

Ben Chapman-Kish

 github.com/BenChapmanKish |  ben-ck.com |  linkedin.com/in/ben-chapman-kish

Skills

Languages: Python, Java, C++, Rust, C, JavaScript, Kotlin, Swift, Obj-C, VHDL, x86 Assembly, SQL, Regex, Shell

Tools: Git, JIRA, JUnit, Docker, Postman, CUDA, Quartus, Hyperfine, Flamegraph, Xcode, Unity

Libraries: TensorFlow/Keras, Scikit-learn, Flask, Node, Express, MongoDB, Kafka, Spark, Thrift, Hadoop

Professional Experience

UNIVERSITY OF GUELPH

Guelph, ON

Teaching Assistant – Computer Organization & Design

January – April 2023

- Provided learning assistance to students both in-lab and via email, guiding students to debug code and determine submission requirements on their own as much as possible
- Designed term project requirements and created Assembly test cases for evaluating student submissions

FACEBOOK

(Remote) New York, NY

Software Engineering Intern

September – December 2020

- Improved ad matching throughput by up to 1,500x by re-designing indexing system to be locally-cacheable and require fewer database cross-references
- Configured profiling to identify bottlenecks in ad pipeline and monitor uptime across schema migrations

minted.

San Francisco, CA

Software Engineering Co-op

January – April 2020

- Rewrote customizer system to reduce dependency on 3rd party services and improve load times by 30%
- Deployed advanced user segmentation, allowing company to market more relevant products to customers

Google

Montreal, QC

Software Engineering Intern

May – August 2019

- Scaled debugging pipeline to handle 400x more traffic by migrating to better-suited data store and optimizing SQL queries, allowing engineers to quickly identify and track a greater variety of bugs
- Reduced maintenance costs by consolidating pipeline logic into smaller modules with full test coverage

toast

Boston, MA

Software Engineering Co-op

September – December 2018

- Solved concurrency bug by designing thread-safe system for calculating prices, reducing crashes by 12%
- Created tool with Gradle and JDBC to replicate production data in a local environment, reducing time for developers to find and address customer-reported problems

TRIBAL SCALE

Toronto, ON

Agile Software Engineer

January – April 2018

- Reduced dependency on server in radio app, decreasing load on server and improving load times by 55%

Defence Research and Development Canada

Toronto, ON

Mobile Application Developer

May – August 2017

- Solved device portability issues with high profile mobile applications, enabling widespread deployment

- Trained deep learning models with Caffe to achieve optimal performance for facial pose estimation
- Designed and programmed framework for crowd-controlled gaming using Python and OpenCV

Leadership Experience

University of Waterloo ECE Student Society

2019 – 2021

Founder, Co-President, Peer Mentor

- Founded and managed student society for undergrad ECE students to foster program cohesion, provide academic and professional supports, and facilitate knowledge-sharing across cohorts and years
- Planned team-building social events for students to encourage collaboration and communication
- Mentored lower-years academically with lab/project guidance, and professionally with resume critiques

University of Waterloo Engineering Society

2016 – 2022

Class Representative, Orientation Week Leader & Director

- Acted as class representative in general meetings, advocating for solutions to challenges faced by ECE students and collaborating with representatives from other disciplines to achieve common goals
- Managed teams of orientation leaders during annual engineering orientation, co-ordinating team schedules during events, resolving conflicts between front-line leaders, and enforcing safety rules for first-years
- Created event plans and contingencies for components of orientation, supervising timing and operation

Academic Projects

Identifying Mental Health Disorders on Twitter using LSTM Models

2024

- Investigated the use of causal deep learning models to predict occurrences of mental health disorders based on a Twitter user's entire post history rather than individual tweets
- Employed RNN and LSTM models as they are causal neural networks good for memory-based NLP
- Used the Twitter-STMHD dataset, vectorizing tweet text with the Word Embeddings method

Classifying Music Genres using Hybrid CNN-RNN Models

2022

- Explored the use of convolutional and recurrent deep learning models, either sequentially (CRNNs) or in parallel (PR-CNNs), to perform music genre recognition on input audio files
- Used the FMA dataset, vectorizing audio signals with Mel-frequency cepstral coefficients

Training Intelligent Game Agents using Double Deep Q-Learning

2022

- Applied deep reinforcement learning to complex games that require higher-level decision making and the ability to learn game mechanics through experience
- Modelled Super Mario Bros (1985) as an RL problem in order to train a game agent to play it, using Double Q-Learning with Deep Neural Networks for off-policy model-free learning

Matching Applicants to Jobs with a Distributed Network of Dynamically-Selected ML Servers

2022

- Designed a distributed dynamic machine learning platform that learns from user reviews to match applicants with job openings on a professional network such as Glassdoor/LinkedIn
- Implemented custom data and transport layers to maximize service throughput and minimize latency
- Created custom fault-tolerant load balancer that can connect to new server instances while running, and selects the best backend server based on speed, uptime, and model accuracy for a given task
- Wrote custom ML servers that each have partial database caches kept in sync by the master server, that each contain several instances of neural networks that are optimized for different tasks

Personal Projects

QuickPic

2018

- Created social network with iOS client that can take, edit, and send pictures to other users
- Implemented backend server with Node and Express to manage users and facilitate user interaction

Pebble Apps

2015 – 2016

- Built smartwatch apps in C using event-driven programming to interact with sensors and actuators

Education

University of Guelph

2022 – 2024 (on leave)

Master's of Computer Engineering, Artificial Intelligence specialization

Notable Courses:

Introduction to Machine Learning

- Feature extraction, data preprocessing, performance measures, supervised and unsupervised learning

Reinforcement Learning

- Markov processes, model-free control, value function approximation, policy gradient, actor critic methods

Deep Learning

- Backpropagation, SGD, CNNs, regularization methods, RNNs, attention and transformers, GANs, GPT

Mathematics of Machine Learning

- Linear algebra, analytical geometry, vector calculus, probability and distributions, continuous optimization

University of Waterloo

2016 – 2022

Bachelor of Honours Computer Engineering

Notable Courses:

Digital Hardware Systems

- Design and modelling with VHDL, FPGA simulation and synthesis, performance and timing analysis

Compilers

- Lexical & semantic analysis, grammars and parsing, regular expressions, finite & push-down automata

Cooperative and Adaptive Algorithms

- Genetic algorithms, swarm intelligence, reinforcement learning, meta-heuristic search techniques

Fundamentals of Computational Intelligence

- Deep learning and CNNs, data preparation and feature selection, fuzzy logic decision-based systems

Programming for Performance

- Reduced-resource computation, GPU kernel design, process profiling, self-optimizing software

Distributed Computing

- Consistency and replication, RPCs, virtualization, fault tolerance, real-time stream processing

Computer Security

- Practical cryptography, trust & threat models, intrusion detection, privacy-preserving machine learning

Awards

Recipient ----- **University of Waterloo President's International Experience Award** 2018, 2020

Winner ----- **University of Waterloo ECE Design Days** 2017

- Designed Arduino-powered ball launcher and wrote an Android app to control it

Top 10 Finalist --- **University of Waterloo EngHack hackathon** 2017

- Created Android app for coordinating study groups featuring Facebook login and Firebase database