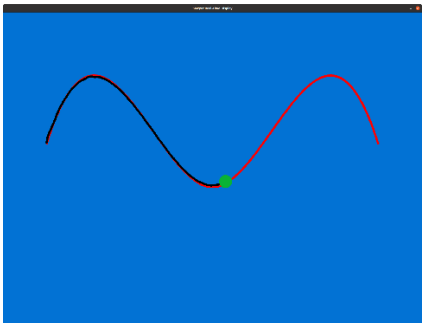
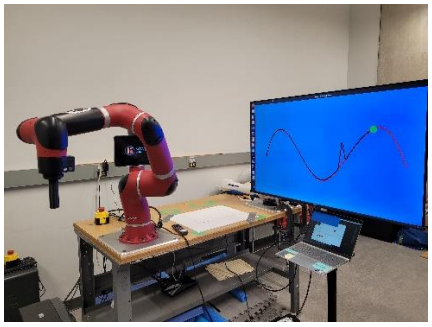
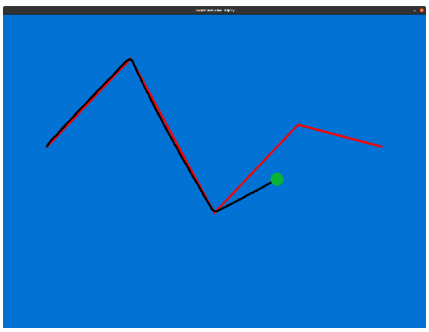
PORTFOLIO

BEN BOGUSLAVSKY

Undergraduate Robotics Research – Ongoing

HTTPS://GITHUB.COM/BENBOGUSLAVSKY18/SAWYER_RESEARCH_IMPLEMENTATION

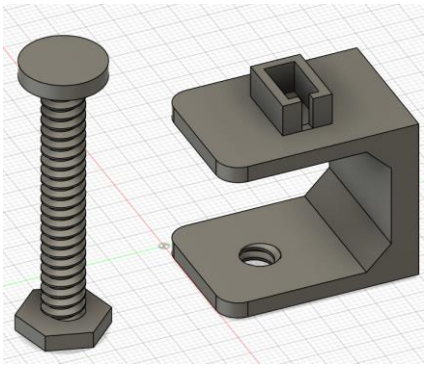
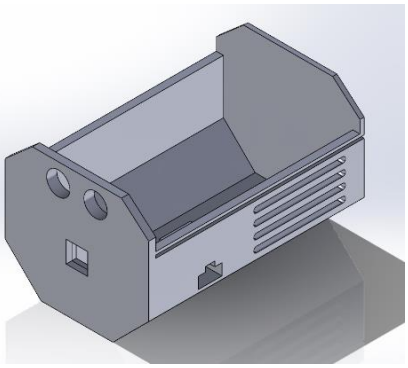
- Leveraged **ROS** and **Python** on Sawyer robot arm to coordinate spline arm movements along randomized and pre-defined paths, with intentional error in motion to study participant's reaction
- Developed a real-time visualization for trial participants using **Pygame**, dynamically displaying the arm's motion and path for enhanced experimental monitoring and participant interaction

Home Security Camera

HTTPS://GITHUB.COM/BENBOGUSLAVSKY18/SECURITY-CAMERA-PROJECT

- Implemented **ESP32Cam** locally hosted web server for real-time video
- Incorporated and programmed sensing components such as **ultrasonic sensor, servo motor** and **IR remote sensor** for functionality including controlled camera panning, password authentication, and person detection
- Designed and modelled lightweight, 3D-printable camera shell and desk clamp using **SolidWorks** and **Fusion360**


