Seth Robles: Mechanical Engineering & Robotics Portfolio

See more at my website https://sethrobles.github.io

Marine Autonomy Lab: Ping360 Integration

Ping360 Polar Heat Map (First 360° Cycle)
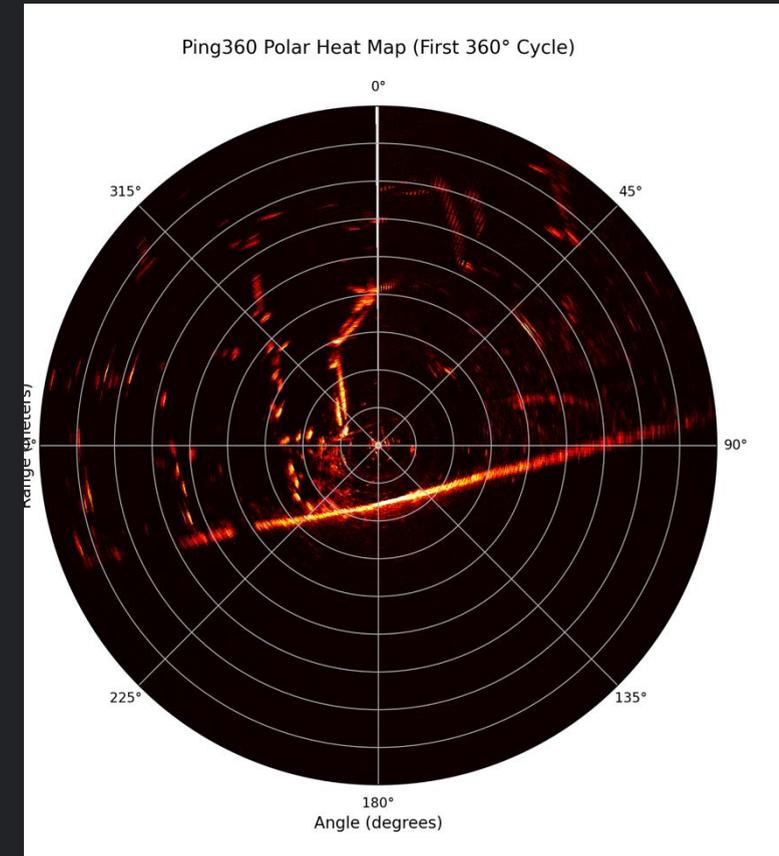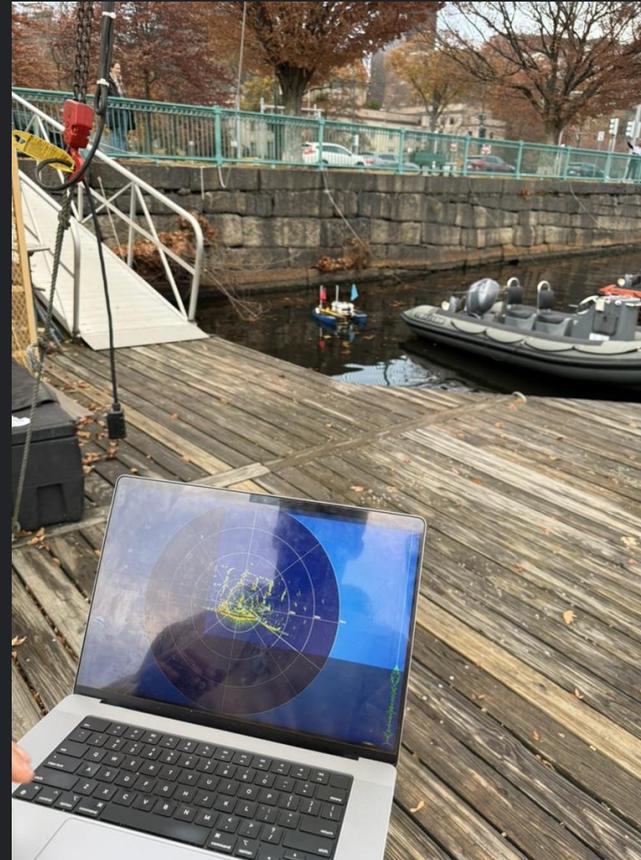
C++ Library

