

Cheng-Yen (Wesley) Hsieh

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EDUCATION

Carnegie Mellon University (CMU), School of Computer Science

Pittsburgh, PA

Master of Science in Computer Vision (MSCV)

Dec. 2023

National Taiwan University (NTU)

Taipei, Taiwan

Bachelor of Science in Electrical Engineering

Feb. 2022

RESEARCH/SELECTED PROJECTS

Self-Supervised Representation Learning for Multi-Label Visual Tasks ([Paper](#), [Github](#))

Taipei, Taiwan

NTU Undergraduate Researcher

Aug. 2020 — Feb. 2022

- Designed an unsupervised visual pretext task for downstream multi-label classification tasks.
- Utilized multi-scale pyramid and patch-level correlation learning to leverage information across distinct scales.
- Outperformed the strongest and SOTA methods by 3.3% mAP and >4.0% mAP.

Detecting Invisible/Highly-Occluded Objects (In Submission)

Pittsburgh, PA

CMU Graduate Researcher | MSCV Capstone Project

Jan. 2023 — Present

- Developed TAO-Amodal, a benchmark dataset to enhance object permanence understanding, by including amodal boxes, heuristic visibility attributes, and novel evaluation metrics.
- Proposed PasteNOcclude data augmentation technique to transform modal trackers into amodal trackers by exclusively utilizing image datasets; Achieved a significant > 1.2% mAP boost on the TAO-Amodal validation set.

Visual Question Answering with Vision Language Multi-Agent Debate

Pittsburgh, PA

MIT Research Assistant (Remote)

Jul. 2023 — Present

- Integrated vision language model agents into a collaborative debate setting to improve language responses through the synthesis of reasoning processes from multiple agents;
- Enhanced > 2% accuracy across diverse tasks such as instance counting, object attributes, and relation analysis.

Federated Learning for Image Classification ([Paper](#), [Github](#))

Taipei, Taiwan

NTU Undergraduate Researcher

Jan. 2020 — Jun. 2021

- Designed computation-efficient FL-hyperdimensional computing (FL-HDC) to address high computation and communication burdens from previously training deep neural networks (DNN)s.
- Utilized bipolarization on model weights to cut communication costs, compensating for the precision loss of numerical values post-bipolarization by proposing an adaptive learning-based retraining mechanism.
- Reduced communication costs by 23 times with comparable accuracy to previous works.

WORK EXPERIENCE

Waymo

Santa Clara, CA

Software Engineer, Machine Learning Infrastructure, Intern.

May. 2023 — Aug. 2023

- Proposed a differential learning rate (DLR) API that automatically divides model groups based on variable names, specified in the configuration files like proto, textproto, and dataclass.
- Created a modularized DLR training pipeline compatible with mainstream deep learning frameworks such as Tensorflow; Achieved a greater than 1.5% accuracy improvement across multiple tasks within the perception team.

ASUS Intelligent Cloud Services (AICS)

Taipei, Taiwan

Software/Machine Learning Engineer Intern, Software Research Development Dept.

Jul. 2021 — Sept. 2021

- Operated Spark database to process and analyze more than 1,000,000 advertisements (Ads) and customer data logs, building an advertisement recommendation system to predict user browsing preferences with decision trees.
- Added over 300 features to solve model underfitting by organizing narrative categorization into multi-levels, improving the system's CTR (Click Through Rate) to 110% compared to previous performance.

PUBLICATIONS

[1] **Cheng-Yen Hsieh**, Chih-Jung Chang, Fu-En Yang, Yu-Chiang Frank Wang, "Self-Supervised Pyramid Representation Learning for Multi-Label Visual Analysis and Beyond", in *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2023.

[2] **Cheng-Yen Hsieh**, Yu-Chuan Chuang, An-Yeu Wu, "C3-SL: Circular Convolution-Based Batch-Wise Compression for Communication-Efficient Split Learning", in *2022 IEEE 32nd International Workshop on Machine Learning for Signal Processing (MLSP)*, 2022.

[3] **Cheng-Yen Hsieh**, Yu-Chuan Chuang and An-Yeu Andy Wu, "FL-HDC: Hyperdimensional Computing Design for the Application of Federated Learning", in *2021 IEEE 3rd International Conference on Artificial Intelligence Circuits and Systems (AICAS)*, 2021, pp. 1-5, doi: 10.1109/AICAS51828.2021.9458526.

TECHNICAL SKILLS

Programming: C/C++, Python, Javascript, Solidity, C#, MATLAB, Latex, Verilog

Frameworks, Tools, and Systems: Pytorch, Tensorflow, Pyspark, Git, Docker, Linux, Windows, MacOS