SCHOOL OF COMPUTATION, INFORMATION AND TECHNOLOGY — INFORMATICS

TECHNISCHE UNIVERSITÄT MÜNCHEN

Bachelor's Thesis, Master's Thesis, ... in Informatics

Thesis title

Author

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Titel der Abschlussarbeit

Author:	Author
Supervisor:	Supervisor
Advisor:	Advisor
Submission Date:	Submission date

I confirm that this bachelor's thesis, master's thesis, ... is my own work and I have documented all sources and material used.

Munich, Submission date Author

Acknowledgments

Abstract

This study dives into the world of RISCV custom extension development and its application to Tiny Machine Learning (TinyML). An important part in the development of

RISCV custom extension is to identify performance bottleneck on benchmark. With a clear view of the bottleneck, custom extension can be further refined.

However, it remains to be a challenge since most of the existing open-source profiling tools don't support RISCV architecture explicitly.

In this work a tool that supports interactive multi-level profiling on RISCV architecture is developed. It integrates well into the ETISS toolchain, a RISCV development

virtual platform developed at the Technical University of Munich (TUM). Given an instruction trace generated by ETISS plugin feature, the tool collects information on-demand

and outputs the callgrind format, which can be used in the GUI Kcachegrind for interactive usage.

The tool is put into practice for benchmarking muRiscvNN, providing use cases in real scenarios. It illustrates how the process of identifying performance bottleneck can

be simplified and sped up. Besides, it provides an infrastructure for developers to extend the profiling functionalities based on their need.

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