BOYU LIU

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GitHub: github.com/Ender-600

SUMMARY

High-achieving Junior Math & CS student with a strong foundation in Software Development, Machine Learning, and Mathematics with a strong passion for innovation and emerging technologies.

SKILLS

- Programming languages: **Python**, **C++**, **C**, **Java**, **JavaScript**, **TypeScript**
- Machine Learning: **Pytorch, TensorFlow, NumPy, Pandas, Matplotlib, Langchain**
- Web development: **React, Svelte, HTML, CSS, Spring Boot, Flask, FastAPI, Express.js**, **Node.js**, **MySQL, AWS**

EDUCATION

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN, LIBERAL ARTS & SCIENCES Expected Graduation: May 2026
Bachelor of Science, ***Mathematics and Computer Science*** *Major |* ***Physics*** *Minor* GPA: 3.86/4.00

- Dean's List, 2023 Spring, LAS James Scholar
- Relevant Courses: Introduction to Computer Science , Discrete Structure, Data Structure, Linear Algebra & Computational Application, Honor Fundamental Mathematics, Statistics and Probability, Computer Systems, Algorithms & Models of Computation, Applied Machine Learning, Database System

PUBLICATION

Liu, B. (2024). **Comparative Analysis of Encoder-Only, Decoder-Only, and Encoder-Decoder Language Models**. In *Proceedings of the 1st International Conference on Data Science and Engineering - ICDSE*; ISBN 978-989-758-690-3, SciTePress, pages 524-530. DOI: 10.5220/0012829800004547

WORK/ RESEARCH EXPERIENCE

NANJING UNIVERSITY Nanjing, China
Research & Development Assistant June 2024 – August 2024

- Worked in a team to develop a system (web application) that could generate visualization and evaluation to any given neural network and provide human-readable explanations based on various evaluation tests and metrics.
- Developed and achieved model structure visualization by integrating **TensorBoard** in a **Pytorch** framework
- Designed and implemented RESTful APIs using **Python** and **FastAPI** to handle the reception and storage of file
- Utilized Data Access Object(**DAO**)and enhanced zip file extraction algorithm to improve input file management system
- Integrated backend functionalities with a **React** front-end, utilizing **Ant Design** for a polished and user-friendly interface.
- Utilized **Postman** for comprehensive testing of backend APIs, ensuring the robustness and reliability of the system

DEEP LANGUAGE MODELS RESEARCH SEMINAR
Instructor & Supervisor: Prof. Pavlos Protopapas from Harvard University Remote
November 2023 – March 2024

- Studied topics of RNN, GRUs, LSTMs, Word Embeddings, ELMO, Seq2Seq, Transformers, BERT, and GPT
- Developed and compared SMS spam detection tools based on different deep learning models, including Naïve Bayes Classifiers, Random Forest, KNN, ELMO, BERT, and GPT2. Utilized TensorFlow, NumPy, Panda, Matplotlib, etc. (Link: colab.research.google.com/drive/1FdEMnr6JSJjVxdgczCiaB9Vaqfsg3Nbk)
- Complete a CVPR format research report and video presentation about this project in collaboration with my teammates, comparing the spam detection Accuracy, Precision, Recall, F1 scores, and ROC-AUC scores between different models

UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN Champaign, IL
CS124 Course Assistant June 2023 – May 2024

- Provided weekly debugging assistance and answered student queries every Wednesday, Thursday, and Friday
- Completed Machine Projects and aided students in online tutoring hours and on course discussion forum

PROJECT EXPERIENCE

TWITCH+: A PERSONAL TWITCH RESOURCES RECOMMENDATION ENGINE

Link: https://u5v6gtkbrw.us-east-2.awsapprunner.com

- Designed and developed a comprehensive full-stack **Spring Boot** application enabling users to search Twitch resources (streams, videos, clips) and receive personalized recommendations
- Created a responsive and user-friendly web interface using **React** and **Ant Design**, enhancing the user experience
- Utilized **MySQL** database hosted on **AWS RDS**, executing CRUD operations through **Spring Data JDBC**.
- Implemented **RESTful APIs**, retrieved real Twitch resources using Twitch API with **OpenFeign** HTTP client
- Integrated user authentication and authorization with **Spring Security**, supporting register, login, and logout.
- Developed a content-based recommendation algorithm by extracting game information from Twitch resources and utilizing users' favorite collections. Employed Spring Boot Caching with **Caffeine** to optimize performance
- **Containerized** the application and deployed it to **AWS App Runner** for scalable and efficient operations.

NEXT AI: A FULL-STACK WEB-BASED Q&A AI AGENT FOR PDF DOCUMENT QUERIES

Link: https://github.com/Ender-600/NextAI

- Created an interactive conversational UI leveraging **React** and **Ant Design**, enabling users to effortlessly upload and interact with PDF documents in real-time
- Implemented RESTful APIs via **Express** and **Node.js** with high-performance request handling
- Utilized an in-memory vector store to cache generated embeddings for efficient retrieval
- Integrated OpenAI's gpt-3.5-turbo API and **Langchain** technologies, resulting in a sophisticated AI Agent capable of document loading, splitting, storage, retrieval, and output functionalities

PHOTON PICTURE OFFICIAL WEBSITE

- Link: uiucphoton.com/
- Developed Photon Picture (a film club) official website with another developer, utilizing **Svelte** framework and **Bun** environment; created an intuitive and navigable online platform for club members
- Contributed innovative ideas to unify the website's overall design aesthetic & UI; Executed collaborative design concepts and delivering a polished front-end webpage leveraging Notion CMS as the database.