Yi-Lin Tuan

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Education

- **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

[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.* submitted to IEEE/ACM Transactions on Audio, Speech, and Language Processing (TASLP).

[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

- **Speech Processing and Machine Learning Laboratory, NTU** *Aug. 2015 - Present*
  Research Assistant (RA) and **Undergraduate Researcher**
  Hoster: 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**
  - Natural language processing conference and journal: ACL 2018 *4, EMNLP 2018 *2, CSL *2
  - Speech processing conference and journal: ISCSLP 2018 *1, APSIPA *1

Teaching Assistant Experience

- **CommE 5045,** *Feb. 2017 - July. 2017*
  Machine Learning and Having it Deep and Structured
  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

- **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

- **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

- **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

- **Machine Learning / Artificial Intelligence**
  Deep and Structured Learning†, Data Analytics and Modeling†, Robotics†, Music Signal Analysis and Retrieval†, Digital Speech Processing†.

- **Fundamental Programming and Mathematics Courses**
  Algorithms, Data Structure and Programming, Computer Programming, Introduction to Computer, Computer Architecture, Probability and Statistics, Linear Algebra, Calculus.

† indicates graduate-level courses

Skills

- **Programming Languages**: Python, C/C++/C#, Shell Script, Matlab, System Verilog
- **Tools**: Tensorflow, Pytorch, Theano, Kaldi, Praat, Git, LaTeX