Donald Ngo Fung IP

+1 (825) 747-6458 | donaldlai19960@gmail.com | linkedin.com/in/donald-ip-b39271187 | github.com/donaldlai19960 | Calgary, AB, Canada

Experience

Software Engineer Sep. 2022 – Aug. 2024

Cornerstone Robotics Limited

- Managed **state machine systems** with **over 1,000 states** for a **behavioral supervision application** in laparoscopic surgical robots, enhancing **robustness and reliability**
- Developed features using **C++** and **Python** on real-time embedded Linux systems with DDS structure, including **Yocto & VxWorks**, achieving **time-critical performance**
- Designed and developed an in-house debugging tool using **Qt**, improving efficiency in identifying and resolving issues
- Collaborated with cross-functional teams in **SDLC**, utilizing **Agile**, **Waterfall**, and **Test-Driven Development** methodologies, ensuring **quality deliverables** and meeting **deadlines**
- Led the development of a new state machine in a new surgical robot, overcoming challenges in laparoscopic surgery and successfully attracting **investor funding**

MPhil Candidate and Research Assistant Oct. 2019 – Aug. 2022

The Chinese University of Hong Kong

- Led development of **software and hardware prototypes** for **3D reconstruction** in endoscopic procedures, securing a **new funding project**
- Implemented **high-performance algorithms in C++ and Python** for **3D point-set processing**, integrating **sensor fusion** to ensure reliability. Used libraries like **OpenCV**, **PCL**, and **OpenGL**
- Developed **anti-counterfeiting** and **joystick control systems** for surgical robots using **ARM Cortex MCU (STM32)**, including firmware and hardware development, and implemented communication protocols like **1-Wire**, **I2C**, and **UART**, resulting in a **secure and efficient control system**
- Presented research at academic conferences under the mentorship of **Prof. YAM Yeung**

Research and Development Intern (Full-time) June 2017 – July 2018

ASMPT

- Developed **high-precision motor systems** and **low-cost electromagnetic position sensors**, achieving **low-latency feedback** and **accurate control**
- Developed a **full-stack web app** using **PHP**, **JavaScript**, and **Bootstrap** to **automate the CE file system and processes**, increasing efficiency by **50%**

Education

The Chinese University of Hong Kong

Master of Philosophy in Mechanical and Automation Engineering *Aug. 2020 – Aug. 2022*

- Thesis: Dual-channel Bi-directional Structured Light 3D Imaging System

The Hong Kong Polytechnic University

Bachelor of Engineering (Hons) Degree in Electronic and Information Engineering *Sept. 2014 – Sept. 2019*

Projects

Structured Light 3D Reconstruction for Endoscope | *C++, Python, QT, PCL* June 2020 – Aug. 2022

- Developed a **prototype multi-channel structured light system**, reducing **measurement error** from **12.3%** to **5%**
- Utilized **translation of point sets**, **Iterative Closest Point (ICP)**, and **Moving Least Squares (MLS)** techniques to integrate multiple **point cloud data sources**, producing a more **complete dataset** (**50% increase**)
- Designed a **user-friendly QT-based GUI** with **threading capabilities**, ensuring **seamless integration** and **optimal performance**
- Leveraged **PCL** and **OpenCV** for **point cloud reconstruction, registration, and smoothing**, ensuring high accuracy

Embedded Software for Quadruped Robot | *Embedded C++, Mbed OS RTOS* Sept. 2018 – June 2019

- Developed **firmware for ARM Cortex MCU (STM32)** for a lightweight, agile quadruped robot
- Utilized **Mbed OS RTOS framework** to ensure precise **task scheduling** and **real-time control** of robot movement with protocols like **CAN bus, I2C, and SPI**
- Integrated **IMU and distance sensors** to enhance **stability and obstacle detection**
- Collaborated with a **multidisciplinary team** to refine **robot gait algorithms**, resulting in **improved locomotion and efficiency**
- Validated system performance using lab instruments and debugging tools such as **ST-LINK** and **CAN BUS analyzer**

Technical Skills

Languages: C/C++, Python, C#, Java, JavaScript, PHP, SQL (MySQL), HTML/CSS
Frameworks: VxWorks, OXF, Qt, Bootstrap
Developer Tools: IBM Rational Rhapsody, CMake, Docker, Keil µVision, STM32CubeMX, Altium Designer, SolidWorks
Libraries: OpenCV, PCL, PyTorch, NumPy, Matplotlib