

## **PROJECTS - Further information and proof supplied on request**

### ***Deep Q-Learning Self Study, November 2024-Current, Personal***

- Implemented Q-learning in PyTorch with the OpenAI CartPole environment
- Currently working on making a working implementation of the more complex CarRacing environment

### ***Aerial Path Planner, October 2024-December 2024, UMO***

- Used OpenCV to create a program that creates a panorama from aerial drone footage
- Utilized PyTorch to create a 24 class segmentation model with only 400 images that achieved a 92% accuracy which would be applied to the panorama
- Utilized the ZoeDepth ML algorithm to create an elevation map of the panorama
- The second half of this project which was not completed by me used the color, height, and segmentation maps to inform an A\* algorithm to plot paths on the terrain

### ***Graphite Coating Machine Prototype V1 and V2, August, 2021-May, 2024, General Electric***

- Building machine that sprays blade dovetails with Graphite solution in order to get rid of farmed out process, decreasing lead time from 4.5 weeks to 2 days
- Sprays, Bakes, and cools part at rate determined by the takt time
- Sensor, Programming, and Electrical work, tying together over 40 sensors, as well as driving all part conveyance, and passive data gathering

### ***Gas Blade Inspection Line Rework, June, 2021, General Electric***

- Reworked ~10 minutes of paperwork per part into a 6 second scan with Cognex camera based scanners
- Created application using Javascript + React + Webpack that queries many different databases using embedded SQL and extrapolates all part information from every previous process in order to determine if the part is ready to be shipped
- If part is not ready for shipping, the automated application explains exactly what is wrong with the part, and how to get it fixed

### ***Coordinate Measuring Machine (CMM) Rework, July, 2022, General Electric***

- Reworked Coordinate measuring machine to better fit “lean manufacturing” standards
- Worked with operators and supervisors to draw up new CMM layout
- Reconfigured Machine to be right-sized, including rerunning all control equipment and operator interface equipment

### ***My Pocket Workshop, Summer, 2023, Business Launch Attempt***

- Business that links together Maine’s existing manufacturing companies to source parts for user created designs, and ship their materials and instructions directly to them
- Cutting down on users’ costs by combining many user projects into bulk orders, reducing material and shipping costs
- Anticipated to have website where users can submit orders and view and purchase other users’ creations
- Anticipated to have specialized kits for difficult projects to aid in engineering education for all ages
- Wrote website using typescript, react, and webpack in order to make aesthetically pleasing user interface for My Pocket Workshop
- Data Storage using MongoDB
- Launched with GoDaddy services

*Cluster Computing with BeagleBone Black, Spring, 2023, Center for Undergraduate Research*

- Mentored by Professor Vincent Weaver
- Created Cluster of eight beaglebone black rev c embedded boards
- Compared processing speed, power consumption, and cost to a similar cluster computer that utilizes Raspberry Pi embedded boards
- Anticipated to Speak at a Conference in April 2023 to report my findings

*UMO BBR Mining Robot V1, June, 2022, Black Bear Robotics*

- Programmed a remote controlled lunar mining robot using the Robot Operating System (ROS2)
- Created transmitter-receiver link between robot and laptop through the use of a wifi router
- Wrote Shell Script to run python movement control program on startup
- Demonstrated learning and proficiency in the Robot Operating System (ROS2)

*UMO BBR Mining Robot V2, June 2023, Black Bear Robotics*

- Reprogrammed a remote controlled lunar mining robot using the Robot Operating System (ROS2)
- Created transmitter-receiver link between robot and laptop through the use of an onboard wifi router
- Wrote Shell Script to run python movement control program on startup
- Arduino C++ program to parse control data from robot and command movement, in addition to relaying motor data back to controller
- Remote Control Interface with remote camera feed, controls, and robot movement data displayed on laptop for easy controlling, written in python with Pygame

*Electric Skateboard V1, June, 2020, Personal*

- Custom built skateboard powered by single belt driven motor
- Speed Control based on input from bluetooth handheld remote
- Designed and 3D Printed all hardware housing, built for quick swapping Lithium Polymer batteries

*Electric Skateboard V2, September, 2022, Personal*

- Custom built skateboard with dual belt-driven motors
- Speed Control based on input from UART Controller, intercepted by Dual VESC
- Designed and 3D Printed all hardware housing
- Hidden Copper Braided cable embedded in the deck to connect rechargeable battery to control electronics, allowing for flexing of the deck

*Boost Convertor, May, 2022, UMO*

- Designed Circuit that generated 24 Volts when supplied 12 Volts
- Authored thorough Technical Report
- Completed in depth cost analysis

*Pong Game, December, 2021, UMO*

- Recreated the video game "Pong" in Verilog
- Wrote custom VGA driver for displaying
- Established keyboard capability using PS2 port

*Tower Takeover Dungeon Crawler Game, December, 2021, UMO*

- Created personal dungeon crawler game in c++
- Demonstrated high proficiency in object oriented programming, inheritance, and pointers
- Command line and input file driven gameplay

*Head of Computer Science Boot Camp, **July, 2018 & July, 2019**, Maine Central Institute*

- Coordinated Curricula for two different age groups spanning ages 7-16
- Demonstrated the ability to teach children the basics of computer programming
- Established foundational Administrative skills