Marisa Kirisame

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https://github.com/MarisaKirisame/

Research

ST Invented a new algorithm for web layout that is 3.23× faster then the SOTA.

MemBalancer Worked at controlling the garbage collector for V8, the Javascript engine behind Chrome. Utilize concurrent programming and garbage collection knowledge.

DTR Developed an algorithm for gradient checkpointing for large machine learning model. Currently upstreaming to Pytorch. Adopted by Megengine, DELTA, and used in production.

TVM Top 20 contributor to high performance ML compiler-runtime. Contributed to the design of Relay, a higher order, differentiable IR. Implemented Algebraic Data Types, Automatic Differentiation, Ahead-Of-Time Compiler, Partial Evaluator, contributed to Type Inference.

Education

2020– **PhD in CS**, *University of Utah*, Salt Lake City

2019–2020 **Master in CS**, *University of Washington*, Seattle

2015–2019 **Bachelor in CS**, *University of Washington*, Seattle

Publications

[1] Marisa Kirisame, Tiezhi Wang, and Pavel Panchekha. Spineless traversal for layout invalidation, 2024.

[2] Marisa Kirisame, Pranav Shenoy, and Pavel Panchekha. Optimal heap limits for reducing browser memory use. *Proc. ACM Program. Lang.*, 6(OOPSLA2), October 2022.

[3] Marisa Kirisame, Steven Lyubomirsky, Altan Haan, Jennifer Brennan, Mike He, Jared Roesch, Tianqi Chen, and Zachary Tatlock. Dynamic tensor rematerialization. In *International Conference on Learning Representations*, 2021.

[4] Jared Roesch, Steven Lyubomirsky, Marisa Kirisame, Josh Pollock, Logan Weber, Ziheng Jiang, Tianqi Chen, Thierry Moreau, and Zachary Tatlock. Relay: A high-level IR for deep learning. *CoRR*, abs/1904.08368, 2019.

Projects

7Tree Using CEGIS and Ltac's logical programming capability, build a push-button program synthesizer and verifier for a domain specific problem in Coq.

Happy-Tree A polytypic decision tree in Haskell that work on any True-Sums-Of-Products.

Ordinary A small web game to teach programming. Used Functional Reactive Programming, Nix, Zipper, and GHCJS.

PE Simply Typed Lambda Calculus with reference/product/sum with Partial Evaluation, Automatic Differentiation. Written in MetaOCaml so it can be compiled to OCaml.

Prover An automated theorem prover for first order logic that use Gentzen's Sequent Calculus. Logic Formula represented as Generalized Algebraic Data Type using TMP in C++.

AI Implemented multiple search algorithms in AI Modern Approach, Including A*, BDBFS, CSP with K Arch Consistency optimization. Used Iterator Style and Boost to increase efficiency.

Coursework

- Programming Languages, Deep Learning
- Advanced Computer Architecture
- Operating Systems, Database
- Graduate TCS, System for ML