Yi-Ting (Dennis) Shen

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Summary

Ph.D. candidate specializing in computer vision, synthetic data, and multimodal LLMs. Lead author of publications at top-tier venues (ICCV, CVPR, ICIP), with a proven track record in designing benchmark datasets and innovative frameworks for real-world applications, including aerial-view human detection, pose retrieval, and medical imaging. Proficient in Python (PyTorch) and C/C++, and recognized with a CVPR Highlight Paper (2.5% of submissions).

Education

Ph.D. (Candidate) in Electrical and Computer Engineering, University of Maryland, College Park 08/2020 – Present
M.S. in Electronics Engineering, National Taiwan University 09/2016 – 01/2019
B.S. in Electrical Engineering, National Taiwan University 09/2012 – 06/2016

Technical Skills

Programming: Python, PyTorch, TensorFlow, OpenCV, C/C++, Verilog, LaTex
Others: Computer Vision, Machine Learning, Synthetic Data Generation/Utilization, Aerial-view Human Detection, Pose Estimation, Composed Image/Pose Retrieval, Multimodal Large Language Models, Scene Understanding

Professional Experience

Graduate Research Assistant

DSPCAD Research Group, University of Maryland (PI: Prof. Shuvra S. Bhattacharyya)

Aug. 2020 – Present | College Park, MD, USA

- Proposed an MLLM-based framework for automatic pose transition description generation and designed a cyclic training scheme for composed pose retrieval, establishing new benchmark datasets (***ICCV'25***).
- Proposed (***CVPR'23***, *Highlight*) and analyzed (*arXiv*) a progressive framework that selects and transforms synthetic images using domain gap metrics, improving realism and enhancing aerial-view human detection.
- Designed a synthetic pose diversification pipeline combining a diffusion-based human pose generator with a pose-guided image-to-image translator (***ICIP'25***).
- Constructed Archangel (*IEEE Access'23*) and SynPlay (*arXiv*) datasets for aerial-view human detection, semantic segmentation, and pose estimation.
- Developed a hyperspectral image classification model optimized for low-resource platforms (*WHISPERS'21*).
- Built a CNN-Transformer hybrid model for fall risk assessment using on-body camera data (***ICASSP'24***, *TNSRE'25*).
- Designed a robust EMA–OCTA retinal image registration framework resilient to vessel density variation (*BOEx'24*).

Graduate Research Assistant

DSPIC Lab, National Taiwan University (PI: Prof. Liang-Gee Chen)

Sep. 2016 – Jan. 2019 | Taipei, Taiwan

- Proposed a self-supervised fisheye depth estimation framework for traversability prediction (master's thesis).
- Developed a multi-object tracking algorithm using 360° panoramic video inputs (*ICCE'18*).
- Contributed to a weakly supervised indoor scene parsing method based on depth domain adaptation (***ICCV'19***).

R&D Intern

MediaTek (Advisors: Dr. Yu-Wen Huang and Dr. Tzu-Der Chuang)

May. 2016 – Aug. 2016 | Hsinchu, Taiwan

- Accelerated decoder-side PMVD (pattern-based motion vector derivation) and optimized bandwidth efficiency.
- Contribution included in U.S. Patent Application *US20180249154A1* (co-inventor).

Undergraduate Research Assistant

DSPIC Lab, National Taiwan University (PI: Prof. Liang-Gee Chen)

Sep. 2014 – June 2016 | Taipei, Taiwan

- Explored depth cue generation techniques for autostereoscopic 3DTV systems (*ICCE'16*).
- Implemented stereo matching algorithms on FPGA for real-time applications

Publications

Conference Proceeding (All peer-reviewed)