Wrote code for a c++ library to interact with Ping360 firmware communication protocol

MOOS-IvP Integration

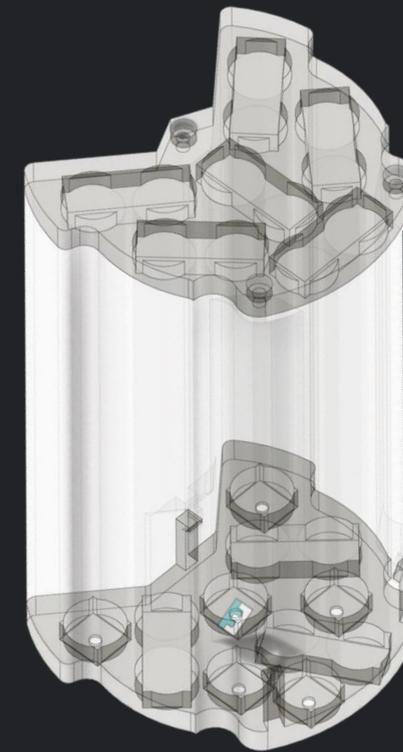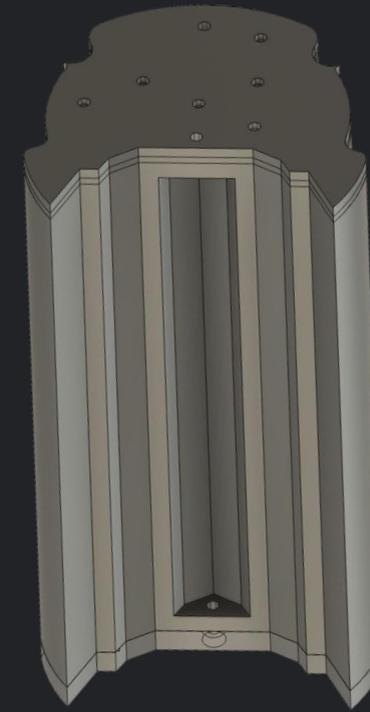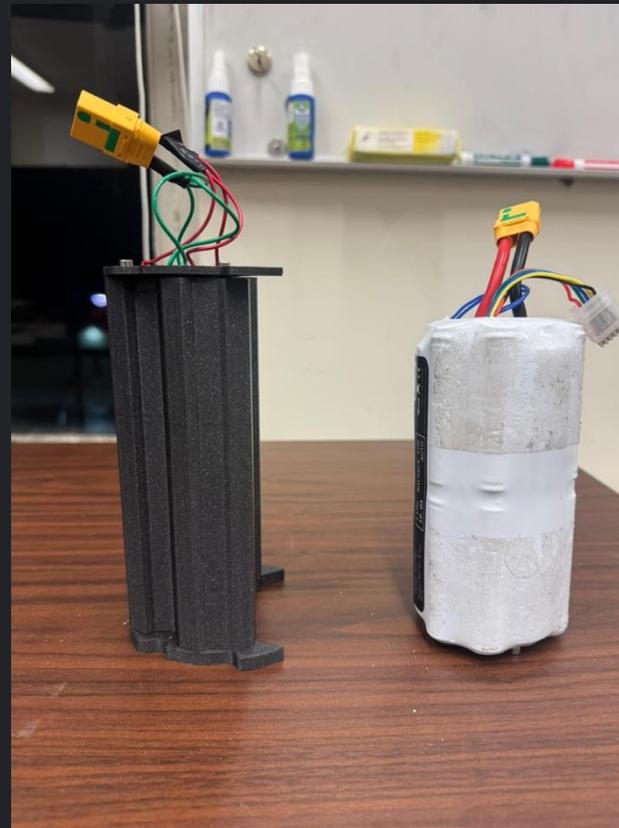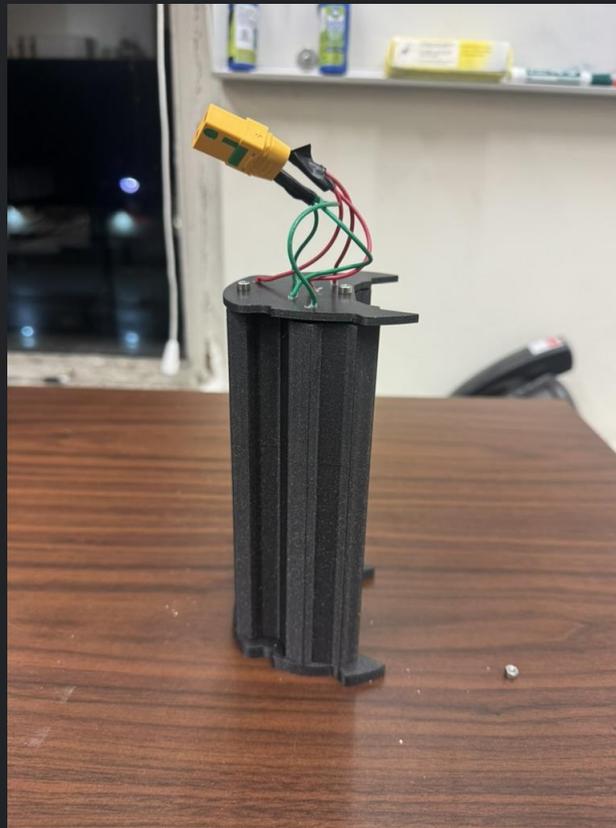Used developed c++ library alongside MOOS-IvP to create a Ping360 app for logging sonar data

