Alex Renda

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Education

Ph.D. student in EECS.
MIT CSAIL, 2018-2024.
Thesis: Programming with Neural Surrogates of Programs.
Worked on learning-based systems and efficient neural networks, advised by Michael Carbin.

S.M. in Electrical Engineering and Computer Science.
MIT, 2020.
Thesis: Comparing Rewinding and Fine-tuning in Neural Network Pruning.
Worked on efficient neural networks, advised by Michael Carbin.

B.S. (Summa Cum Laude) in Computer Science with Honors, with a minor in Linguistics.
Cornell University, 2018.
Worked on programming abstractions for natural language and intelligent systems as an undergraduate member of the Capra group, advised by Adrian Sampson.

Publications

CoMEt: x86 Cost Model Explanation Framework.
Isha Chaudhary, **Alex Renda**, Charith Mendis, and Gagandeep Singh.
MLSys, 2024.
`https://arxiv.org/abs/2302.06836`

Turaco: Complexity-Guided Data Sampling for Training Neural Surrogates of Programs.
Alex Renda, Yi Ding, and Michael Carbin.
OOPSLA, 2023.
`https://arxiv.org/abs/2309.11726`

Programming with Neural Surrogates of Programs.
Alex Renda, Yi Ding, and Michael Carbin.
Onward!, 2021.
`https://alexrenda.com/onward-2021`

DiffTune: Optimizing CPU Simulator Parameters with Learned Differentiable Surrogates.
Alex Renda, Yishen Chen, Charith Mendis, and Michael Carbin.
MICRO, 2020.
`https://arxiv.org/abs/2010.04017`

Comparing Rewinding and Fine-tuning in Neural Network Pruning.
Alex Renda, Jonathan Frankle, and Michael Carbin.
ICLR, 2020.
Oral presentation (<2% of submitted papers).
`https://arxiv.org/abs/2003.02389`

BHive: A Benchmark Suite and Measurement Framework for Validating x86-64 Basic Block Performance Models.
Yishen Chen, Ajay Brahmakshatriya, Charith Mendis, **Alex Renda**, Eric Atkinson, Ondřej Sýkora,
Saman Amarasinghe, and Michael Carbin.
IISWC, 2019.
https://groups.csail.mit.edu/commit/papers/19/ithemal-measurement.pdf

Ithemal: Accurate, Portable and Fast Basic Block Throughput Estimation using Deep Neural Networks.
Charith Mendis, **Alex Renda**, Saman Amarasinghe, and Michael Carbin.
ICML, 2019.
Best Paper award at the ML for Systems workshop at ISCA 2019.
https://arxiv.org/abs/1808.07412

Programming Language Support for Natural Language Interaction.
Alex Renda, Harrison Goldstein, Sarah Bird, Chris Quirk, and Adrian Sampson.
SysML, 2018.
http://mlsys.org/Conferences/doc/2018/56.pdf
Extended draft: https://arxiv.org/abs/1709.04991

Workshop Papers

Can LLMs Generate Random Numbers? Evaluating LLM Sampling in Controlled Domains.
Alex Renda*, Aspen Hopkins*, and Michael Carbin.
Sampling and Optimization in Discrete Space Workshop, ICML, 2023.
http://people.csail.mit.edu/renda/llm-sampling-paper

Renamer: A Transformer Architecture Invariant to Variable Renaming.
Zachary Ankner, **Alex Renda**, and Michael Carbin.
Machine Learning for Systems Workshop, NeurIPS, 2023.

