Portfolio   Ben Boguslavsky

Tennis Training Robot – HTTPS://GITHUB.COM/BEANMEISTER18/TENNISTRAININGROBOTPROJECT

- Programmed and built prototype tennis training robot that positions itself in various positions on a tennis court and launches tennis balls at random directions
- Constructed mechanical components such as geared flywheels, intake systems and conveyors using Lego EV3 Robotics Kit
- Programmed automated functionality using RobotC to minimise user interaction
- Developed a color detection mechanism, enhancing 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 readability, reliability and functionality


Home Security Camera – HTTPS://GITHUB.COM/BEANMEISTER18/SECURITY-CAMERA-PROJECT
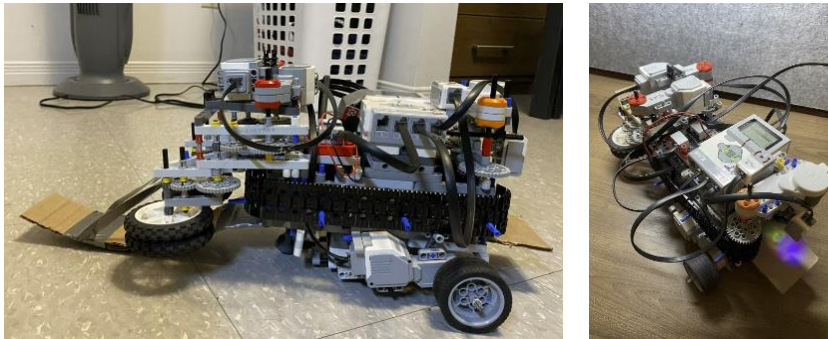
- Designed and modelled lightweight, 3D-printable camera shell and desk clamp using SolidWorks and Fusion360
- Implemented ESP32Cam locally-hosted web server for real-time video
- Incorporated and programmed Arduino components such as ultrasonic sensor, servo motor and IR sensor for functionality including controlled camera panning, password authentication, and person detection
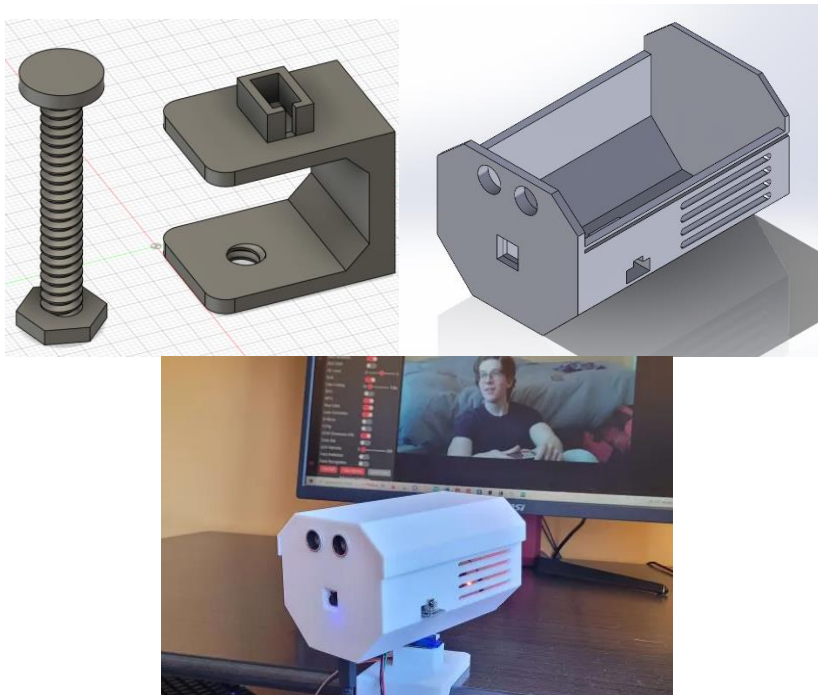
## Statistical Data Measurement Device –

