Ali Toyserkani

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Experience

WATonomous – SAE Autonomous Vehicle Challenge | *Technical Project Manager* Sep 2017 – present

- Currently **co-lead a group of over 150 students** in building a level 4 self-driving car.
- Created an embedded controls interface to execute planned trajectories using **PID controllers** and **CAN communication.**
- Developed a data pipelining package in **ROS** and **PCL** to synchronously distribute 150 MB/s of camera, **LiDAR and RADAR** data.
- Implemented and trained a neural network using **TensorFlow, CUDA, and cuDNN** used in a real-time **OpenCV** lane-tracking model.

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

- Developed safety-critical GPU drivers (**OpenCL**, Vulkan, OpenGL) in C & C++ for AMD and NVIDIA Embedded Graphics Cards.
- Built new multithreaded/multipartition sample applications on top of the drivers to **increase 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

- 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 making polymeric parts without the need for support structures.
- Co-created a **real-time image processing model** using **OpenCV** to adjust process parameters when detecting part defects.
- Conducted several phases of research experiments for multiple projects and plotted data using **MATLAB**.

Projects

Quadcopter Drone Feb 2018

- Built a semi-autonomous drone with 6 D.O.F. and smooth control using a Qualcomm **DragonBoard 410c** with **ROS.**
- Designed a 3 axis gimbal to take undisrupted video footage while moving using an **IMU** for calibration.
- Developed a remote controller using an **Arduino Nano** to send **RF** signals to the quadcopter.

4-Axis Robotic Arm Nov 2016

- Created a **multi-purpose robotic arm** with 4 degrees of freedom to repeat sets of user-taught 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, Bash, JavaScript, Java
Software: ROS, Qt, OpenCV, Arduino, Node.js, OpenGL, TensorFlow, CUDA, MATLAB, Git
Design/Hardware: SolidWorks, AutoCAD, Fusion360, Machining Tools, PCB Design, Soldering, Oscilloscopes, Sensors

Education

University of Waterloo, Honours Mechatronics Engineering | *Class of 2021*

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

Interests

- Running – Trying to run at least 20 km a week. Ontario 2014 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.com.