MT-ADRES: multi-threading on coarse-grained reconfigurable architecture - DTU Orbit (24/12/2018)

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The coarse-grained reconfigurable architecture ADRES (architecture for dynamically reconfigurable embedded systems) and its compiler offer high instruction-level parallelism (ILP) to applications by means of a sparsely interconnected array of functional units and register files. As high-ILP architectures achieve only low parallelism when executing partially sequential code segments, which is also known as Amdahl's law, this article proposes to extend ADRES to MT-ADRES (multi-threaded ADRES) to also exploit thread-level parallelism. On MT-ADRES architectures, the array can be partitioned in multiple smaller arrays that can execute threads in parallel. Because the partition can be changed dynamically, this extension provides more flexibility than a multi-core approach. This article presents details of the enhanced architecture and results obtained from an MPEG-2 decoder implementation that exploits a mix of thread-level parallelism and instruction-level parallelism.

General information
State: Published
Organisations: Department of Informatics and Mathematical Modeling, Embedded Systems Engineering, Freescale Semiconductor, IMEC
Contributors: Wu, K., Kanstein, A., Madsen, J., Berekovic, M.
Pages: 761-776
Publication date: 2008
Peer-reviewed: Yes

Publication information
Journal: International Journal of Electronics
Volume: 95
Issue number: 7
ISSN (Print): 0020-7217
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.04 SJR 0.264 SNIP 0.77
Web of Science (2017): Impact factor 0.939
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 0.73 SJR 0.262 SNIP 0.711
Web of Science (2016): Impact factor 0.729
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 0.57 SJR 0.205 SNIP 0.405
Web of Science (2015): Impact factor 0.414
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 0.59 SJR 0.246 SNIP 0.582
Web of Science (2014): Impact factor 0.459
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 0.83 SJR 0.286 SNIP 0.687
Web of Science (2013): Impact factor 0.751
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 0.65 SJR 0.233 SNIP 0.626
Web of Science (2012): Impact factor 0.509
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 0.61 SJR 0.247 SNIP 0.538
Web of Science (2011): Impact factor 0.44
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.205 SNIP 0.394
Web of Science (2010): Impact factor 0.257