Chien-Yi **Wang**

Research Scientist · Applied Scientist

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Summary

Current Senior Research Scientist at NVIDIA Research in Taiwan. 9+ years experience specializing in computer vision research, deep learning-based model optimization, and machine learning service integration. My research focus is mainly on multi-modal representation learning, foundation models, face modeling, and collaborative learning. I am interested in revolutionizing a machine learning system from the bottom up, devising a better problem-solving method for challenging tasks, and learning new technologies and tools if the need arises.

Work Experience

NVIDIA — *Taipei, Taiwan*

Senior Research Scientist — *Oct. 2022 - Current*

- Proposed a new PEFT method named DoRA, which incorporates weight decomposition concepts into LoRA, resulting in improved capacity without sacrificing efficiency. DoRA consistently outperforms LoRA on various tasks with LLM and LVLM. The proposed method has been integrated into the HuggingFace PEFT library.
- Proposed the Multi-Level Concept Prototypes Classifier (MCPNet), an inherently interpretable model, that can explain a classifier's prediction via concept prototypes from different blocks in the deep learning models without sacrificing the prediction accuracy. (accepted at CVPR'24)
- Introduced a novel two-stage Reinforced Rationale Prompted Paradigm for Natural Language Explanation (NLE) in Visual Question Answering (VQA). The framework successfully retains the plausibility and faithfulness of the explanation via the reinforced objective. (accepted at ICLR'24)
- Proposed a novel personalized Federated Learning framework of client-specific Prompt Generation (pFedPG) to enable efficient model personalization for heterogeneous clients. (accepted at ICCV'23)
- Proposed the Quality-aware audio-visual fusion (QuAVF) framework which won 1st place on the 2023 Ego4D talking-to-me (TTM) challenge.
- Co-advised several Ph.D. students at National Yang Ming Chiao Tung University.

Microsoft — *Taipei, Taiwan*

Senior Research Engineer — *Sep. 2018 - Sep. 2022*

- Built and deployed the latest face recognition and face anti-spoofing CNN-based models into the Windows Hello product for frictionless Windows login experience. The latest version reduced the error rate by up to 30% and improve the user experience index by 10%.
- Addressed the long-standing cross model compatibility issue in Windows Hello by developing a novel unified representation learning framework. The proposed solution can significantly improve the software upgrade experience and save the package size by 55%.
- Proposed and implemented the local-adaptive face recognition model, which can further actively optimize the model during run-time on specific devices. The solution is integrated into the physical access control system for the first-stage evaluation and deployment.
- Designed the light-weight efficient siamese-based multi-face tracking algorithm and integrated the system into the internal products.
- Led and managed multiple interns for driving long-term product-oriented research projects.
- Published 6+ research papers in top conferences in Computer Vision and Machine Learning.

Ambarella, Inc. — *Hsinchu, Taiwan*

Algorithm Engineer — *Feb. 2018 - Aug. 2018*

- Built and deployed hardware efficient CNN-based face detection models which are capable of real-time inference on low-power chips.
- Implemented state-of-the-art CNN-based model compression and quantization algorithms in the internal development pipeline.

Honda Research Institute — *Mountain View, CA, USA*

Research Engineer & Research Intern — *May. 2016 - Jan. 2018*

- Built and deployed a 3D scene understanding framework which consists of 3D object detection, localization, point cloud semantic segmentation, and object tracking modules. It was integrated into the internal data collection tool for building datasets more efficiently.
- Collaborate with the partner company to annotate fine-grained segmentation labels and ensure the diversity and cleanness of the dataet.
- Developed a LiDAR and camera sensor fusion algorithm which employed the multi-task learning of semantic segmentation and object detection. It was integrated into the collaborative fleet learning pipeline which enables the parking map real-time generation and broadcasting.
- Published a US patent and a paper in 2018 IEEE IV conference.

Publications

- Shih-Yang Liu, **Chien-Yi Wang**, Hongxu Yin, Pavlo Molchanov, Yu-Chiang Frank Wang, Kwang-Ting Cheng, Min-Hung Chen, "DoRA: Weight-Decomposed Low-Rank Adaptation", arXiv 2024
- Bor-Shiun Wang, **Chien-Yi Wang***, Wei-Chen Chiu*, "MCPNet: An Interpretable Classifier via Multi-Level Concept Prototypes", in IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024
- Hsu-Kuang Chiu, **Chien-Yi Wang**, Min-Hung Chen, Stephen F. Smith, "Probabilistic 3D Multi-Object Cooperative Tracking for Autonomous Driving via Differentiable Multi-Sensor Kalman Filter", in IEEE International Conference on Robotics and Automation (ICRA), 2024
- Kai-Po Chang, Chi-Ping Huang, Wei-Yuan Cheng, Fu-En Yang, **Chien-Yi Wang**, Yung-Hsuan Lai, Yu-Chiang Frank Wang, "RAPPER: Reinforced Rationale-Prompted Paradigm for Natural Language Explanation in Visual Question Answering", in International Conference on Learning Representations (ICLR), 2024

