Yung-Sung Chuang

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Education

Massachusetts Institute of Technology (MIT) *Sep. 2021 - PRESENT*

PH.D. STUDENT IN EECS

- Computer Science & Artificial Intelligence Laboratory (CSAIL), Advisor: Dr. James Glass

National Taiwan University (NTU) *Sep. 2016 - Jun. 2020*

B.S. IN ELECTRICAL ENGINEERING

- **GPA:** overall: **4.18/4.30**, major: **4.22/4.30**, last 60: **4.27/4.30**, graduate ranking: **15/177 (8%)**
- **Honors:** Presidential Award * 4 (S '18, S '19, F '19, S '20), Irving T. Ho Memorial Scholarship (F '18, F '19)
- **Selected Courses:** Data Structure and Programming 2017 Fall (**A+**), Algorithms 2019 Spring (**A+**), Machine Learning 2018 Spring (**A+**), Digital Speech Processing 2018 Fall (**A+**), Deep Learning for Computer Vision 2019 Spring (**A+**), Computer Architecture 2019 Fall (**A+**)

Research Experiences

Spoken Language Systems Group, MIT, *Advisor: Dr. James Glass* *Sep. 2021 - PRESENT*

RESEARCH ASSISTANT

- Researching on **Contrastive Learning for NLP**.

Speech Processing Lab, NTU, *Advisor: Prof. Hung-yi Lee & Lin-shan Lee* *Aug. 2018 - Aug. 2021*

UNDERGRADUATE RESEARCHER

- Researched on **Non-autoregressive Speech-to-Text Translation**. [*Findings@ACL'21*]
- Researched on **Cross-Lingual Zero-shot Transfer** tasks. [*arXiv Link*]
- Researched on **Language Model Pre-training** for speech and text to solve **Spoken Question Answering** tasks. [*Interspeech'20*]
  - Receive **Travel Grant** in Interspeech 2020 with this paper.
- Researched on **Text Style Transfer** with CycleGAN architecture [*Github Link*] and delete-insert-based Transformer. [*Github Link*]

Machine Intelligence and Understanding Lab, NTU, *Advisor: Prof. Yun-Nung (Vivian) Chen* *Feb. 2019 - Aug. 2020*

UNDERGRADUATE RESEARCHER

- Researched on **Knowledge Distillation** to improve **Lifelong Learning** for language tasks. [*EMNLP'20*]
  - Won **Appier Best Application Award** in **2020 NTU CSIE Undergrad Special Research Exhibition**.
- Researched on **Cycle Consistency and Duality of NLU and NLG** to improve both NLU/NLG tasks. [*Findings@EMNLP'20*]
- Researched on Generating Conclusions from Medical RCT Papers. [*LOUHI 2019@EMNLP*]
  - Won the **2nd place** and **Appier 1st prize** in **2019 NTU CSIE Undergrad Special Research Exhibition**.

Intelligent Agent Systems Lab, Academia Sinica, *Advisor: Prof. Wen-Lian Hsu* *Jul. 2018 - Feb. 2019*

RESEARCH INTERN AND RESEARCH ASSISTANT

- Built a supervised **Accurate Collocation Parsing System** with state-of-the-art deep learning methods. [*Github Link*]
- Developed fully-unsupervised methods to find collocation pairs in a large corpus with Word2Vec technique. [*Github Link*]

Publications († indicates equal contribution.)

[1] Cheng-I Jeff Lai, Yang Zhang, Alexander H. Liu, Shiyu Chang, Yi-Lun Liao, **Yung-Sung Chuang**, Kaizhi Qian, Sameer Khurana, David Cox, James Glass. "PARP: Prune, Adjust and Re-Prune for Self-Supervised Speech Recognition". *In Thirty-fifth Conference on Neural Information Processing Systems (NeurIPS) 2021.*

[2] Shu-wen Yang, Po-Han Chi†, **Yung-Sung Chuang**†, Cheng-I Jeff Lai†, Kushal Lakhotia†, Yist Y. Lin†, Andy T. Liu†, Jiatong Shi†, Xuankai Chang, Guan-Ting Lin, Tzu-Hsien Huang, Wei-Cheng Tseng, Ko-tik Lee, Da-Rong Liu, Zili Huang, Shuyan Dong, Shang-Wen Li, Shinji Watanabe, Abdelrahman Mohamed, Hung-Yi Lee. "SUPERB: Speech processing Universal PERformance Benchmark". *In Interspeech 2021.*

[3] Shun-Po Chuang†, **Yung-Sung Chuang**†, Chih-Chiang Chang†, Hung-Yi Lee. "Investigating the Reordering Capability in CTC-based Non-Autoregressive End-to-End Speech Translation". *In ACL-IJCNLP 2021: Findings.*

[4] **Yung-Sung Chuang**, Mingye Gao, Hongyin Luo, James Glass, Hung-Yi Lee, Yun-Nung Chen, Shang-Wen Li. "Mitigating Biases in Toxic Language Detection through Invariant Rationalization". *In The 5th Workshop on Online Abuse and Harms at The Joint Conference of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing (WOAH@ ACL-IJCNLP)* 2021.

