Christodoulos Benetatos

San Francisco, CA | xribene55@gmail.com | (585) 406-8092
cbenetatos.com | in/christodoulos-benetatos | github.com/xribene

Education

University of Rochester, PhD in Electrical and Computer Engineering — Sept 2018 – Dec 2024

- Deep Learning
- Music and Audio Signal Processing
- Supervised by Prof. Zhiyao Duan

National Technical University of Athens, B.Sc/M.Sc in Electrical and Computer Engineering — Sept 2011 – Dec 2017

- Thesis: A Brain Computer Interface (BCI), using Steady State Visual Evoked Potentials (SSVEP), for the task of maze navigation.
- Supervised by Prof. A. G. Stafylopatis and Dr G. Siolas

Experience

Research Scientist Intern, ByteDance Inc. – Santa Clara, CA — June 2022 – Aug 2022

- Developed generative models (VAE and Transformers) to improve various automatic music generation pipelines.

Research Scientist Intern, Kwai Inc. – Seattle, WA — Aug 2020 – Nov 2020

- Multimodal modeling of dance videos. Visual beat tracking and audio synchronization
- Developed a real time digital audio effects suite in C++ for iOS

Research Assistant, University of Rochester, AIR Lab – Rochester, NY — Sept 2018 – Dec 2024

- Developing AI tools (algorithms and prototypes) to assist musicians in music making, using generative models, graph neural networks, and reinforcement learning.
- Supervised by Prof. Zhiyao Duan

Software Engineer, Metis Cyberspace Technology – Athens, Greece — Jan 2018 – Aug 2018

- Designed algorithms for real-time remote monitoring and performance assessment of equipment onboard vessels.

Projects

Guitar Score Reduction as a Reinforcement Learning Problem — 2023 – present

- Framed the task of guitar score reduction as a combinatorial optimization problem and used Proximal Policy Optimization (PPO) to solve it.
- Designed novel rule-based and data-driven reward functions to guide the learning process.
- Used a transformer-based RL agent that operates on scores represented as graphs.

HARP — 2023 – present

- Lead Developer
- HARP lets users of Digital Audio Workstations (DAWs) access large state-of-the-art deep learning models using cloud-based services, without breaking the within-DAW workflow.

Euterpe: A Web Framework for Interactive Music Systems — 2021 – 2023

- Enabled researchers without JavaScript expertise to easily deploy musical agents on the web.
- Supported real-time audio/MIDI synchronization and data visualization.
- Re-Implemented various deep-learning musical agents using Euterpe

and presented a live-coding session in ISMIR 2023.

Draw and listen! 2020 – 2021

- Built a sketch-based system for music inpainting enabling users to draw a melodic contour and hear them realized instantly.
- Derived a new melody disentanglement scheme -> 'melody = contour + rhythm + context'.
- Designed a VAE architecture that realizes the above disentanglement.

Score Following for Event Augmented Live Performances 2021 – 2022

- Implemented a modified ODTW algorithm for real-time audio-score alignment.
- Developed a UI to visualize the alignment and activate events.
- Used OSC to send events in real-time to a TouchDesigner instance for triggering sound and video effects.
- Deployed the system in a mini-concert with the TableTopOpera.

BachDuet 2019 – 2020

- Designed a RNN model for real-time musical counterpoint improvisation.
- Trained on duets extracted from Bach Chorales.
- Implemented a prototype system and demoed it live at various venues.

Publications

Euterpe: A Web Framework for Interactive Music Systems 2023
Yongyi Zang*, ***Christodoulos Benetatos****, Zhiyao Duan, (* equal contribution)
Journal of the Audio Engineering Society (JAES)

HARP: Bringing Deep Learning to the DAW with Hosted, Asynchronous, Remote Processing 2023
Hugo Flores Garcia, ***Christodoulos Benetatos***, et al.
NeurIPS workshop on Machine Learning for Creativity and Design

Draw and listen! a sketch-based system for music inpainting 2022
Christodoulos Benetatos, Zhiyao Duan
Transactions of the International Society for Music Information Retrieval (TISMIR)

Collagenet: Fusing arbitrary melody and accompaniment into a coherent song 2022
Abudukelimu Wuerkaixi, ***Christodoulos Benetatos***, Zhiyao Duan
International Conference on Music Information Retrieval (ISMIR)

BachDuet: A deep learning system for human-machine counterpoint improvisation 2020
Christodoulos Benetatos, Joseph VanderStel, Zhiyao Duan
New Interfaces for Musical Expression (NIME)

Talks and Demos

Guitar Score Reduction as a Reinforcement Learning Problem – San Francisco, CA Dec 2024

- Work In Progress (under submission)
- Demo at the International Symposium on Music Information Retrieval (ISMIR)

Euterpe: A Web Framework for Interactive Music Systems – Madrid, Spain June 2024

- Oral presentation at the AES International Conference

Computer-Assisted Music-Making Systems: Taxonomy, Review, and Coding – Milan, Italy Nov 2023

- Tutorial and Live Coding at the International Symposium on Music Information Retrieval (ISMIR)

Automatic Rendering of Augmented Effects in Immersive Concerts – Rochester, NY Nov 2022

- Demo at the 7th Annual Frameless XR Symposium

BachDuet: A deep learning system for human-machine counterpoint improvisation – Delft, Netherlands Nov 2019

- Demo at the International Symposium on Music Information Retrieval (ISMIR)

Skills

Programming Languages: Python, C++, JavaScript, Java, Matlab

Frameworks: Pytorch, JUCE, Vue.js, Spring

Languages: Greek (native), English (fluent)

Music Skills

Instruments: Classical Guitar, Flute, Mandolin, Cajon

Music Production: Reaper, Sample Library Programming