Future Goals

Develop mapping and SLAM tools to work for object avoidance and mapping of the Charles River

Marine Autonomy Lab: AA Battery Pack
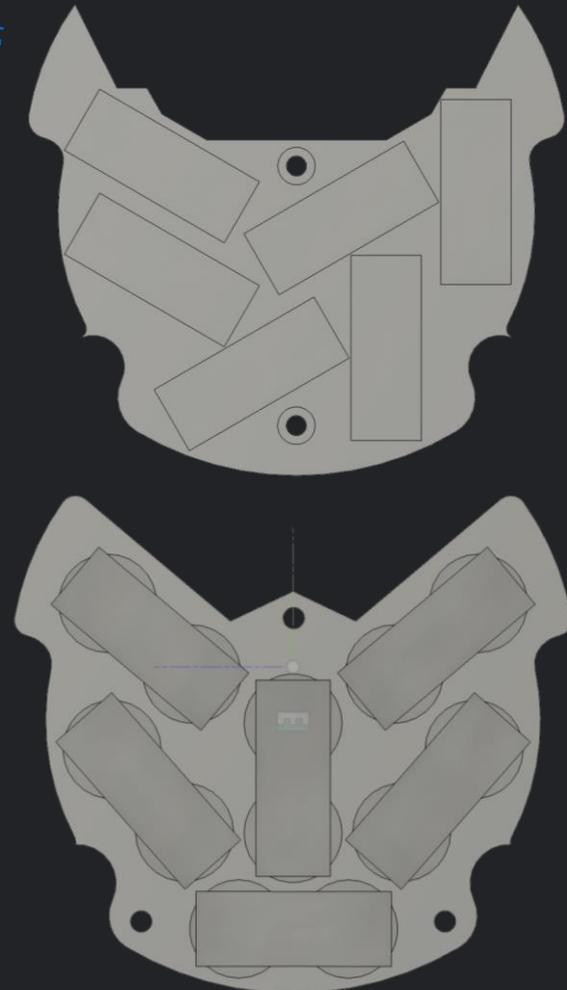
AA Battery Pack

