Tsai-Shien Chen

Master Student at National Taiwan University

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Research Interests

Deep Learning for Computer Vision, Unsupervised Learning, Representative Learning, Vehicle / Person Re-identification

Education

National Taiwan University (NTU) *Taipei, Taiwan*

Bachelor in Electrical Engineering *Sep. 2015 - Jun. 2019*

- **Overall GPA: 4.23 / 4.30**
- **Overall Class Rank: 5th / 190**
- **4 times of Presidential Awards** (top 5% in the department) over 8 semesters

Master in Electronics Engineering *Sep. 2019 - (Ongoing)*

- **Current GPA: 4.30 / 4.30**
- **Current Class Rank: 5th / 190**
- Joining in Media IC & Systen Lab advised by Prof. Shao-Yi Chien

Research & Work Experiences

***Remote Cooperation* with UC Merced & Google, Prof. Ming-Hsuan Yang** *Online*

Incremental False Negative Detection for Contrastive Learning [**in submission**] *Jan. 2021 - 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.

***Graduate Researcher* in Media IC & System Lab, Prof. Shao-Yi Chien** *Taipei, Taiwan*

Adaptive Region Pooling for Fine-Grained Recognition [**in submission**] *Sep. 2019 - (Ongoing)*

- Proposed a downsampling operation which greatly balances the granularity of downsampled feature and the scale of focused region.
- Outperformed the state-of-the-arts in both the tasks of fine-grained image classification and vehicle re-identification.

Orientation-aware Vehicle Re-identification with Semantics-guided Part Attention Network [**ECCV-20 (Oral)**]

- Proposed a network which 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 over 5000 valid submissions).

Viewpoint-aware Channel-Wise Attentive Network for Vehicle Re-Identification [**CVPRW-20**]

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

Supervised Joint Domain Learning for Vehicle Re-Identification [**CVPRW-19**]

- Proposed a framework to mitigate the domain gaps due to misaligned feature distribution between different datasets.
- Got 3rd place in a CVPR Workshop: AI City Challenge 2019.

***Scientific Research Intern* at MediaTek** *Hsinchu, Taiwan*

- Explored a deep-learning algorithm for video encoding to increase the PSNR under light computation constraints. *Jul. 2019 - Sep. 2019*

***Software Engineering Intern* at Industrial Technology Research Institute** *Hsinchu, Taiwan*

- Developed a software tool to simulate the wind force analysis *Jul. 2017 - Aug. 2017*
- Supported the customers choosing the components under safety requirements.

***Undergraduate Student* at National Taiwan University** *Taipei, Taiwan*

Integrated Circuit (IC) Design: from Software to Hardware Development *Sep. 2015 - Sep. 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

Publications

1. **Tsai-Shien Chen**, Wei-Chih Hung, Hung-Yu Tseng, Shao-Yi Chien, Ming-Hsuan Yang, "Incremental False Negative Detection for Contrastive Learning", ***arXiv preprint arXiv:2106.03719***
2. **Tsai-Shien Chen**, Chih-Ting Liu, Shao-Yi Chien, "Adaptive Region Pooling for Fine-Grained Recognition"
3. 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***
4. 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 in proceedings of ***Conference on Computer Vision and Pattern Recognition (CVPR) Workshops 2021***
5. **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]**
6. **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***
7. 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***

Achievements & Awards

2021	**Reviewer,** International Conference on Computer Vision (ICCV)
2021	**Reviewer,** Journals: IEEE Transactions on Intelligent Transportation Systems / Neurocomputing
2021	**Teaching Assistant,** NTU EEE5053: Computer Vision (Spring 2021)
2020-2021	**Intel and NTU IoX Center Scholarship,** Publication and Registration Grant 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 times of Presidential Awards (top 5% in department),** National Taiwan University
2019	**3rd place (out of 334 teams),** CVPR Workshop: 2019 AI City Challenge (hosted by NVIDIA)
2019	**2nd place,** Deep Learning for Computer Vision: Final Project Contest
2019	**Top 13%,** Worldwide Kaggle Competition: Human Protein Atlas Image Classification
2018	**4th place (out of 200+ students),** Data Structure and Programming: Final Project Contest (hosted by Cadence)
2014	**Semifinal (top 5% in country),** International Physics Olympiad Domestic Competition

Selected Projects

Vehicle Re-Identification and Traffic Anomaly Detection System

2019/2020 CVPR WORKSHOP: AI CITY CHALLENGE *2019, 2020*

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

Worldwide 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	Chinese (Mandarin), English (TOEFL: 105)
Operating Systems	GNU/Linux (Ubuntu), Mac OSX, Windows
Programming Languages	Python, C++, Verilog/System-Verilog, LaTeX
Deep Learning Frameworks	PyTorch, Keras