TAEGYUN KWON

Graduate School of Culture Technology (Ph.D., M.S.) and Physics (B.S.)

Daehak-ro 291, Yuseong-gu, Daejeon, Republic of Korea, 34141

+82-10-9941-1257 | *ilcobo2@gmail.com*

MIR / Deep learning Researcher, Amateur Pianist.
Postdoctor Researcher at the Department of Graduate School of Culture Technology, KAIST

INTERESTS

- · Music Information Retrieval
- · Automatic Music Transcription & Alignment
- · Expressive Music Performance Modeling
- · Computer - Human Interaction in Performance
- · Deep Learning
- · Audio Signal Processing

EXPERIENCE

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2024 - Present
Postdoc

- · Research on human-computer interaction on music performance,
  transcription, multimodal performance techonolgy

AudAI 2023 - Present
Co-Founder

- · Start-up for AI co-creation assistant service, focused on singing voice generation

Clova, Naver Corp., Korea Jul. 2017 - Aug. 2017
Research Internship

- · Developed AI-DJ project for Naver music service

T-brain, SK Telecom, Korea Sep. 2019 - Jan. 2020
Research Internship

- · Music AI application development. Multi-instrument transcription / Separation

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST)

- · Ph.D., Graduate School of Culture Technology Sep. 2018 - Feb. 2024

   Music and Audio Computing Lab. (Supervisor: Prof. Juhan Nam)

- · M.S., Graduate School of Culture Technology Sep. 2016 - Aug. 2018

   Music and Audio Computing Lab. (Supervisor: Prof. Juhan Nam)

- · B.S., Department of Physics Feb. 2011 - Aug. 2016

PROJECTS

Conversational AI Feedback System for Expressive Music Performance Learning.   May. 2024 - Present
Training LLM with musical feedback information, and constructing interactive human-machine teaching system.

Real-time audiovisual music information processing for interactive AI performance systems   Mar. 2023 - Present
Research and develop real-time oriented human-computer interaction system. Including synchronization, visual feedback and machine listening.
[Score following], [Cue Detection]

Multi-Modal Piano Performance Data Collection and Generation
Collaboration with YAMAHA Corp. (from 2023). Acquisition, analysis   Sep. 2021 - Present
and generation of expressive piano performance motion in precise 3D data.
[project page]

Expressive music performance creation system using machine learning
Collaboration with Music Dept., Seoul National University.   Jul. 2018 - May. 2021
Model human-like expressive performance on piano with machine learning approaches.
[project page]

Developing transcription algorithm for guitar performance audio
Developed a neural transcription system for guitar with a small number of   Sep. 2017 - Dec. 2018
labeled audio.

Developing music score-based web platform for classical music appreciation
Developed music visualization web platform with automatic audio-to-score   Feb. 2016 - Sep. 2016
alignment. [demo]

PUBLICATIONS

Peer-reviewed Publication

1. Jiyun Park, Sangeon Yong, **Taegyun Kwon**, and Juhan Nam. "A Real-time Lyrics Alignment System Using Chroma and Phonetic Features For Classical Vocal Performance"
   International Conference on Acoustics, Speech Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2024

2. Hyemi Kim, Jiyun Park, **Taegyun Kwon**, Dasaem Jeong, and Juhan Nam. "A Study of Audio Mixing Methods for Piano Transcription in Violin-Piano Ensembles"
   Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2023

3. Choi Eunjin, Yoonjin Chung, Seolhee Lee, Jongik Jeon, **Taegyun Kwon** and Juhan Nam. "YM2413-MDB: A Multi-Instrumental FM Video Game Music Dataset with Emotion Annotations"
   Proceedings of the 23th International Society for Music Information Retrieval Conference (ISMIR), 2022

4. **Taegyun Kwon**, Dasaem Jeong, and Juhan Nam. "Polyphonic Piano Transcription Using Autoregressive Multi-State Note Model"
   Proceedings of the 21th International Society for Music Information Retrieval Conference (ISMIR), 2020

5. Dasaem Jeong, **Taegyun Kwon**, and Juhan Nam. "Note Intensity Estimation of Piano Recordings Using Coarsely-aligned MIDI Score"
   Journal of the Audio Engineering Society, 68 (1/2), 34-47, 2019.

