Distinguished Lecture Series

Technology Considerations in Computer Architecture

Monday, September 5th , 2016 10:00am
Auditorium 106

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Abstract

Good engineering practice uses the characteristics of existing technologies to optimize implementation. Often, this will mean that design techniques optimal in a previous generation prove impractical or even unusable when a new technology becomes dominant. This rule is all too often forgotten, which we will demonstrate in two problems of computer design: Field-Programmable Gate Arrays (FPGA) and hardware prefetchers (providing the ability to fetch data early in anticipation of the need). FPGAs are extremely useful in mobile embedded systems where computing power and energy considerations are major concerns. Partial reconfiguration is often used to reduce power consumption when parts of the array are inactive, albeit at the cost of high energy overhead due to the large cost of transferring configuration information. Our study reveals that partial reconfiguration accelerates execution and reduces overall energy consumption by half. Second, we will demonstrate how increased transistor integration allows hardware prefetching to improve both energy-efficiency and performance.

For more information: http://www.iis.sinica.edu.tw/