

## Relay-Augmented Bottleneck Throughput Maximization for Correlated Data Routing: A Game Theoretic Perspective

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**Abstract :** In this paper, an energy-aware method is presented, integrating energy-efficient relay-augmented techniques for correlated data routing with the goal of optimizing bottleneck throughput in wireless sensor networks. The system tackles the dual challenge of throughput optimization while considering sensor network energy consumption. A unique routing metric has been developed to enable throughput maximization while minimizing energy consumption by utilizing data correlation patterns. The paper introduces a game theoretic framework to address the NP-complete optimization problem inherent in throughput-maximizing correlation-aware routing with energy limitations. By creating an algorithm that blends energy-aware route selection strategies with the best reaction dynamics, this framework provides a local solution. The suggested technique considerably raises the bottleneck throughput for each source in the network while reducing energy consumption by choosing the best routes that strike a compromise between throughput enhancement and energy efficiency. Extensive numerical analyses verify the efficiency of the method. The outcomes demonstrate the significant decrease in energy consumption attained by the energy-efficient relay-augmented bottleneck throughput maximization technique, in addition to confirming the anticipated throughput benefits.

**Keywords :** correlated data aggregation, energy efficiency, game theory, relay-augmented routing, throughput maximization, wireless sensor networks

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