

Tsai-Shien Chen

PH.D. STUDENT AT UNIVERSITY OF CALIFORNIA, MERCED

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Research Interests

Deep Learning for Computer Vision, Unsupervised Representation Learning, Vehicle / Person Re-identification, Scene Understanding

Education

University of California, Merced

PH.D. IN ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

- Advisor: Prof. Ming-Hsuan Yang

Merced, USA

Aug. 2022 (ongoing)

National Taiwan University

MASTER IN GRADUATE INSTITUTE OF ELECTRONICS ENGINEERING

- Advisor: Prof. Shao-Yi Chien
- GPA: 4.30 / 4.30, Rank: 1st / 128

Taipei, Taiwan

Sep. 2019 - March 2022

BACHELOR IN ELECTRICAL ENGINEERING

- GPA: 4.23 / 4.30, Rank: 5th / 190

Sep. 2015 - Jun. 2019

Publications

(google scholar page: "https://scholar.google.com/citations?user=KWL0P_YAAAAJ")

1. **Tsai-Shien Chen**, Wei-Chih Hung, Hung-Yu Tseng, Shao-Yi Chien, Ming-Hsuan Yang, "Incremental False Negative Detection for Contrastive Learning", in proceedings of **International Conference on Learning Representations (ICLR), 2022**
2. Chih-Ting Liu, Man-Yu Lee, **Tsai-Shien Chen**, Shao-Yi Chien, "Hard Samples Rectification for Unsupervised Cross-domain Person Re-identification", in proceedings of **International Conference on Image Processing (ICIP), 2021**
3. Kai-Siang Yang, Yu-Kai Chen, **Tsai-Shien Chen**, Chih-Ting Liu, Shao-Yi Chien, "Tracklet-Refined Multi-Camera Tracking Based on Balanced Cross-Domain Re-Identification for Vehicles", in proceedings of **Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2021**
4. **Tsai-Shien Chen**, Chih-Ting Liu, Chih-Wei Wu, Shao-Yi Chien, "Orientation-aware Vehicle Re-identification with Semantics-guided Part Attention Network", in proceedings of **European Conference on Computer Vision (ECCV), 2020 [Oral]**
5. **Tsai-Shien Chen**, Man-Yu Lee, Chih-Ting Liu, Shao-Yi Chien, "Viewpoint-Aware Channel-Wise Attentive Network for Vehicle Re-Identification", in proceedings of **Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2020**
6. Chih-Ting Liu, Man-Yu Lee, Chih-Wei Wu, Bo-Ying Chen, **Tsai-Shien Chen**, Yao-Ting Hsu, Shao-Yi Chien, "Supervised Joint Domain Learning for Vehicle Re-Identification", in proceedings of **Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2019**

Research & Work Experiences

Remote Cooperation with UC Merced & Google, PROF. MING-HSUAN YANG

Online

INCREMENTAL FALSE NEGATIVE DETECTION FOR CONTRASTIVE LEARNING [ICLR'22]

Dec. 2020 - May 2021

- Highlighted the unfavorable effect from false negatives for self-supervised contrastive learning.
- Proposed a strategy to incrementally detect more reliable false negatives when the embedding space becomes more semantically structural.

Master Student at National Taiwan University, PROF. SHAO-YI CHIEN & PROF. CHU-SONG CHEN

Taipei, Taiwan

DENSE CONTRASTIVE PRE-TRAINING ON LARGE-SCALE UNLABELED DATASET FOR SCENE TEXT RECOGNITION

Sep. 2019 - March 2022

- Built a large-scale unlabeled scene text dataset which contains around 8 million word boxes captured from 300 metropolises around the world.
- Introduced a novel dense contrastive learning framework to pre-train a strong scene text recognition model on the proposed dataset.

ORIENTATION-AWARE VEHICLE RE-IDENTIFICATION WITH SEMANTICS-GUIDED PART ATTENTION NETWORK [ECCV'20 (ORAL)]

- Proposed a network that can predict the localization of different vehicle views given only image-level labels during training.
- Proposed a distance metric that places greater emphasis on co-occurrence vehicle views when evaluating the feature distance of two images.
- Selected as an oral paper at ECCV 2020 (top 2% paper from 5025 valid submissions).

