

Research and evaluation of some factors affecting video streaming quality using WebRTC technology

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Abstract: This study investigates and evaluates key factors influencing video streaming quality in WebRTC-based applications. WebRTC enables real-time, peer-to-peer communication, but its performance is highly sensitive to network conditions and configuration parameters. Through a systematic experimental framework, this research analyzes the impact of network metrics such as packet loss, jitter, and bandwidth fluctuation, alongside codec selection (VP8, VP9, H.264) and adaptive bitrate algorithms. Objective quality metrics, including Peak Signal-to-Noise Ratio (PSNR) and Structural Similarity Index (SSIM), were employed to assess video fidelity under controlled network simulations. The results indicate that packet loss and jitter are the most critical factors, causing significant degradation in visual quality and increased latency. Furthermore, the choice of codec and adaptive bitrate strategy substantially affects stability and user experience. These findings provide practical guidelines for optimizing WebRTC configurations to enhance streaming quality in variable network environments, contributing to improved performance for real-time communication applications.

Keywords: WebRTC, video streaming, quality assessment, influencing factors