Toyota Innovation Challenge – Hole/Sticker Detector

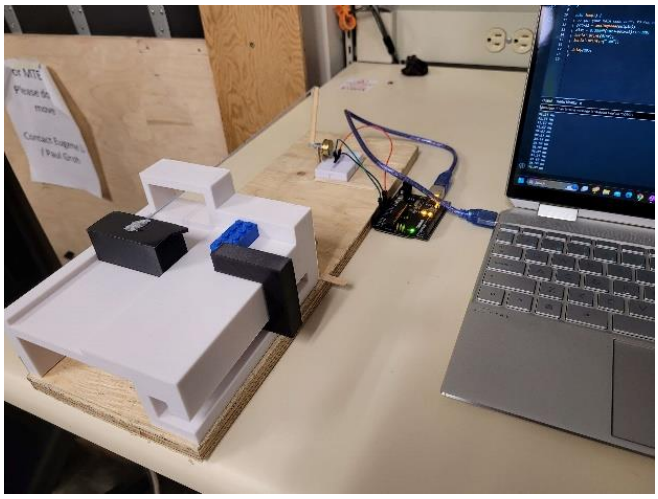
HTTPS://GITHUB.COM/BENBOGUSLAVSKY18/TOYOTACHALLENGE-STICKERS

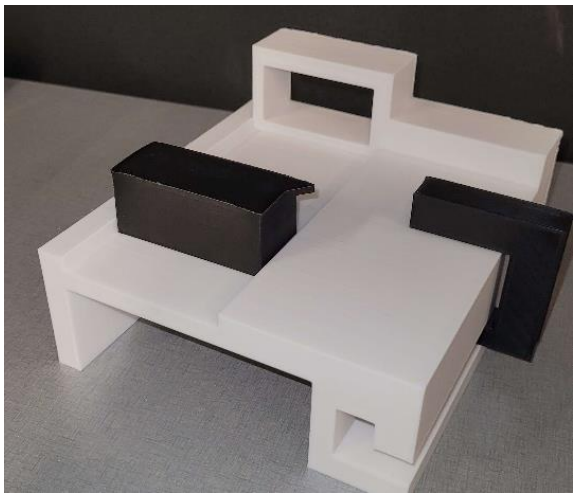
- Worked in teams to develop an AI program to detect/differentiate between holes and stickers on extrusions with **98% accuracy**
- Employed **Jupyter** Notebooks as a primary tool for developing and training a **CNN**, utilizing Python frameworks and libraries such as **Keras** and **OpenCV**
- Engaged in peer-to-peer learning and knowledge sharing, actively seeking feedback from teammates and incorporating suggestions in brainstorming sessions


Digital Measurement Device

HTTPS://GITHUB.COM/BENBOGUSLAVSKY18/MEASUREMENT-DEVICE

- Designed, modelled and **3D printed** parts for a precision measurement device created using statistical methods using an **Arduino** with a **rotary potentiometer**, successfully achieving measurement **accuracy within one millimeter**
- Conducted data acquisition, calibration and uncertainty analysis to maximize measurement precision and consistency
- Prepared a detailed report, presentation and documentation