- Fu-En Yang, **Chien-Yi Wang**, Yu-Chiang Frank Wang, "Efficient Model Personalization in Federated Learning via Client-Specific Prompt Generation", in IEEE International Conference on Computer Vision (ICCV), 2023
- Hsi-Che Lin, **Chien-Yi Wang**, Min-Hung Chen, Szu-Wei Fu, Yu-Chiang Frank Wang, "QuAVF: Quality-aware Audio-Visual Fusion for Ego4D Talking to Me Challenge", in IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop, 2023 **(1st Place Winner)**
- Chih-Jung Chang, Yaw-Chern Lee, Shih-Hsuan Yao, Min-Hung Chen, **Chien-Yi Wang**, Shang-Hong Lai, Trista Pei-Chun Chen, "A Closer Look at Geometric Temporal Dynamics for Face Anti-Spoofing", in IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop, 2023 **(Best Paper Award)**
- Meng-Tzu Chiu, Hsun-Ying Cheng, **Chien-Yi Wang**, Shang-Hong Lai, "RGB-D Face Recognition with Identity-Style Disentanglement and Depth Augmentation", in IEEE Transactions on Biometrics, Behavior, and Identity Science (TBIOM), 2023
- Fu-En Wang, **Chien-Yi Wang**, Min Sun, Shang-Hong Lai, "MixFairFace: Towards Ultimate Fairness via MixFair Adapter in Face Recognition", in AAAI Conference on Artificial Intelligence (AAAI), 2023
- Chu-Chun Chuang, **Chien-Yi Wang**, Shang-Hong Lai, "Generalized Face Anti-Spoofing via Multi-Task Learning and One-Side Meta Triplet Loss", in IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2023
- **Chien-Yi Wang**, Yu-Ding Lu, Shang-Ta Yang, Shang-Hong Lai, "PatchNet: A Simple Face Anti-Spoofing Framework via Fine-Grained Patch Recognition", in IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022
- **Chien-Yi Wang***, Wenbin Zhu*, Kuan-Lun Tseng, Shang-Hong Lai, Baoyuan Wang, "Local-Adaptive Face Recognition via Graph-based Meta-Clustering and Regularized Adaptation", in IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022
- **Chien-Yi Wang***, Chih-Ting Liu*, Shao-Yi Chien, Shang-Hong Lai, "FedFR: Joint Optimization Federated Framework for Generic and Personalized Face Recognition", in AAAI Conference on Artificial Intelligence (AAAI), 2022
- Yu-Chun Wang, **Chien-Yi Wang**, Shang-Hong Lai, "Disentangled Representation with Dual-stage Feature Learning for Face Anti-spoofing", in Winter Conference on Applications of Computer Vision (WACV), 2022
- Meng-Tzu Chiu, Hsun-Ying Cheng, **Chien-Yi Wang**, Shang-Hong Lai, "High-Accuracy RGB-D Face Recognition via Segmentation-Aware Face Depth Estimation and Mask-Guided Attention Network", in IEEE International Conference on Automatic Face and Gesture Recognition (FG), 2021
- **Chien-Yi Wang**, Athma Narayanan, Yi-Ting Chen, "Joint 3D object detection and orientation estimation via multimodal fusion", US Patent, 2021
- **Chien-Yi Wang**, Ya-Liang Chang, Shang-Ta Yang, Shang-Hong Lai, "Unified Representation Learning for Cross Model Compatibility", in British Machine Vision Conference (BMVC), 2020.
- **Chien-Yi Wang**, Yi-Ting Chen, Behzad Dariush, "Systems for generating parking maps and methods thereof", US Patent, 2018
- **Chien-Yi Wang**, Athma Narayanan, Abhishek Patil, Wei Zhan, Yi-Ting Chen, "A 3D Dynamic Scene Analysis Framework for Development of Intelligent Transportation Systems", IEEE Intelligent Vehicles Symposium (IV), 2018.
- Xiang Fu, **Chien-Yi Wang**, Chen Chen, Changhu Wang, C.-C. Jay Kuo, "Robust Image Segmentation Using Contour-Guided Color Palette", Proceedings of IEEE International Conference on Computer Vision (ICCV), 2015.

Education

University of Southern California (USC)

Los Angeles, CA, USA

Master in Electrical Engineering (GPA: 3.91 / 4.0)

Aug. 2014 - Aug. 2016

- Got the Scholarship for Overseas Study from Ministry of Education in Taiwan.
- Teaching assistant (TA) for the class "Simulation Methods for Stochastic Systems".
- Developed the robust contour detection and image segmentation algorithm in Media Communication Lab (MCLab) and published a paper.
- Became the PhD Candidate in 2015.

National Taiwan University (NTU)

Taipei, Taiwan

Bachelor of Science in Electrical Engineering (GPA: 4.0 / 4.0)

Aug. 2009 - Jun. 2013

- Got the Presidential Award twice which is given to the top 5% students in the department.
- Received the College Student Research Creativity Award from National Science Council.
- Got the Silver Medal in 50th International Mathematical Olympiad (IMO).

Reviewer

- IEEE Conference on Computer Vision and Pattern Recognition (CVPR) **(Awarded as Outstanding Reviewer in 2022)**
- IEEE European Conference on Computer Vision (ECCV)
- IEEE International Conference on Computer Vision (ICCV)
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- International Journal of Computer Vision (IJCV)
- IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)
- International Joint Conferences on Artificial Intelligence (IJCAI)
- Asian Conference on Computer Vision (ACCV)
- British Machine Vision Conference (BMVC)
- IEEE Intelligent Vehicles Symposium (IV)