

Research Interests

Deep Learning for Computer Vision, 3D Computer Vision, Scene Understanding, Image/Video Processing, View Synthesis, Structure-from-Motion, SLAM, Local Invariant Feature, Interactive Vision Techniques

Education

National Taiwan University

Master of Science in Computer Science and Information Engineering

Taipei, Taiwan

Sep. 2018–Jun. 2020

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

National Chiao Tung University (now National Yang Ming Chiao Tung University)

Bachelor of Science in Computer Science (Network and Multimedia Engineering Program)

Hsinchu, Taiwan

Sep. 2014–Jun. 2018

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

Publications

- 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," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021. [[webpage](#), [pdf](#)]
- 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](#)]
- 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," *IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, 2021. [[pdf](#)]
- 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 Computer-Human Interaction (TAICHI)*, 2018.
- 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 Computer-Human Interaction (TAICHI)*, 2017.

Research Experiences

AI Application and Integration Lab at Academia Sinica

Research Assistant advised by Prof. Chu-Song Chen

Taipei, Taiwan

Sep. 2020–present

- Developing 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]**
- Leading a research team to develop video view synthesis with style transfer using 3D geometric constraints.
- Leading a team of Traditional Chinese scene text detection and recognition in self-supervised learning manners; and developing scene text synthesis algorithms with depth estimation and scene text replacement.
- Contributed in a multi-view multi-human 3D pose estimation and tracking system with 100 fps. **[CVPRW 2021]**
- 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

Research Assistant

Taipei, Taiwan

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.

Graduate Research Assistant advised by Prof. Yi-Ping Hung

Taipei, Taiwan

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 self-supervised monocular depth and camera ego-motion estimation 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

Undergraduate Research Assistant advised by Prof. Kuan-Wen Chen

Hsinchu, Taiwan

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

- **Teaching Assistant**, 3D Computer Vision with Deep Learning Applications (CSIE5429), NTU Spring 2021
- **Teaching Assistant**, Digital Image Processing (CSIE5612), NTU Fall 2019
- **Teaching Assistant**, Probability (CSIE2121), NTU Spring 2019
- **Teaching Assistant**, Computer Vision for UAV Autopilot (DCP1249), NCTU Spring 2018

Awards and Achievements

- **Reviewer**, Pattern Recognition
- **Academic Achievement Award** × 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, Bash, Javascript, PHP, SQL, C#, Swift
- **Development Tools:**
Unix, PyTorch, OpenCV, Open3D, COLMAP, OpenGL, TensorFlow, Git, Unity
- **Languages:**
Chinese (native), English (fluent, TOEFL MyBest: 105)