

# Yi-Lin Tuan

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## Education

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- **National Taiwan University (NTU), Taipei, Taiwan** Sep. 2013 - June. 2017  
B.S. in Electrical Engineering, College of Electrical Engineering and Computer Science  
Overall GPA: 4.13/4.30; Related Courses GPA: 4.18/4.30  
Presidential Award (top 5%; rank 1/169) (Mar. 2014)

## PUBLICATIONS

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- [1] Che-Ping Tsai\*, **Yi-Lin Tuan\***, and Lin-shan Lee. *Transcribing Lyrics from Commercial Song Audio: the First Step towards Singing Content Processing*. IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2018.
- [2] **Yi-Lin Tuan** and Hung-yi Lee. *Improving Conditional Sequence Generative Adversarial Network by Stepwise Evaluation*. IEEE/ACM Transactions on Audio, Speech, and Language Processing.
- [3] Zih-Yun Chiu, **Yi-Lin Tuan**, Hung-yi Lee, and Li-Chen Fu. *Parallelized Reverse Curriculum Generation*. submitted to Journal Track of the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD), 2019.
- [4] **Yi-Lin Tuan**, Yun-Nung Chen, and Hung-yi Lee. *Zero-Shot Dialogue Generation with Dynamic Knowledge Graphs*. under submission.
- [5] Feng-Guang Su\*, Aliyah Hsu\*, **Yi-Lin Tuan**, and Hung-Yi Lee. *A Multi-Style Conversation Model via Adversarial Learning*. under submission.
- [6] **Yi-Lin Tuan\***, Jinzhi Zhang\*, Yujia Li, and Hung-yi Lee. *Proximal Policy Optimization and its Dynamic Version for Sequence Generation*. arXiv preprint arXiv:1808.07982.

\* indicates co-first authors

## Research Experience

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- **Speech Processing and Machine Learning Laboratory, NTU** Aug. 2015 - Present  
**Research Assistant (RA) and Undergraduate Researcher**  
Host: Prof. Hung-yi Lee and Prof. Lin-shan Lee
  - **Dialog Generation with Knowledge Graphs.** (advised by Prof. Yun-Nung Chen and Prof. Hung-yi Lee) [4]
    - \* Collected data of **TV series**, including dialogues, speakers, scenes, and a manually constructed knowledge graph.
    - \* Proposed a generative model to **retrieve knowledge reasoning paths through learning dialogues and zero-shot generate dialogues using unseen knowledge graphs**.
  - **Sequence Generation with Generative Adversarial Network (GAN) and Reinforcement Learning (RL).** (advised by Prof. Hung-yi Lee)
    - \* Compared and analyzed previous stepwise evaluation methods of RL in sequence GANs. [2]
    - \* Proposed a framework of **sequence GANs** to optimize training stability and lower computational cost. The framework can also be used to make a **chit-chat chatbot** to produce more informative responses. [2]
    - \* Transferred the update method for **sequence generation** from policy gradient to **proximal policy optimization (PPO)** to stabilize training. [6]
    - \* Proposed a dynamic version of PPO to facilitate training. [6]
  - **Spoken Language Processing – Lyrics Recognition.** (advised by Prof. Lin-shan Lee) [1]
    - \* This work was a **benchmark on English lyrics recognition** in 2018.
    - \* Collected **vocal-only commercial song audios with paired transcripts**. Several ASR models were trained, including GMM-HMM, DNN, LSTM and enhancements like i-vector.
    - \* Trained several ASR models (GMM-HMM, DNN, LSTM with i-vector) and tackled **varying phoneme durations** using enhanced self-loop HMM.
  - **Deep Reinforcement Learning.** (advised by Prof. Hung-yi Lee)
    - \* Trained an intelligent agent to play Pikachu Volleyball game using Deep Q Network(DQN).
    - \* Trained dialogue generation using Deep Deterministic Policy Gradient (DDPG) in a large action space.
    - \* Stabilized the training of Actor-Critic based RL (AC) using the techniques for improving GANs. [3]
- **Second Reviewer**
  - Conferences: ACL 2018 \*4, EMNLP 2018 \*2, ISCSLP 2018 \*1
  - Journals: T-SLP \*1, CSL \*2, APSIPA \*1

## Teaching Assistant Experience

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- **Comme 5045, Machine Learning and Having it Deep and Structured** *Feb. 2017 - July. 2017*  
Instructor: Prof. Hung-yi Lee  
Tutored in GANs, deep reinforcement learning and chit-chat chatbots.
- **EE4049, Special Project** *Oct. 2017 - present.*  
Instructor: Prof. Lin-shan Lee and Prof. Hung-yi Lee  
Led and advised three groups of undergraduate students. The groups are currently working on:
  - **A Multi-style Conversation Model via Adversarial Learning.** [5]
  - **What does a GAN learn? An Analysis of Discriminators for Conversation Models.**

## Awards & Honors

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- **Presidential Award (top 5%; rank 1/169)** *Mar. 2014*
- **NTU Electrical Engineering 1960 Alumni Scholarship (US\$3,000)** *Sep. 2014, Sep. 2016*
- **Outstanding Achievement Award (Innovate Asia Design Contest, Altera, Intel)** *Aug. 2016*  
Topic: FPGA Mobile 3D Projector

## Term Project Highlights

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- **Piano Accompaniment Robot** [video] *Oct. 2016 - Feb. 2017*  
CSIE 5047, Robotics  
Designed the planning algorithm and the robotics mechanism to build a robot that automatically plays the piano to accompany music it hears.
- **Realtime Pitch Tracking Game** [video] *Apr. 2016 - June 2016*  
NM 7613, Music Signal Analysis and Retrieval  
Programmed a 3D game controlled by unvoiced sound and real-time detected pitch of voice sound.
- **Mobile 3D Projector** [video] *Oct. 2015 - Aug. 2016*  
EE 3016, Electrical Engineering Lab – Digital Circuit  
Designed a portable 3D projector, and optimized the memory storage and computation time.
- **Language Sentiment Classification** *Oct. 2015 - Aug. 2016*  
EE 4037, Introduction to Digital Speech Processing  
Improved the classification of positive-negative sentiment of text using deep learning and external POS tagging.

## Extracurricular Activities

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- **Melody & Lyrics Club, National Taiwan University** *Sep. 2013 - June. 2015*
  - **Director and Playwright of Musical:** Wrote the lyrics, music and scripts, and directed the public performance.

## Related Courses

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- **Machine Learning / Artificial Intelligence**  
Deep and Structured Learning<sup>†</sup>, Data Analytics and Modeling<sup>†</sup>, Robotics<sup>†</sup>, Music Signal Analysis and Retrieval<sup>†</sup>, Digital Speech Processing<sup>†</sup>.
  - **Fundamental Programming and Mathematics Courses**  
Algorithms, Data Structure and Programming, Computer Programming, Introduction to Computer, Computer Architecture, Probability and Statistics, Linear Algebra, Calculus.
- <sup>†</sup> indicates graduate-level courses

## Skills

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- **Programming Languages:** Python, C/C++/C#, Shell Script, Matlab, System Verilog
- **Tools:** Tensorflow, Pytorch, Theano, Kaldi, Praat, Git, L<sup>A</sup>T<sub>E</sub>X