Mostafa Ayesh

Embedded Software Developer

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Education

Software Engineering MASc. Sep. 2020 – May. 2024
McMaster University *Hamilton, ON*

Mechatronics Engineering & Management B.Eng. Sep. 2014 – Apr. 2020
McMaster University *Hamilton, ON*

Experience

Application Engineer Jan. 2023 – Present
Indie Semiconductor *Toronto, ON*

- Tailored software and hardware solutions to fulfill specific customer needs
- Implemented image sensor drivers to support new image sensors
- Developed tools for extraction, parsing, and verification of embedded data from video streams
- Engineered host-side tools to facilitate communication with the camera video processor SoC through I^2C
- Conducted comprehensive functional safety and timing analyses, ensuring adherence to industry standards and regulatory requirements

Graduate Research Assistant May 2020 – Dec. 2022
McMaster Automotive Resource Centre *Hamilton, ON*

- Collaborated with NXP Semiconductor and an automotive OEM to migrate motor control application to a centralized architecture
- Designed firmware for pre-production hardware (NXP S32S & S32K3), configuring peripherals, clock trees, and pin multiplexing
- Implemented time synchronization using Time Sensitive Networking (TSN) over Automotive Ethernet
- Utilized Lauterbach TRACE32 with JTAG debugging and ETM tracing for hardware and software testing and troubleshooting
- Performed signal verification and timing analysis for networking and motor control applicationss

Embedded Systems Specialist Oct. 2018 – Aug. 2020
NEUDOSE Satellite Team *Hamilton, ON*

- Worked on a project funded by the Canadian Space Agency (CSA) to build and launch a satellite
- Developed STM32-based CAN drivers for satellite On-Board Computer with (CSP) network stack support
- Contributed to the development of FreeRTOS-based flight software for the On-Board Computer in C/C++
- Created a prototype Printed Circuit Board using Altium Designer for flight software testing purposes"

Research Assistant May 2017 – Apr. 2020
McMaster Centre for Software Certification *Hamilton, ON*

- Developed model-based Pacemaker following Boston Scientific specs using MATLAB Simulink on NXP FRDM-K64F
- Implemented real-time Pacemaker configuration and monitoring through UART in MATLAB Simulink with a Python GUI
- Automated hardware testing with Arm Mbed firmware (C++) and Python scripts utilizing UART communication

Projects

RETINA (Realtime Indoor Navigation Assistant) May 2020

- A navigation system to assist people with visual impairment navigate buildings utilizing Ultra-Wide Band (UWB) technology with 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
- Integrated the mobile app with OpenStreetMap API for indoor maps as well as Nominatim for reverse geocoding and Valhalla for route generation

Booky Jan. 2018

- A Cross-Platform mobile app (iOS & Android) that allows the user to search for books by using a picture of the book built using Google flutter
- Used Google Cloud services for image search as well retrieving information about the book of interest

Sumobot Challenge Mar. 2018

- Selected the components and built the electrical circuitry for the Sumobot
- Developed a C++ arduino project for motor control as well sensor sampling (line detection, ultrasound)

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

Languages	C, Python, C++, ARM Assembly, JavaScript, Java, Dart, Verilog, SQL
Tools	CMake, Ninja, GDB, OpenOCD, Git, Docker, SVN
Software	MATLAB, Simulink, Altium Designer, Lauterbach TRACE32, STM32CubeMX
Hardware	ARM Cortex-M (STM32, NXP S32K3), ARM Cortex-R (NXP S32S24), PowerPC (NXP MPC5777C), FPGA
Communication	CAN, Automotive Ethernet (TSN), UART, SPI, I^2C, MQTT, UDP, TCP/IP