Markus Kunej

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Education

University of Toronto **Sept 2018 – May 2023**
Bachelor of Applied Science in Engineering Science, Major in Machine Intelligence, Business Certificate *Toronto, ON*

Experience

Software Engineer — Huawei Technologies Canada **May 2021 – June 2022**
github.com/markuskunej/Mindspore_PRs *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 **May 2020 – Sept 2020**
AI accelerator chip startup located in Toronto *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 tsunAImi® accelerator card. (C)
- Created register-transfer level (RTL) tests using the cocotb verification framework and Synopsys VCS verification. (Python)

Projects

Locating Landmarks in the Ear using ML | *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 an 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 and our client. Remmie Health 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 hashring. 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)

Predicting Soccer Match Outcomes using an AI Model | *Python, PyTorch, Statistics, Web Scraping* **Jan 2021**

- Developed a multi-layer perceptron model which accurately predicts the outcome of an English Premier League soccer match (win, lose, or draw) 48% of the time.
- Used density and box plots to select the 12 most statistically relevant stats from the original 64 recorded for each match.

Skills and Interests

Languages: Python, C++, Java, C, SQL, JSX, HTML/CSS, JavaScript, Swift, Verilog, Assembly
Technologies/Frameworks: PyTorch, TensorFlow, MindSpore, GitHub, React, Linux, Google Colab, Xcode, Arduino
Interests: Soccer, bikepacking (biking + backpacking), strategy games (Catan, Diplomacy), triathlon, Rocket League

Awards

Schulich Leader Scholarship **2018**

- Awarded one of Canada's most prestigious scholarships ($100,000), given to students who demonstrate academic excellence, leadership, and are entrepreneurial minded. Only 50 were awarded nation-wide.

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.