6. Dasaem Jeong, **Taegyun Kwon**, Yoojin Kim, Kyogu Lee, and Juhan Nam. "Hierarchical RNN-based System for Modeling Expressive Piano Performance"
   Proceedings of the 20th International Society for Music Information Retrieval Conference (ISMIR), 2019

7. Saebyul Park, **Taegyun Kwon**, Jongpil Lee, Jeounghoon Kim, and Juhan Nam. "A Cross-Scape Plot Representation for Visualizing Symbolic Melodic Similarity"
   Proceedings of the 20th International Society for Music Information Retrieval Conference (ISMIR), 2019

8. Dasaem Jeong, **Taegyun Kwon**, Yoojin Kim, and Juhan Nam. "Graph Neural Network for Music Score Data and Modeling Expressive Piano Performance"
   Proceedings of the 36th International Conference on Machine Learning (ICML), 2019

9. Dasaem Jeong, **Taegyun Kwon**, and Juhan Nam. "A Timbre-based Approach to Estimate Key Velocity from Polyphonic Piano Recordings"
   Proceedings of the 19th International Society for Music Information Retrieval Conference (ISMIR), 2018

10. **Taegyun Kwon**, Dasaem Jeong and Juhan Nam. "Audio-to-Score Alignment Of Piano Music Using RNN-based Automatic Music Transcription "
    Proceedings of the 14th Sound and Music Computing Conference (SMC), 2017

Under Review

1. **Taegyun Kwon**, Dasaem Jeong and Juhan Nam. "Towards Efficient and Real-Time Piano Transcription Using Neural Autoregressive Models"
   https://arxiv.org/abs/2404.06818
   Under Review, 2024

Peer-reviewed Abstract / Workshops

1. Dawon Park, **Taegyun Kwon**, Joonhyung Bae, Jongwha Park, Juhan Nam and Jaebum Park. "Multivariate Kinematic Analysis of Piano Performance: A Case Study of A Professional Pianist"
   International Society of Biomechanics (ISB), 2023

2. **Taegyun Kwon**, Dawon Park, Joonhyung Bae, Jongwha Park, Juhan Nam and Jaebum Park. "Automated Gap-Filing Algorithm for Kinetic Data of Finger Movement: Pianist Hand Motion Cleaning using Spatio-Temporal Imputation"
   International Society of Biomechanics (ISB), 2023

3. Yoojin Kim, Jeongmi Park, Dasaem Jeong, **Taegyun Kwon**, Jonghwa Park, Juhan Nam. "Emotion Classification and Analysis of Expressive Performances in Classical Piano Music"
   Proceedings of the 16th International Conference on Music Perception and Cognition (ICMPC16), 2021

4. Dasaem Jeong, Seungheon Doh, and **Taegyun Kwon**. "TräumerAI: Dreaming Music with Style-GAN"
   Workshop on Machine Learning for Creativity and Design, Neural Information Processing Systems (NeurIPS), 2020

5. Dasaem Jeong, **Taegyun Kwon**, Yoojin Kim, and Juhan Nam. "Score and Performance Features for Rendering Expressive Music Performances"
   Proceedings of the Music Encoding Conference (MEC), 2019

6. Dasaem Jeong, **Taegyun Kwon**, and Juhan Nam. "VirtuosoNet: A Hierarchical Attention RNN for Generating Expressive Piano Performance from Music Score"

Workshop on Machine Learning for Creativity and Design, Neural Information Processing Systems (NeurIPS), 2018

7. Dasaem Jeong, **Taegyun Kwon**, Chaelin Park, and Juhan Nam. "PerformScore: Toward Performance Visualization With the Score on the Web Browser"
Late Breaking Demo in the 18th International Society for Musical Information Retrieval Conference (ISMIR), 2017

8. Adrian Kim, Soram Park, Jangyeon Park, Jung-Woo Ha, **Taegyun Kwon** and Juhan Nam. "Automatic DJ Mix Generation Using Highlight Detection"
Late Breaking Demo in the 18th International Society for Musical Information Retrieval Conference (ISMIR), 2017

AWARDS

Sejong Research Fellowship   Research Foundation of Korea, 2024-2028
Conversational AI Feedback System for Expressive Music Performance Learning.

