Darren Dong

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EDUCATION

University of Michigan, Ann Arbor, MI

M.S.E in Computer Science and Engineering **Expected: May 2027**

B.S.E in Computer Science with Minor in Electrical Engineering, GPA: 3.848/4.0 **Expected: May 2026**

Relevant Courses: Data Structures and Algorithms, Advanced Operating Systems, Computer Security, Foundations of Computer Science, Web Systems, Machine Learning, Artificial Intelligence, Computer Vision, Practical Data Science

EXPERIENCES

IT Automation Prompt Engineering Intern | *Keurig Dr Pepper, Frisco, TX* **June 2025 - August 2025**

- Piloting automated shelf image analysis with GenAI and computer vision to identify product voids and potential revenue loss; current testing focuses on optimizing image resolution and model accuracy.
- Designing and building an operator-support chatbot for the Allentown plant; early pilot aims for a 20% reduction in troubleshooting downtime and $300K in annual revenue growth based on projected OEE improvements.

EECS 442 Computer Vision Instructional Assistant | *University of Michigan, Ann Arbor, MI* **January 2025 - Present**

- Developed homework assignments on neural networks and contrastive learning for a computer vision course (100+ students), enhancing both conceptual and practical skills.
- Held weekly office hours and provided prompt support on Piazza to reinforce lecture content and address student questions.
- Maintained the course website by updating links and resources, ensuring reliable access to current information.

Research Assistant | *University of Michigan, Ann Arbor, MI* **May 2023 - August 2023**

- Built an affordable, sustainable greenhouse ventilation system (under $100) using durable, weather-resistant components; ensured easy assembly and public accessibility and achieved sub-2-second responsiveness to temperature changes and push-button interactions, with full shutter motion completed within 10 seconds of receiving a signal.
- Maintained regular communication with the supervising professor to planned future phases, including wireless networking integration with ESP32.

PROJECTS

Network File System **April 2025**

- Designed and implemented a distributed file system supporting concurrent read, write, create, and delete operations using socket programming, enabling multiple client processes to interact with shared files reliably.
- Employed reader-writer and upgradable locks to maintain data consistency and ensure safe concurrent access under high load, preventing race conditions and deadlocks.

Virtual Memory Pager **March 2025**

- Designed and implemented a C++ virtual memory pager supporting address space management, including swap/file-backed pages, copy-on-write, and dynamic swap sharing for parent and child processes. Managed page state and permissions with read/write, dirty, and referenced bits; optimized memory eviction using the clock replacement algorithm.
- Enabled core operations such as mapping, context switching, and forking, demonstrating a deep understanding of process isolation and OS-level resource management.

C++ Thread Library **February 2025**

- Developed a multithreaded library with preemptive scheduling and thread lifecycle management, enabling fair CPU allocation across multiple cores (SMP) in a simulated OS kernel.
- Implemented advanced synchronization primitives (mutexes, semaphores, conditional variables) and integrated deadlock detection/prevention, RAII resource management, and interrupt-driven context switching for robust & efficient parallel execution.

Foundational Search Engine **November 2024**

- Built a distributed search engine using a custom MapReduce framework, scaling to process and index large web directories across multiple worker nodes with dynamic task reassignment and failure recovery.
- Developed an efficient query handling module with support for pagination, caching, PageRank algorithms, and asynchronous API requests, creating a unified, fault-tolerant and relevant information retrieval pipeline of regularly updated datasets.

SLAM and Navigation of a Two-Wheeled Robot **January 2024 - April 2024**

- Programmed a two-wheeled robot to autonomously explore mazes using particle filter-based sensing and odometry precision, though fine motor PID tuning, minimizing movement error, and achieving pose accuracy within 10 cm and 30° of target
- Deployed A* path planning and real-time obstacle avoidance, enabling efficient and safe traversal of dynamic environments.

SKILLS

Programming Languages: C++, Java, Python, JavaScript, SQL, C, HTML, CSS, Dart, Shell Scripting

Frameworks & Libraries: Flask, React, Flutter, Jinja2, PyTorch, NumPy, Pandas

Platforms & Tools: Linux, Windows, macOS, Docker, AWS, Git, GitHub