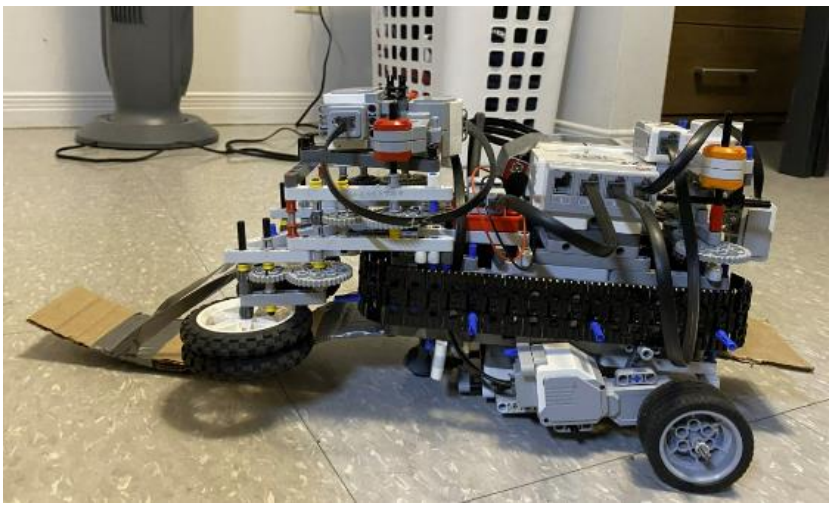


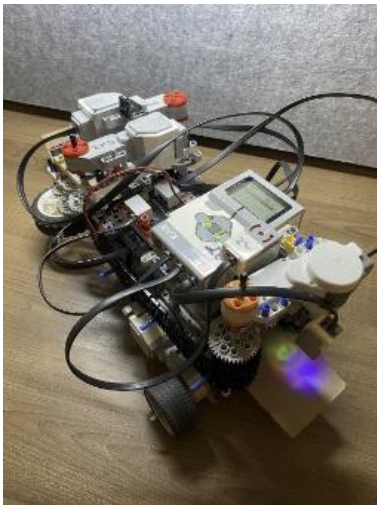


Tennis Training Robot

HTTPS://GITHUB.COM/BENBOGUSLAVSKY18/TENNISTRAININGROBOTPROJECT

- Programmed and built prototype tennis training robot that positions itself in various positions on a tennis court and launches tennis balls in random directions
- Constructed mechanical components such as **geared flywheels**, **intake system** and **internal conveyors** using Lego EV3 Robotics Kit
- Implemented **automated runtime functionality** and initial **mode selection** user interface using **RobotC**
- Developed a **color detection mechanism**, enhancing system safety and preventing insertion of unauthorized hazardous objects
- Led and collaborated within an Agile environment, participating in sprint planning and reviews while completing deliverables on time
- Tested and debugged code, improving reliability and functionality

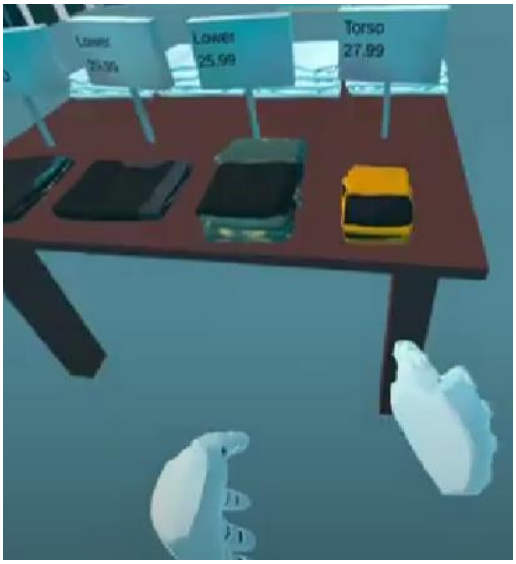




Hack The North 2024 – VR Clothes Shopping

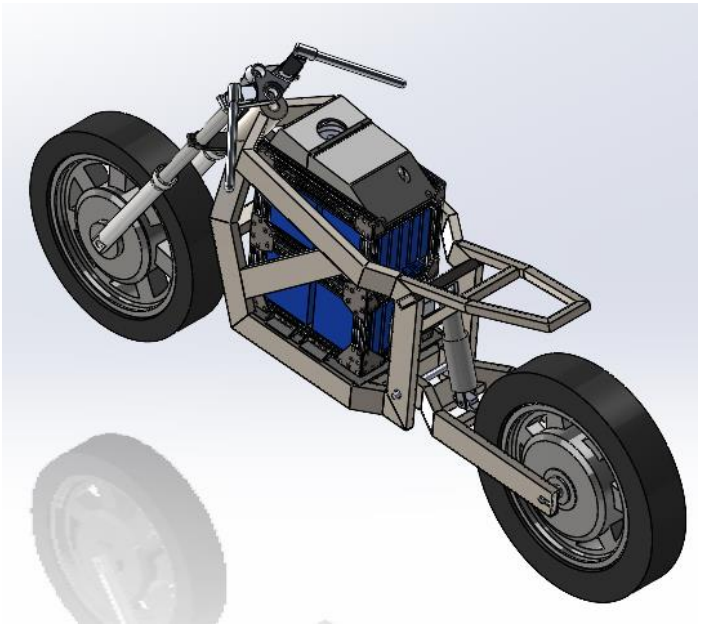
HTTPS://DEVPOST.COM/SOFTWARE/SHOP-THE-NORTH

