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: Machine Learning, Artificial Intelligence, Computer Vision, Natural Language Processing, Practical Data Science, Data Structures and Algorithms, Web Systems, Sensors and Signals, How to Make Robots

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

Retrieval-Augmented Generation (RAG) Course Assistant **April 2025**
- Engineered preprocessing pipeline with recursive chunking and General Text Embeddings for robust document retrieval, multimodal support for diagrams and slides using CLIP embeddings, improving comprehension of visual course content.
- Evaluated multiple embeddings, LLMs, and hyperparameters; optimized pipeline achieved high accuracy on 15 course-specific QA queries, outperforming baseline no-context LLMs.

Dog Species Image Classification **November 2024**
- Evaluated ViT, CNN, and InceptionNet architectures with transfer learning; iteratively tuned layers, batch norm, residuals, and applied extensive data augmentation and preprocessing to address dataset biases.
- Analyzed training/test splits to mitigate color correlation; final model used targeted ViT on augmented, balanced data.
- Explored performance improvements via learning rate adjustments and weight initialization; future work includes cross-validation and extended GPU training.

Recipe Rating Prediction **November 2024 - December 2024**
- Cleaned and merged 80,000+ recipes and ratings; parsed nutritional and recipe features for analysis.
- Conducted exploratory data analysis to identify relationships between nutritional values, recipe complexity, and user ratings.
- Engineered log-transformed and polynomial features to capture non-linear effects in nutritional data.
- Developed ridge regression models with RobustScaler and optimized hyperparameters to predict recipe ratings.

SLAM and Navigation of a Two-Wheeled Robot **January 2024 - April 2024**
- Programmed a two-wheeled robot to autonomously explore unknown mazes using particle filter-based SLAM and LIDAR localization, achieving pose accuracy within 10 cm and 30°.
- Deployed A* path planning and real-time obstacle avoidance, enabling efficient and safe traversal of dynamic environments.
- Enhanced odometry precision by tuning motor controls with PID algorithms, minimizing movement error.

Object Detection and Classifications **March 2024 - April 2024**
- Implemented the YOLOv8 model for efficient multi-object detection, focusing on five fruit classes using a Kaggle dataset. Achieved bounding box detection and confidence levels up to ~90%.
- Conducted a research-driven analysis to implement a fusion model based on EmotionNet and Central Binary Local Pattern (CBLP) algorithm. Achieved 50% accuracy with EmotionNet and 33% with the CBLP algorithm for emotion recognition.

SKILLS

Programming Languages: Python, C++, SQL, Shell Scripting
Frameworks & Libraries: PyTorch, TensorFlow, NumPy, Pandas, Matplotlib, OpenCV, Scikit-learn, Flask
Platforms & Tools: Jupyter Notebook, Google Colab, Linux, Windows, Docker, AWS, GCP, Git, GitHub