Dharak Verma

Computer Engineering @ McMaster University

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Professional Experience

Canoo Inc. — Los Angeles, CA

Embedded Software Engineering Intern, Autonomous Driving — May 2022 - Aug 2022

- Developed, tested, and integrated XCP (Universal Measurement and Calibration Protocol) and NVM (Non-Volatile Memory) software components to enable run-time tuning of controls algorithm parameters
- Integrated custom image signing tool to enable secure over-the-air software updates for Autonomous Driving ECU
- Created message framework and code auto-generation tools to enable data transfer between processors via IPCF (Inter-Platform Communication) and DDS (Data Distribution Service), reducing SRAM usage by 24%
- **Skills/Tools:** C, Python, Embedded Linux, RTOS, Yocto, Git, UDP/IP, Vector CANape & CANoe, ARM, NXP

Embedded Software Engineering Intern, Vehicle Platform — Sep 2021 - Dec 2021

- Matured in-vehicle remote diagnostics embedded software stack to enable capture, storage, and retrieval of DTC (Diagnostic Trouble Code) Snapshots for SPC56 ECUs
- Utilized ISO 14229-1 to implement UDS (Unified Diagnostic Services) for reading and clearing DTC Snapshots
- Developed Python Mako templates to enable C-code auto-generation for ECU specific DTCs and Snapshots
- Architected NVM framework for performant DTC Snapshot storage and removal during run-time
- **Skills/Tools:** C, Python, Bash, Git, Linux, RTOS, CAN, UDS, MULTI IDE, Vector CANoe, VectorCAST

Tesla Inc. — Sparks, NV

Software Engineering Intern, Software Vehicle Test Engineering — Jan 2022 - Apr 2022

- Re-architected Battery Pack test software by abstracting tester hardware control from test sequence, resulting in singular codebase for all tester cabinet revisions and new software standard for organization
- Matured hardware-abstraction library by adding support for safety-controlled contactors, allowing for contactor status to be integrated into test sequence and hardware failures to be reported
- Architected vehicle firmware deployment tool, automating firmware deployment to any vehicle tester(s), supporting multiple deployment methods, and saving 8 Engineering hours per deployment
- **Skills/Tools:** Go, Python, C, Linux, Git, National Instruments PXI, Wago & Pilz I/O Systems, Multimeters

Controls Software Engineering Intern, Model S/3/X/Y Drive Unit — Aug 2020 - Aug 2021

- Led Inverter automation equipment fault-reduction and availability increase initiative, improving line-wide availability by 4.6% to hit ramp-up-rate
- Reprogrammed bottleneck Stator automation equipment, reducing cycle time by 2.3s, downtime by 80%, and increasing maximum output by 77%
- **Skills/Tools:** Python, SQL, Ignition, Allen-Bradley & Siemens PLC, Studio5000, TIA14, Keyence Vision Sensors

Controls Software Engineering Intern, Model 3 Battery Pack — May 2019 - Aug 2019

- Developed automated Line Availability and Machine Alarm algorithms to enable predictive maintenance
- Commissioned new automated production station for Model 3 Battery Pack to eliminate on-road failures ($100k/failure), end-of-line tester failures ($150/failure) and 80 second cycle time increases
- **Skills/Tools:** Python, SQL, Ignition, Git, Allen-Bradley PLC, Studio5000

Design Teams

MAC Formula SAE Electric — Hamilton, ON

Technical Director, Software & Vehicle Controls — Oct 2018 - Present

- Managed 80+ Engineering students, cross-functional projects, and sponsorship relations while adapting to COVID-19 pandemic and working full-time
- Re-architected embedded system using STM32F7 platform, reducing complexity and increasing functionality
- Designed, simulated, and integrated vehicle control system to enable basic driving functionality by managing battery management, cooling, vehicle mode selection, tractive motor, and vehicle dynamics
- Created and enforced documentation guidelines for team-wide use with emphasis on future team sustainability

Education

McMaster University — Hamilton, ON

Bachelor of Engineering, Computer Engineering & Co-op — Class of 2023