HONGZHI LIU

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Education

- **University of Massachusetts Amherst** — Amherst, MA
  Master of Science in Electrical and Computer Engineering — *Feb. 2016 – Feb. 2018*
- **Beijing Technology and Business University** — Beijing, China
  Bachelor of Engineering in Electrical and Electronics — *Sep. 2008 – Sep. 2012*

Relavant Courses

- **Self-taught courses:**: CS106B Programming Abstractions, CS106X Programming Abstractions in C++, CS106L Standard C++ Progrmaming, CS170 Efficient Algorithm and Intratable Problems
- **University courses**: ECE242 Data Structures and Algorithms, ECE665 Advanced Algorithm, ECE570 System Software Design, ECE603 Probability and Random Process, ECE697DA Data Mining, ECE697IP Digital Image Processing

Projects

- **Fun with Data Structures** — C++
  side project
  - **Data Structures**: Implemented various of Data Structures including Stack, Queue, Linked List, Hash Table, Binary Search Tree, Binary Heap, Graph and Union-Find
  - **Sorting**: Implemented various of Sorting Algorithms both recursively and iteratively including Bubble sort, Selection sort, Insertion sort, Merge sort, Shell sort and Quick sort
- **Trailblazer** — C++
  side project
  - **Path-searching**: Implemented **Depth-first search, Breadth-first search, Dijkstra's algorithm and A* search** to explore the 2-dimensional world. User can load mazes, terrians or maps, select different searching algorithm, and visually see how does they behave differently as they explore
  - **Build my own Google map**: Build my own version of Umass campus map and see how the searching algorithms work in graph of real-world.
- **Smashing the stack** — C & GDB
  independent
  - **Corrupt the stack**: Using GDB to find the return address of a specific function, overwrite it such that `Shellcode` will be executed as the function return, allowing us to gain the root access
- **Disk Scheduler and Thread library** — C++
  independent — *auto-grader:100/100*
  - **Disk Scheduler**: Write a concurrent program to issue and service disk requests using a provided thread library
  - **Thread library**: Implement a thread libray to support multiple threads within a Linux process using context switching
- **Virtual Memory Manager** — C++
  independent — *auto-grader:100/100*
  - **Pager**: Implemented an external pager that handles virtual memory requests for application processes, including address space creation and deconstruction, read and write faults
  - **Clock**: Utilized the second-chance clock algorithm for page replacement
- **Secure Instant Messaging** — Java
  group in pair
  - **Connection**: Socket programming to achieve the connection between clients and server
  - **Security-centered**: Design and implement `AES, RSA, SSL protocol` to provide secure data communication
- **Hyper-spectral image Fusion and Segmentation** — MATLAB
  group in pair
  - **Fusion**: Fuse two Hyper-spectral images using Harris corner dection and feature matching algorithms
  - **Segmentation**: Segmenting Hyper-spectral image using a combination of Principle Component Analysis and k-means clustering based approach

Programming Skills

- **Languages**: C++, C, Java, Python, MATLAB
- **Environment and Tools:**: Linux, Bash, Git, GDB, Vim, Makefile, Docker, LaTeX, KaTeX, Markdown