Axel Jacobsen

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PROGRAMMING Python 5 years, C/C++ 2 years, Java/MATLAB 1 year
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 OT-2 code base with a focus on speeding up epithelial cell growth protocols - doubled speed of certain frequent operations, reduced code base size by ~75% while expanding the capabilities of the robot
- Created 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++ to test PCBs that arrive from fabrication - autonomously verifies PCB component placmeent to increase production throughput
- Designed an isolator PCB to isolate digital lines from sensitive measurement devices, allowing 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 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
- Feed-forward neural net written with Numpy solves MNIST with 97.2% accuracy, vectorized for fast training

16-WEEK AUTONOMOUS ROBOT COMPETITION | Engineering Physics

- Deployed a real-time object detection algorithm on Raspberry Pi
- Created signal processing software to detect IR signals with sub-millisecond detection time
- 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 both multiprocessing and multithreading