# 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: Yi-Ping Hung (advisor), Yung-Yu Chuang, Yu-Chiang Frank Wang, Chu-Song Chen, 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 Sep. 2014–Jun. 2018

- Network and Multimedia Engineering Program
- 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–current

- 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 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.

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

- Interdisciplinary project advised by Yi-Hsiu Chen (Communication, NCCU, Taiwan), partially Chien-Wen (Tina) Yuan (Library and Information Studies, NTNU, Taiwan), and Gary Hsieh (Computer Science, UW, Seattle).
- 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

## Extracurricular Activities

- **Director**, Midland of Taiwan Alumni Association in NCTU
  Sep. 2015–Aug. 2016
- **Member**, Computer Science Association in NCTU
  Jun. 2015–May. 2016
- **Member**, Tennis Team of the Computer Science department in NCTU
  Sep. 2014–Jun. 2016
- **Member**, Fire Dance Club in NCTU
  Sep. 2014–May. 2015