Zhiyuan Song

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Education

University of California, Santa Cruz **Sep. 2022 – June 2026**
Bachelor of Science in Computer Science *GPA: 3.97/4.00*

Relevant Coursework

- Data Structures & Algorithms
- Computer Systems & Assembly Language
- Computer Systems & C Programming
- Applied Discrete Mathematics
- Beginning Python
- Programming Abstractions in Python

Technical Skills

Programming Languages: C, C++, C#, Java, JavaScript, HTML/CSS, Assembly Language, Python, R
Technologies/Frameworks: Node.js, Pandas, NumPy, libcurl
Development Tools: Git, GitHub, VS Code, PyCharm, IDLE
Operating Systems: Ubuntu, Linux, Unix

Projects

Web Crawler in C | *C Programming, Web Scraping, libcurl, Regex* **November 2023**

- **Project Description:** Spearheaded the development of a Basic Web Crawler in C, leveraging fundamental web scraping techniques and systems programming.
- Used command-line arguments to set seed URL, page directory, and crawling depth.
- Employed **URL normalization techniques** to ensure consistency and enhance the reliability of the crawling process.
- Integrated **libcurl** for efficient HTTP requests, enabling seamless HTML retrieval from web pages.
- Orchestrated the design and implementation of HTML parsing functionalities, utilizing **regular expressions** to extract hyperlinks from page content.
- Engineered a **FIFO queue** to manage crawling, prioritizing URLs by insertion order.
- Implemented **error handling mechanisms** to gracefully manage exceptions, including failed URL normalization, download errors, and memory allocation errors.

Word Range Queries using AVL Trees | *C++ Programming, Data Structures, Algorithm Optimization* **April 2024**

- **Project Description:** Spearheaded the development of an advanced data structure utilizing **AVL trees** to perform efficient insertions and range queries on large-scale text data.
- Implemented a **self-balancing AVL tree** to maintain optimal performance for insertion and query operations.
- **Enhanced AVL tree nodes** with subtree size, max, and min value properties to speed up range queries.
- **Optimized** the data structure to handle 2M insertions and queries in under one minute, ensuring high efficiency.
- Developed a custom **range query algorithm** using AVL tree properties for **logarithmic time complexity**.
- Conducted **extensive testing** using a variety of input scenarios to ensure robustness and accuracy of the data structure.

Rewards

Dean's Honor: Winter 2024, Fall 2023, Spring 2023, Winter 2023, Fall 2022