The Effect of Data Dimensionality on Neural Network Prunability.
Zachary Ankner, **Alex Renda**, Gintare Karolina Dziugaite, Jonathan Frankle, and Tian Jin.
I Can't Believe It's Not Better Workshop, NeurIPS, 2022.
https://arxiv.org/abs/2212.00291

TIRAMISU: A Polyhedral Compiler for Dense and Sparse Deep Learning.
Riyadh Baghdadi, Abdelkader Nadir Debbagh, Kamel Abdous, Fatima Zohra Benhamida, **Alex Renda**,
Jonathan Elliott Frankle, Michael Carbin, and Saman Amarasinghe.
Workshop on Systems for ML, NeurIPS, 2019.
https://arxiv.org/abs/2005.04091

Drafts

A Theory of Equivalence-Preserving Program Embeddings.
Logan Weber, Jesse Michel, **Alex Renda**, Saman Amarasinghe, and Michael Carbin.
2023.
https://openreview.net/forum?id=69MODRAL5u8

Cello: Efficient Computer Systems Optimization with Predictive Early Termination and Censored Regression.
Yi Ding, **Alex Renda**, Ahsan Pervaiz, Michael Carbin, and Henry Hoffmann.
2022.
https://arxiv.org/abs/2204.04831

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*Equal contribution.

Teaching

6.1100 (formerly 6.035) - Computer Language Engineering.
Teaching Assistant. MIT, Spring 2023.

CS 4120 - Introduction to Compilers.
Teaching Assistant. Cornell University, Spring 2018.

CS 2112 - Object Oriented Programming and Data Structures - Honors.
Consultant. Cornell University, Fall 2015, Fall 2016.

Honors and Awards

NSF GRFP Honorable Mention, 2020

Best Paper award for Ithemal at the ML for Systems workshop at ISCA 2019

MIT Great Educators Fellowship, 2018-2019

Cornell University: Summa Cum Laude with Honors, 2018

Academic Service

NeurIPS 2023 – Reviewer

ICML 2023 – Reviewer

ICLR 2023 – Reviewer

PLDI 2023 – Social Events Co-Chair

OOPSLA 2022 – Artifact Evaluator / External Review Committee

ECOOP 2022 – Artifact Evaluator / External Review Committee

ICLR 2022 – Reviewer

POPL 2022 – Artifact Evaluator

OOPSLA 2021 – Artifact Evaluator

NeurIPS 2021 – Reviewer

ICML 2021 – Reviewer

ASPLOS 2021 – Artifact Evaluator

ICLR 2021 – Reviewer (Outstanding Reviewer)

AAAI 2021 – Emergency Reviewer

NeurIPS 2020 – Reviewer

ICML 2020 – Reviewer (Top 33% Reviewer)

Institutional Service

PLSE Seminar Co-Coordinator – Spring 2021 - Summer 2022

PLSE Coffee Chat Co-Coordinator – Fall 2020 - Summer 2022

PLSE Lunch Co-Coordinator – Fall 2019 - Spring 2020, Fall 2021 - Summer 2022

EECS GAAP Mentor – Fall 2020, Fall 2021, Fall 2022

Fast ML Reading Group Coordinator – Fall 2019 - Spring 2020

Extracurricular Projects

CUAUV: Software Team member 2014-2018, Computer Vision group lead 2017-2018.

Industry Experience

Spring 2021: Consultant at ReadySet

Summer 2020: MLSys Research Intern at OctoML

Summer 2018: Software Engineering Intern at Two Sigma

Summer 2017: Software Engineering Intern at Two Sigma

Summer 2016: Software Engineering Intern at Facebook

Summer 2014: System Validation Intern at Tesla

Relevant Coursework

Fundamentals of Program Analysis, Armando Solar-Lezama, MIT, Fall 2019.

Randomized Algorithms, David Karger, MIT, Spring 2019.

Machine Learning, Devarat Shah, David Sontag, and Suvrit Sra, MIT, Fall 2018.

Distributed Algorithms, Nancy Lynch, MIT, Fall 2018.

Category Theory, Ross Tate, Cornell University, Spring 2018.

Advanced Machine Learning Systems, Chris de Sa, Cornell University, Fall 2017.

Certified Software Systems, Andrew Myers, and Greg Morrisett, Cornell University, Fall 2017.

Applications of Parallel Computers, David Bindel, Cornell University, Fall 2017.

Advanced Programming Languages, Adrian Sampson, Cornell University, Spring 2017.

Introduction to Compilers, Andrew Myers, Cornell University, Spring 2016.