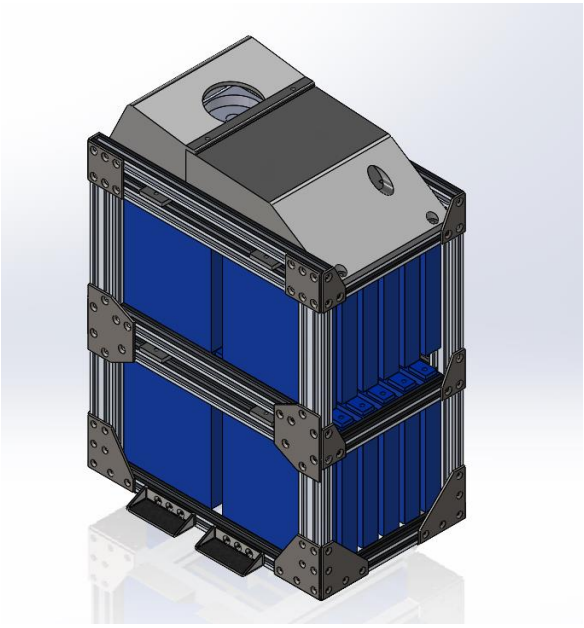
- Designed and developed a **VR** application simulating online clothes shopping, utilizing **Unity** and **C#**
- Integrated **Shopify API** to create a dynamic and interactive shopping environment, enabling users to see online store items and try them on
- **Shopify API Challenge Winner** (Best use of API) and **3rd place in the Ubisoft Game Dev Challenge**



Electric Motorcycle Design Team – UW Electrium Design Team

- Participated in the design, CAD (**SolidWorks**) and **machining** of Electric Motorcycle
- Researched, documented and conducted analysis of several important processes, such as FEA and fairing manufacturing for improvement of future design iterations
- Conducted **FMEA**, identifying potential failure modes to maximize safety and robustness of motorcycle components

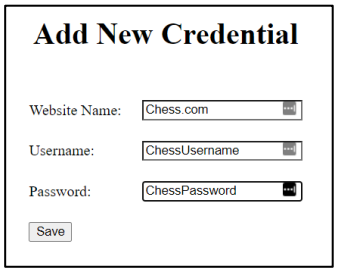


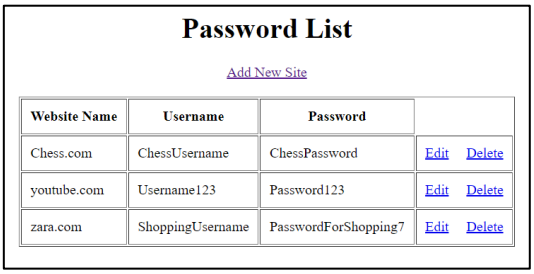


Website Credential Storage

HTTPS://GITHUB.COM/BENBOGUSLAVSKY18/PASSWORDCARDS

- A **Maven**-based locally hosted website developed with **Java** to store username and password credentials, implementing **REST APIs** and **Spring Boot 2**
- Applied OOP principles from university course topics





Robot Arm Torque Calculator Algorithm

HTTPS://GITHUB.COM/BENBOGUSLAVSKY18/ROBOT-ARM-TORQUE-CALCULATOR-PROJECT

- Created a program using **C++** which inputs lengths of part of a 3 DOF robot arm and outputs the optimal angles and resulting torque required to hold the manipulator at a specific static position
- Leveraged physics concepts to eliminate repetitive calculations, successfully identifying some of the lowest achievable torque values in the class.