Axel Jacobsen

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Relevant Experience

Chan-Zuckerberg Biohub

R&D Engineer | Mar 2022 Present

We are creating a low-cost imaging cytometer for malaria detection. This device uses machine learning to diagnose malaria by imaging unstained blood and classifying blood cells with an object detection model

- Created a state-of-the-art diagnostic deep learning model for malaria detection. Achieved a detection limit below 0.00038% parasitemia, roughly 1 false positive in every 260,000 predictions. Optimized to run seamlessly at 30 FPS on Raspberry Pi 4. Currently drafting the associated research paper

- Architected and optimized software for the microscope. Key contributions include:
    - Created a multiprocessing manager to efficiently move data between processes for heavy calculations, reducing execution times from 16.3 ms to 4.8 ms
    - Enhanced data-saving speed, enabling stable operations at 30 FPS

- Created a deep learning model to gauge the focus quality of microscope images, aiding in the collection of over 10 TB of data from our deployment to Uganda

Chan-Zuckerberg Biohub

R&D Engineering Intern | Jun 2020 Dec 2020, Jul 2021 Dec 2021

- Overhauled the codebase of the Opentrons OT-2 pipetting robot, greatly simplifying its API and reducing its size by ∼60% without sacrificing functionality

- Authored an ADC driver for a luminometer detecting COVID-19 antigens, currently deployed in Bangladesh. Link to research

Wildlife Computers

Engineering Intern | May 2019 – Aug 2019

- Engineered a PCB to protect digital lines from interference, ensuring precision voltage measurements

- Developed C++ software for automated PCB component verification, boosting production efficiency

Control Mobile

Data Science Co-op | Jan 2018 – Apr 2018

- Optimized SQL database operations by evaluating and improving 300+ SQL queries, achieving a 65% reduction in data retrieval time

- Collaborated with the backend team on bug fixes, code development, and refactoring

Projects

Deep Learning

- Crafted an Asynchronous Advantage Actor-Critic Model using Pytorch, enhanced for multicore CPU operation

- Developed an LSTM-based Deep Q-Network

- Much surfboard repair

Engineering Physics Autonomous Robot Competition

- Engineered an autonomous robot in 8 weeks capable of navigating a maze and detecting IR frequencies

- Wrote signal processing software for rapid IR frequency detection and managed the creation of robot subsystem circuits

- Formulated robotic control circuits and driver software to maneuver robotic subsystems

Education

University of British Columbia
B.ASc Engineering Physics | Graduated May 2022

Denmark Technical University
Exchange Semester | Winter 2019
Won the DTU OS Course Competition with the creation of the fastest reverse hash server