Project Portfolio

By: Jainish Mehta

Mission Control Space Services

In my first co-op, I worked on creating functions that aided in a broader path planning algorithm. I solved complex math challenges, such as cubic spline interpolation, that involved linear algebra and numerical methods, including Gaussian-Jordan elimination, LU decomposition, etc. I also did a calibration routine embedded systems project, wherein I needed to find the tilt of the rover as it climbs a hill. I learned more complex topics, such as quaternions, normalized Euler angles, A* search algorithm, and graphs as a data structure.

Technical Skills:

- C++,
- Typescript (Javascript)
- Git (Gitlab)
- Yarn
- Linux Ubuntu
- Jenkins
- VS Code
- Docker

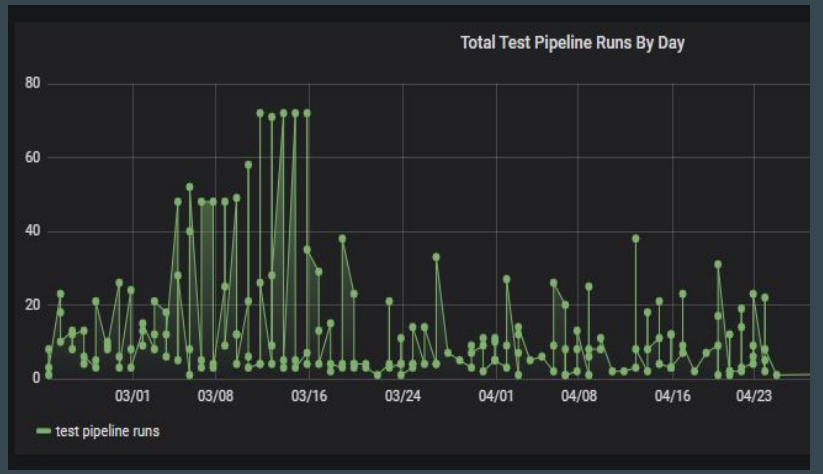
Manulife Financial

In my second co-op, I worked with the DevOps team using Java. I worked on included the Perfecto cloud platform that allowed teams to do mobile app and browser testing, wherein I integrated it into our Selenium framework. I also worked with RESTful APIs and Postman to extract information about the Perfecto cloud to query onto Grafana, a solution that allows data visualization and analytics. I also learned much more on TDM (test data management), ALM (application lifecycle management), CI/CD practices, Jenkins and UFT (Unified Functional Testing). Check out some visuals on the next slide.

Technical skills:

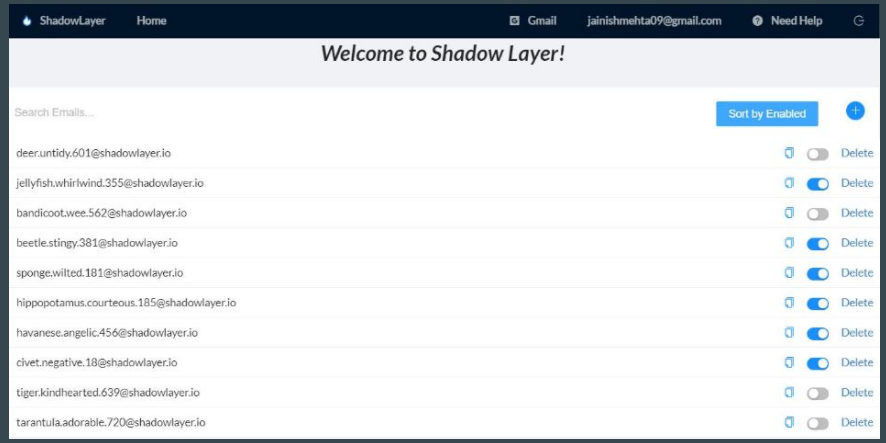
- Java
- git (Gitlab)
- Npm
- Jenkins
- Postman
- RESTful APIs
- Selenium
- TestNG, Cucumber
- some SQL
- Eclipse

