Ali Toyserkani

alitoyserkani.me • ali.toyserkani1998@gmail.com • linkedin.com/in/alitoyserkani/ • github.com/alitoyserkani

Experience

Lyft Level 5 | *Hardware Engineer Intern – Autonomous Driving* | Palo Alto, CA — May '19 – Dec '18

- Improved **compute efficiency (latency/power) by over 10x** through benchmarking and integration of **neural network hardware accelerators**
- Designed a **camera interface board** in Altium which performs image compression, lens correction and filtering through an ISP
- Optimized compute performance by using TensorFlow (Python) and vendor-specific tools to **re-format, prune, and re-train detection models**

Lyft Level 5 | *Software Engineer Intern – Autonomous Driving* | Palo Alto, CA — Aug '18 – Dec '18

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

WATonomous – SAE Autonomous Vehicle Challenge | *Technical Project Manager* | Waterloo, ON — Jan '18 – Apr '19

- Managed and **led a group of over 100 students** in building a self-driving car for the SAE Autodrive Challenge
- Created an embedded controls interface to execute planned 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

Core Avionics & Industrial, Inc. | *Embedded Software Developer* | Waterloo, ON — Jan '18 – Apr '18

- Developed safety-critical **GPU** drivers (OpenCL, Vulkan, OpenGL) in **C & C++** for AMD and NVIDIA **embedded graphics** cards
- Built new multithreaded/multipartitioned sample applications for the drivers, **increasing code coverage by 25%**

Multi-Scale Additive Manufacturing (3D Printing) Lab | *Research Assistant* | Waterloo, ON — May '17 – Aug '17

- Took initiative to re-design, build and assemble a **binder-jetting 3D printer**, allowing researchers to run over 15% more experiments
- Co-developed a **new hybrid additive manufacturing method** (paper) for making polymer parts without the need for support structures
- Created a real-time image processing model and an STL slicer using **OpenCV/Qt** to adjust process parameters when detecting part defects

Projects

Quadruped Robotic Dog

- Designing a self-balancing four-legged robot in Fusion360, and manufacturing using harmonic gear trains, 3D printing, and machining tools
- Developing **control logic in ROS** to control the robot, read in sensor data on a Raspberry Pi, and send motor actuation commands to Arduino's

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 a 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, MATLAB, Bash, JavaScript, Java
- **Software:** ROS, Qt, OpenCV, TensorFlow, Arduino, CUDA, OpenGL, Git
- **Design/Hardware:** SolidWorks, Fusion360, AutoCAD, Machining Tools, PCB Design, Soldering, Oscilloscopes

Education

University of Waterloo, Mechatronics Engineering, Option in Artificial Intelligence (GPA: 3.86) — Sep '16 – Apr '21

- **Online Coursework:** Robotics SW Engineering (ColumbiaX), AI for Robotics (Udacity), CS 231n - CNNs for Visual Recognition (Stanford)

Interests

- **Long Distance Running** - Ontario 2014 Track and Field Finalist, Cross Country Runner
- **Hiking -** Climbed mountains in Alberta, climbed Mount Damavand, looking to climb Mount Kilimanjaro