Zhe-Yu Liu

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Education

National Taiwan University (Prof. Winston Hsu) Sep. 2018 - Aug. 2020
M.S. in Computer Science & Information Engineering *Taipei, Taiwan*
- Researching in Video Inpainting and Action Recognition.

National Tsing Hua University Sep. 2014 - June. 2018
B.S. in Computer Science (GPA 4.15/4.3) *Hsinchu, Taiwan*

Publication

- *Ya-Liang Chang, ***Zhe Yu Liu**, Kuan-Ying Lee, and Winston Hsu. "Free-form Video Inpainting with 3D Gated Convolution and Temporal PatchGAN.", ICCV 2019.
- *Ya-Liang Chang, ***Zhe Yu Liu**, Kuan-Ying Lee, and Winston Hsu. "Learnable Gated Temporal Shift Module for Deep Video Inpainting.", BMVC spotlight 2019.
- Ya-Liang Chang, **Zhe Yu Liu**, and Winston Hsu. "VORNet: Spatio-temporally Consistent Video Inpainting for Object Removal.", NTIRE CVPRW 2019.
- Kuang-Yu Jeng, Yueh-Cheng Liu, **Zhe Yu Liu**, Jen-Wei Wang, Ya-Liang Chang, Hung-Ting Su, Winston H. Hsu. "GDN: A Coarse-To-Fine (C2F) Representation for End-To-End 6-DoF Grasp Detection", CORL 2020.
- Yu-Sheng Lin, **Zhe-Yu Liu**, Yu-An Chen, Yu-Siang Wang, Hsin-Ying Lee, Yi-Rong Chen, Ya-Liang Chang, Winston H Hsu. "xCos: An Explainable Cosine Metric for Face Verification Task", under review.
- Chen-Hsi Chang, Hung-Ting Su, Juiheng Hsu, Yu-Siang Wang, Yu-Cheng Chang, **Zhe Yu Liu**, Ya-Liang Chang, Wen-Feng Cheng, Ke-Jyun Wang, Winston H. Hsu. "Situation and Behavior Understanding by Trope Detection on Films", WWW 2021.
- Wang Yu-Siang, Hung-Ting Su, Chen-Hsi Chang, **Zhe-Yu Liu**, and Winston H. Hsu. "Video Question Generation via Semantic Rich Cross-Modal Self-Attention Networks Learning.", ICASSP 2020
- Hu-Cheng Lee, Sebastian Agethen, Chih-Yu Lin, Hsin-Yu Hsu, P. H. Hsu, **Zhe-Yu Liu**, H C Chu, Winston Hsu. "Multi-Modal Fusion for Moment in Time Video Classification"

Research Experience

Deep Video Inpainting

- Designed 3D Gated Convolution to tackle video inpainting problem with irregular masks and Temporal Patch-GAN structure to enhance the genuineness and temporal consistency of output videos. Surpassed current SOTAs by reducing **at least 24% and 16%** in terms of LPIPS and FID scores, respectively, under all masking scenarios, and had up to **80% preference** compared to other SOTAs in our user study. [Demo] [GitHub]
- Proposed Learnable Temporal Shift Module for video inpainting network and the model and **reduced 66% parameters and inference time** without performance drop. [GitHub]
- Built an video object removal architecture combined with image inpainting, video refinement, and flows warping networks. Trecent patch-based and image-based methods in MSE, SSIM, and LPISP scores.

Action Recognition

- Designed metrics to quantitatively measure object representation bias in action recognition datasets and propose an adversarial object synthesis approach to mitigate the wrong object-action dependency in most of action recognition models. (Paper under review.)
- Analyzed relation between objects and action recognition performance and applied Attribute Consistency Loss in 2018 Moments in Time Action Recognition challenge. Our fusion model achieved **3rd place** in the mini track.
- Explored a variety of backbones and fusion of different modalities and won the **3rd** and **4th** positions in EPIC-Kitchens Egocentric Action Recognition Challenge 2019 in the anticipation and recognition tracks.

Skills

Programming language Python, C/C++, Java, MATLAB, and SQL syntax

Data Science toolkit Numpy, Scikit-Learn, Pandas, and Scipy

Deep Learning framework Pytorch, Tensorflow, and Keras

Version control Git and GitHub development flow

Unix-like OS hands-on experience

Languages

Mandarin Native Speaker

English TOEIC: 965 (Listening: 495, Reading: 470)

Honors & Awards

INTERNATIONAL

2019 **Third Place**, EPIC-Kitchens Egocentric Action Anticipation Challenge 2019

2019 **Forth Place**, EPIC-Kitchens Egocentric Action Recognition Challenge 2019

2018 **Third Place**, ActivityNet Challenge 2018 held in CVPR 2018 - Moments in Time Challenge Mini Track

2016 **Haraya Award**, ACM-ICPC Asia Manila Regional Contest

2016 **Tenth Place**, ACM-ICPC Asia Chung-Li Regional Contest

NATIONAL

2018 **Fifth Place**, 2018 Senior Project Contest Finals in NTHU CS Department. Combined AutoEncoder with clustering techniques for video compression

2016 **Honorable Mention**, National Collegiate Programming Context

Course Works

Image Captioning, Generating captions given images by applying LSTM on top of CNN with attention mechanism. [Report]

Reverse Image Caption, Generating flower images given its description using Conditional WGAN-GP. [Report]

Flappy Bird DQN Agent, Applying deep Reinforcement Learning algorithm to play Flappy Bird. [Report]

Image Forgery Detection, Detecting image splicing using interpolation-related spectral signatures. [Github]

Jlask, Using Java to implement important components of Flask, a website framework written in Python, to practice OOP design concepts. [Github]

Extracurricular Activity

Student Association of CS Department in National Tsing Hua University Sep. 2015 - Aug. 2016

Staff of Academic Department

- Organized online resources for the CS department.
- Guided high school students in 2016 NTHU exposition.

Volleyball Team of CS Department in National Tsing Hua University Sep. 2015 - Aug. 2016

Leader

- Championship of 2017 National North CS Cup.
- Runner Up of 2016 National Midland CS Cup.