Chih-Pin Tan

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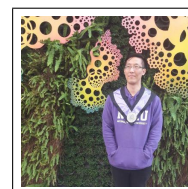
Researching on Symbolic Music Generation/Machine Learning
Aiming to build world-level AI music composing system

Education

2020 – 2022	**National Cheng Kung University**, Taiwan, *Master of Science in Computer Science*.
2013 – 2018	**National Tsing Hua University**, Taiwan, *Bachelor of Science in Computer Science*.

Skills

Machine Learning Research and Tool Development for Music Application

Programming Language: Python, C/C++, Rust

Work Experiences

March 2023 -	Research Engineer, Advanced Research Center, **KKCompany**, Taiwan
October 2022 - January 2023	Research Assistant, Research Center for IT Innovation, **Academia Sinica**, Taiwan, Advised by Yi-Hsuan Yang
September 2020 - June 2022	Research Assistant, Studio of Computer Research on Music and Multimedia Lab, Computer Science Department, **National Cheng Kung University**, Taiwan, Advised by Alvin Wen-Yu Su

Publications

Chih-Pin Tan, Alvin Wen-Yu Su, Yi-Hsuan Yang. *Melody Infilling with User-Provided Structural Context*. in Proc. *International Conference on Music Information Retrieval*, 2022.

Chih-Pin Tan, Chin-Jui Chang, Alvin Wen-Yu Su, Yi-Hsuan Yang. *Music Score Expansion with Variable-Length Infilling*. in *Late Breaking Demo, International Conference on Music Information Retrieval*, 2021.

Projects

Multi-track Music Generation with Resampling (on-going)

- Nowadays multi-track music-generating models generate all tracks concurrently. We are curious about if there is another generating strategy such as generating one track at a time and "modifying" this track to fit the others if necessary by Gibbs sampling.
- Acquired skills: VAE, disentanglement, Adding time-varying conditions for Transformers
- Collaborate with Hao-Wen Dong (link), University of California San Diego.

Controllable Melody Infilling (paper/code/demo)

- Preserving the musical structure in the infilling process is a challenging task. Hence we try to give the model some "tips" to help it generate the melody under the given contour.
- Build the model based on TransformerXL, and fully understand the **Attention mechanism** and the technique used in Transformer-family models including **variant token representation**, **special positional encoding**, and **memoriztion mechanism**.
- Use tricky **segment embedding** to change the TransformerXL from sequential generating model to infilling model.
- Implement an "**Attention-Selecting**" module to receive a certain context information from the encoder
- Solve over-imitation problem by different training strategies (considering the loss of given prompts).
- Learn how to present the completed work, including **formal paper writing**, **release of open-source code & documentation**, and **paper presentation**.
- "(1) The paper is in general well written and the logic flows. (2) The authors are quite resourceful. They put just the right resources together to achieve the task. (pop909, it's structural lables, transformer, etc. (3) **adding structural control is a hard task, and to use cross-attention may be a good choice**." - meta-reviwer of ISMIR 2022

Music Score Expansion (paper/code/demo)

- Expand 12-bars piano score to 16-bars with Transformer-based model, variable-length infilling (VLI), by **adjusting data format**.
- Evaluate on 20 musical segments from AILabs-Pop1k7 dataset, and find the potential of music expansion with infilling models by analyzing melodic and rhythmic properties.
- "The basic idea of your late-breaking-demo, the application of "infilling" algorithms to musical prolongation, is quite interesting. **In fact, I've never quite understood the real *musical* potential of infilling, and this is an excellent demonstration**." - reviwer of ISMIR 2021