

Wei-Chih Chern

Computer Vision | Image Processing | Machine Learning



[linkedin.com/in/wei-chern](https://www.linkedin.com/in/wei-chern)



github.com/WeiChihChern



chernw1@udayton.edu



+1 (323) 205-0056

Education

- [University of Dayton](#), Ph.D. Course in Electrical and Computer Engineering, U.S.A. Aug 2020 - Present
- [California Polytechnic State University, San Luis Obispo](#), Master, Electrical Engineering, U.S.A. Sep 2014 - Jul 2017
- [National Changhua University of Education](#), Bachelor, Industrial Engineering, Taiwan Sep 2009 - Jul 2013

Publication ([Google Scholar](#))

Journal

- **Wei-Chih Chern**, Taegeon Kim, Tam V. Nguyen, Vijayan K. Asari, and Hongjo Kim (2023). "Self-Supervised Sub-category Exploration for Pseudo Label Generation," *Automation in Construction*, Impact Factor = 10.3 ([Paper](#))
- **Wei-Chih Chern**, Jeongho Hyeon, Tam V. Nguyen, Vijayan K. Asari, and Hongjo Kim (2023). "Context-aware Safety Assessment System for Far-field Monitoring," *Automation in Construction*, Impact Factor = 10.3 ([Paper](#))
- Yeji Hong, **Wei-Chih Chern**, Tam V. Nguyen, Hubo Cai, and Hongjo Kim (2023). "Semi-supervised Domain Adaptation for Segmentation Models on Different Monitoring Settings," *Automation in Construction*, Impact Factor = 10.3 ([Paper](#))
- **Wei-Chih Chern**, Tam V. Nguyen, Vijayan K. Asari, Hongjo Kim (2022). "Impact of Loss Functions on Semantic Segmentation in Far-field Monitoring," *Computer-Aided Civil and Infrastructure Engineering*, Impact Factor = 11.77 ([Paper](#))

Conference

- **Wei-Chih Chern**, Vijayan Asari, and Hongjo Kim (2023). "Hashing-based Object Tracking for Construction Site Safety Monitoring across Different Domains," *ASCE International Conference on Computing in Civil Engineering 2023*, Jun. 25-28, Corvallis, Oregon.
- Jeongho Hyeon, Minwoo Jeong, Giwon Shin, **Wei-Chih Chern**, Vijayan K. Asari, and Hongjo Kim (2023). "Evaluating Road Segmentation Performance in Participatory Sensing: Investigation into Alternative Metrics," *The 40th International Symposium on Automation and Robotics in Construction (ISARC 2023)* Jul. 3-7, Chennai, India.
- **Wei-Chih Chern**, Jeongho Hyeon, Tam V. Nguyen, Vijayan K. Asari, and Hongjo Kim (2022). "Context-Aware PPE Compliance Check in Far-Field Monitoring," *The International Conference on Computing in Civil and Building Engineering (ICCCBE)* Oct. 26-28, 2022, Cape Town, Republic of South Africa.
- **Wei-Chih Chern**, Vijayan Asari, Tam Nguyen, and Hongjo Kim (2022). "Weakly supervised pseudo label generation for construction vehicle segmentation," *39th International Symposium on Automation and Robotics in Construction (ISARC 2022)* July 13th - 15th, Bogotá, Colombia. (**Selected for Plenary Talks**)
- **Wei-Chih Chern**, Hongjo Kim, Vijayan Asari, and Tam Nguyen (2022). "Compound Loss Function of semantic segmentation models for imbalanced construction data," *The 9th International Conference on Construction Engineering and Project Management (ICCEPM)* Jun. 20-23, 2022, Las Vegas, NV, USA.
- Yeji Hong, **Wei Chih Chern**, Tam Nguyen and Hongjo Kim (2021). "Generalization of Construction Object Segmentation Models using Self-Supervised Learning and Copy-Paste Data Augmentation," *The 38th International Symposium on Automation and Robotics in Construction (ISARC 2021)*, Dubai, UAE.

Work Experience

Graduate Assistant, [Vision Lab & SI Lab](#), Dayton, OH

Aug 2020 - Present

Python/Pytorch/Tensorflow/Docker/C++

- Advised by [Dr. Asari](#), [Dr. Kim](#) and [Dr. Nguyen](#)
- Construction Worker Safety Tracking
 - Established color-hashing based algorithm to establish efficient real-time construction worker tracking for safety monitoring
- Robust Semantic Segmentation for Construction Site Monitoring
 - Investigated data imbalance and small object recognition problems in far-field monitoring
 - Improved overall segmentation performance by 9.27% with a compound loss function design
- Context-aware Safety Assessment in Construction Sites
 - Presented a novel architecture integrating object detection, semantic segmentation, and depth estimation methods to assess the safety status of each worker in CCTV
 - Analyzed working contexts based on depth estimation in 2D images
 - Estimated the safety status of each worker with the detection, segmentation, and depth information
- Automated Training Data Generation for Semantic Segmentation in Construction Site Imagery
 - Investigated the potential of weakly supervised learning algorithms for polygon annotation generation
 - Designed a fusion model to automatically generate segmentation masks from bounding box annotation
 - Demonstrated the effectiveness of pseudo labels in training segmentation models (mIoU of 88.9% in AIM dataset)
- Glacier Facies Mapping
 - Identified glacier faces like clean ice, debris-covered regions, and waters on SAR imagery with semantic segmentation

Software Engineer, [E-Lead](#), Chunghua, Taiwan

Sep 2019 - Jul 2020

C++/Python/Shell/Docker

- Co-led a team of 10 engineers. Reviewed and arranged project schedules. Reported directly to the Vice President of R&D
- Adapted docker container for development
- Leader of Driver Monitoring System (Python/C++):
 - Deployed Single-Shot Detector, Kalman filter, and model quantization for embedded devices
 - Transferred Caffe model to Pytorch for quantization aware training
 - Achieved 30 FPS and 0.85 mAP on TI TDA2
- Augmented Reality - Head-Up Display (C++):
 - Increased FPS by 13% by changing lookup table's data structure
 - Implemented a smoothing function that mitigates visual misalignment to projected animation
- Advanced Driver Assistance Systems (C++):
 - Increased FPS by 10% by optimizing a region proposal algorithm and multi-thread support

Machine Learning Engineer, [WiZR LLC](#), Santa Monica/Taichung

Nov 2018 - Mar 2019

C++/Python/FFmpeg/Docker

- Reduced video clip size by 20% with VP9 to the vision system with FFmpeg
- Established detection communications between the vision system (C++) and license plate recognition system (Python) with Redis
- Maintain dev docker container for the vision system

Production Automation Intern, [California Strawberry Commission](#), San Luis Obispo, CA

Jun 2017 - Sep 2017

- Designed a Python vision system with a CNN strawberry roots classifier for a planting robot

Reference

Dr. Vijayan K. Asari (Academic Advisor)

Professor
Department of Electrical and Computer Engineering
University of Dayton, OH, USA
Email: vasari1@udayton.edu

Dr. Hongjo Kim (Academic Co-Advisor)

Assistant Professor
Department of Civil and Environmental Engineering

Yonsei University, Republic of Korea
Email: hongjo@yonsei.ac.kr

Dr. Tam Nguyen (Academic Co-Advisor)

Assistant Professor
Department of Computer Science
University of Dayton, OH, USA
Email: tnguyen1@udayton.edu