Hochschule Karlsruhe
University of
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HKA

Dynamische Programmanalysen für nebenläufige Programme - Data Race Prediction mit TSan V2

Seminararbeit

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1 Einleitung

data race concurrent programs prone to data races, due to highly nondeterministic nature. 2 conflicting events next to each other in trace

conflicting event 2 read/write events, at least one event is write event

dynamic data race prediction predict trace orderings that exhibit data races

exhaustive predictive methods identify as many orderings as possible

efficient predictive methods $O(n)$ runtime, compromise completeness and soundness

HB relation events can be ordered by happens-before relation and if they can't that means they can be ordered in a way that they are next to each other in the trace $\rightarrow$ data race

vector clocks used to represent happens-before relation, if incomparable then data race

epochs vector clocks need $O(n)$ time and space, instead epochs can be used which consist of time stamp j and thread id k $\rightarrow$ j#k

2 FastTrack Algorithmus TSan

- FastTrack uses an optimized semi-adaptive version of epochs

[1] [2]

3 TSan Tool Beispiele Anwendung, Code

4 Fazit

Literaturverzeichnis

[1] C. Flanagan und S. Freund, „FastTrack: Efficient and Precise Dynamic Race Detection,“ Bd. 53, Juni 2009, S. 121–133. DOI: 10.1145/1542476.1542490.

[2] M. Sulzmann und K. Stadtmüller, „Efficient, Near Complete and Often Sound Hybrid Dynamic Data Race Prediction (extended version),“ *CoRR*, Jg. abs/2004.06969, 2020. arXiv: 2004.06969. Adresse: https://arxiv.org/abs/2004.06969.

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