

USE OF AUCTIONS IN WIRELESS SENSOR NETWORKS

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ABSTRACT

The use of market mechanisms to solve computer science problems such as resource sharing, load distribution and network routing, is gaining significant traction. In this thesis, we investigate new market mechanisms to solve the problem of bandwidth sharing in wireless sensor networks (WSNs) in event-driven scenarios. We first demonstrate that a previously proposed strategy that greedily selects winners in repeated routing auctions is not globally optimal and then propose and evaluate a *lookahead* mechanism for winner selection in auctions. This mechanism improves upon the winner selection process for intelligently allocating network resources in WSNs. We experimentally show that there is a trade-off between the efficiency of the winner selection process and the depth of lookahead. Finally, we examine a frequent problem encountered by object tracking applications in WSNs, traveling congestion, in which congestion moves along with bursts of data from node to node. We design and evaluate a novel mechanism which we call *Traveling Auctions* to alleviate the problem of traveling congestion.