Alexander Bowler

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Education

University of Michigan Aug. 2022 – May 2026
BSE in Computer Science *Ann Arbor, MI*

- GPA: 4.0/4.0
- Courses: Machine Learning, Robot Control, Reinforcement Learning, Operating Systems, GPU Programming

Experience

Robotic Controls Test Engineering Intern | *C++, Protobuf, Gazebo, CAD* May 2025 – Present
Symbotic *Wilmington, MA*

- Created a low overhead sensor noise injection framework to alter sensor readings with various types of noise
- Created digital twin for mobile bot in Gazebo with driving and case handling capabilities. Used to automate testing and move on-bot tests to CI/CD framework
- Wrote Gazebo Plugins to efficiently simulate physical interactions while avoiding expensive internal collisions

Computer Vision Engineering Intern| *Python, Pytorch, IsaacSim, Docker* Jan. 2025 – May 2025
IMetalX *Sausalito, CA*

- Researched, designed, and implemented an instance segmentation pipeline utilizing a YOLO detection model, and promptable SAM segmentor
- Developed a Space Simulation tool utilizing Nvidia IsaacSim to generate over 30,000 unique images of satellites
- Aided in the development of a secure docker container, and deployment to a secure test center for a customer demo

Organizations

Michigan Robotic Submarine Team - Software Lead | *Python, ROS, Docker, Git* Aug. 2023 – Present

- Researched Extended Kalman Filters and currently applying it to DVL and IMU sensor data
- Developed HSV filtering pipeline with timed service requests to enable efficient object detection
- Reorganized and rewired submarine's electrical system, achieving a tenfold reduction in motor power loss

Michigan Student AI Lab (MSAIL) - ML Discussion Leader | *Python, Git* Jan. 2024 – Present

- Founded and led a weekly initiative to discuss recent advancements in AI and provided an opportunity for members to present impactful research papers in machine learning
- Created a multilayer perceptron from scratch and applied it to a credit card fraud dataset achieving 99% accuracy

Projects

GPT-2 124M Model | *Python, Pytorch, HuggingFace, LambdaLabs*

- Recreated OpenAI's GPT-2 architecture utilizing GPT-2 and GPT-3 papers and Andrej Karpathy's GPT series
- Wrote a multi-gpu training script utilizing full capabilities of 8 H100s to train the 124 million parameter GPT-2 model, achieving a lower loss than OpenAI's GPT-2

Multi-class Image Classification on GTSRB | *Python, Pytorch, CLIP, Git*

- Designed and trained multiple neural networks to classify the 43 classes from the German Traffic Sign Recognition Benchmark, obtaining 84% accuracy utilizing a deep neural network, and 88% accuracy utilizing a CNN
- Utilized OpenAi's CLIP model zero-shot to classify the images on a variety of synonymous class labels

Technical Skills

Languages: C/C++, Python, Java, Matlab, Julia
Frameworks: ROS/ROS2, GoogleTest, Pytest, Gazebo, Cuda
Developer Tools: Git, Docker, VS Code, IntelliJ, CMake
Libraries: Pandas, NumPy, Matplotlib, Tensorflow, Pytorch, CLIP, OpenCV