning and illumination processing for robots", **Principal Investigator**, Siasun Robot & Automation Co.,Ltd., RMB: 800,000.

8. 2013.12-2016.12:" Illumination, Reflectance, and camera modeling", (Grant Number:

Y3A1065101), **Principal Investigator**, Chinese Academy of Sciences. RMB: 400, 000.

9. 2011.01-2013.12:" Physical and imaging properties of outdoor shadow and its removal methods", (Grant Number: 61102116), **Principal Investigator**, National Natural Science Foundation of China, RMB: 280,000.

10. 2010.09-2014.09:" Image degradation modeling and processing by scattering", (Grant Number: Y3A1204101), **Principal Investigator**, Open Research Fund of National Key Laboratory, RMB: 200,000.

Honors and Awards

[1] 2020, First Prize of Liaoning Provincial Natural Science Award.

[2] 2019, First Prize of Natural Science of Chinese Association of Automation.

[3] 2016, Academic award of nature science in Liaoning province, first prize.

[4] 2018, Outstanding Youth Innovation Promotion Award, Chinese Academy of Sciences.

[5] 2020, First Prize in "Underwater Target Recognition" of the Underwater Unmanned Vehicle Real Boat Competition.

Standing Member of the Integrated Robot Committee of the Chinese Society of Automation

Professional Service

[1] Program Committee: CVPR 2018, SIGGRAPH 2018, ICIP 2018, WCICA 2018, ICIP 2017.

[2] IEEE, Senior member

[3] Technical Program Committee: CYBER 2016, CYBER 2018, IST 2018

[4] Guest Editor: Journal of Imaging, Electronics, Sensors, Frontiers in Robotics and AI, Frontiers in Computer Science

[5] Reviewer: IEEE Transactions on PAMI, IEEE Transactions on Image Processing, Pattern Recognition, IEEE Signal Processing Letters, IEEE Transactions on Industrial Informatics, IEEE Transactions on Systems, Man, and Cybernetics, Journal of the Optical Society of America A, Applied Optics, Computers & Graphics, and Remote Sensing.

[6] Evaluation expert: National Science & technology, China

[7] Evaluation expert: Major Research Plan (Tri-Co Robots) of the National Natural Science Foundation of China (NSFC).

Advisees

[1] Current Ph.D. students,

Yiming Su, Shijun Zhou, Yang Lu, Yajing Liu, Mingxue Li, Zhenshuo Yang, Yukuan Zhang, and Qian He.

[2] Alumni

Dr. Denglu Wu (Research Scientist, National University of Singapore)

Dr. Zhigang Duan (Inspur Group Co., Ltd)

Dr. Liangqiong Qu (Assistant Professor, The University of Hong Kong)

Dr. Weihong Ren (Assistant Professor, Harbin Institute of Technology, ShenZhen, China)

References

Available upon request.