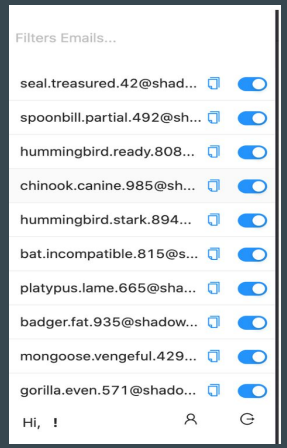
Time Of Last DevTest Health Check	Time of Last ALM Health Check
05/22/2020 - 17:01:38	05/22/2020 - 17:01:25
Result of Last DevTest Health Check	**Result of Last ALM Health Check**
SUCCESS	ABORTED



Red Canari

In my third co-op, I worked as a full-stack software developer. I worked on a web application and Chrome extension for a tool, Shadow Layer, using HTML, CSS, React.JS, and AWS (Cognito and Amplify framework). ShadowLayer is an email proxy program that aimed to map “shadowed” emails to an actual email such that the actual email can disable and enable the “shadowed” email at any point to prevent spam.



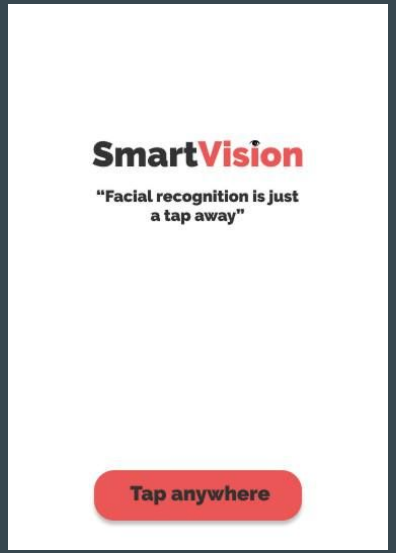


Technical skills:

- React.JS
- git (Gitlab)
- HTML, CSS
- RESTful APIs
- AWS

SmartVision

The goal of this project was to help disabled individuals interact with their surroundings using a software that takes in images and converts it into text that is later converted into speech. I got hands-on experience with UI/UX designs, iOS mobile applications, and first-time exposure to Swift. I also learned more about computer vision and how to use Apple's Vision framework and CoreML models for image recognition.



Technical skills:

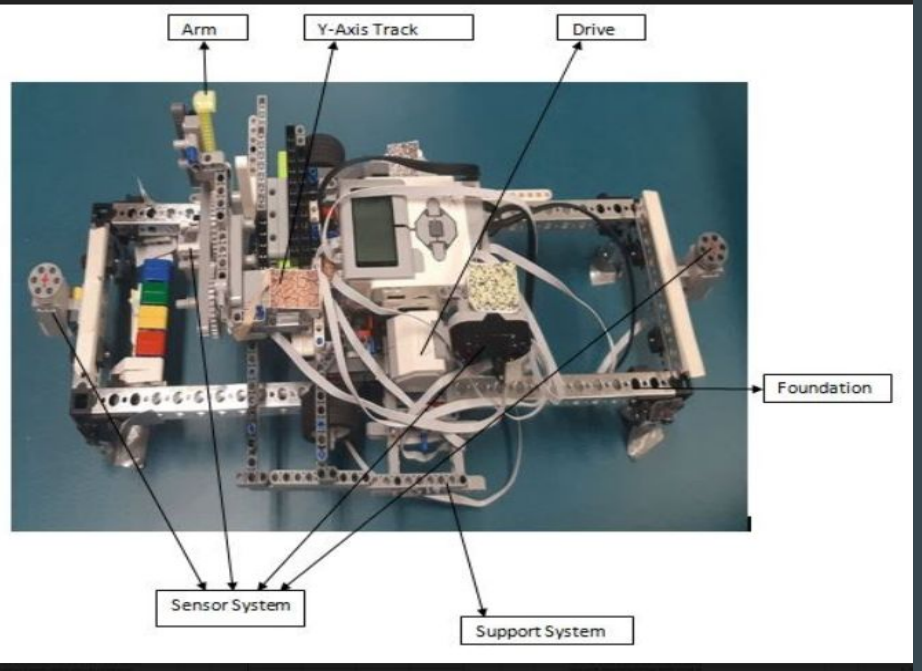
- Vision API
- Swift
- git (Github)

