ELLIOT DUBUQUE

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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