Axel Jacobsen

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PROGRAMMING Strong with Python, experienced in C/C++, Java, MATLAB
ELECTRICAL / MECHANICAL Experience with PCB design, mechanical prototyping and CAD software, fluid system design
OTHER Have EU passport (Citizen of Denmark, Canada)

EXPERIENCE

R&D ENGINEERING INTERN | Chan-Zuckerberg Biohub | Jun 2020 - Dec 2020

Reprogrammed the Opentrons OT-2, an open-source pipetting robot for lab automation

- Rewrote almost all software for the robot with a focus on speeding up epithelial cell growth protocols - new code base size is ~25% of the original, with at least doubling of efficiency for frequent operations
- Redesigned computing architecture so arbitrary instruments (e.g. cell counters) can be used during protocols instead of just the Opentrons instruments

ENGINEERING INTERN | Wildlife Computers | May 2019 – Aug 2019

Wildlife Computers is the leading provider of advanced wildlife telemetry solutions

- Wrote C++ firmware to test PCBs that arrive from fabrication - autonomously confirms correct placement of components which allows for identification of faulty boards, improving production throughput
- Designed a digital isolator PCB to isolate the company's hardware from measurement devices, allowing for low-noise and accurate voltage measurements

DATA SCIENCE CO-OP | Control Mobile | Jan 2018 – Apr 2018

Control Mobile aggregated and displayed transaction data for over 100 companies that used Stripe/Square/Paypal

- 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 agile backend team to fix existing bugs, write new code, and to refactor current code

PROJECTS

VARIOUS DEEP LEARNING PROJECTS

- Asynchronous Advantage Actor-Critic Model, reinforcement learning project optimized for CPU with multiprocessing
- Deep Q-Network in PyTorch to play Atari's Pong, trained on Denmark Technical University's High Performance Computing Cluster
- Feed-forward neural net written with Numpy solves MNIST with 97.2% accuracy, vectorized for fast training

AUTONOMOUS ROBOT COMPETITION | Engineering Physics

- Deployed a real-time object detection algorithm on Raspberry Pi
- Created signal processing software to quickly and accurately detect certain IR signals
- Wrote C controls software and created circuits to control the mechanical subsystems

EDUCATION

UNIVERSITY OF BRITISH COLUMBIA | Expected May 2022

B.ASc Engineering Physics, GPA 3.70
Coursework includes Lagrangian Mechanics, Computational Modelling (currently with fluids), 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 | Winter 2019

Exchange Semester
Coursework includes Operating Systems, Deep Learning, Robotics, Computationally Hard Problems.
Won the DTU OS Challenge for writing the fastest reverse hash server in C, using multiprocessing and multithreading