Designed a 12s3p AA battery pack for low resource and high-risk environment
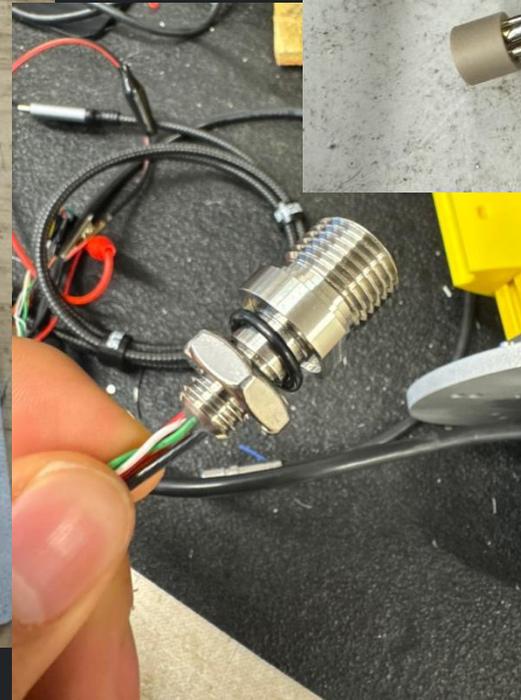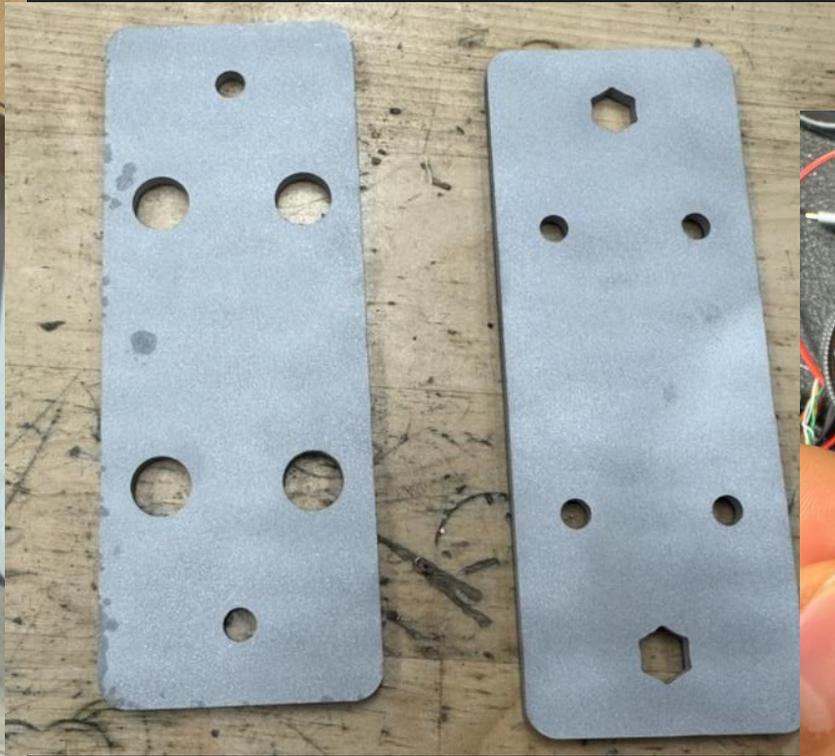
Spurdog AUVs

Designed to fit in a 16-cm space, giving only 1 cm of clearance for design

Skills Used

Fusion 360 (Lab Standard), soldering, FDM Printing

Marine Autonomy Lab: Additional Hardware

Mounts

Waterjetted and CNCed mounts for Ping360 and BlueBoat radios

Ping360 Cable Termination

Converted and potted a Ping360 cable to work with BlueBoats Blue Trail termination kits

