Johnny (Chunyu) Wang (He/Him)

Embedded Software Developer and UBC MEng Computer Engineering

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Project Portfolio: https://johnnywang3739.github.io

Location: Surrey, BC, Canada

SKILLS

Software: Python, Java, C/C++, JavaScript, Assembly, SQL, Object-Oriented Programming, Inter-Process-Communication (IPC), Version Control (Git, SVN), Linux, Machine Learning
Firmware: Real-Time Operating Systems (RTOS), FreeRTOS, Multi-threaded Programming, Digital Design (Verilog and VHDL), Microcontrollers (STM32, ESP32, Raspberry Pi, RISC-V).
Electrical: Lab Equipment (Oscilloscope, Spectrum Analyzer, Protocol Analyzer), PCB Design (KiCAD, Altium Designer), Simulation (LTSpice, Modalism, PLECS), Analog/Digital Circuit.
Protocol: USB, TCP/IP, PCIe, CAN, UART, SPI, I2C, HTTP, RS-485, MQTT

WORK EXPERIENCE

Embedded Software Developer, Westgate Technology Corporation

Delta, British Columbia **04/2024-Present**

Technologies Used: C, Python, Agile Development, Kernel Programming, Wireshark, Packet Analyzer, PuTTy, code stepping, JTAG.

• Developed low-level drivers in C on STM32 platform for communication with devices such as Silicon Lab chipsets, LTE modules, Wifi modem, significantly facilitated project progress within 3 weeks of employment.
• Utilized code stepping and advanced debugging techniques to fix bugs, optimize code structure, and delivered high-quality firmware.
• Implemented real-time code performance optimizations on FreeRTOS to achieve efficient multi-tasking and optimal CPU time utilization.
• Provided real-time Chinese/English translation for communications with Asian suppliers, ensuring smooth communication about project plans between multiple parties.

Product Engineer Co-op, Microchip Technology Inc

Burnaby, British Columbia **05/2023-09/2023**

Technologies Used: Python, Jira, Digital Signal Processing (DSP), PCIe, Excel Pivot Tables/Slicers, Automated Testing Equipment.

• Characterized next-generation PCIe switches to quantify performance of mixed-signal IP blocks over Process, Voltage and Temperature (PVT), ensuring safe high-speed data communication over SerDes.
• Developed Python scripts for automated stress testing and performance optimization based on PVT-aware features.
• Used advanced testing equipment to debug high jitter issues using different test patterns, identifying the root cause.
• Built data processing pipelines and used Excel Pivot charts for efficient analysis and reporting of debugging data.

Firmware Developer Intern, Human-Computer Interaction Lab, University of Nottingham Ningbo China

Ningbo, China **06/2020-09/2020**

Technologies Used: Arduino Teensy (C/C++ Code), IMUs, I2C, Bluetooth, ML models, GUI (Qt), CI/CD

• Developed a smart wearable device for sign language recognition project, achieving real-time sign translation.
• Developed firmware to calculate quaternion, angular velocity, acceleration, and orientation from the IMU sensors.
• Led firmware team to collect hand movement data, transmitted via Bluetooth from sensors to PC.
• Collaborated with MLE team to develop Neural Networks to predict sign language with accuracy of above 90% and developed real-time GUI with Qt framework to visualize and record real-time hand movement data.

EDUCATION

University of British Columbia **09/2022-01/2024**

MEng Electrical and Computer Engineering

• **Graduated** with a grade average of **94**
• **Key Courses:** Multimedia Systems, Deep Learning with Structured Data, Advanced Learning Systems, Human Computer Interaction, Advanced Machine Learning Tools, Co-op placement

University of Nottingham **09/2018-08/2022**

BEng Hons Electrical and Electronic Engineering

• **Graduated** with **First Class** Honours
• **Key Courses:** Embedded Computing, Scalable Cross-Platform Software Design, Electronic Processing and Communications, Power Electronics and Control, Final Year Individual Thesis

TECHNICAL PROJECTS

GPS Viewer Desktop App **05/2024-08/2024**
Technologies Used: C++, Qt6, Google Map API, Javascript, GUI, Real-Time data processing, NMEA parser, windows installer
Link: https://github.com/johnnywang3739/GPS-desktop-app
• Developed a Qt desktop application in C++ for real-time GPS visualization on Google Maps, interfacing with STM32 and Quectel LC29H GNSS.
• Developed STM32 firmware using DMA-based UART read method to process NMEA sentences in real time.
• Implemented network utilities, data recording, and NMEA parsing features.
• Packaged the application into an installer for easy deployment, ensuring successful product delivery to end users.

