

David Liu

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EDUCATION

Boston University Boston, MA
Ph.D. with focus on Artificial Intelligence for **Audio** Start: Sept 2023
Advised by Dr. Brian Kulis

University of Wisconsin - Madison Madison, WI
Bachelor of Science May 2023
Majors: Computer Science, Data Science, Mathematics GPA: 3.868/4.000
Relevant Courses: Introduction to Artificial Intelligence, Introduction to Algorithms, Linear Optimization

SKILLS

Computer Software: LaTeX, G Suite, Microsoft Office, Linux, Unity

Music Creation: FL Studio, Musescore, Serum

Languages: Java (Fluent), Python (Fluent), C (Fluent), Rust (Intermediate), Haskell (Intermediate), JavaScript (Intermediate), C# (Intermediate), R (Intermediate)

WORK EXPERIENCE

Boston University - Department of Computer Science Boston, MA
Graduate Research Assistant for AI for Understanding Earthquakes August 2024-Present

- Prepared an encoder-decoder model for earthquake waveforms (seismographs)
- Scraped waveforms from earthquake monitoring stations near Parkfield, CA
- Use state space models instead of transformers

Boston University - Department of Computer Science Boston, MA
Teaching Fellow for Combinatorial Structures with Dr. Peter Golbus August 2023-May 2024

- Prepare an outline for coursework on a weekly schedule
- Teach discussion sections, which reinforces topics discussed during lectures
- Hold office hours and answer questions regarding the course material as well as any general questions about the course
- Planned the examinations as well as organized grading assignments

University of Wisconsin - Madison Math Learning Center Madison, WI
Peer Mentor October 2021-May 2023

- Explain concepts in a group setting to Calculus 1 and Multivariable Calculus students to further their understanding of the material.
- Reinforced the students' knowledge in multiple courses such as Linear Algebra and Analysis.
- Communicate effectively with students and other peer mentors to help the students' learning processes.
- Planned meetings to help students prepare for their examinations

PROJECTS

Computing Audio Features using State-Space Models Boston University, MA
Group with Brian Kulis Summer 2024 - Present

- Using **Mamba** models on a variety of music-feature related problems.
- Multiple data processing techniques were used, tailored to the specific problem being tackled

Music Style Transfer with MusicGen Boston University, MA
Group Project with Brian Kulis Spring 2024 - Present

- Conditioning using raw audio in order to provide more information for output
- Training with generated text and melody conditioned audio clips.
- Finetune a transformer-based generative music model

Transcription Transformer Model

Boston University, MA

Group Project with Brian Kulis and Sadie Allen

Fall 2023 - Present

- Utilizing spectrograms as the primary input for the transformer model
- Implement algorithms to convert the output sequence back into symbolic music as well as creating scripts for data processing

Logistic Model

University of Wisconsin-Madison

Data Programming II

November 2021-December 2021

- Developed a logistic model using SKLearn to predict which users of a site are interested in a promotion.
- Consolidated training data for the logistic model by combining data into one dataframe using Pandas DataFrames.
- Utilized the actual user participation as the testing data in order to find the accuracy of the model.

Monopoly ELO Bot

Madison, WI

Independent Project

June 2022

- Developed a method for ranking players over multiple games
- Connected the bot to Discord by using the Lightbulb API
- Created a formula to change a players current elo based on the players and rankings in the current game

Gomoku AI

Madison, WI

Independent Project

Fall 2022 - Spring 2023

- Learning reinforcement learning in order to develop a bot to place more optimal moves.
- Start with finding the State and Action spaces for a smaller version, similar to Tic-Tac-Toe

POSTERS AND PRESENTATIONS

Meter Detection: Computing Audio Features using Mamba-based Models

Cambridge, MA

Speech and Audio in the Northeast Workshop

Fall 2022 - Spring 2023

- Attended talks related to Generative Speech and Music Models and NLP techniques.
- Presented a poster on work about Meter Detection using State-Space Models

AWARDS

Zero Robotics NASA/MIT World Competition: World Champion 2019 (First Place)

NFMC Junior Composition Contest: Honorable Mention for National 2019

WSMA Composition Project: First Place for Piano Solo 2016 and First Place for Ensemble 2020

University of Wisconsin - Madison Dean's List

ORGANIZATIONS

BU AIR, Member

September 2023- Present

- Attended seminars as well as reviewed papers submitted to multiple conferences

Putnam Club, Member

November 2020 - May 2023

- Discussed questions from previous exams.

Boxing Club, Member

September 2021 - May 2023

- Practiced the sport and volunteered for the community in events such as parades and book sales.

Taiwanese Undergraduate Student Association, Member

September 2021 - May 2023

- Attended multiple events and learned more about Taiwanese culture

Quiz Bowl Team, Member

September 2021 - May 2023

- Practiced Quiz Bowl questions and traveled to other schools to compete

VOLUNTEER EXPERIENCE

Overseas Youth English Teaching Volunteer Service Program in Taiwan

Pingtung, Taiwan

Assisting Individuals with Disadvantages (A.I.D.) Volunteer English Instructor

June 2019-July 2019

- Taught 27 children English by designing curriculum from scratch and presented in the classroom 8+ hours daily.
- Created engaging and helpful activities to ensure students learned material while improving their English skills.

Boxing Club Book Sale

Madison, Wisconsin

Boxing Club

Spring 2022

- Organized books in the book sale and help attendees find their desired material
- Packed the books and put them into storage once the event was over