I-Chieh Wei (Sam Wei)

◇ **E-Mail:** sam.icwei@gmail.com

◇ **Website:** https://sma1033.github.io/site/

◇ **Linkedin:** Sam Wei

◇ **Facebook:** Sma I-Chieh Wei

◇ **Address:** available upon request

◇ **Mobile:** available upon request

RESEARCH EXPERIENCE

Research Assistant, Music and Culture Technology Laboratory, Academia Sinica, Taiwan (Feb. 2017 – Present)

- Work under the supervision of *Dr. Li Su*
- Perform project-oriented research tasks including paper survey, data analysis, algorithm design and paper drafting
- **Percussive Instruments Automated Accompaniment Generation**
  - Generate accompaniment drum tracks for full-length pop songs
  - Predict the drum track structure with the melodic audio Self-Similarity Matrix (SSM)
  - Perform content analysis on MIDI and audio files in large-scale datasets (10k+ songs)
  - Collaborate with *Dr. Chih-Wei Wu (Netflix, Inc., USA)* for experimental design
  - Report results in the paper [1]
- **Real-time Audio-to-Score Alignment System**
  - Design a real-time score-following system for live musical performances
  - Use Parallel Dynamic Time Warping (DTW) to minimize the system response time
  - Collaborate with Pacing Art Culture Education Foundation for music visualization design
  - Hold an enriched live classical concert (National Concert Hall, Taiwan)
  - Report results in the paper [2]
- **Interactive Musical Performance System**
  - Retrieve designated 5-second audio clip from audio database (1000+ files) in 60 milliseconds
  - Activate pre-programmed audio clips with microphone input
  - Use Nvidia GPU to measure the similarity between audio clips
  - Optimize the computation of DTW library in *Librosa* and improve the speed by 700%
- **Creating Personal Musical Instrument with Speech Phonemes**
  - Identify English phonemes in speech voice with Convolutional Neural Networks
  - Use pre-defined rules to create personalized instruments (drums, bass, and lead)
  - Create online Colab notebook for demo

PUBLICATIONS

[1] I-Chieh Wei, Chih-Wei Wu, Li Su. "*GENERATING STRUCTURED DRUM PATTERN USING VARIATIONAL AUTOENCODER AND SELF-SIMILARITY MATRIX,*" International Society for Music Information Retrieval Conference (ISMIR), 2019.

[2] I-Chieh Wei, Li Su. "*ONLINE MUSIC PERFORMANCE TRACKING USING PARALLEL DYNAMIC TIME WARPING,*" IEEE 20th International Workshop on Multimedia Signal Processing (MMSP), 2018.

[3] I-Chieh Wei, Dan Chen, Yu-Cheng Lin, Ching-Jan Chen. "*The Stability Modeling of Ripple-Based Constant On-Time Control Schemes Used in the Converters Operating in DCM,*" International Conference on Renewable Energy Research and Applications (ICRERA), Nagasaki, Japan, Nov. 2012.

[4] I-Chieh Wei, Dan Chen. "*Modeling of Ripple-Based Constant On-Time Control Buck Converter,*" Unpublished master's thesis, National Taiwan University, Taiwan. 2011.

PRESENTATIONS

Talks

- "***GENERATING STRUCTURED DRUM PATTERN USING VARIATIONAL AUTOENCODER AND SELF-SIMILARITY MATRIX***"
  – 4 min presentation to introduce the motivation, methodology, and results of the conference published work (ISMIR, Nov. 2019)
- **Introduction to Music Information Retrieval (MIR) and their applications**
  – 25 min presentation (annual member seminar, Digital Music Creation Club, Apr 2019)
- **Rhythm generation using Generative Adversarial Network (GAN)**
  – 30 min lecture ('*When Music Meets AI*' series seminar, FabCafe, June 2018)

Posters

- "***ONLINE MUSIC PERFORMANCE TRACKING USING PARALLEL DYNAMIC TIME WARPING,***"
  – on 20th MMSP (2018)
- "***GENERATING STRUCTURED DRUM PATTERN USING VARIATIONAL AUTOENCODER AND SELF-SIMILARITY MATRIX,***"
  – on 20th ISMIR (2019)

WORK EXPERIENCE

Integrated Circuit Engineer, MediaTek, Taipei, Taiwan (Sept. 2014 – Sept. 2016)

- Design mobile electronics for industry-leading companies including Sony and Huawei
- Collaborate with 500+ engineers in the engineering group for mobile platform design

Integrated Circuit Engineer, Advanced Analog Technology, Taipei, Taiwan (Mar. 2013 – Aug. 2014)

- Design consumer electronics (LCD Panel, Battery Charger)
- Develop new digital-to-analog converter that improves output accuracy by 30%

Squad Leader of the communication team, Ministry of Defense, Taipei, Taiwan (Dec. 2011 – Dec. 2012)

- Lead a group of 9 soldiers to maintain the communication infrastructure and equipments used in the basement of the Ministry of Defense

EDUCATION

National Taiwan University (NTU), Taipei, Taiwan (Sept. 2009 – Aug. 2011)

- M.S. in Electrical Engineering, GPA: 3.95 / 4.3

National Chiao Tung University (NCTU), Hsinchu, Taiwan (Sept. 2004 – June. 2009)

- B.S. in Electrical Engineering, GPA: 3.87 / 4.3
- Relevant courses
  – Computer Programing || Data Structures || DSP Programming
  – Computer Architecture || Signals and Systems || Music Theory

OTHER EXPERIENCE

Keyboard Player, Red Hipple Band, Taipei, Taiwan (Sept. 2015 – Dec. 2018)

- Play accompaniment in a trio including violin, drum, and keyboard
- 50+ public performance including wedding ceremony, government-funded culture event, and community moon festival carnival

SKILLS

Python, Tensorflow, Pytorch, Matlab, C++

Cloud system operation (Amazon AWS, Google cloud platform)