Douglas Huang

Mechatronics Engineering | University of Waterloo

douglas.huang@uwaterloo.ca | www.douglashuang.me | github.com/DouglasHuang

Skills

- Proficient in **C/C++** development and **Python** scripting.
- Experience with **ARM Cortex** (STM32 and Kinetis) and **Arduino** MCUs, soldering, and lab test equipment.
- Strong understanding of data structures and algorithms, embedded systems and computer organization.
- Knowledge of 2D and 3D modelling with **AutoCAD**, **Solidworks**, and PCB design with **Altium Designer**.
- Development tools: **Git**, **Bash**, **Make**, **GDB**, **Vim**, **IAR Embedded Workbench**, and **Eclipse**.

Experience

Sep. 2015 – Dec. 2015 — **Embedded Software Developer**, Imagine Communications Canada

- Developed firmware for PCI-Express IP video streaming card built on Freescale (NXP) ARM microcontroller and MQX real-time operating system.
- Designed and implemented a mailbox system and protocol between Windows driver and card using SPI communication for transmission of network configuration data.
- Created and integrated an abstraction layer for driver initialization using lookup tables, reducing code size and decreasing runtime from linear to constant time.

Jan. 2015 – May 2015 — **Bioinformatics Software Developer**, Agriculture and Agri-Food Canada

- Wrote and maintained data analysis pipelines using Python, Perl, and Bash shell scripting, for DNA sequence annotation and genome assemblies of wheat and flax.
- Designed and developed a genome assembly file merger following MapReduce programming paradigm to combine 53,000 DNA scaffolds from 403 genotypes.
- Implemented GNU Parallel to parallelize microRNA annotation pipeline, decreasing processing time by 40%, and coded new modules for improved data analysis using R.

Oct. 2014 – Present — **Electrical Team Member**, Waterloo Hybrid SAE Team

- Writing firmware and assembling dynamometer wiring harness for 2016 vehicle.
- Developed engine data parser in C to transform raw data from race car vehicle control unit into analyzable information, using Arduino for serial communication.
- Assisted in PCB development with Altium Designer, board assembly, and hardware testing using oscilloscope and multimeter.

Projects

Jan. 2015 — **CodePaper**, UofT Hacks

- Created a graphical programming language using Python that interprets user-drawn flow diagrams for functional programming.
- Implemented OpenCV computer vision library for image processing and used a binary tree structure to identify and store nodes and edges.
- Developed web application using Flask for photo submission and online processing.

Sep. 2014 — **TurnIT Bike Indicator Light System**, Hack the North

- Engineered a Bluetooth motion-activated bicycle indicator light system using Arduino and Pebble smart-watch.
- Programmed watch accelerometer to detect arm gestures and control corresponding lights connected to Arduino via Bluetooth module.
- Created a five–segment LED arrow array embedded into a 3-D printed electronics housing designed using Solidworks.

Education

2014 – 2019 — **Bachelor of Applied Science in Mechatronics Engineering**, University of Waterloo
GPA: 3.9/4.0