[5] Cheng-I Lai, **Yung-Sung Chuang**, Hung-Yi Lee, Shang-Wen Li, James Glass. "Semi-Supervised Spoken Language Understanding via Self-Supervised Speech and Language Model Pretraining". *In ICASSP 2021.*

[6] **Yung-Sung Chuang**, Shang-Yu Su, Yun-Nung Chen. "Lifelong Language Knowledge Distillation". *In EMNLP 2020*.

[7] Shang-Yu Su†, **Yung-Sung Chuang**† , Yun-Nung Chen. "Dual Inference for Improving Language Understanding and Generation". *In Findings of EMNLP 2020*.

[8] **Yung-Sung Chuang**, Chi-Liang Liu, Hung-Yi Lee, Lin-shan Lee. "SpeechBERT: An Audio-and-text Jointly Learned Language Model for End-to-end Spoken Question Answering". *In Proc. Interspeech 2020*.

[9] Alexander Te-Wei Shieh†, **Yung-Sung Chuang**†, Shang-Yu Su, Yun-Nung Chen. "Towards Understanding of Medical Randomized Controlled Trials by Conclusion Generation". In *Proceedings of the 10th International Workshop on Health Text Mining and Information Analysis at EMNLP 2019*

[10] Chi-Liang Liu†, Tsung-Yuan Hsu†, **Yung-Sung Chuang**†, Hung-yi Lee. "A Study of Cross-Lingual Ability and Language-specific Information in Multilingual BERT". *Preprint; arXiv:2004.09205*.

Teachings

Teaching Assistant on Deep Learning for Human Language Processing 2020 Spring Course — *Mar. 2020 - Jun. 2020*

- Designed homework 1 on **End-to-end Speech Recognition** topic. Slide Link: https://bit.ly/dlhlp-hw1
- Introduced to **Non-Autoregressive Sequence Generation** topic in class.
- Youtube Video Link: https://www.youtube.com/watch?v=jvyKmU4OM3c

Guest Lecturer on Machine Learning 2019 Spring Course — *Mar. 2019*

- Introduced to research papers on the topic of **Unsupervised Syntactic Parsing**.
- Youtube Video Link: https://www.youtube.com/watch?v=YIuBHB9Ejok

Honors & Awards

Presidential Award - for top 5% students (4 times), Electrical Engineering Dept. at NTU — *Spring '18, Spring '19, Fall '19, Spring '20*

Irving T. Ho Memorial Scholarship (2 times), EECS at NTU — *Fall '18, Fall '19*

Travel Grant, INTERSPEECH 2020 conference — *Sep. 2020*

Appier Best Application Award, 2020 NTU CSIE Undergrad Special Research Exhibition — *Jun. 2020*

2nd Place & Appier 1st Award, 2019 NTU CSIE Undergrad Special Research Exhibition — *Jun. 2019*

2nd Place, 2019 NTUEE Undergraduate Innovation Award — *Jun. 2019*

1st Place, 2018 H. Spectrum Demo Day (out of 21 teams) — *Jul. 2018*

1st Place, NCTS Health Hackathon 2018 (out of 18 teams) — *Jun. 2018*

Top 8 Finalist, Microsoft Imagine Cup Taiwan National Final 2018 — *Apr. 2018*

Best Tech Award & Microsoft Enterprise Award, MakeNTU 2018 (out of 50 teams) — *Mar. 2018*

1st Place of Dept. of Transportation, HackNTU 2017 (out of 100+ teams) — *Jul. 2017*

Selected Projects

Speech Recognition for Impaired Speaker [*Github Link*] [*Report Link*] — *Jun. 2020*

Course Final Project of "**Introduction to Biomedical Engineering**"

- Automatic Speech Recognition for Impaired Voice Speaker via Personalized Adaptation.
- Reducing the word error rate **from 80% to 20%** for patient voice (in Mandarin).
- Supporting online learning from user feedback.

Multi-Source Domain Adaptation Challenge [*Poster Link*] — *Jun. 2019*

Course Final Project of "**Deep Learning for Computer Vision**"

- Experimented on unsupervised domain adaptation (UDA) for multi-source dataset from ICCV2019 Workshop Challenge.
- Won the **2nd place** in **2019 NTUEE Undergraduate Innovation Award.** [*Photo Link*]

Pywordseg: State-of-the-art Chinese Word Segmentation Toolkit [*Github Link*] [*PyPI Link*] — *Jan. 2019*

Course Final Project of "**Digital Speech Processing**"

- Developed an open source **state-of-the-art** Chinese word segmentation system with BiLSTM and ELMo, helping the downstream Chinese NLP task.

Skills

Languages C++, Python, Go, MATLAB, Shell Scripting

Libraries&Toolkits Tensorflow, PyTorch, Keras, LaTeX, Git, Linux