APE-CAMP: Art Performance Academy Program   Arts Council Korea, 2023
Best Presentation: *Neo Harmonics.* Including Overseas Research Trip Award [News]

E5 KAIST Student Entrepreneurship Support Program   KAIST, 2022
4th Prize : *Team Rednose*

KAIST NAVER Clova AI Workshop   NAVER Corp, 2019
Best Poster : "Hierarchical RNN-based System for Modeling Expressive Piano Performance" [News]

ART PROJECTS

⟨ **X-Space** ⟩ **Co-creation of Daejeon Art Center and KAIST**
Technical Director, AI Interaction.   28 Sep. 2024
Concert, Daejeon Art Center.

⟨ **신체 비전** ⟩ **Neo-art Project**
Technical Director, Physical Simulation.   8 Aug. 2024
Choreography, Ansan Art Center.

⟨ **Con Amore** ⟩ **20th Anniversary of Daejeon Art Center**
AI piano performance with Flutist Jasmin Choi.   5 Oct. 2023
Concert, Daejeon Art Center.[News article]

⟨ **All About Errors** ⟩
Interactive Performance with AI Piano, Visualization and choreography.   26 Sep. 2023
Music Director, Realtime Music-Motion Interaction
Concert, Gwangju Complex Cube. [Link]

⟨ **Inovate Korea** ⟩ **AI piano with Soprano Sumi Jo**
AI piano performance generation, Performance planning, Development.   27 Jun. 2023
Concert, KAIST Sports Complex.[News article]

⟨ **Haydn Avent** ⟩
AI piano performance generation, automatic transcription, alignment.   15 Apr. 2022 - 17 Apr. 2022
Concert, Daejeon Art Center Ensemble Hall.[News article]

⟨ **I'm a KAIST** ⟩ **collaboration with Sumi Jo**
AI piano performance generation, planning.   6 Jan. 2022
Concert, KAIST Auditorium

⟨ **Interactive AI piano** ⟩

AI piano installation, planning, development.   21 Sep. 2021 - Present

Installation, Sinsegae Department Store Art& Science Nexperium

⟨ **AI X Human meet with piano** ⟩ **collaboration with Gimpo Philharmonic Orchestra**

AI piano performance development.   21 Jul. 2021

Recorded Concert, Gimpo Art Hall

⟨ **AI Piano Duet Performance** ⟩ **collaboration with Jongwha Park**

AI piano performance development.   21 Feb. 2021

Ceremony of the 50th anniversary of KAIST, KAIST Auditorium

⟨ **AlphaGo** ⟩, ⟨ **BadaGa** ⟩, ⟨ **B, A? ... C, H** ⟩; **collaboration with Hana Ryou**

AI piano performance development.   13 Jan. 2021

Recorded Concert, WhiteHall, Seocho, Seoul

⟨ **Deep Space Music** ⟩ **collaboration with NOS VISUALS**

AI piano performance development, installation.   Nov. 2019 - Jan. 2020

Exhibition 'WAYS OF SEEING', Daejeon Museum of Art

ACADEMIC ACTIVITY

Reviwer for ISMIR (2020-2024), Neurips (2022-2024), ICML (2023), TASLP, IEEE SPL

PATENTS

1. Juhan Nam, **Taegyun Kwon**, Dasaem Jeong. "Computer Systm for Real-time Automatic Piano Transcription And Reperformance with Pitch, Intensity and Pedal Estimation, and method thereof" - Korean Patent Application no. 10-2021-0017377, 2021

2. Juhan Nam, Daseam Jeong, **Taegyun Kwon**, Yoojin Kim. "Method and Device for Multi-Style Conditioned Expressive Piano Reperformance Rendering" - Korean Patent Application no. 10-2020-0070101, 2020

3. Juhan Nam, **Taegyun Kwon**, Dasaem Jeong. "Method and System for Audio and Score Alignment of Music Using Neural Network-Based Automatic Music Transcription" - Korean Patent Registration no. 10-1939001-0000, 2019