1. **Shen, Y. T.***, Eum, S.*, Lee, D., Shete, R., Wang, C. Y., Kwon, H., & Bhattacharyya, S. S., "AutoComPose: Automatic Generation of Pose Transition Descriptions for Composed Pose Retrieval Using Multimodal LLMs," *The IEEE/CVF International Conference on Computer Vision (**ICCV**), 2025.* (*equal contribution)
2. **Shen, Y. T.***, Lee, H.*, Kwon, H., & Bhattacharyya, S. S., "Diversifying Human Pose in Synthetic Data for Aerial-view Human Detection," *The IEEE International Conference on Image Processing (**ICIP**), 2025.* (*equal contribution)
3. Wang, C. Y., Sadrieh, F. K., **Shen, Y. T.**, Oppizzi, G., Zhang, L. Q., & Tao, Y., "Real-Time Privacy-Preserving Fall Risk Assessment with a Single Body-Worn Tracking Camera," *The IEEE International Conference on Acoustics, Speech and Signal Processing (**ICASSP**), 2024.*
4. **Shen, Y. T.***, Lee, H.*, Kwon, H., & Bhattacharyya, S. S., "Progressive Transformation Learning for Leveraging Virtual Images in Training," *The IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023.* (*equal contribution) **[Highlight]**
5. Lee, E. J., **Shen, Y. T.**, Pan, L., Li, Z., & Bhattacharyya, S. S., "DCT-based Hyperspectral Image Classification on Resource-Constrained Platforms," *11th Workshop on Hyperspectral Imaging and Signal Processing: Evolution in Remote Sensing (**WHISPERS**), 2021.*
6. Liu, K. C., **Shen, Y. T.**, Klopp, J. P., & Chen, L. G., "What Synthesis is Missing: Depth Adaptation Integrated with Weak Supervision for Indoor Scene Parsing," *The IEEE/CVF International Conference on Computer Vision (**ICCV**), 2019.*
7. Liu, K. C.*, **Shen, Y. T.***, & Chen, L. G., "Simple Online and Realtime Tracking with Spherical Panoramic Camera," *The IEEE International Conference on Consumer Electronics (**ICCE**), 2018.* (*equal contribution)
8. **Shen, Y. T.**, Liu, G. L., Wu, S. S., & Chen, L. G., "3D Perception Enhancement in Autostereoscopic TV by Depth cue for 3D Model Interaction," *The IEEE International Conference on Consumer Electronics (**ICCE**)*, 2016.

JOURNAL

9. Wang, C. Y., Sadrieh, F. K., **Shen, Y. T.**, Oppizzi, G., Zhang, L. Q., & Tao, Y., "EgoFall: Real-time Privacy-Preserving Fall Risk Assessment with a Single On-Body Tracking Camera," *IEEE Transactions on Neural Systems and Rehabilitation Engineering (**TNSRE**), 2025.*
10. Wang, C. Y., Nandhan, A. G., **Shen, Y. T.**, Chen, W. Y., Kumar, S. S. S., Long, A., ... & Tao, Y., "ShellCollect: A Framework for Smart Precision Shellfish Harvesting Using Data Collection Path Planning," ***IEEE Access**, 2024.*
11. Wang, C. Y., Sadrieh, F. K., **Shen, Y. T.**, Chen, S. E., Kim, S., Chen, V., ... & Tao, Y., "MEMO: dataset and methods for robust multimodal retinal image registration with large or small vessel density differences," *Biomedical Optics Express (**BOEx**), 2024.*
12. **Shen, Y. T.**, Lee, Y., Kwon, H., Conover, D. M., Bhattacharyya, S. S., Vale, N., ... & Skirlo, F., "Archangel: A Hybrid UAV-based Human Detection Benchmark with Position and Pose Metadata," ***IEEE Access**, 2023.*

PREPRINT

13. Yim, J., Lee, H., Eum, S., **Shen, Y. T.**, Zhang, Y., Kwon, H., & Bhattacharyya, S. S., "SynPlay: Importing Real-world Diversity for a Synthetic Human Dataset," *Submitted.*
14. Lee, H.*, Zhang, Y.*, **Shen, Y. T.***, Kwon, H., & Bhattacharyya, S. S., "Exploring the Impact of Synthetic Data for Aerial-view Human Detection," *Submitted.* (*equal contribution)

Awards and Honors

- Highlight Paper, CVPR 2023 (10% of accepted papers, 2.5% of submissions) 06/2023
- Award for Design Complete, Cell-Based Digital Circuit Category, 2018 IC Design Contest 09/2018
- Award for Excellent, Problem E, International CAD Contest at ICCAD 12/2015