Study on the effectiveness of network coding techniques in geographic partitioning routing methods for ad hoc networks.

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Abstract: This study investigates the effectiveness of network coding techniques within geographic routing protocols for mobile ad hoc networks (MANETs). Geographic routing, which leverages location information for packet forwarding, offers scalability but suffers from performance degradation in dynamic, error-prone environments due to link failures and packet loss. By integrating network coding, a technique that allows intermediate nodes to combine multiple packets before forwarding, the proposed approach aims to enhance data delivery reliability and throughput. The research evaluates key performance metrics, including packet delivery ratio, end-to-end delay, and network overhead, through simulation under varying node mobility and traffic conditions. Results demonstrate that the incorporation of network coding significantly improves resilience against packet loss and reduces the number of retransmissions compared to traditional geographic routing. However, the added computational complexity introduces a marginal increase in processing delay. The findings confirm that network coding is a viable enhancement for geographic routing in MANETs, particularly in scenarios with high node mobility or unreliable wireless links, offering a robust trade-off between reliability and latency.

Keywords: network coding, geographic routing, ad hoc networks, routing protocol