The University of Alabama
Department of Computer Science
Colloquium Series Speaker

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Scheduling On-Demand Broadcast with Timing Constraints

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Abstract:

Broadcast delivery has been acknowledged as an effective way to dispense data in certain highly dynamic environments. While there are several well-known on-line broadcast scheduling strategies that minimize wait time, there has been little research that considers on-demand broadcasting with timing constraints. Scheduling strategies are needed that identify which data item to broadcast next in order to minimize missed deadlines. In this work, we present the mathematical formulation of a real-time broadcast system and an analysis of the system as a Markov Decision Process (MDP). The MDP model indicates finding an optimal solution is a hard problem in PSPACE. We propose two scheduling heuristics, called Aggregated Critical Requests-ω (ACR-ω) and Aggregated Critical Requests-β (ACR-β), which are based on the MDP formulation. These scheduling algorithms are designed for timely delivery of data to clients in order to maximize the reward by minimizing the deadlines missed. Results from trace-driven experiments indicate the ACR approach provides a flexible strategy that can outperform existing strategies under a variety of factors.