Skills Used

Waterjetting, potting cables, CNC milling, tapping

FIDL: Suction Tank Track Robot

Suction Tank

A self-contained 3D printed suction tank developed to work with suction cup arrays
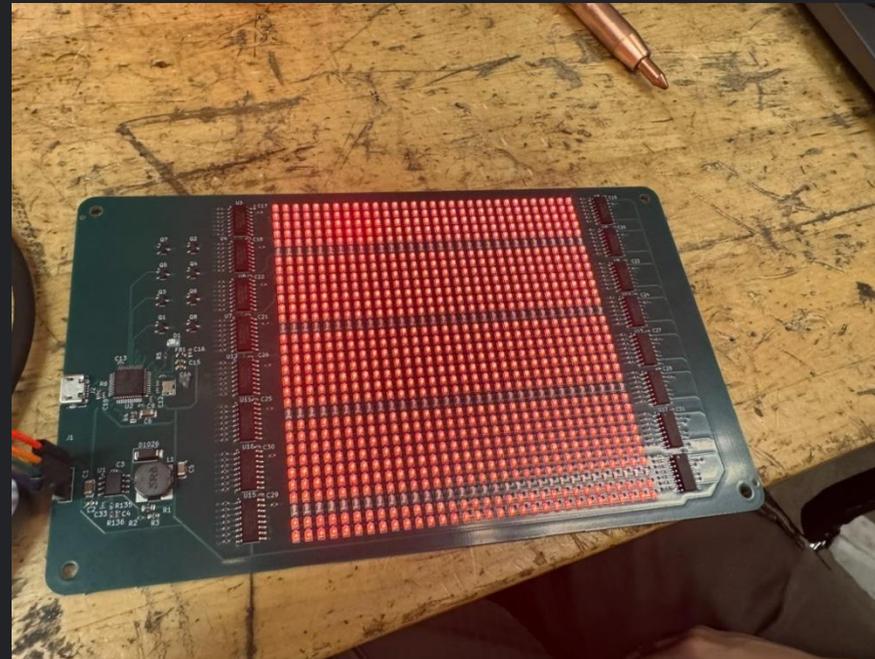

Frame Iterations

This project involved a lot of iterations for designing the frame to improve track movement
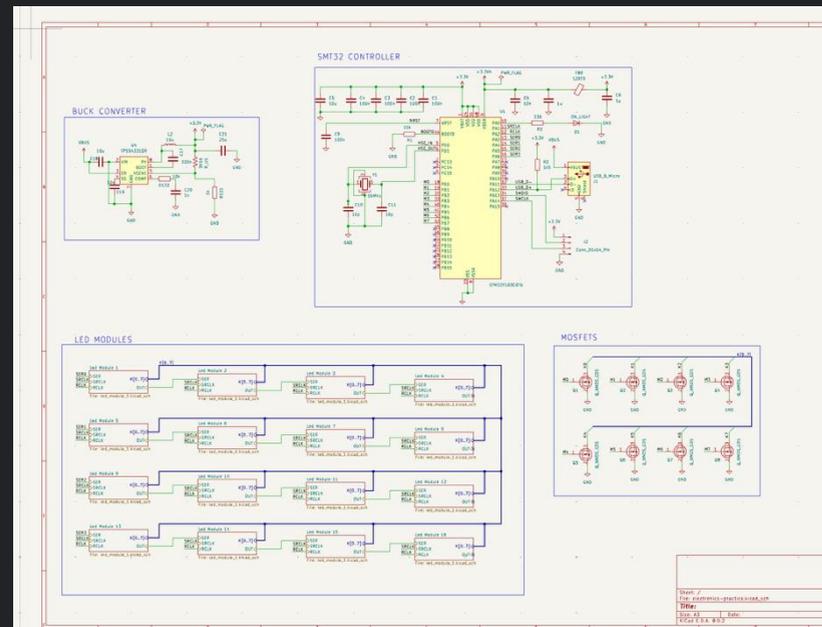

