Energy-Aware Real-time Scheduling of a Set of Sporadic Directed Acyclic Graph

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ABSTRACT
In this work, we study energy-aware real-time scheduling of a set of sporadic Directed Acyclic Graph (DAG) tasks with implicit deadlines. While meeting all real-time constraints, we try to identify the best task allocation and execution pattern such that the average power consumption of the whole platform is minimized. To the best of our knowledge, this is the first work that addresses the power consumption issue in scheduling multiple DAG tasks on multi-cores and allows intra- and inter-task processor sharing. We first adapt the decomposition-based framework for federated scheduling and propose an energy-sub-optimal scheduler. Extensive simulations are conducted to demonstrate the effectiveness and efficiency of the proposed scheduling algorithms, which leads to energy savings of 26% to 40% comparing to existing DAG task schedulers.