Dynamic Scheduling Without Real Time Requirements For High Level Synthesis

*Note: Sub-titles are not captured in Xplore and should not be used

1st Charles Arsenal Okere
Department of Electronic Engineering
Hamm-Lippstadt University Of Applied Science
Lippstadt, Germany
charles-arsenal.okere@stud.hshl.de

***Abstract*—Dennard scaling has failed, which has resulted in an explosion of specialized hardware accelerators. As a viable alternative, high-level synthesis (HLS) is gaining popularity. HLS enables the transformation of untimed high-level software programs into cycle-accurate RTL hardware implementations automatically. Scheduling is the fundamental algorithmic contribution that converts an untimed sequential description without regard for time to a timed parallel implementation. Historically, HLS has dealt with resource-constrained scheduling, an NP-hard problem that can be precisely handled using a variety of methods. However, scheduling heuristics are limited in their ability to deal with more complicated scheduling problems. Additionally, they are unable to perform global optimization, which means they may lose out on substantial chances for improvement. These concerns result in an unknown quality-of-results gap between the designer and the tool. HLS makes an attempt to address atypical programs (for example, graph algorithms, data analytics, and sparse matrix calculations). In comparison, static scheduling is based on extremely conservative data and risk assumptions about the structure. These applications exhibit data-dependent control flows, irregular patterns of memory reliance, and a dynamic workload. This study will examine several existing approaches to scheduling in order to gain a better understanding of how they work.**

REFERENCES

IEEE conference templates contain guidance text for composing and formatting conference papers. Please ensure that all template text is removed from your conference paper prior to submission to the conference. Failure to remove the template text from your paper may result in your paper not being published.

Identify applicable funding agency here. If none, delete this.