Baotong Tian

+1 (585)-451-6253 • baotongtian1@gmail.com • user-tian.github.io
user-tian

Education

University of Rochester **August 2024 – Present**
Ph.D. in Electrical and Computer Engineering

Tsinghua University **September 2020 – June 2024**
Bachelor of Engineering in Automation
GPA 3.86/4.0

Scholarships & Awards

- **2021, 2022 Tsinghua Arts and Culture Merit Scholarship** (Awarded to undergraduate students for great contribution to cultural activities within the department)
- **2022, 2023 Tsinghua Academic Excellence Scholarship** (Awarded to undergraduate students for excelling GPA throughout the school year)
- **2023 Tsinghua Innovation Award of Science and Technology** (Awarded to undergraduate students with excellent research potential)

Publication & Conference Submission

- Borui, Zhang*, **Baotong Tian***, Wenzhao Zheng, Jie Zhou, and Jiwen Lu. "Exploring Unified Perspective For Fast Shapley Value Estimation." arXiv preprint arXiv:2311.01010 (2023). Under Review. [Arxiv]

Research Interests

Fields Speech Processing, Speech Diarization, Music Information Retrieval, Computer Audition, Music Generation, Audio Signal Processing

Methods Deep Learning, Neural Networks

Selected Course Projects

Every Word, Every Action and Every Thought **Jul, 2021-Aug, 2021**
Course: Object Oriented Programming, Advisor: Jingtao Fan
Department of Automation, Tsinghua University

- Achieved user & administrator registration and text storage in C++.
- Built a GUI for registration and text input/output display.

Metric Learning for Human Face Recognition **Nov, 2022-Dec, 2022**
Course: Pattern Recognition and Machine Learning, Advisor: Jiwen Lu
Department of Automation, Tsinghua University

- Modified ResNet and VGG16 for deep feature extraction.
- Applied techniques such as face alignment and contrastive loss to enhance performance.

Pushing Stones **Apr, 2023-May, 2023**
Course: Basis of Artificial Intelligence, Advisor: Hui Qiao
Department of Automation, Tsinghua University

- Achieved initial map generation including the position of person, stones and holes.
- Applied A* algorithm in searching the route.
- Built a GUI for map visualization and interactive playing.

Research Experience

Controllable Sheet Music Generation **June, 2021-Dec, 2022**

Research Assistant, Advisors: Xin Jin & Duo Xu & Song-chun Zhu
AI Music Group, Beijing Institute for General Artificial Intelligence

- Learned music psychology and emotion perception in music.
- Learned about the generative theory and basic structural analysis of tonal music.
- Participated in the implementation of Music And-or-Graph.
- Developed a genetic algorithm for **music variation** in Python.

Explainable Machine Learning **Feb, 2023-Present**

Research Assistant, Advisors: Jiwen Lu & Jie Zhou
Intelligent Vision Group, Department of Automation, Tsinghua University

- **Unified** current approaches of Shapley value estimation.
- Proposed **SimSHAP** as a simple and fast amortized Shapley value estimator (Paper submitted to **ICLR'24**, currently under review).

Work Experience

Automatic Chord Recognition for Pop songs (Internship) **Jun, 2023-Aug, 2023**

Algorithm Engineer, Advisor: Jian Wu
R&D Department, Beijing Deepmusic Technology Co.

- Applied Bi-LSTM for multi-task learning of bass and chord quality.
- Applied **Conditional Random Field** (CRF) as a post-filtering technique to enhance chord recognition task accuracy by incorporating context information.

Teaching

Teaching Assistant:

- ECE208/408 The Art of Machine Learning Spring 2025

Music Background and Interests

Singing

- Joined the school choir at primary school.
- Won the 4th place in the Singing Carnival in High School.

Instrument Playing

- Electric Piano (age 5 to 12, got the Amateur Highest Performance Level at the age of 12)
- Guitar (age 13 to present)

Music Composition & Production

- Learned basic music production skills such as music arrangement and mixing in college.
- Selected for the Class of 2021-2022 in **Tsinghua University's Music Dream Program**, which is designed to nurture and develop campus musicians.
- Released 6 songs on QQ music & The NetEase's Cloud music, produced by **Logic Pro X**.

Links

- Solo and Choir performance can be seen [here].
- My musician page on [The NetEase's Cloud Music], [QQ Music], and [SoundCloud].

Programming & Language Skills

Programming Skills:

- Proficient: Python, PyTorch, Markdown, LaTeX, Git
- Familiar: MATLAB, C/C++, Linux, TensorFlow, HTML, etc

Languages:

- TOEFL iBT: 104/120 (Reading 26, Listening 29, Speaking 24, Writing 25)
- GRE: 328/340 + 4.0/6.0 (Verbal 158, Quantitative 170, Analytical Writing 4.0)