Ali Toyserkani

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Work Experience

Lyft | *Software Engineer Intern – Autonomous Driving* Aug 2018 – Present

- Integrating multiple RTOS's (Nucleus, ThreadX, FreeRTOS) onto 50+ MCUs on the autonomous fleet's embedded compute platforms
- Created a hardware-agnostic embedded software framework (**C++**) which performs critical drive-by-wire functions on the vehicle platform
- Implemented and deployed a **<1ms time-critical steering controller** on a new fleet of self-driving vehicles, used by motion planning team

Core Avionics & Industrial, Inc. | *Embedded Software Developer* Jan 2018 – Apr 2018

- Developed safety-critical **GPU** drivers (OpenCL, Vulkan, OpenGL) in **C & C++** for AMD and NVIDIA **embedded graphics** cards
- Built new multithreaded/multipartition test applications for the drivers, **increasing code coverage by 25%**
- Wrote **Python** scripts to streamline a complex build process to one command, saving time and manual effort

Multi-Scale Additive Manufacturing (3D Printing) Lab | *Research Assistant* May 2017 – Aug 2017

- Took initiative to re-design, build and assemble a **binder-jetting 3D printer**, allowing researchers to run over 15% more experiments
- Built a cross-platform **Qt application** using **OpenGL** and **boost** to create machine toolpaths from imported CAD files
- Co-developed a **new hybrid additive manufacturing method** for making polymer parts without support material
- Created a **real-time image processing model** using **OpenCV** to adjust process parameters when detecting part defects

Projects

WATonomous – SAE Autonomous Vehicle Challenge | *Technical Project Manager*

- **Co-leading a group of over 150 students** in building a level 4 self-driving car for a 3-year competition
- Created a controls interface to execute planned motion planning trajectories using **PID controllers** and **CAN communication**
- Developed data pipelining package in **ROS** and **PCL** to synchronously distribute 150 MB/s of camera, **LiDAR and RADAR** data

Quadcopter Drone

- Built a semi-autonomous drone with 6 D.O.F. and smooth control using **ROS** on a **Qualcomm DragonBoard 410c** board
- Developed a remote controller using an **Arduino Nano** to send **RF** signals to the quadcopter

4-Axis Robotic Arm

- Created a **multi-purpose robotic arm** with 4 D.O.F to repeat a user-recorded set of tasks
- Wrote **embedded C software** to wirelessly control the robotic arm's axes with a console joystick

Awards & Competitions

- **3rd Place @ IEEE Hardware Hackathon 2017** for creating an electronic hand glove for smart home automation
- **Winner of CANSOFCOM Military Challenge @ Hack the North 2017** for creating a video surveillance tool
- **Top 15 Autonomous Mars Rover Robot @ International University Rover Competition 2017**
- **Best IoT Project @ Queens University Hackathon 2018** for prototyping a home facial recognition platform

Technical Skills & Tools

Languages: C++, C, Python, Bash, JavaScript, Java, ARM Assembly

Software: ROS, Qt, OpenCV, Arduino, Node.js, OpenGL, TensorFlow, Pytorch, CUDA, MATLAB, Git

Design/Hardware: SolidWorks, AutoCAD, Fusion360, Machining Tools, PCB Design, Soldering, Oscilloscopes, Sensors

Education

University of Waterloo, Honours Mechatronics Engineering (GPA: 3.86) Sep 2016 – Present

Online Coursework: *ColumbiaX's Robotics Software Engineering, Udacity's Artificial Intelligence for Robotics, Stanford's Convolutional Neural Networks for Visual Recognition (CS 231n)*

Interests

- **Long Distance Running** – Ontario Track and Field Finalist, Cross Country Runner.
- **Hiking** – Climbed mountains in Alberta, climbed Mount Damavand, Yosemite Glacier Point, looking to climb Mount Kilimanjaro