

Anthony Hong

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Education

Carnegie Mellon University (CMU) Pittsburgh, PA, USA
Bachelor of Engineering and Arts, Electrical and Computer Engineering and Music Technology
Additional Major: Artificial Intelligence

Relevant Coursework

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|---|---|
| Advanced Digital Signal Processing (Graduate) | Machine Learning for Signal Processing (Graduate) |
| Introduction to Deep Learning | Introduction to Machine Learning |
| Introduction to Computer Systems | Introduction to Embedded Systems (Spring 2024) |

Skills

Technical: real-time DSP, audio prototyping, acoustics, data structures and algorithms, systems programming
Musical: FL Studio, Logic Pro, Pro Tools, electronic music production, piano, sound engineering
Tools: Matlab, Juce, C/C++, CMake, Python, PyTorch, Git, Google Cloud, HTML/CSS, Java, Max/MSP/Jitter
Languages: English (native), Chinese (native), Shanghainese (native)

Experience / Projects

Virtual Eurhythmics Tutor Sept. 2023 - Present

- Developed a program that plays randomly generated rhythms for users to practice musicianship
- Designed logic to support different BPM's and accurate timings
- Designed algorithms to generate sequences of fixed total duration and record it as text score
- Designed algorithms to mark bars and split and tie notes across downbeats for visual clarity

Gerzz Interactive May. 2023 - Sept. 2023

Machine Learning and Signal Processing Intern Shanghai, China

- Modified the existing VITS model for training singing voice conversion, improved clarity of pronunciation and naturalness of unvoiced components
- Implemented real-time reverb and Transformers robot voice effect algorithms in C++
- Developed a real-time AI-based acoustic echo cancellation system

Filter-dependent Point Cloud Audio Visualization Feb. 2023 - Mar. 2023

- Developed an audio filter whose shape also modifies granularity of point cloud visualization
- Programmed the filter to be shaped arbitrarily by mouse
- Written entirely in Max/MSP/Jitter

Carnegie Mellon University Aug. 2022 - May. 2023

Teaching Assistant Pittsburgh, PA, USA

- “Signals and Systems”: covered system properties, convolution, Fourier/Laplace/Z Transform, sampling
- “Digital Signal Processing”: covered multirate DSP, filter design, Discrete/Fast Fourier Transform
- Hosted weekly office hours to help students understand important signal processing concepts
- Created homework assignments and exams that aid students’ understanding

Course Projects Jun. 2022 - May. 2023

- “Introduction to Deep Learning” Course Projects
 - Created Pytorch classes from scratch for loading and preprocessing speech and image data
 - Implemented various models for different tasks from scratch, using basic Pytorch functions
 - Reviewed multiple research papers describing different model architectures and their performances
 - Attention-based Automatic Speech Recognition
 - Reviewed the “Listen, Attend, and Spell” research paper
 - Implemented an attention mechanism, a pyramidal bi-directional long-short-term memory (pBLSTM)-based encoder (listener), and a LSTM-based decoder (speller)

- Used the Librispeech dataset for training, validating, and testing
 - Achieved 8.9 Levenshtein distance during testing
- Convolutional neural network for face classification
 - Reviewed research papers on Convnext and ResNet
 - Experimented with and built Convnext and ResNet from scratch, using pytorch functions
 - Used the VGGFace2 dataset for training, validating and testing
 - Achieved 90% test accuracy using the Convnext model
- Deep neural network for frame-level speech recognition
 - Built a multi-layer perceptron (MLP) for mapping speech to phonemes
 - Experimented with various MLP architectures and other hyperparameters, including but not limited to: dropout probability, learning rate, scheduler, batch size, and optimizer
 - Used the Librispeech dataset for training, validating, and testing
 - Achieved 88% test accuracy
- “Advanced Digital Signal Processing” Matlab Simulations
 - Noise canceller using adaptive filtering and the LMS update algorithm
 - Linear predictive coding-based vocoder
 - Phase vocoder that changes the time and pitch of music independently
- “Introduction to Computer Systems” Course Projects
 - Tiny interactive shell that supports background jobs, process interruptions, and zombie reaping
 - Dynamic memory allocator (1300+ lines of C code) achieving high throughput and utilization
 - Cache simulator adopting the LRU replacement policy
 - Fast matrix transposition implemented with blocking techniques

Carnegie Mellon University AB Tech

Aug. 2021 - Dec. 2022

Sound Engineer

Pittsburgh, PA, USA

- Set up sound and lighting equipments
- Assisted operating sound board during the performance to monitor sound quality and feedback
- Communicated with stage managers to ensure smooth transition between performances

Music Producer

Dec. 2015 - Present

- Produced high-quality original music, solely responsible for all aspects of production: composition, sound design, sound recording, mixing and mastering
- Used signal processing methods to generate real-time audiovisual artwork accompanying original music
- Created a musician website from scratch using HTML/CSS, regularly updating content

References

Richard Stern, Professor of Electrical and Computer Engineering at CMU: rs1e@andrew.cmu.edu

Ying Xu, CTO at Gerzz Interactive: ishine2010@gmail.com

Tiange Ling, CEO at Gerzz Interactive: tiangeling@gmail.com

Awards / Honors

Dean's list, Fall 2022

International Electronic Music Competition Top 25%, Aug. 2019

Black Hole Recordings China Remix Competition Honorable Mention, Feb. 2019

United States Academic Decathlon China Music Section Gold Medalist, Feb. 2019