

MARKUS KUNEJ

Toronto, ON (Canadian and EU Citizen)

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EDUCATION

University of Toronto

Bachelor of Applied Science in Engineering Science, Major in Machine Intelligence, Business Certificate

Sept 2018 – May 2023

Toronto, ON

EXPERIENCE

Software Engineer — Huawei Technologies Canada

github.com/markuskunej/Mindspore_PRs

May 2021 – June 2022

Markham, ON (Remote)

- Worked on MindSpore, Huawei's new, open-source AI computing framework as part of the distributed systems and AI team.
- Developed a new feature to offload dataset operations from the CPU to either a GPU or AI accelerator device, reducing training times by 20% on networks such as ResNet and AlexNet. (C++, Python)
- Wrote CPU, GPU, and AI accelerator kernels for MindSpore operations, allowing for additional AI networks to be supported by their AI framework. (C++, CUDA)
- Created and ran performance tests on AI networks, analyzing loss, accuracy and memory data to locate bottlenecks in the system. (Bash, Python)

Hardware Engineer — Untether AI

AI accelerator chip startup located in Toronto

May 2020 – Sept 2020

Toronto, ON

- Designed Python scripts to test the boundary scan architecture (JTAG) of their first-generation AI chip, the runAI200®. Ran these scripts on a FPGA device in the lab. (Python, Bash)
- Wrote firmware used to control the General Purpose Input/Output pins and voltages on the tsunAlmi® accelerator card. (C)
- Created register-transfer level (RTL) tests using the cocotb verification framework and Synopsys VCS verification. (Python)

PROJECTS

Forecasting Air Pollution - Undergrad Thesis | Python, Numpy, Jupyter, Regression Models, Sensitivity Analysis

April 2023

- Modelled air pollution levels in major construction sites in downtown Toronto as a multivariate time series.
- Utilized Vector Auto Regressive Moving Average Models to accurately (80%+) predict short-term air pollution levels.
- Performed Sobol Sensitivity Analysis to understand the first and secondary correlations between air pollutants and weather.
- Discovered 5 out of the 8 air pollutants were most influenced by a weather variable (wind speed, humidity, etc.).

Improving Otoscope Image Capture using Deep Learning | Python, PyTorch, Object Detection, Weights & Biases, AWS S3

Jan 2023

- Member of a 5-person capstone team with consumer otoscope maker Remmie Health as our client.
- Developed a CNN object-detection model to locate 2 landmarks of an ear with 0.25 and 0.16 mean percent distance errors.
- Implemented a pipeline using AWS S3 to label the ear canal images for the object detection model efficiently.
- Drafted a 38-page professional report outlining results and presented a PechaKucha-format talk to the class. Our client was happy with the results and we received a 92% grade for the class.

Distributed Cloud Storage Service | Java, Distributed Systems, Data Replication, Encryption

April 2023

- Designed a scalable and replicated key-value storage service.
- Implemented server failure detection using shutdown hooks and reconciliation logic to ensure data is not lost. (Java)
- Achieved consistent hashing using a hashing. Allowed the service to scale with the addition or removal of data servers. (Java)
- Added public-key message encryption for messages between data servers and client to keep data confidential. This required a dual symmetric (AES) and asymmetric (RSA) encryption format to send longer messages. (Java)

SKILLS AND INTERESTS

Languages: Python, C++, Java, C, SQL, HTML/CSS, JavaScript, SystemVerilog, VHDL

Technologies/Frameworks: PyTorch, CUDA, TensorFlow, MindSpore, Git, React, Flask, MongoDB, Linux, Arduino

Interests: Soccer, bikepacking (biking + backpacking), strategy games (Catan, Diplomacy), triathlon, Rocket League

AWARDS

Schulich Leader Scholarship

2018

- Awarded Canada's most coveted undergraduate STEM scholarship, valued at \$100,000.

Canada Wide Science Fair - Senior Gold Medal Excellence Award

2018

- Finished top 10 at Canada's national science fair for my project *The Echo Belt*, a mobility aid for the visually impaired.