Gear System

The gears were consistently refined to mesh better with the track and limit alignment issues

Personal: LED Array PCB

LED Array PCB

A 4-layer PCB developed in KiCAD as a gift flashed with an ST-Link as a gift for my girlfriend that flashes icons

KiCAD Design

My first design in KiCAD, this design used hierarchical deisgns alongside many LEDs, NFETs, and a buck regulator

Firmware Programming

The PCB was flashed with an ST-Link with firmware written in STM32CubeIDE

2.00 Library Tracker

Project Description

Analog system requested by librarian to keep track of students' activities in class

User Requirements

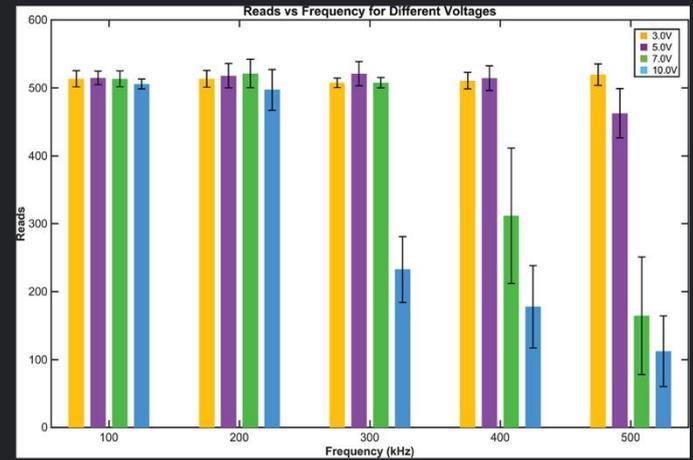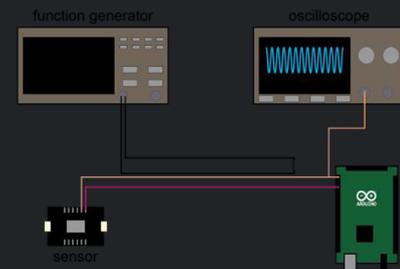Required to be robust, built from wood, 'aesthetically pleasing' and intuitive

Skills Used

Onshape, Arduino, C++, Soldering, lasercutting
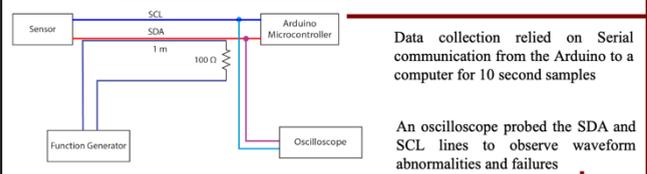
2.67l: EMI Investigation

Project Description

Analyzed the impact that wire cross-talk could have on I2C communication reliability

Experimental Analysis

Observed both waveform level data and computer reads to interpret I2C communication failures

