Carl Erik Larsen

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Education

MEng Joint Honours - Electrical and Mechanical Engineering September 2019 – May 2024
University of Edinburgh - First Class Honours (4.0 GPA), Class of '24 *Edinburgh, UK*

Exchange Programme September 2021 – May 2022
University of California Los Angeles *CA, USA*

Professional Experience

System Architect September 2024 – Present
Danfoss Climate Solutions | C, C4 Model, ONNX *Nordborg, Denmark*
- Responsible aligning 21 software engineers for early-stage development of seven interconnected software systems

Marketing Engineer Intern - Competitor Product Portfolio Analysis June 2024 – August 2024
STMicroelectronics | PowerBI, Power Automate *Edinburgh, UK*
- Designed PowerBI dashboard for real-time competitor sensor portfolio analysis for data-driven strategic decision-making
- Collaborated with product management, R&D, and product marketing accounting for key stakeholder specifications
- Analyzed and compared sensor specifications for insights in competitive positioning, product development and pricing
- Developed Power Automate flows for automatic creation and maintenance of competitor based views

Deep Learning AI Intern - LiDAR Data Processing August 2023 – June 2024
STMicroelectronics | Python, TensorFlow, Keras *Edinburgh, UK*
- Exploring deep learning techniques for LiDAR waveform/histogram for deployment on edge devices
- Leveraged Weights and Biases MLOps platform for hyperparameter optimization using random search
- Collected, augmented, and managed data dataset for model portfolio training ensuring model generalization
- Developed matplotlib custom visualization technique adopted confusion matrix
- Benchmarked networks with custom performance metric to evaluate performance and explore points of failure
- Planned and executed project management plan leveraging scheduling, risk registers and work breakdown structure
- Liased with legal team to develop and file patent application US 18/584,856 as sole inventor
- Improved peak detection rate compared to state of the art algorithms by 23% with a 10kB model

Digital Design Intern - Resource Constrained Machine Learning January 2023 – August 2023
STMicroelectronics | C, Python, TensorFlow *Edinburgh, UK*
- Firmware patch build for fixed-point processor, memory limited, stack only microcontroller unit
- Implemented user orientation detection application (on STM32) to assist screen rotation where gyroscope data is insufficient
- Trained custom computer vision network to infer on a low-resolution depth sensor (99% classification accuracy at 5kB RAM)
- Optimized neural network firmware for processor without floating-point unit with QKeras layers and t-SNE
- Planned and executed project management plan leveraging scheduling, risk registers and work breakdown structure
- Developed custom toolchain for automatic configuration of neural networks on ST's internal photonics processor
- Presented my PyQt6 GUI live demo for an international audience of 150 people at innovation forum
- Authored application note pending application team industrialization of IP
- Developed machine learning on-boarding procedure and guide for new interns

Embedded Systems Intern - Motor Calibration June 2022 – September 2022
Universal Robots | C, Matlab *Odense, Denmark*
- Applied motor control theory, accounting for Clarke and Park (direct-quadrature-zero) transforms
- Developed firmware for motor calibration algorithm resulting in error reduction from 27% to less than 3%
- Simulated electromechanical drive control system with analogue-to-digital converter quantization, and hardware constraints
- Ensured implementation was compatible with all robot joint sizes to streamline deployment in production

Projects

UCLA Smart Grid Energy Research Center (SMERC) | *Python* March 2022 - June 2022
- Simulated electric vehicle to everything (V2X) smart systems, optimizing their implications for the grid

Face Mask Compliant Door Lock | *PyTorch, C++* December 2021
- Trained a neural network to analyze frames in real time to detect face mask compliance
- Augmented dataset to allow for functionality with variations in mask color and tested the neural network for security faults
- Designed and 3D-printed a locking mechanism

Mach-Zehnder Interferometry | *Python, LaTeX* June 2018 – December 2018
- Self-taught Python to process 350 million bit sequence representing photon counts
- Studied wave-particle duality and quantum optics for International Baccalaureate extended essay
- Attended two summer internships (DTU and SDU) in the pursuit of understanding the scientific theory

Other Competences

Software: Solidworks, Altium, CATIA V5, MATLAB
Languages: **English** - Mother tongue, **Danish** - Fluent, **Chinese** - Advanced Intermediate, **Spanish** - Ab initio
Interests: Swimming, Psychology, Learning languages, Football, Chess