Samia Siddique Sama

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Robotics Skills

Python	C++	C	C#	Java	ROS	OpenCV	Linux
Image Analysis	Computer Vision		OnShape		SolidWorks		MATLAB

Employment

Firmware Developer (Co-op) — May 21 - Aug 21

Reliable Controls, Victoria, British Columbia

- Add features, bug fixes and unit tests, in **C++**, in preparation of future releases of the different programmable controllers used for green building applications
- Collaborate with 15 other team members, using JIRA and BitBucket, to update the main BACnet protocol code base and also the windows and linux device targets
- Write **python** scripts to automatically fix 7000+ **lint** warnings of different types across the code base, to improve the code quality and structure

R&D Engineering Intern — June 20 - Dec 20

Chan Zuckerberg Biohub, San Francisco, California

Fluorescence-Activated Cell-Sorter (FACS) Automation Project

- The FACS automation project is a subset of the Cell Atlas project ((https://bit.ly/3shwzeS) that aims to map all the human cells in the body. The cells need to be sorted before classification and currently this takes about 8 hours of the researchers time just for a single batch
- Designed and wrote an **object oriented** software package (czfacsautomation) using **python** and packages including **numpy, openCV, pandas** and **seaborn**, and **C++** to carry out the entire process from start to end
- The package includes modular and individually tested classes, TCP communication with external hardware (**arduino, stages**), scatter plot analysis and communication across multiple processes

Protein Purifier Project

- COVID-19 caused a skyrocket in the demand for purified COVID spike proteins in lab environments, therefore we designed a high throughput medium volume automated purifier.
- Worked in a team of 2 to build the **raspberry pi** controlled instrument and created both the front and backend of a **GUI,** in **python,** to allow biologists to effectively use the device
- The device is equipped with multiple channels, modes, and routes, (using pumps, motors and stages) to encompass the flexibility required in liquid chromatography

QA Analyst (Co-op) — May 19 - Aug 19

Broadcom Corporation, Richmond, British Columbia

- Performed quality checks and analyzed nightly regression tests (NRT) on different features on **Linux**-based PCIe Storage Adapter
- Wrote scripts to automate various tests, in **python,** and collaborated with other members using **Git**, Gerrit and JIRA
- Wrote **python/bash** tests and debugged various issues in SoCs connected to **Linux** boxes via **TCP**

Software Developer (Co-op) — Jan 18 - May 18

Vancity Credit Union, Vancouver, British Columbia

- Received a 3-day training on Agile Development and worked in two scrum teams to develop production quality software
- Developed a data migration application in **C#** to transfer 1tb files to an online server and save $1000 of yearly licensing fees. Collaborated with other members via **TFS**
- Developed a Data Quality Repository App by creating a relational database in **SQL** and connecting it to an app created in **C#,** to record and track all IT data quality issues

Projects

Automated Insect Circadian Behavior Tracker (Capstone) — Oct 20 - Current

UBC Entomology Lab, Vancouver

- Working in a team of 3 to build an open source device called a Sticky Pi, to capture images of insects and record environmental conditions periodically. The goal is to install a bunch of Sticky Pi's across a field and analyze the images to understand circadian behavior
- Wrote scripts in **python/bash** to automate run the system periodically and initiate protocols
- Designed the housing to hold the camera and raspberry pi, in **OnShape,** to be **3D printed.** Focused on ensuring modularity, repeatability in assembly and weather proofing in the design

Automated Printhead Inspection for RX-1 Bioprinter (Capstone) — Oct 19 - May 20

Aspect Biosystems, Vancouver

- Worked in a team of 4 to create a mechanical jig consisting of a 2-axis stage and a high resolution optical and illumination system to detect defects, on printheads, as small as 2um
- Wrote code in **python**, using **openCV**, to analyze images and outline defects such as tears, air bubbles and cracks on the printheads
- Created detailed system design and BOM on **SolidWorks**. Designed a fine tuning z-stage to pick up defects on different focal planes and created the assembly for the entire system

Software Framework for Autonomous Systems Course (ROS) — Nov 19 - Dec 19

- Developed software using **ROS**, **python** and **RViz** to navigate a robot on a mapped environment and collect secret messages by analyzing QR codes. The code revealed the current location and the location for the next message. The first code was used to decipher the hidden coordinate frame of the QR locations and adjust to the robot's reference frame using **tf package**
- Used **ROS** with **RViz** and **Gazeebo** to simulate a pick and drop robot

Music Therapy Rehabilitation Device for Stroke Patients (Design Team) — Jan 18 - May 19

- Worked as a mechanical engineer in the UBC Biomedical Engineering Student Design Team to design interactive devices, with controlled music and lighting, to help patients effectively exercise
- Created and assembled the entire Squeeze device, which resembles a dumbbell and responds to different pressure levels. Created the device in **SolidWorks** and 3D printed the parts out of PLA

Autonomous Pickup Truck (https://rt14-lysanderoth.github.io/) — Jun 18 - Aug 18

- Worked in a group of 4, for over 70+ hrs/week to build one of the most consistent robots to compete in a Stars Wars themed competition. The robot traversed through an obstacle course to pick up and return objects to a designated safe position
- Designed the chassis for the truck in **Onshape**, printed the chassis on the **laser cutter**, **3D printed** the wheels and **waterjet** cut the polycarbonate claws and delrin gears
- Co-wrote code in **C++** on a customized **Arduino** to develop a state machine to carry out different tasks. This included line following using **PID**, object detection using a lidar module communicating via **I2C** and edge detection