Inter-Session Network Coding with Clustering Routing in Wireless Delay Tolerant Networks

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Abstract- Delay Tolerant Network (DTN) is a multi-hop wireless network, which has an intermittent connection due to the mobility of nodes, short of wireless communication range, sleeping mode of nodes. As a result, delay tolerant network usually gets higher average delay and overhead. In this paper, we propose an Inter-session Network Coding based Clustering routing (INCC). Inter-session network coding codes messages from different flow together using the broadcast nature of wireless network to improve the transmission efficiency. Due to the dynamic topology structure, the inter-session network coding scheme cannot be applied to DTNs directly. Therefore, we cluster the node to gain more coding opportunities. We classify the nodes into different clusters according to their contact frequency. The packets could be performed network coding in the proposed scheme even if they have different destination nodes. Then, we use Ordinary Differential Equations (ODEs) to investigate the advantage of applying network coding in DTNs in terms of average delay. Finally, we evaluate the performance of INCC via simulations, and simulation results show that INCC can achieve lower average delivery delay and reduce the network load.

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