

Runzhe Liang

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EDUCATION

Carnegie Mellon University

Aug 2021 – May 2025

B.S. in Computer Science (Machine Learning and Computer Systems Track), GPA: 4.0/4.0

Relevant Courses: Intro to Deep Learning (PhD), Intro to Computer Systems, Artificial Intelligence, Linear Algebra, Probability and Computing, Theoretical Computer Science, Multivariate Calculus, Web Development

EXPERIENCE

CMU 15-210: Parallel and Sequential Data Structures and Algorithms

Jan 2023 – Present

Teaching Assistant

- Led recitations and office hours for 200+ students on advanced algo design & functional programming in Standard ML
- Introduced and refined new lab infrastructure in C++ and helped recruit new TAs for future semester
- Topics taught range from dynamic programming to graph/randomized algorithms and parallel data structure design

CMU Data Interaction Group (DIG)

Sep 2022 – Dec 2022

Software Engineer Intern

- Designed data visualization schemes for evaluations of machine learning model performance for non-technical users
- Implemented an interactive evaluation visualization web interface using Typescript and Vega-Lite
- Collaborated with UX design team using Figma to improve user experience based on community feedbacks

CMU 15-251: Great Ideas in Theoretical Computer Science

Aug 2022 – Dec 2022

Course Tutor

- Held weekly 1-on-1 meetings with 10+ students to help identify and fill gaps in understanding of the course materials
- Topics covered including automata theory, computational complexity, randomized algorithms, and cryptography

PROJECTS

Distributed Text Search Engine | *Java, Lucene*

- Developed a text-based, large scale search engine indexed with Lucene API, supporting different retrieval models including boolean retrieval, BM25, Indri, LeToR, PM2, and xQuAD
- Trained a SVM classifier to rank documents by learning from manually assessed relevance judgments, using document dependent & independent features
- Be able to retrieve documents from 500,000+ files with either personalized or diversified results within 1 minute

Frame-Level Speech Recognition MLP | *Python, PyTorch, NumPy, Pandas*

- Created a multi-layer perceptron for frame-level phonetic transcription of raw Mel Frequency Cepstral Coefficients
- Implemented residual connection and memory-efficient dataset to speed up training process
- Used cosine annealing scheduling, optimizer switching, and ensemble technique to prevent over-fitting and improve validation accuracy
- Improved speech recognition accuracy by over 20% compared with the baseline model

Concurrent Web Proxy | *C Language*

- Built a fully functional web proxy that can accept, parse, and forward HTTP requests to end servers and fetch relevant content back to clients
- Used POSIX Threads library to generate threads that serve multiple concurrent requests in parallel
- Constructed a dynamic cache of 1GB to speed up HTTP requests by over 60%, applying mutex to avoid race condition

Dynamic Memory Allocator | *C Language*

- Implemented an efficient memory allocator using segregated lists, supporting malloc, free, calloc and realloc functions, with a throughput and memory utilization rate higher than the standard library implementations

TECHNICAL SKILLS

Languages: Java, Python, C/C++, SQL, Standard ML, OCaml, JavaScript, HTML, CSS, L^AT_EX

Frameworks: pandas, NumPy, PyTorch, React, Node.js, Express.js, Svelte, Bootstrap, Vega (Lite)

Developer Tools: Git, Google Colab, AWS, MongoDB, WandB, VS Code, PyCharm, IntelliJ, Clion, Vim