

ELLIOT DUBUQUE

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

OBJECTIVE

Recent Computer Engineering graduate from the University of Michigan with a deep-seated passion for technology and software development. Skilled programmer who enjoys building useful products. Always on the lookout for like-minded professionals and exciting opportunities to innovate and grow.

EDUCATION

University of Michigan, Ann Arbor

Aug 2019 - April 2023

B.S.E in Computer Engineering, Cum Laude

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.
- **User Friendly Design:** Constructed python REST API with extensive documentation to kick-start open source user development.

FANUC America Corporation, Rochester Hills MI

May - August 2022

Motion Engineering

Robotics, Python, Matlab, C

- **Code Architecture Analysis:** Examined, evaluated, and emulated the spline motion planning and spline speed control algorithms using Matlab and Python.
- **Process Automation:** Developed python path-building library to test out unique and challenging paths that contained varying amounts of curvature, discontinuities, etc.
- **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

- **Infrastructure Development:** Developed a C++ communication infrastructure using ROS to bridge gap between quadcopter flight controls in C and verification models in OCAML.

PROJECTS

Posture Controlled Robotic Arm

2023

Robotic Arm with REST API and CV Pipeline

Robotics, Python, Computer Vision, Machine Learning

- **Robotic Arm Design:** Engineered and built a 5DOF robotic arm to mimic the joints from a human arm, controllable remotely through an http server in python.
- **Machine Learning Pipeline:** Utilized a CV model to extract joint angles from two real-time camera feeds that are sent to the motion controller.
- **Motion Controller:** Developed an algorithm to smooth motion by filtering noise and implementing a velocity controller with velocity commands being sent remotely to arm.

SLAM Mobile Robot

2023

Simultaneous Localization and Mapping, Kinematics and Controls on a Mobile Robot

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

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, Job Prospect AI

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