- Designed, modelled and 3D printed a precision measurement device using statistical methods, successfully achieving accuracy to within one millimeter
- Conducted data acquisition, calibration and uncertainty analysis using potentiometer to maximize measurement precision and consistency
- Modeled and 3D printed components
- Prepared a detailed report, presentation and documentation
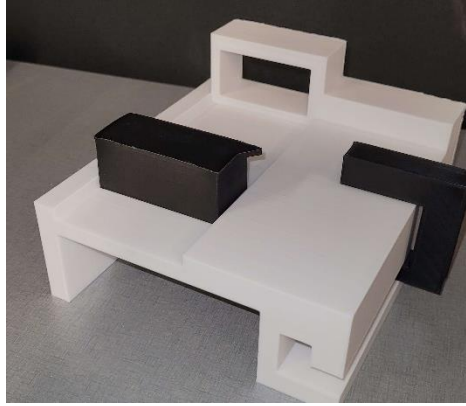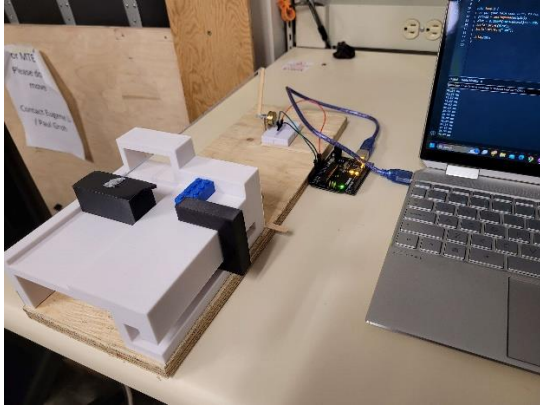
## Toyota Innovation Challenge 2023 – Hole and Sticker Detection

- Worked in a team to develop an AI program to detect and differentiate between dark holes and black stickers
- Employed Jupyter Notebooks as a primary tool for developing and training an AI model, utilizing Python frameworks and libraries such as TensorFlow and OpenCV
- Engaged in peer-to-peer learning and knowledge sharing, actively seeking feedback from teammates and incorporating suggestions in brainstorming sessions
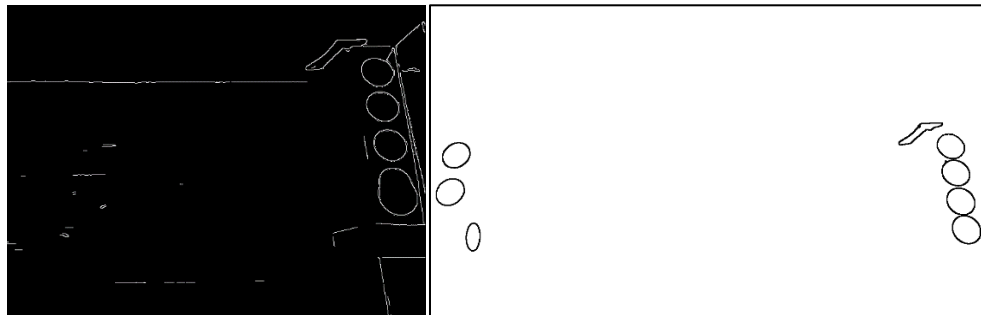
Electric Motorcycle Design Team – UW Electrium Design Team

- Actively participating in the design, CAD and machining of Electric Motorcycle
- Researching, documenting and conducting analysis of several important processes, such as FMEA and Fairing manufacturing
- Assisting in the development of firmware, such as the audio system for the heads-up display on STM32F469I
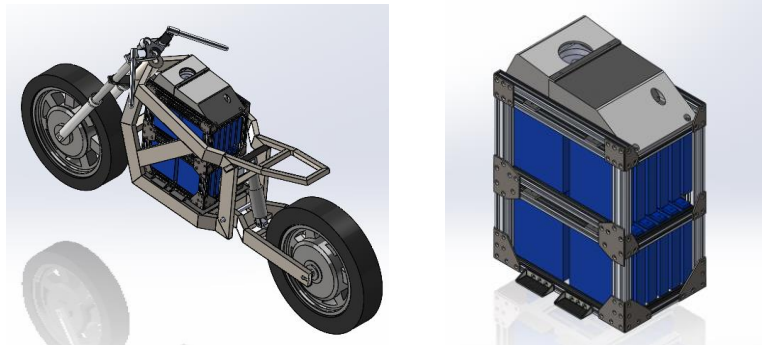
Website Credential Storage – HTTPS://GITHUB.COM/BEANMEISTER18/PASSWORDCARDS

- Developed a maven-based locally hosted website using 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/BEANMEISTER18/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
    - The algorithm accepts 5 inputs: The x and y coordinates the arm needs to reach, and the length of each individual arm section. The program outputs the angles at which the three arm sections are positioned at relative to the x-axis, as well as the torque values of the base, elbow and wrist of the arm.
- Leveraged physics course concepts to save a significant amount of time, removing the need for repetitive calculations, resulting in finishing the assignment ahead of time and determining some of the lowest torque values achievable in the class

Tetrix robotic manipulator

- Worked in a group with a Tetrix robotics kit to create a robotic manipulator to move small objects with 360 degree range of motion
- Participated in building the base and arm, attaching motors
    - Determined creative solutions such as counterweights to balance the structure