

Research on techniques for determining data transmission paths in delay-sensitive mobile networks based on excess bandwidth estimation

Vu Dinh Cuong

Abstract: This study proposes a novel technique for determining data transmission paths in delay-sensitive mobile networks, leveraging available bandwidth estimation to enhance Quality of Service (QoS). The increasing demand for real-time applications, such as video streaming and online gaming, necessitates routing mechanisms that minimize latency while maintaining throughput. Traditional routing protocols often fail to adapt to fluctuating network conditions, leading to congestion and increased delay. The proposed method employs a passive estimation algorithm to continuously monitor and predict available bandwidth on candidate links. By integrating this estimation into a dynamic path selection framework, the technique prioritizes routes with sufficient residual capacity, thereby reducing queuing delays and packet loss. Simulation results demonstrate that the approach significantly outperforms conventional shortest-path and load-balancing algorithms in terms of end-to-end delay and jitter, particularly under high traffic loads. The findings offer a practical solution for optimizing data flow in heterogeneous mobile environments, contributing to the development of more responsive and reliable next-generation wireless networks.

Keywords: bandwidth estimation, delay-sensitive networks, mobile data transmission, path selection