Custom USB Driver Development for STM32 with Silicon Lab USB Devices **04/2024-06/2024**
Technologies Used: C, Device Driver, USB Protocol, USB Packet Analyzer, Wireshark, Composite Devices, FreeRTOS.
Link: https://github.com/johnnywang3739/USB-VCP-host-driver
• Developed a custom USB driver to interface STM32 with CP2105 dual UART to USB device for CDC communication based on the Silicon Lab CP210x Linux USB driver.
• Analyzed USB packets and datasheets to derive necessary control transfer request packets and vendor-specific commands for initializing Virtual Com Port (VCP) communication.
• Developed functions to set baud rate, and line coding for both ECI and SCI port, achieving high speed data transfer on both endpoint interfaces.
• Conducted stress tests on multi-port communication and integrated design on FreeRTOS for real-time performance.

Autonomous Robot Battle Tank using Reinforcement Learning **09/2023-12/2023**
Technologies Used: Java, Unit Test, Version Control, RL, Q-learning, Temporal-Difference Learning, Maven
Link: https://github.com/johnnywang3739/Robo-Battle-Tank-RL
• Engineered an autonomous agent using Reinforcement Learning to defeat NPC robot opponents.
• Incorporated Robocode JAVA development API for agent environment simulation.
• Developed MLP engine to learn combat data on the fly and used SARSA method to derive Q values for actions
• Achieved win rate of over 90% after 10000 rounds.

3D Model Viewer Engine using OpenGL **09/2022-12/2022**
Technologies Used: Python, OpenGL, Shaders, 3D Graphics, Dynamic Lighting, Camera Control.
Link: https://github.com/johnnywang3739/OpenGL3DEngine-repo
• Developed a 3D model viewer in Python and OpenGL designed for high-quality graphics rendering with six degrees of freedom for camera and object movement.
• Implemented dynamic lighting and custom shaders for realistic textures, supporting multiple light sources including point and directional lights.
• Enabled interactive model manipulation—rotation, scaling, and translation—providing an intuitive user experience for detailed 3D analysis.

Doppler Radar Based Speed Detector for Vehicles **09/2020-06/2021**
Technologies Used: HDL, Xilinx ISE, Xilinx XC2C64A CoolRunner-II, STM32, KiCad, ADC, Data Acquisition, FFT, C++
Link: https://github.com/johnnywang3739/doppler-speed-radar-repo
• Developed a Doppler Radar-based Speed Detector using STM32 microcontroller.
• Designed a signal data acquisition pipeline using bandpass filters and amplifiers through ADC input, coupled with real-time FFT algorithm for speed analysis on STM32.
• Engineered a display interface driver using FPGA, achieving RS-485 serial to parallel data conversion RTL design

Fully Controlled Two Switch Forward Converter (Power Converter) **09/2020-06/2021**
Technologies Used: Electromagnetics, EMI, Power Electronics, PWM, Transformer/Inductor Design, Modelling, Closed loop Control
Link: https://drive.google.com/drive/folders/11juw4Xo5b66RLRj7_6glR6B6cXnFEZSu
• Utilized PLECS and MATLAB (Bode Plot) to design the closed-loop forward converter to produce regulated 15 V output voltage from a 230 V AC source at 100KHz switching frequency.
• Conducted main transformer and gate-drive circuit transformer electromagnetic design and inductor design.
• Developed Printed Circuit Board (PCB) with circuit topology and verified design with bench power supply.

Real-Time Line-Following Vehicle with Digital PID Control **09/2019-06/2020**
Technologies Used: C, Raspberry Pi, Encoder Motor, H-bridge, I2C, UART, PID, Bi-directional Wireless Communication, ISR
Link: https://drive.google.com/drive/folders/1W4iabE1VbcG60yYF9RsxGSotqVrL41pk?usp=drive_link
• Developed a robust Line-following Vehicle that utilizes ISR of 250 Hz to perform high-speed track tracing.
• Programmed the Master device of Raspberry Pi to communicate with encoder motor drive board to control speed and calculate travel distances.
• Implemented Bi-directional Bluetooth connection for remote controller to receive vehicle data and send instructions.

ENGINEERING TEAMS

Formula Student Racing Team, Nottingham **10/2021-01/2022**
• Developed GUI with Qt to communicate with inverter to read/write data using CAN protocol
• Programmed Electronic Control Unit (ECU) with MoTeC to control vehicle electrical system in different state through ECU input/output and communicate with Power Distribution Modules.