Ali Toyserkani

2A Mechatronics Engineering Student, University of Waterloo

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EXPERIENCE

Multi-Scale Additive Manufacturing (3D Printing) Laboratory   *Jan 2017 – Aug 2017*
Research Assistant & Software Developer **|** Waterloo, ON

- Built a cross-platform **Qt-based application** using OpenGL and boost to create machine-dependent toolpaths from imported CAD files. Code on **Github**.
- Co-developed a **new hybrid additive manufacturing method** for polymeric parts without the need for support structures.
- Co-created a **real-time image processing model** using **OpenCV** and Dlib to adjust process parameters when detecting part defects.
- Conducted several phases of research experiments for multiple projects and plotted data using **MATLAB**.

Fluid Mechanics Research Laboratory   *Jul 2016 – Dec 2016*
Part-Time Hardware Developer **|** Waterloo, ON

- Created mechanical models of the human vocal tract to educate youth on phonetics and linguistics.
- Used **Arduino** UNO, 555-timers, amplifiers, and IoT to emulate a changing human voice.
- Manufactured and machined over 75 metal, plastic and wooden parts for the assemblies of multiple trachea models.

PROJECTS

HomeSleeves – Finger Sleeves for Home Automation **|** *3rd place, Toronto IEEE Hardware Hackathon 2017*

- Built a wearable hand accessory using **Arduino** Nano to control lighting and music volume with ease.
- Identified user commands by combining data from capacitive force sensors and a 3-axis gyroscope/accelerometer.
- Controlled devices (lights and speakers) by sending command signals with a TCP local WiFi socket using **Node.js** and **Arduino**.

SmartHelm – A Bicycle Helmet That Provides Feedback **|** *Best Embedded Hack, WearHacks 2017*

- Engineered a hardware system for a sport helmet, making biking more safe, informative, and stylish.
- Users can receive vibrational and auditory feedback to react against incoming vehicles and navigational updates.
- Enabled **Bluetooth communication** to send Google Maps API updates from an **Edison MCU** to an Android smartphone.
- Developed the embedded software in **C++** to process sensor data and control RGB LED's to provide vehicles with signaling.

Autonomous Mars Rover **|** *15th place worldwide, International University Rover Challenge 2017*

- Designed and built a rover with the ability to traverse autonomously over tough terrain, move/analyze objects, detect its surroundings and communicate with a base station via radio.
- Constructed the power distribution mechanism, fixtures for the camera hardware, and assembly parts for the rover's chassis.

ExtensaArm – A Modular 4-Axis Robotic Arm **|** *Term Project, Robotics Engineering Design, Fall 2016*

- Created a multi-purpose robotic arm with 4-axis freedom to repeat sets of user-taught tasks.
- Wrote embedded C software to wirelessly control the robotic arm's axes with a console joystick.
- Developed efficient algorithms to convert manually controlled robot movements to an executable machine file for task repetition.

INTERESTS & ACTIVITIES

- **Running –** Trying to run at least 15 km a week, instead of staring at my computer screen all day, Ontario Track and Field Finalist
- **Leadership –** Always organizing meaningful events, served as an executive on high school leadership council
- **Chess –** Slowly working my way towards grandmaster on chess dot com

TECHNICAL SKILLS & TOOLS

Languages: C/C++, Python, Bash, C#, JavaScript
Software: Qt, OpenCV, Dlib, Arduino, Node.js, OpenGL, Unity, Unix/Linux, MATLAB
Hardware: Machining Tools, PCB Design, Soldering, Oscilloscopes, Sensors
Design: SolidWorks, AutoCAD, Fusion360, DipTrace, Altium