Aktiv

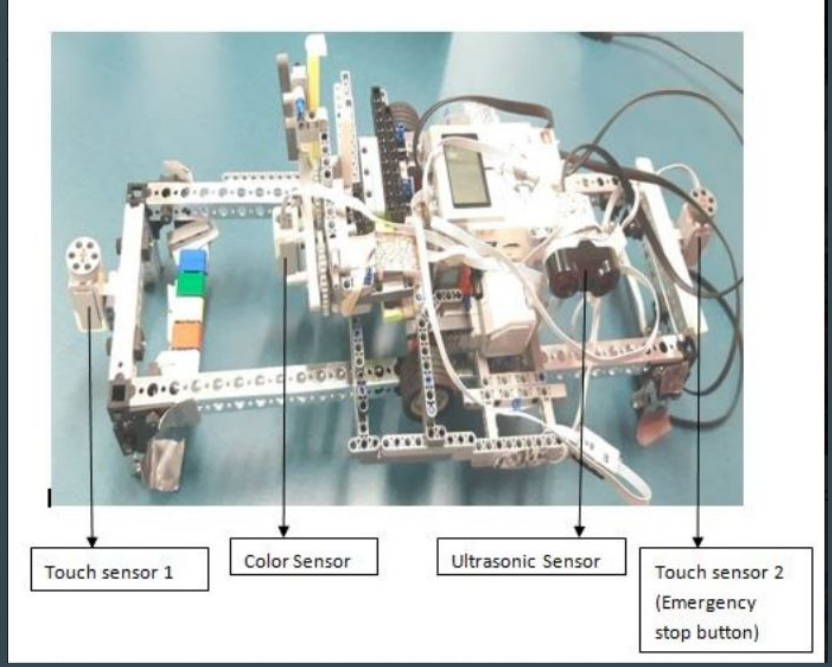
This project involved creating a robot that was able to receive an input and type the response onto a computer keyboard. This required mapping the keyboard and maintaining accuracy using a PID controller. This project sparked my interest in robotics and its broader applications on a larger scale. At the end, we also tried to use computer vision open source code to get sign language as the user input. This code was written in Python and slightly modified for our purposes (nonetheless, it didn't work with this input too well). Some pictures are included in the next slide!

Technical skills:

