Heng-Jui (Harry) Chang

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My research interest is in **machine learning** and **spoken language processing**. In particular, I focus on end-to-end automatic speech recognition (ASR).

EDUCATION

National Taiwan University (NTU)   Taipei, Taiwan
B.S. in **Electrical Engineering** and **Intelligence Medicine Program**   Sep. 2017 – Jun. 2021 (expected)

- **GPA:** overall: **4.24/4.30**, last 60 credits: **4.27/4.30**, ranking: **6/261 (top 2%)**
- **Honors:** 4 Dean's List Awards and Irving T. Ho Memorial Scholarship
- **Related courses:** Digital Speech Processing, Deep Learning for Human Language Processing, Algorithms, Machine Learning, Natural Language Processing, Optimization Algorithms

RESEARCH EXPERIENCE

Speech Processing Laboratory, NTU   Taipei, Taiwan
Undergraduate Researcher, Supervised by Prof. Lin-shan Lee & Prof. Hung-yi Lee   Mar. 2019 – Present

- **End-to-end Non-autoregressive Code-switching ASR** [1] [*paper*]
  Proposed using Pinyin-based Mask-CTC and word embedding regularization methods to tackle the Mandarin-English code-switching ASR issue and achieved state-of-the-art performance on the SEAME corpus.
- **Lifelong Learning of End-to-end ASR** [2] [*paper*]
  Proposed data selection methods for lifelong learning of end-to-end ASR and achieved 29% WER reduction compared to the fine-tuning baseline when learning WSJ, LibriSpeech, and Switchboard sequentially.
- **End-to-end Whispered Speech Recognition** [3] [*paper*]
  Proposed frequency-weighted approaches, layer-wise transfer learning, and pseudo whisper pre-training methods for robust whispered speech recognition with end-to-end models.

PUBLICATIONS ([†] INDICATES EQUAL CONTRIBUTION)

[1] Shun-Po Chuang[†], **Heng-Jui Chang**[†], Sung-Feng Huang, and Hung-yi Lee, "Non-autoregressive Mandarin-English code-switching speech recognition with Pinyin mask-CTC and word embedding regularization", *under review*, 2021.

[2] **Heng-Jui Chang**, Hung-yi Lee, and Lin-shan Lee, "Towards lifelong learning of end-to-end ASR", *under review*, 2021.

[3] **Heng-Jui Chang**, Alexander H. Liu, Hung-yi Lee, and Lin-shan Lee, "End-to-end whispered speech recognition with frequency-weighted approaches and pseudo whisper pre-training", *IEEE Spoken Language Technology Workshop (SLT)*, 2021.

SELECTED PROJECTS

End-to-end Automatic Speech Recognition in PyTorch [*Github Link (800+ stars)*]
Open Sourced Project, Github   Aug. 2020

- Implemented time-synchronous CTC beam decoding algorithm in PyTorch and helped maintaining the project.

Are We Attracted to People Who Look Like Us? [*Github Link*]
Course final project of *Interactive Computer Graphics*, NTU CSIE   Jun. 2020

- A psychological experiment using 2D face image metamorphosis implemented in NumPy and OpenCV.
- Let people rank morphed faces by attractiveness where one of the faces included their faces and the results corroborated the hypothesis with high confidence.

Deep Learning-Based Image Geometric Rectification [*Demo Link*]

Course final project of *Digital Image Processing*, NTU EE   Jan. 2020

  – Used a CNN-based autoencoder to estimate the displacement vector field and restore distorted images by self-supervised learning with synthesized images.

TEACHING

- **TA of Machine Learning (English Class)**   Spring 2021
  Instructor: Prof. Hung-yi Lee, NTU EE
- **TA of Machine Learning (Mandarin Class)**   Spring 2021
  Instructor: Prof. Hung-yi Lee, NTU EE
- **TA of Linear Algebra**   Fall 2020
  Instructor: Prof. Hung-yi Lee, NTU EE
- **TA of Deep Learning for Human Language Processing Special Project**   Summer & Fall 2020
  Instructor: Prof. Hung-yi Lee, NTU EE
- **TA of Signals and Systems**   Spring 2020
  Instructor: Prof. Lin-shan Lee, NTU EE

SCHOLARSHIPS AND AWARDS

- **Irving T. Ho Memorial Scholarship**, NTU EECS   2020
- **Dean's List Award**, NTU EE (Fall'17, Spring'19, Fall'19, Spring'20)   2017–2020
- **7th Place**, Final Project of Data Structure and Programming, NTU EE (125 attendees)   2019
- **Enterprise Award**, MakeNTU Hackathon   2018
- **6th Place**, Taipei High School Academic Competition in Informatics (115 attendees)   2016

SKILLS

- **Programming:** C/C++, Python, MATLAB, Bash
- **Deep Learning:** Pytorch, Keras, Tensorflow
- **Speech Processing:** Kaldi, ESPnet
- **OS:** Linux, Mac OSX
- **Other:** Git, LaTeX

LANGUAGES

- **English:** proficient
- **Mandarin:** native
- **Japanese:** intermediate

EXTRACURRICULAR ACTIVITIES

The Republic of China Army   Taichung, Taiwan

Rifleman   Summer 2018 & Summer 2019

  – Completed obligatory military service through two-staged regular service for university and college students.

NTU Balloon Design Club   Taipei, Taiwan

Lecturer   Jun. 2018 – Jun. 2019

  – Designed balloon arts, taught members techniques, and held several events. [*page*] [*photo*]

LINE Store   Taipei, Taiwan

LINE Sticker Creator   Jun. 2016 – Feb. 2019

  – Created three sets of LINE stickers and sold online. [*HJ Chang's Stickers*]
  – Sold stickers are globally used 500+ times per day.