

Mostafa Ayesh

Embedded Software Engineer

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mostafaayesh.com

Education

Software Engineering MAsc. - Automotive E/E Architectures

McMaster University

Sep. 2020 – May. 2024

Hamilton, ON

Mechatronics Engineering & Management B.Eng.

McMaster University

Sep. 2014 – Apr. 2020

Hamilton, ON

Experience

Software Engineer

Indie Semiconductor

Jan. 2023 – Present

Toronto, ON

- > Developed low-level C drivers supporting image sensors and serializers/deserializers in an RTOS environment
- > Created tools for extraction, processing, and verification of embedded data from video streams
- > Engineered host-side tools to facilitate communication with an SoC through I²C and UART
- > Conducted comprehensive functional safety and timing analyses, ensuring adherence to industry standards and regulatory requirements

Researcher - Automotive Embedded Systems

Stellantis (McMaster Automotive Resource Centre)

May 2020 – Dec. 2022

Hamilton, ON

- > Brought-up pre-production hardware (NXP S32S & S32K) to support an electric motor control application, configuring peripherals, clock trees, and pin multiplexing
- > Implemented a real-time motor control firmware in an RTOS based centralized automotive architecture
- > Integrated precise time synchronization based on Time Sensitive Networking (TSN) over Automotive Ethernet
- > Utilized advanced tools such as Lauterbach TRACE32 with JTAG debugging and ETM tracing for thorough hardware and software testing, troubleshooting, and optimization
- > Conducted comprehensive signal verification and timing analysis for networking and motor control applications, ensuring adherence to OEM performance requirements

Embedded Firmware Specialist

NEUDOSE

Oct. 2018 – May 2020

Hamilton, ON

- > Engineered STM32-based CAN drivers for satellite On-Board Computer with (CSP) network stack support
- > Developed mission-critical FreeRTOS-based flight software for the On-Board Computer in C/C++
- > Designed a prototype Printed Circuit Board (PCB) using Altium Designer, serving as a crucial component in the testing phase of the flight software

Research Assistant - Model Based Design

McMaster Centre for Software Certification

May 2017 – Apr. 2020

Hamilton, ON

- > Developed model-based Pacemaker following Boston Scientific specs using MATLAB Simulink on FRDM-K64F
- > Implemented real-time Pacemaker configuration and monitoring over UART in MATLAB Simulink
- > Automated hardware testing over UART utilizing Arm Mbed firmware (C++) and Python

Projects

RETINA (Realtime Indoor Navigation Assistant)

May 2020

- > Developed a Real-time Indoor Navigation Assistant, catering to individuals with visual impairment by leveraging Ultra-Wide Band (UWB) technology, achieving sub-meter precision
- > Implemented BLE communication between the mobile app and Decawave DW1000 UWB transceivers to retrieve the user's real-time position and heading
- > Utilized Nominatim for reverse geocoding to enhance location-based services and integrated Valhalla for efficient route generation tailored to indoor environments
- > Contributed to the accessibility and inclusivity of indoor spaces by developing a system that goes beyond traditional navigation, ensuring a smooth and reliable user experience

Booky

Jan. 2018

- > Developed a Cross-Platform mobile app using Flutter available on iOS & Android, enabling users to find books by taking a picture of the cover
- > Implemented image search functionality using Google Cloud services, allowing users to explore and discover books of interest effortlessly

Training & Certification

JavaScript Algorithms and Data Structures

freeCodeCamp

Advanced MATLAB for Scientific Computing

Stanford Online

Publications

Two Simulink Models with Requirements for a Simple Controller of a Pacemaker Device

Sep. 2022

- > Accepted at the 9th International Workshop on Applied Verification of Continuous and Hybrid Systems

Skills

Programming Languages

C, Python, C++, ARM Assembly, JavaScript, Java, Dart, Verilog, SQL

Development Tools

CMake, Ninja, GDB, OpenOCD, Git, Docker, SVN

Software Development

MATLAB, Simulink, Altium Designer, Lauterbach TRACE32, STM32CubeMX, Keil μ Vision

Hardware Platforms & Architectures

ARM Cortex-M (STM32F, NXP S32K), ARM Cortex-R (NXP S32S), PowerPC (NXP MPC5), FPGA

Communication Protocols & Technologies

CAN, Automotive Ethernet (TSN), UART, SPI, I²C, MQTT, UDP, TCP/IP