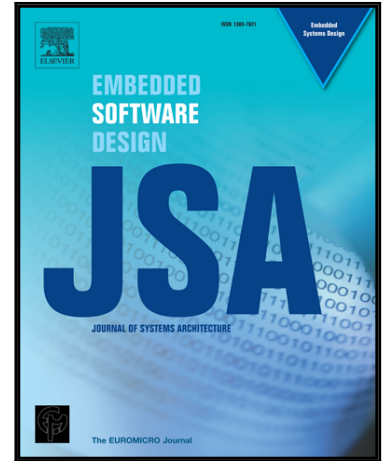


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Accurate Power Modeling of Modern Mobile Application Processors

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Abstract. The power modeling of mobile application processors (APs) is a challenging task due to their complexity. The existing power models and their associated devices have mostly been made obsolete by recent hardware developments. In this paper, we propose an enhanced power model used in modern mobile devices. The model accurately estimates the power consumption of AP component and utilizes the runtime usage information of each hardware component. We evaluated the model accuracy using various benchmarks, as well as popular smartphone applications with multiple devices that employ different APs. The evaluation shows that our model achieves the mean absolute percentage error (MAPE) of 5.1%.

Keywords: Energy-aware systems, modeling, power management

1. Introduction

With the availability of multicore-based mobile application processors (APs), the performance of mobile devices such as smartphones and tablets has significantly increased in recent years. These SoC-based mobile APs typically include CPU and GPU cores, multimedia processors, and other hardware subsystems to effectively support complex applications running on sophisticated mobile operating systems. The enhanced functionality of mobile APs demands increased power consumption, hence, their energy efficiency is a critical issue because the battery capacity has not been increasing fast enough to keep up with power requirements.

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