Cheng-Ping **Hsieh**

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Research Interests

Affective Computing, Machine Learning/Deep Learning, and Signal Processing

Education

National Taiwan University (NTU) *Taipei, Taiwan*

Bachelor of Science in Electrical Engineering *Sep. 2015 - Present*

- **Overall GPA: 4.08/4.3 (3.92/4.0)**, Major GPA: 4.12/4.3, Last 60 GPA: 4.26/4.3
- **Rank: 1/251** in senior year
- **Machine Learning Courses:** Machine Learning, Applied Deep Learning, Introduction to Digital Speech Processing
- **Affective Computing Courses:** Cognitive Computing, Biomedical Engineering Lab Experiment, Advanced Signal Processing

Research Experience

***Research Assistant*, Speech Processing and Machine Learning Lab** *NTU, Taiwan*

Supervised by Prof. Hung-yi Lee *Jul. 2019 - Present*

– **Unsupervised Speech Disentanglement**

- Analyzed disentangled joint continuous and discrete representation in speech.
- Developed a voice conversion framework with instance normalization and speaker verification embedding.

***Undergraduate Researcher*, Speech Processing Lab** *NTU, Taiwan*

Supervised by Prof. Lin-shan Lee *Feb. 2018 - Jun. 2019*

– **Emotion Classification for Labeling on Large Dialogue Corpus**

- Surveyed and analyzed corpus in Chinese and English with emotion annotation.
- Implemented BERT model with metric learning strategy for classification and investigated the distribution of each emotion.

– **Emotion Chatting Machine**

- Developed a chat bot in Chinese with seq2seq model based on emotion external and internal memory.
- Researched text/image style transfer techniques to change text emotion in desired.

***Undergraduate Researcher*, Access IC Design Lab** *NTU, Taiwan*

Supervised by Prof. An-Yeu Wu *Feb. 2018 - Jun. 2019*

– **Multi-Modal Emotion Recognition Based on Physiological Signals**

- Developed a machine learning framework for emotion recognition on DEAP and AMIGOS datasets.
- Implemented signal processing techniques for multi-modal physiological signals including EEG, ECG, and EDA

– **Stress Detection Based on Electrodermal Activity [2019 SiPS]**

- Proposed a framework achieving 93% F1 score with state-of-the-art performance and reducing 95% feature computation cost.
- Analyzed EDA signal features among time, frequency, wavelet, and entropy domain for stress detection in WESAD dataset.

– **Electrodermal Activity Analysis on Mind-Wandering Dataset**

- Verified the availability of EDA signal on Mind-Regretting instead of Mind-Wandering because of the high arousal state.
- Explored different domain features with anova (P-value) analysis and feature importance analysis.

Publications

1. **Cheng-Ping Hsieh**, Yi-Ta Chen, Win-Ken Ben, and An-Yeu Wu, "Feature Selection Framework for Xgboost Based on Electrodermal Activity in Stress Detection", in *2019 IEEE International Workshop on Signal Processing Systems (SiPS)*

Honors & Awards

2019 **6th Place out of 100 teams,** AI Rush 2019 Competition host in Korea by NAVER and LINE
2019 **High Distinction Award,** Student Paper Competition in Chinese Association of Engineering
2019 **Dean's List Award (top 5% of class),** National Taiwan University Electrical Engineering
2018 **Dean's List Award (top 5% of class),** National Taiwan University Electrical Engineering
2018 **Best-Aesthetic Award,** Cognitive Computing Final Project Presentation
2017 **9th Place out of 170+ students,** Data Structure and Programming Final Project Contest

Teaching Experience

***Teaching Assistant*, Machine Learning (Spring 2019)** *NTU, Taiwan*

Instructed by Prof. Hung-yi Lee *Feb. 2019 - Jun. 2019*

- To assist 100+ students, we designed eight assignments and one final project to prepare a well-developed learning environment.
- Explored the fundamental knowledge of machine learning theory and application from basic regression, classification, computer vision, and nature language processing to model compress, explain, and attack.

Selected Projects

Text to Speech without Text *CSIE 5431, 2019*

- Researched and compared techniques designed for discrete vector representation in unsupervised acoustic units discovery.
- Analyzed acoustic representation with latent interpolations and discussed trade-offs between latent bitrate and voice quality.

Cartoon Face Generation *CSIE 5431, 2019*

- Generated cartoon faces from ACGAN with conditional hidden concatenation and WGAN-GP adversarial loss.
- Reduced mode collapse problems when introducing spectral normalization instead of batch normalization.

Deep Reinforcement Learning on Atari Games *CSIE 5431, 2019*

- Applied Policy Gradient and Deep Q-Learning on Atari LunarLander/Assault Games with several advanced strategies.
- Implemented A2C algorithm with proximal policy optimization and generalized advantage estimation on SuperMarioBros

Fashion Ceiba *EE 3035, 2019*

- Designed a platform for teachers real-time to display lecture notes and for students to ask questions immediately in class.
- Built the web application with React, GraphQL, MongoDB, and other development tools from frontend to backend.

Facial Beauty Prediction *CSIE 5420, 2018*

- Implemented different objective functions to learn a distribution of facial beauty considering class relations.
- Discussed the effectiveness for future applications regarding different skin colors, lightness, and saturation of images

Freesound General-Purpose Audio Tagging Challenge in Kaggle *EE 5184, 2018*

- Developed a framework can automatically recognize sounds from a wide range of real-world environments
- Researched dimension reduction with auto-encoder and label spreading to consider class similarity.

Automatic Sleep Stage Classification *EE 4057, 2018*

- Designed a head mounted device based on EEG signal to detect sleep stages, waking people in light sleep as an alarm clock.
- Applied deep learning (end-to-end CNN model), and traditional learning methods in feature extraction and classification.

Skills

Natural Languages	Chinese (Mandarin), English, Taiwanese
Programming Languages	Python, JavaScript, C/C++, Shell, Matlab, Verilog, LaTeX
Deep Learning Libraries	PyTorch, Tensorflow, Keras

Leadership

***President*, NTUEE Student Association (EESA)** *Jul. 2017 - Jun. 2018*

- Led all divisions of EESA, the largest student association in NTU, including Public Relation, Marketing, Activities, Academic, and others. Acted as a bridge between EE students, EE alumni and school administration.
- Chairman of the IEEE NTU Student Branch. Established connections between our department and the IEEE community, providing opportunities to engage with professional IEEE members

***Student Representative*, NTUEE Graduate Association** *Sep. 2018 - Jun. 2019*

- Expected to deliver a commencement speech on behalf of the student body at the Department Graduation Ceremony.
- Coordinated photo-shooting, yearbook-making, party, and catering for graduating students from Dept. of Electrical Engineering.

***President*, NTUEE Summer Camp** *Dec. 2017 - Jul. 2018*

- NTUEE Camp is the most prestigious student camp in Taiwan. With 100+ staff members, we welcome 144 high school students (selected from 1000+ applications) for intensive hacking, company visiting and various group activities.

***President*, NTUEE Week** *Aug. 2017 - Oct. 2017*

- To hold NTUEE Week, the most popular campus student fair in NTU, we organize students to design market promotion with videos and games, prepare handmade dessert and beverages, and perform talent show like dancing and bands.

***Director/Playwright/Actor*, NTUEE Freshman and Sophomore Drama** *Jan. 2016/2017 - Mar. 2016/2017*

- NTUEE Night is the best show night in NTU. Every year the drama will attract 300+ audience to appreciate magnificent stage scenery, fascinating plots and excellent acting performance.