Tran Ma

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About

I built compilers. Most recently I built a deep learning compiler for self-driving cars. From there I gained a passion for machine learning, and want to advance in this field via novel applications.

I have general software engineering skills, experience building data-centric applications, machine learning foundations, experience with modern computer vision models, and strong research skills.

Work Experience

Ghost Autonomy   Mountain View, CA, USA and Sydney, AU

Machine Learning System Engineer   April 2019 - March 2024

Ghost built an autonomy kit for cars using stereo cameras, radar, and mobile hardware. I worked on the internal training system, which was used to build and deploy most production models built at Ghost.

– For training, I worked on:
  – a front-end tensor library, with a PyTorch-like interface for building models.
  – the backpropagation engine, using a tape-based algorithm.
  – array operations and their derivatives on CPU and GPU (with OpenCL).
– For deployment, I worked on:
  – the compiler to produce code for model inference.
  – accelerating inference. I implemented:
    – operator fusion and rewrites.
    – quantization for model weights.
    – specialized operator implementations in OpenCL.
    – array layout optimization.
  – exporting to ONNX.

During this time I moved towards model engineering. I worked on lane detection in birds-eye view, contributing to:

– a key-points based pure CNN model.
– a ground-truth algorithm, mixing human annotations with a probabilistic approach.

I also worked on:

– deploying models using alternative vendor tools.
– program verification for the runtime.

Standard Chartered Bank   London, UK

Quantitative Developer   Oct 2018 - Mar 2019

SCB has a custom framework for analytics. I supported the risk-reporting features, writing tests for the bank's value-at-risk estimate.

Cog Systems   Sydney, Australia

Senior Software Engineer (Contract)   Jun 2018 - Sep 2018

Cog built high-assurance applications for embedded systems. I developed a toolchain for trusted control systems and protocols. I:
– designed the specification language.
– built a compiler to produce program proofs in Isabelle and verified executables via CompCert.

Ambiata   Sydney, Australia

Software Engineer   Jun 2015 - Mar 2018

Ambiata built a platform for data science. I worked on:

– icile, an SQL-like query language over streams. It has a fusion system to ensure data is streamed once only, and compiles to C code.
– zebra, a columnar immutable data store.

Anchor   Sydney, Australia

Software Engineer   Aug 2014 - Apr 2015

Anchor offered managed cloud services. I worked on core tools for collecting metrics, processing logs, and managing permissions.

Open Kernel Labs   Sydney, Australia

Software Engineer   Mar 2013 - Jun 2014

OK Labs built secure mobile devices utilizing the seL4 verified microkernel. I worked on using hardware virtualization features from ARMv7ve in the hypervisor.

National ICT Australia   Sydney, Australia

Research Assistant   2011 - 2012

I was an undergraduate student in the seL4 verified microkernel project. I worked on information flow proofs and proof automation tactics.

EDUCATION

2009 - 2013   BSc. Computer Science at **University of New South Wales, Australia**   (Honours)

SKILLS

Machine Learning	Computer Vision, Implementation
Compilers	EDSLs, Optimizations, Type Theory
ML Libraries	PyTorch, TensorFlow, scikit-learn
Languages	Python, C, OpenCL C, Scala, Java, Haskell