Ali Toyserkani

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An engineering student looking to improve additive manufacturing with machine learning. Strong understanding in manufacturing systems, data structures/algorithms, object oriented programming, hardware design and materials science.

EXPERIENCE

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

- Largest 3D manufacturing research laboratory in Canada, focusing on all aspects of high-quality part development, from material characterization, new machine development, process optimization, smart toolpath algorithms to feedback control systems.
- Built a cross-platform **Qt-based application** 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 of support structures.
- Co-created a **real-time image processing model** using OpenCV and Dlib to adjust process parameters when detecting part defects.
- Managed several phases of research experiments for multiple projects and plotted data using MATLAB.
- Wrote important sections in research publications and presentations for the laboratory's industrial and government partners.
- Trained 4 incoming PhD/MASc students on lab machines, experimental procedures, and project timelines.
- Designed fixtures and circuit boards to prepare two systems for CSA approval.

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 the power of IoT to emulate a changing human voice.
- Constructed roughly 75 metal, plastic and wood 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 (LED lights and speakers) by sending command signals with a TCP local WiFi socket using NodeJS 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 Intel 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*

- Co-designed and build a rover with the ability to transport autonomously, maneuver 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 chasis.

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

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

EDUCATION

BASc Candidate, Mechatronics Engineering Co-op   *Class of 2021*
University of Waterloo

TECHNICAL SKILLS & TOOLS

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