

ELLIOT DUBUQUE

4655 M72 ◊ Harrisville, MI 48740
(+989) 657-2141 ◊ edubuque13@gmail.com ◊ elliotdubuque.com

EDUCATION

University of Michigan, Ann Arbor

Aug 2019 - April 2023

B.S.E in Computer Engineering

Concentration in Robotics, Embedded Systems, and System Software

EXPERIENCE

FlowNodes, Mountain View CA

August 2022 - Feb 2023

Freelance Embedded Software Engineer

Embedded Systems, Backend Development, IoT

- **Hands-on Development:** Planned, 3D printed, and built a calibration station using an arduino, stepper motors, anemometers, and a bluetooth module.
- **Realtime Data:** Designed calibration software in python using multi-threading and bluetooth for real-time data extraction and wireless communication.

FANUC America Corporation, Rochester Hills MI

May - August 2022

Motion Engineering Intern

Robotics, Python, Matlab, C

- **Code Architecture Analysis:** Examined, evaluated, and emulated the spline motion planning and spline speed control algorithms using Matlab and Python.
- **Algorithm Optimization:** Produced a structured analytical report showcasing 15% faster average path speeds as well as a user-facing guideline for programming perfect spline paths.

University of Michigan, Ann Arbor MI

May 2020 - Feb 2021

Researcher: Formal Verification of Cyber-physical Systems

C++, C, Matlab, ROS, OCAML

PROJECTS

Job Prospect AI

2023

Solo Passion Project

Fullstack, AI, Python, Typescript

- **Front-end Development:** Wireframed and built a complex Single-Page Application using NextJS, React, and TailwindCSS hosted on an AWS Amplify instance
- **Back-end Design:** Implemented storage, auth, and compute functions using Supabase and FastAPI
- **AI Processing Pipeline:** Tested and iterated multi-stage pipeline using Selenium to concurrently scrape web pages and Langchain to compose a multi-model architecture tuned with careful prompt engineering.

Posture Controlled Robotic Arm

2023

EECS 467 Final Design Project

Robotics, Python, Computer Vision, Machine Learning

- **Designing the System:** Built a 5DOF robotic arm with a joint configuration mimicing a human arm, controllable through two cameras via our pose & joint detection CV pipeline.
- **Wireless Communication:** Filtered extracted joint angles to create smooth velocity commands that were sent asynchronously to an HTTP server hosting the robot's software environment

SLAM Mobile Robot

2023

EECS 467 Project

Robotics, C++, SLAM

- **SLAM Implementation:** Crafted and executed SLAM using Monte-Carlo Localization combined with A* path planning for precise navigation
- **Motor & Motion Control:** Engineered PID motor-controllers and a comprehensive motion control stack to seamlessly integrate with upper-level path planning strategies

Network File Server

2022

EECS 482 Multi-Client Network File Server and Client Interface

Networking, Operating Systems, C++

- **Concurrent Client Handling:** Developed a multi-client network file system capable of managing concurrent clients in parallel, ensuring robust access protections and efficient data handling.

Monocular Depth Estimation

2023

Rapid Depth Estimation of RGB images

Python, PyTorch, Computer Vision, Machine Learning

- **Model Architecture:** Developed an encoder-decoder network to break down training data to feed into a CNN model which could perform estimations
- **Estimation Results:** Realized a loss of 0.02 on validation and test set after being trained on over 250,000 images.

Enhanced AV Path Planning

2023

Dynamic Path Planning in a Partially Visible Environment

Robotics, Python, Simulation, AV

- **D* Lite Implementation:** Implemented D* Lite for path planning in an environment with moving obstacles and limited vision.
- **Implementation Results:** Resulted in our algorithm decreasing computation time by 66% and memory use by 80% when compared to Repeated A* in a simulated physical environment.

Other Projects

Multi-Core Threading Library, OS Pager, Robotic Laser Tag, AI Chess Bot & GUI

TECHNICAL SKILLS

Skills	Embedded Systems, Robotics, Full Stack, Data
Languages	C, C++, Python, Type/JavaScript, SQL, ARM Assembly
Frameworks	Linux, TensorFlow, PyTorch
Frontend	Next.js, React.js, TailwindCSS
Backend	Express, Next.js, REST
Databases	SQLite, MongoDB, PostgreSQL, Supabase
Hobbies	Mountain Biking, Running, Hiking, Video Games, Exploring Tech