- C++
- RobotC
- some Python
- mechanical modelling

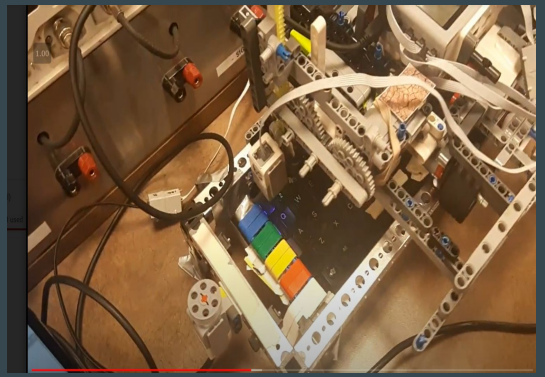


Major parts of the Aktiv



Sensor Implementation

The robot on the keyboard track

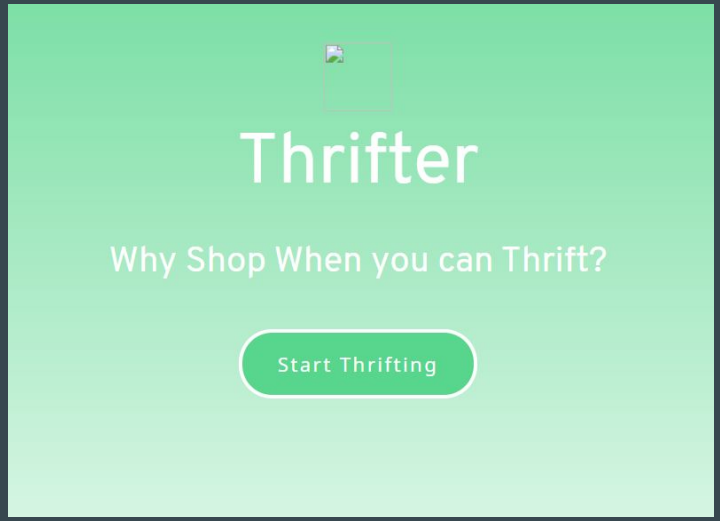


Thrifter

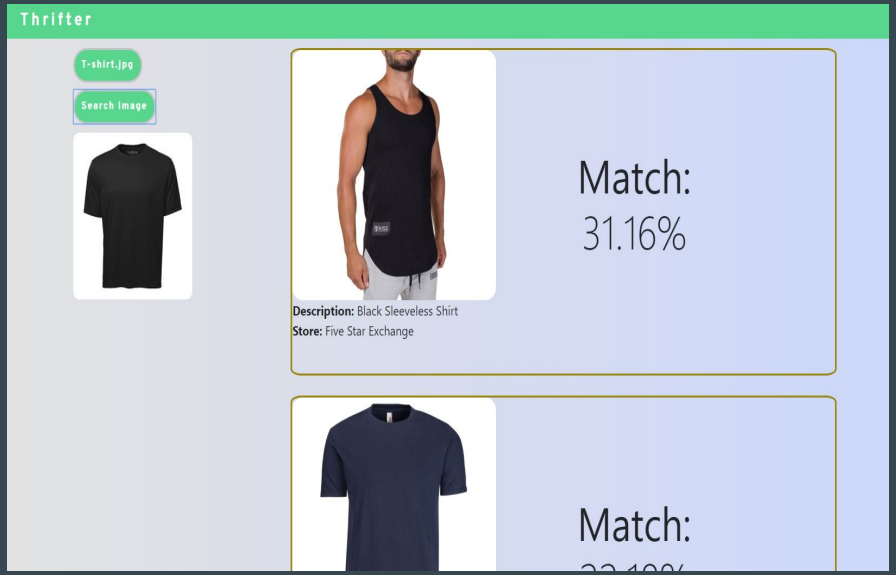
This project aimed to encourage users to thrift shop in order to minimize the impacts of fast fashion on the environment. This web application worked by finding the most optimal match between a database of business-side clothing and a picture of clothing that a user inputs. This involved using Google Cloud Platform Vision API to convert each picture into a set of tags. A MongoDB database was used to store the business-side clothing. The backend server filtered each piece of clothing based on relevant manual tags in order to “clean the data” and determine which type of clothing the API interpreted it to be. Then, a KNN supervised algorithm was ran in a Express.js server to find the optimal match. This project related to my passion for sustainable development and machine learning. Check out some pictures on the next slide!

Technical skills:

- Google Cloud Platform’s Vision API
- Javascript
- HTML, CSS
- some MongoDB
- supervised learning
- NPM
- git (Github)



