YIWEI CHEN

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EDUCATION

Tsinghua University **Fall 2020 – May 2024 (Expected)**

Double Bachelor's Degree in Science and Engineering **Beijing, China**

- Double Degree of Bachelor of Science in **Mathematics and Physics** & Bachelor of Engineering in Civil Engineering and Systems.
- Current GPA: **3.85**/4.00 (Freshman year: 3.77, Sophomore year: 3.90, Junior year: 3.94).
- Academic Awards: Tsinghua University Comprehensive Excellence Scholarship (Top 20%, 2022); Tsinghua University Academic Excellence Scholarship (Top 17%, 2022).

RESEARCH EXPERIENCE

Federated Learning Contribution Estimation [1] **Sep. 2022 – Present**

Database Laboratory, Tsinghua University **Beijing, China**

- Advisor: Professor Guoliang Li Homepage.
- Key Contributions:
  - An in-depth survey. Examined a wide range of contribution estimation methods and dissected the problem into three key aspects: data utility metrics, contribution estimation schemes, and optimization techniques.
  - A comprehensive evaluation. Conducted an extensive evaluation of various state-of-the-art contribution estimation methods, comparing their effectiveness, robustness, and efficiency, which encompasses various datasets, data distributions, and adverse behaviors.
  - An extensive set of observations and findings. Identified the advantages and limitations of different data utility metrics, contribution estimation schemes and optimization techniques across various scenarios, as well as the summarized findings.
  - An extensible testing framework. Developed a flexible testing framework capable of accommodating multiple implemented methods, which serves as a potential benchmark for evaluating performance in this field.

PUBLICATIONS

[1] **Yiwei Chen**, Kaiyu Li, Guoliang Li, and Yong Wang. 2023. Contributions Estimation in Federated Learning: A Comprehensive Experimental Evaluation. *Manuscript* (2023).

SELECTED PROJECTS

AI for Connect 4 Game Code **Spring 2023**

Course Project for *Introduction to Artificial Intelligence* (90/100) **Beijing, China**

- Designed an evaluation function for assessing Connect 4 board positions, and leveraged it to implement an AI based on alpha-beta pruning algorithm for Connect 4 game in C++.

Band Management System Code **Spring 2022**

Course Project for *Principle and Application of Database* (A+) **Beijing, China**

- Designed a database for band management using E-R diagram, and implemented a band management system in Python and SQL with a local MySQL server.
- Key Features:
  - Graphical User Interace. Completed a basic graphical user interface for the system with Tkinter.
  - Band Management. Created a user-friendly interface for users to effortlessly create, search and join bands.
  - Song Management. Designed a song management module allowing users to create, search, and delete songs associated with their respective bands.
  - Performance Management. Enabled users to manage their band's performances. This feature not only allowed users to create, search, and delete performances but also facilitated the attachment of song lists.

MIDI-Compatible Keyboard Code **Spring 2022**

Course Project for **Beijing, China**

***The Fundamental of Computer: The Hardware/Software Interface* (A)**

- Designed and implemented a MIDI-compatible keyboard instrument with STM32 and STM32CubeIDE in C, allowing users to play and record MIDI notes into the DAW on their computers.

- Achievements: Led directly to the instructor of the course designing and introducing a mandatory experiment on MIDI keyboards, with the goal of getting students to understand the role of protocols.
- Key Features:
  - High-Accuracy Input. Improved user experience by implementing an jitter reduction algorithm, resulting in a low error rate, albeit using standard course-provided buttons.
  - Diverse MIDI Input Methods. Enhanced flexibility and compatibility by implementing two distinct MIDI signal input methods: a conventional setup alongside a cost-effective alternative approach.

Selected Courses

Tsinghua University **Fall 2020 – May 2024 (Expected)**
Double Bachelor's Degree in Science and Engineering **Beijing, China**

- Principle and Application of Database (A+).
- Data Structures and Algorithms (A).
- The Fundamental of Computer: The Hardware/Software Interface (A).
- Introduction to Artificial Intelligence (P, 90/100).
- Calculus A(2) (A).
- Probability and Stochastic Processes (A-).
- Fundamentals of Electronics (A).
- Fundamentals of Geomatics (A).

Professional Skills

- Language: English (CET-6); Chinese (Native).
- Technical Skills: Python (PyTorch, Sklearn, Seaborn), C++, MATLAB, SQL; LaTeX, Drawio (a diagram maker); Github, Overleaf; AutoCAD, Solidworks, Autodesk Inventor.

Extracurricular Activities

- **Deputy Group Leader.** Industrial Investigation Group of Weiyang College. Feb. 2022 – Jan. 2023
  - Contributed to Weiyang College Industrial Investigation Team's achievement of the 2022 Tsinghua University Student Social Investigation Gold Medal Team Honor (Top 27 among more than 1000 teams and sub-teams), and the 2022 Tsinghua University Student Winter Social Investigation First Prize Team Honor (Top 20).
- **Team Leader.** Baseball Team of Weiyang College. Sep. 2020 – Aug. 2022
  - Established the Baseball Team of Weiyang College.
  - Led the team to achieve 4th place in the Group B at Tsinghua Baseball Match in 2020.
- **Band Drummer.** Sep. 2017 – Present
  - Performed at live music venues including Dusk Dawn Club and YUYINTANG, with performance locations covering Beijing, Shanghai and Hebei.
  - Participated in the arrangement of some of the released songs of LostExit band.