Axel Jacobsen

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LANGUAGES Advanced in **Python** experienced in **C** **Javascript** learning **Julia** **Lisp** **Rust**
DEEP LEARNING Designing, training, and deploying neural networks on a low-cost instrument to diagnose malaria

RELEVANT EXPERIENCE

CHAN-ZUCKERBERG BIOHUB | Associate R&D Engineer | Mar 2022 - Present

- Designing, training, and deploying a custom object detection network to diagnose malaria real-time on limited compute, as well as a simple convolutional network to determine focal drift
- Writing protocols for automated cell-splitting, including designing an algorithm to speed up aliquots

CHAN-ZUCKERBERG BIOHUB | R&D Engineering Intern | Jun 2020 - Dec 2020, Jul 2021 - Dec 2021

- Rewrote codebase of the Opentrons OT-2, an open-source pipetting robot
  - Designed tests to measure drift of OT-2, accurate to 1 µm over ~1 m, using cross-correlation
  - Simplified software, reduced size by ~60% while maintaining previous functionality
- Designed and ran tests to measure drift of OT-2, accurate to 1 µm over ~1 m, using cross-correlation
- Wrote ann ADC driver for a low cost luminometer to detect COVID-19 antigens, deployed in Bangladesh

WILDLIFE COMPUTERS | Engineering Intern | May 2019 – Aug 2019

- Designed an isolator PCB to isolate digital lines from sensitive measurement devices, allowing low-noise and accurate voltage measurements
- Wrote C++ to test PCBs that arrive from fabrication - autonomously verifies PCB component placement to increase production throughput

CONTROL MOBILE | Data Science Co-op | Jan 2018 – Apr 2018

- Wrote Python scripts to analyze and rank order over 300 individual SQL queries by their runtime to optimize the SQL database; reduced the runtime to fetch and display customer data by 65%
- Worked with the backend team to fix existing bugs, write new code, and refactor current code

PROJECTS

DEEP LEARNING

- Asynchronous Advantage Actor-Critic Model written in Pytorch, optimized for multicore CPUs via multiprocessing
- LSTM-based Deep Q-Network, trained on Denmark Technical University's High-Performance Computing Cluster

ENGINEERING PHYSICS AUTONOMOUS ROBOT COMPETITION

- Designed and created an autonomous robot from scratch in 8 weeks, capable of navigating a complex and dynamic course
- Implemented signal processing software to detect specific IR frequencies with sub-millisecond detection time
- Wrote (in C) driver software for the robotic arm / claw, as well as software for high-level control loops of robot

EDUCATION

UNIVERSITY OF BRITISH COLUMBIA | B.ASc Engineering Physics, Graduated May 2022

Coursework includes Lagrangian Mechanics, Computational Modelling, Digital Systems and Microcomputers, Signals and Systems, Applied Quantum Mechanics, Linear Algebra, Honours Multivariable and Vector Calculus, Complex Analysis, Optics, Statistical Mechanics

DENMARK TECHNICAL UNIVERSITY | Exchange Semester, Winter 2019

Coursework includes Operating Systems, Deep Learning, Robotics, Computationally Hard Problems.
Won DTU OS Course Competition for writing the fastest reverse hash server in C