Technical Communication

A poster and paper were written as part of the requirements of the cover

2.12 UR5 Pick & Place Robot

UR5 Object Detection

Create a "Bottle" object

HSV thresholding to identify colorful bottles

Edge detection to identify clear bottles

Increase mask quality with morphological operations

Find object center and predict future position using velocity
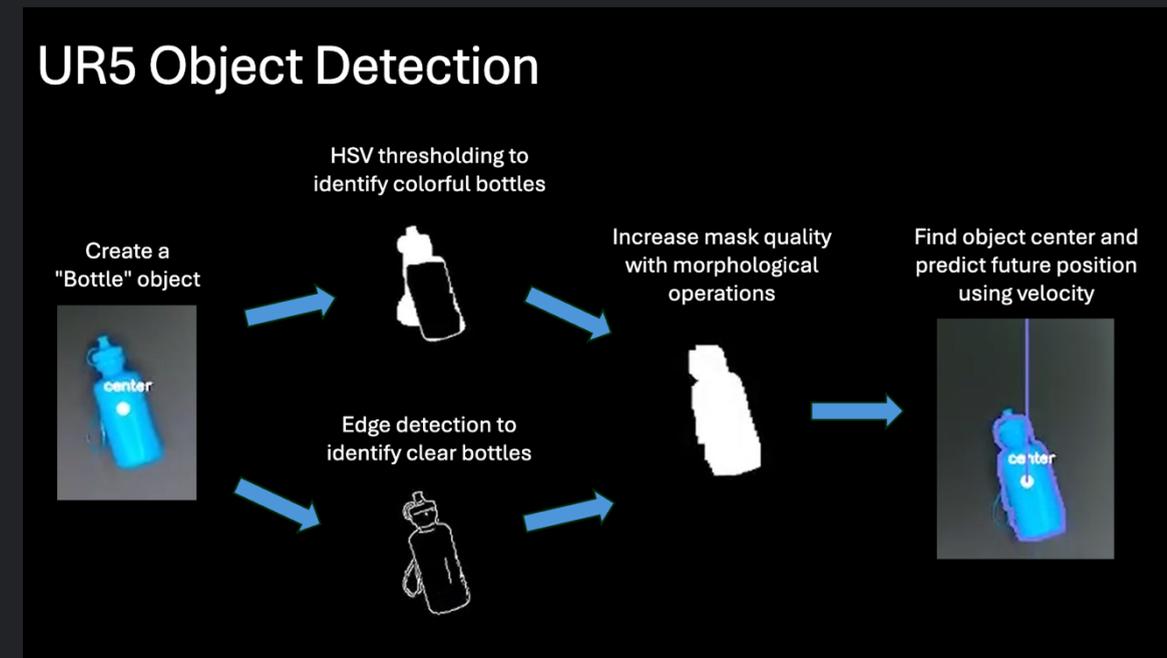
Project Description

I was a project lead for 5 upperclassmen designing a pick-and-place robot with a UR5
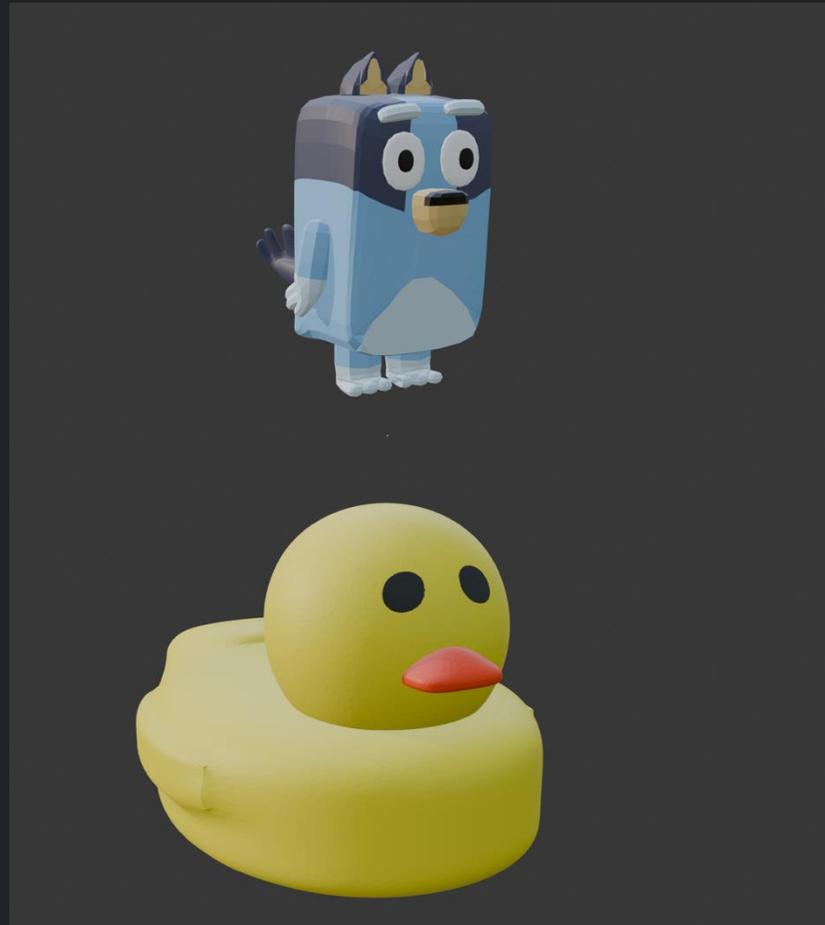
User Requirements