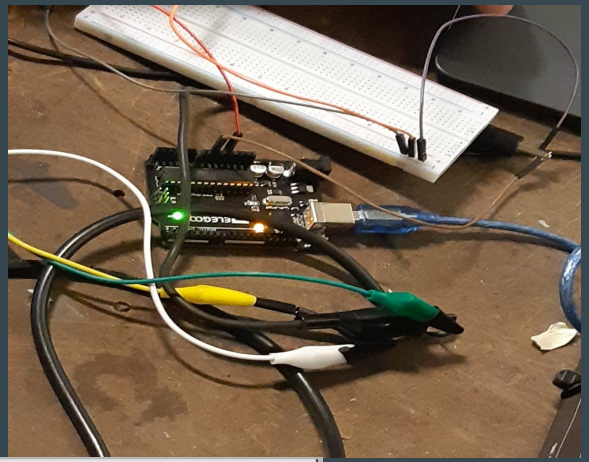
Start Page of Thrifter

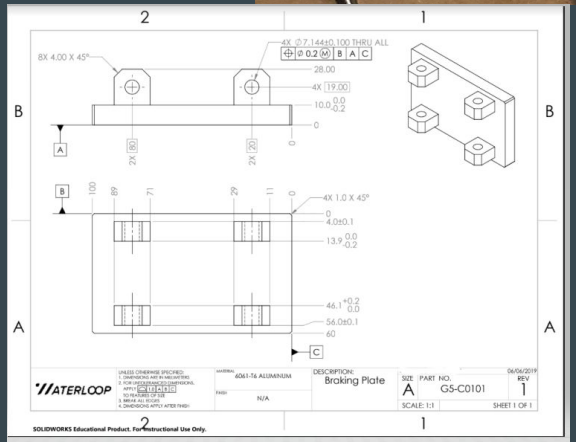


Testing the Software with Different Pieces of Clothing

University of Waterloo, Waterloop Design Team

I worked for the mechanical and embedded systems subteams for Waterloop. I created a design for the battery enclosure and braking plates (braking system) for the Hyperloop using Solidworks, considering requirements such as materials and location of holes to fit pins. I also worked on figuring out how to receive responses from a RobotEQ controller using an Arduino and CAN-bus principles. Additionally, I was required to interpret information about an incremental rotary encoder using C programming.

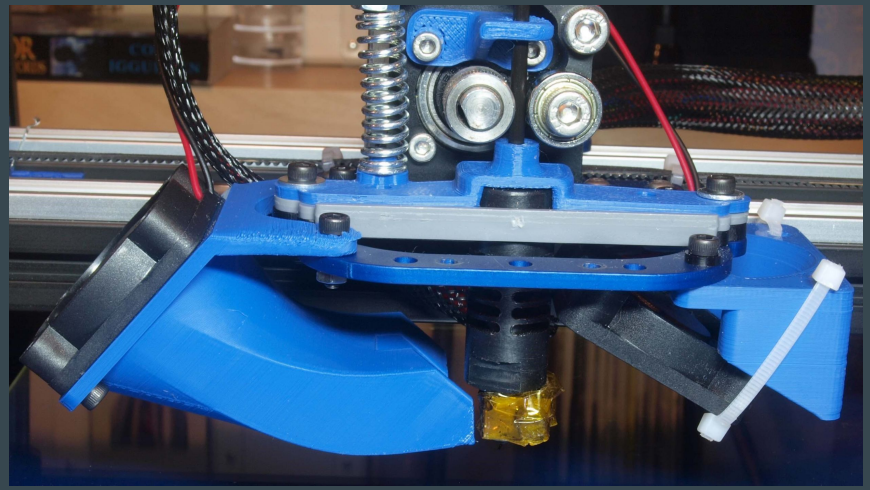




Rapid Prototyping (3-D printing) Optimization

I worked alongside a graduate biomedical engineering student on a study about rapid prototyping cardiac anatomy of patients with congenital heart disease to be used as an education tool for surgeons.

I performed tests and created models to determine optimization for transparency, 3D printing material, nozzle and bed temperature, and cooling systems.



City of Edmonton Youth Council

I was honored to serve in the health and wellness subcommittee wherein I was able to create projects that destigimized mental health, as well as encourage healthy lifestyles for physical health. I worked on surveying people after StepUPYEG was launched. This project aimed to revamp the University of Alberta staircase with motivating messages to promote well-being. I also led discussions about the planning, logistics, and implementation of SpotlightYEG that aimed to normalize mental health discussions as youth express themselves and their stories through fine arts. Through this, I was able to pursue a passion of mental health and learn more about leadership.

More Projects to Come...

These are just *some* of the major projects I was involved in, in which I learned much more about the software development process, as well as about teamwork. I hope to continue more projects into the future, including modelling data analytics for COVID-19, creating a movie recommendation system (in progress, using Python and skicit-learn), and many more projects, especially relating to machine learning! Thanks for reading!