Benat Froemming-Aldanondo

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EDUCATION

University of Minnesota, Minneapolis, US — September 2021 — May 2025
Bachelor's of Science in Data Science, Computer Science & Engineering Department — Cumulative GPA: 3.712/4.00

Relevant Courses: Software Engineering, Data Structures & Algorithms, Computer and Database Systems, Machine Learning Fundaments, Linear Algebra, Intro to AI, Data Mining, Optimization, Deep Learning, Natural Language Processing, and Computer Vision.

University of Minnesota, Minneapolis, US — September 2025 — 2026
Master's of Science in Computer Science, Computer Science & Engineering Department

SKILLS

Python, Java, C/C++, R, SQL, Algorithms, Web Development, Linux, Github, PostgreSQL, Machine Learning, ROS, OpenCV, LaTex, Statistics, Spanish

PROFESSIONAL EXPERIENCE

Undergraduate Researcher — Minneapolis, Minnesota
Minnesota Robotics Institute, Maria Gini's Group — September 2024 – December 2024

- Developed an object-oriented simulation framework in Python to evaluate multi-agent vehicle coordination algorithms.
- Designed and implemented a novel deep reinforcement learning algorithm in PyTorch, achieving a 21% increase in traffic capacity.

Research Intern — Detroit, Michigan
National Science Foundation - Michigan State University & Lawrence Tech University — May 2024 — August 2024

- Designed, deployed, and validated lane-following and adaptive speed algorithms on real drive-by-wire vehicles using C++ with ROS, reducing acceleration and braking at intersections by up to 75.35% compared to human drivers.
- Developed novel vision-based lane-following algorithms in Python utilizing OpenCV, unsupervised clustering techniques, and deep learning models for enhanced performance.
- Collaborated with a team of research interns, leading development efforts and managing version control with GitHub, resulting in a successful submission to a top-tier conference.
- Built a cost-effective roadside unit using a Raspberry Pi (Linux Ubuntu) and Arduino for vehicle-to-everything (V2X) communication.

PROJECTS

Backend Lead, Major Planner Project, Social Coding Club — January 2024 – May 2024

- Developed a web application using Python and Flask to assist students in identifying the optimal majors based on their preferences.
- Extracted data from the university's database in JSON format and implemented a robust data cleaning pipelines in Python.
- Created a custom recommendation algorithm to provide tailored suggestions for students.

Motion & Mapping Lead, Micro Mouse Robot, IEEE Club — September 2024 – Present

- Building an autonomous robot from scratch using a microcontroller, motors, and sensors for maze traversal.
- Developing and optimizing pathfinding algorithms (Dijkstra's, A*, DFS, Floodfill) for autonomous maze-solving, both in simulation and on the real robot using Python and C++.

Flag Guessing Web App — December 2022 – Present

- Designed and developed an interactive educational website for learning world flags using HTML, CSS, and JavaScript, reaching 1000+ users.

Course Projects — September 2021 – Present

- Implemented a feed-forward neural network with backpropagation from scratch in Python, utilizing Numpy, Pandas, and Matplotlib to classify handwritten digits from the MNIST dataset, achieving 92% accuracy on test data.
- Developed the Wordle game in Java, adhering to object-oriented programming principles and providing a user-friendly interface.
- Performed exploratory data analysis with R and Python on the COVID-19 World Health Organization dataset and applied supervised and unsupervised machine learning models to predict propagation trends.
- Extracted key insights about a flight network using SQL and PostgreSQL, enhancing operational efficiency as part of an air control system and optimizing route networks and pricing strategies using Julia.
- Understood and modified PostgreSQL's backend in C to implement a custom buffer replacement policy.
- Designed and implemented a heuristic algorithm based on A* to solve the coverage path planning problem, achieving optimal results significantly faster than exhaustive search methods.