Advantages of VCG Auction based Relay Algorithm for DTNs

Abstract

Wireless Mobile ad hoc networks use Delay/disruption tolerant technology in order to make up for the lack of end to end connectivity. DTNs work in store-carry-forward fashion to deliver messages with opportunistic encounters of nodes. And this strategy consumes resources such as storage and energy. This could well be the reason for nodes to avoid message forwarding, to save their limited resources. This kind of selfish behavior hinders communication. In order to stimulate participation of nodes for a smooth communication incentives are awarded. An efficient Incentive-Compatible-Routing Protocol (ICRP) with multiple copies for two-hop DTNs by using optimal sequential stopping rule and algorithmic game theory will be used. Relaying nodes can receive the maximum reward only when they honestly report the true encounter probability and routing metrics, which will stimulate nodes to participate in the relay node selection process. To implement this Vickrey-Clarke-Groves (VCG) Auction (second-price sealed-bid) based algorithm is employed as a strategy to refine the relay node selection process. ICRP attempts to find the optimal stopping time threshold adaptively based on realistic probability model and propose an algorithm to calculate the threshold. Based on this threshold,
it proposes a new method to select relay nodes for multi-copy transmissions. ICRP can effectively stimulate nodes to carry/forward messages and achieve higher packet delivery ratio with lower transmission cost. This implementation reduces the end-to-end delay, energy consumption. And it ensures the existence of more number of live nodes.

References

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Index Terms

Computer Science Algorithms

Keywords

Epidemic Algorithm, Incentive Compatible routing algorithm (ICRP), optimal sequential stopping rule, VCG based auction Algorithm.