Managed team members, ordering components, and distributing workload

Contributions

Worked on autonomy and object detection, as well as the vacuum gripper –simple but consistent
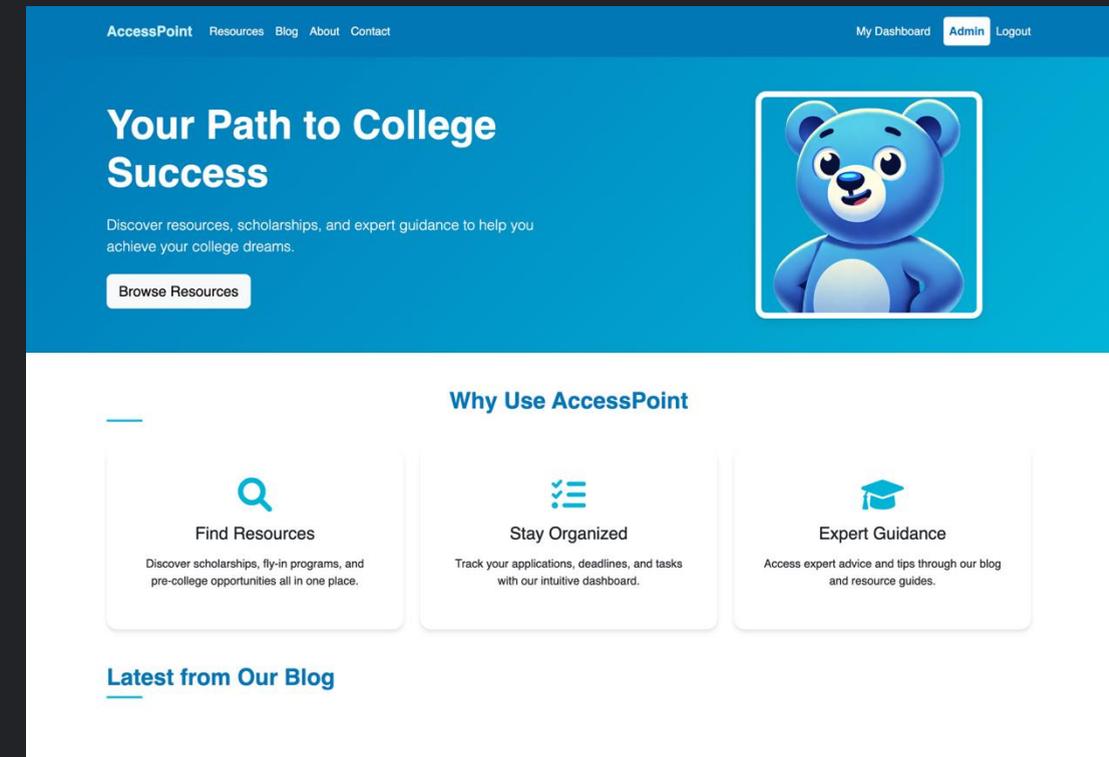
Miscellaneous

Blender Development

I recently got into making figures in Blender that I intend to print as gifts for friends or making animations

LED Acrylic Sign

A gift for friends currently in progress (a lot of soldering is required), this sign will be a lit up blue for residents of Burton 1 who call themselves B1ners

AccessPoint

A flask website made by a friend and I (now taken down) to help first generation students apply to colleges