Yao-Chih Lee

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Research Interests

Deep Learning for Computer Vision, 3D Computer Vision, Scene Understanding, Image/Video Processing

Education

National Taiwan University Taipei, Taiwan
Master of Science in Computer Science and Information Engineering Sep. 2018–Jun. 2020

- Thesis: "3D Video Stabilization with Depth Estimation by CNN-based Optimization" **[CVPR2021]**
  Committee: Prof. Yi-Ping Hung (advisor), Prof. Yung-Yu Chuang, Prof. Yu-Chiang Frank Wang, Prof. Chu-Song Chen, Prof. Kuan-Wen Chen
- GPA: 4.24/4.3
- Rank: 7th/132

National Chiao Tung University (Now National Yang Ming Chiao Tung University) Hsinchu, Taiwan
Bachelor of Science in Computer Science (Network and Multimedia Engineering Program) Sep. 2014–Jun. 2018

- GPA: 4.14/4.3; (major) 4.2/4.3
- Rank: 1st/50
- Academic Achievement Award: 4 times (top 5% ranking in 4 semesters)

Publications

1. **Yao-Chih Lee**, Kuan-Wei Tseng, Guan-Sheng Chen, Chu-Song Chen, "GCVD: Globally Consistent Video Depth and Pose Estimation with Efficiency," *In submission*.
2. Shu-Jung Han, **Yao-Chih Lee**, Shih-Yi Chien, Yihsiu Chen, "Social Roles and Trust in Human-Agent Interaction: Is it All about Performance?," *In submission*.
3. **Yao-Chih Lee**, Kuan-Wei Tseng, Yu-Ta Chen, Chien-Cheng Chen, Chu-Song Chen and Yi-Ping Hung, "3D Video Stabilization with Depth Estimation by CNN-based Optimization," *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021. [webpage, pdf]
4. Yu-Ta Chen, Kuan-Wei Tseng, **Yao-Chih Lee**, Chun-Yu Chen, Yi-Ping Hung, "PixStabNet: Fast Multi-Scale Deep Online Video Stabilization with Pixel-based Warping," *IEEE International Conference on Image Processing (ICIP)*, 2021. [pdf]
5. Hau Chu, Jia-Hong Lee, **Yao-Chih Lee**, Ching-Hsien Hsu, Jia-Da Li, Chu-Song Chen, "Part-aware Measurement for Robust Multi-View Multi-Human 3D Pose Estimation and Tracking," *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2021. [pdf]
6. Ping-Jung Duh, Yu-Cheng Sung, **Yao-Chih Lee**, Kuan-Wen Chen, Liang-Yu Fan Chiang, "A Design of Vision-based Navigation System for the Visually Impaired," *The Conference of Taiwan Human-Computer Interaction (TAICHI)*, 2018.
7. Yu-Cheng Sung, **Yao-Chih Lee**, Sarah Wang, Wei-Ting Hu, Kuan-Wen Chen, "An UAV Autopilot System for Sports Player Tracking," *The Conference of Taiwan Human-Computer Interaction (TAICHI)*, 2017.

Experiences

AI Application and Integration Lab at Academia Sinica Taipei, Taiwan
Research Assistant (full-time) advised by Prof. Chu-Song Chen Sep. 2020–present

- Developed globally consistent video dense depth and camera pose estimation with a CNN-based optimization framework, which outperformed the state-of-the-art by 19% improvement with strong efficiency. **[In submission]**.
- Contributed in a multi-view multi-human 3D pose estimation and tracking system with 100 fps **[CVPRW 2021]**.
- Led a research team of Traditional Chinese scene text detection and recognition in self-supervised learning manners; and developed scene text synthesis algorithms with depth estimation and scene text replacement.

- Solved CT metal artifact reduction in CT-MRI paired images by leveraging conditional GAN and contrastive loss.
- Developed multiple scale image deblurring and denoising, for different scales of microscopy images.

Interdisciplinary Human-AI Interaction Research Project Taipei, Taiwan
Research Assistant (part-time) Jul. 2020–Aug. 2020

- Advised by Prof. Yihsiu Chen (Communication, NCCU, Taiwan), Prof. Gary Hsieh (Human Centered Design & Engineering, UW, Seattle). and Prof. Chien-Wen Tina Yuan (Library & Information Studies, NTNU, Taiwan).
- Developed experimental platforms of human-AI collaboration to serve over 700 participants **[In submission]**.

Image and Vision Lab at National Taiwan University, collaborating with MediaTek, Inc. Taipei, Taiwan
Graduate Research Assistant advised by Prof. Yi-Ping Hung Sep. 2018–Jun. 2020

- Proposed the first 3D learning-based video stabilization algorithm with self-supervised depth and pose estimation. The method consistently outperforms the state-of-the-art methods, especially in challenging videos. **[CVPR2021]**.
- Proposed an online video stabilization algorithm with a coarse-to-fine approach, which achieved 54.6 fps and surpassed the state-of-the-art by 29% with robust shape preservation. **[ICIP2021]**.
- Developed in self-supervised monocular depth and camera ego-motion estimation algorithm for wild videos.
- Conducted thorough evaluations on the performance of local feature algorithms for visual SLAM systems.

Collaborative Vision Lab at National Chiao Tung University Hsinchu, Taiwan
Undergraduate Research Assistant advised by Prof. Kuan-Wen Chen Aug. 2016–Jun. 2018

- Developed UAV autopilot and visual tracking system with OCR and human detection **[TAICHI2017]**.
- Contributed in a navigation system for visually impaired with streaming semantic segmentation. **[TAICHI2018]**.
- Constructed a semi-automatic feature correspondence annotation system to construct a real-world dataset of matching patches for a learning-based viewpoint- and illumination-invariant local feature extraction.
- Developed semantic segmentation and SLAM system with 3D reconstruction for virtual reality environments.

Teaching

- **3D Computer Vision with Deep Learning Applications (CSIE5429)** Spring 2021
  Teaching Assistant (Instructor: Chu-Song Chen) at NTU, Taiwan
- **Digital Image Processing (CSIE5612)** Fall 2019
  Teaching Assistant (Instructor: Yi-Ping Hung) at NTU, Taiwan
- **Probability (CSIE2121)** Spring 2019
  Teaching Assistant (Instructor: Yi-Ping Hung) at NTU, Taiwan
- **Computer Vision for UAV Autopilot (DCP1249)** Spring 2018
  Teaching Assistant (Instructor: Kuan-Wen Chen) at NCTU, Taiwan

Awards and Academic Activities

- **Reviewer**, Pattern Recognition
- **Academic Achievement Award** $\times$ **4**, (Top 5% ranking)
  Fall 2014, Spring 2016, Fall 2016, and Spring 2017
- **Excellence Award**, Undergraduate Project Competition
  An UAV autopilot system for sports player tracking
- **Departmental Core Course Scholarship**
  Top 3 ranking in the course of Operating System

Skills

- **Programming Languages:**
  Python, C/C++, LaTeX, MatLab, Javascript, PHP, HTML, SQL, C#, Swift
- **Development Tools:**
  Unix, PyTorch, OpenCV, Open3D, OpenGL, TensorFlow, COLMAP, Git, Unity
- **Languages:**
  Chinese (native), English (fluent, TOEFL MyBest: 105)