VIEWPOINT-AWARE CHANNEL-WISE ATTENTIVE NETWORK FOR VEHICLE RE-IDENTIFICATION [CVPRW'20]

- Proposed an attention mechanism to make the framework channel-wisely reweigh each feature map based on the viewpoint of vehicle image.
- Explored the interpretability of how our channel-wise attention mechanism actually improves the learning framework.

Software Engineer Internship at MediaTek

Hsinchu, Taiwan

- Explored a deep-learning algorithm for video encoding to increase the PSNR under light computation constraints.

July 2019 - Aug. 2019

Software Developer Internship at Industrial Technology Research Institute

Hsinchu, Taiwan

- Developed a software tool to simulate the wind force analysis
- Supported the customers choosing the components under safety requirements.

Jul. 2017 - Aug. 2017

Undergraduate Student at National Taiwan University

Taipei, Taiwan

INTEGRATED CIRCUIT (IC) DESIGN: FROM SOFTWARE TO HARDWARE DEVELOPMENT

Sep. 2015 - June 2019

- Practicing a complete process of IC development, including (1) software design and verification, (2) RTL implementation, (3) gate-level synthesis, (4) placement and routing, and (5) taping out the custom IC chip.

POWER SUPPLY CIRCUIT DESIGN: RECTIFIER IMPLEMENTATION

- Made a mini fan that takes 110V AC as input and outputs 0V - 2.5V DC for controllable wind speed.
- Went through: (1) circuit design, (2) printed circuit board (PCB) making, (3) electrical component welding, and (4) circuit verification

Honors & Awards

2022	Honorary Member (top 3% in college) , Phi Tau Phi Scholastic Honor Society
2020-2021	Intel and NTU IoX Center Scholarship , Publication and Registration Grants for ECCV'20, CVPR'20, CVPR'21
2020	Oral Paper (2% acceptance rate) , European Conference on Computer Vision (ECCV), 2020
2019	Valedictorian , Department of Electrical Engineering, National Taiwan University
2015-2019	4-time Presidential Award (top 5% in department) , National Taiwan University
2019	3rd place (out of 334 teams from 44 countries) , CVPR Workshop: 2019 AI City Challenge (hosted by NVIDIA)
2019	2nd place , Deep Learning for Computer Vision: Final Project Contest
2019	Top 13% , International Kaggle Competition: Human Protein Atlas Image Classification
2018	4th place (out of 200+ students) , Data Structure and Programming: Final Project Contest (hosted by Cadence)

Professional Activities

2021	Reviewer , Conferences: CVPR'22, ICCV'21
2021	Reviewer , Journals: IEEE T-ITS, Neurocomputing
2021	Teaching Assistant , NTU EEE5053: Computer Vision (Spring 2021)

Selected Projects

Vehicle Re-Identification and Traffic Anomaly Detection System

2019 CVPR WORKSHOP: AI CITY CHALLENGE

2019

- Designed a system to (1) match vehicle images of the same identity captured from different cameras and (2) detect anomalies, such as lane violation, illegal U-turns and wrong-direction driving, etc.

International Kaggle Competition: Human Protein Atlas Image Classification

FINAL PROJECT CONTEST OF MACHINE LEARNING

2019

- Solved the problem of multi-label classification on 27 highly imbalanced protein patterns.
- Proposed an algorithm with AdaBoost and ensemble technique to cope with imbalanced dataset and ranked 1st in class / 279th in the world.

Speech Recognition System

FINAL PROJECT OF INTRODUCTION TO DIGITAL SPEECH PROCESSING

2019

- Built a complete speech process and recognition algorithm, including transformation from signal to spectrogram, computation of 39-dim MFCC, and CNN model for classification.

Speago: Voice Control Outfit Recommendation System

2017 MAKENTU HACKATHON

2017

- Implemented a smart closet which is controlled by an Android app. It would automatically pick up the recommended outfit based on the weather, temperature, and the voice command of the user.

Skills

Languages	Mandarin Chinese, English (TOEFL: 101 [R29/L26/S21/W25])
Operating Systems	GNU/Linux (Ubuntu), Mac OSX, Windows
Programming Languages	Python, C++, Verilog/System-Verilog, \LaTeX
Deep Learning Frameworks	PyTorch, Keras