Jesse Haber-Kucharsky

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Summary

- Substantial experience delivering software projects across varied domains (AI, robotics, distributed systems, embedded platforms) with a focus on correctness, simplicity, and testability.
- Adept at understanding and applying mathematical tools from fields like machine learning, optimization, and statistics to solve engineering problems.
- Clear communicator and public speaker dedicated to collaboration and to growing strong and supportive teams.
- Modern C++, C, OCaml, Python, Rust, Haskell, Scala.

Professional Experience (Abridged)

Independent Software Consultant

Sep. 2020 — Present

Untether AI

Senior Software Developer
Toronto, ON, Canada
Jun. 2019 — Jun. 2020

AI Hardware Accelerator

- Created software models in Python for foundational chip functionality — e.g., intra-chip communication — and wrote property-based tests which exercised them against the real chip (Verilog). These tests uncovered several critical design flaws prior to tape-out.
- Restructured, refactored, polished, and documented prototype TensorFlow code written by ML researchers for quantization and graph transformation into a software platform distributed to customers to integrate their models with the toolchain.
- Devised an algorithm for partitioning computational graphs based on their data-flow characteristics and delivered it as a standalone component of the compiler toolchain (C++), thereby ensuring the platform was compatible with large ML models such as those in the MLPerf benchmark.

Uber Advanced Technologies Group

Software Engineer
Pittsburgh, PA, U.S.A.
Feb. 2016 — May 2017

Self-Driving Cars

- Re-designed key pieces of the inter-process messaging system for the real-time self-driving platform (C++ and Python) to correctly handle concurrency and resource management and to simplify the API, delivering millions of messages per second per vehicle and also powering offline simulation and analysis.
- Introduced a new system for on-board processes to publish metrics, including aggregation, serialization, transport over mobile networks (with throttling), and ingestion into Elasticsearch for analysis. This system's initial release led to the successful launch of a self-driving pilot program in a city on the opposite coast by making it possible to observe the progress in mapping the region as it happened.

ScyllaDB

Software Engineer
Remote
May 2017 — Jun. 2019

High-Performance Distributed NoSQL Database

- Developed a sophisticated new access-control system for users based on inheritable permission sets (roles) and integration with LDAP. This required adding to and restructuring many parts of the database "stack" including the query engine and CQL layer, writing an asynchronous LDAP client library (based on OpenLDAP), and clearly documenting and presenting on the new functionality (internally and publicly). These advanced security features made Scylla a viable option for enterprise customers.
- Migrated Seastar – the advanced concurrency framework for C++ and the basis of Scylla – to a modern build system (CMake) that allowed customers and open-source users to easily integrate it into their own libraries and applications.

Microsoft Research

Research Intern
Redmond, WA, U.S.A.
May 2014 — Aug. 2014

Massive-Scale Distributed Systems

- Delved deeply into Cosmos internals – an in-production system for distributed storage, data processing, and machine learning crucial for products like Bing – and created tools to analyze its performance characteristics.

Education

Carnegie Mellon University

Master of Science (M.S.)
Electrical & Computer Engineering
Pittsburgh, PA, U.S.A.
Aug. 2013 — Dec. 2014

Admitted as a Ph.D. student with a focus on large-scale systems for machine learning and data processing. Transitioned to a Master's degree based on refined goals.

- Performance modeling of computer systems with queuing theory.
- Theory of machine learning, including a team project to design a classifier for songbird species (based on audio recordings of their songs) comparing SVM and k-NN.
- Readings and research in advanced and distributed operating systems.

University of Waterloo

Bachelor of Applied Science (B.A.Sc.)
Distinction and Dean's Honours
Honours Electrical Engineering
Waterloo, ON, Canada
Sep. 2008 — Apr. 2013

Emphasized control and communications theory, digital signal processing, optimization, and artificial intelligence.

Design project: Home power-usage monitoring system with custom wireless hardware modules, firmware, statistical forecasting, and web administration.

Awards

Carnegie Mellon University	Aug. 2013 — May 2014	Frank J. Marshal Graduate Fellowship
National Research Council of Canada	Aug. 2013 — Aug. 2014 Aug. 2012 — Dec. 2012	Postgraduate Scholarship Master's Award Undergraduate Student Research Award
University of Waterloo	Mar. 2013 Jun. 2012	Infusion Cup for best design project of 71 teams Sandford Fleming Foundation Co-op Proficiency Award