

Analysis of the influence of some network performance parameters on video transmission quality in remote monitoring systems

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Abstract: This study investigates the impact of key network performance parameters on video transmission quality within remote monitoring systems. As such systems increasingly rely on real-time video for critical decision-making, understanding the influence of network conditions is essential. Through a systematic analysis, the research evaluates how variables such as packet loss, jitter, latency, and available bandwidth affect video quality metrics, including Peak Signal-to-Noise Ratio (PSNR) and Structural Similarity Index (SSIM). Controlled experiments were conducted under varying network scenarios to quantify the degradation thresholds for acceptable video quality. The findings reveal that packet loss and jitter have the most significant detrimental effect, while latency primarily impacts real-time interactivity rather than perceptual quality. The study provides a quantitative framework for predicting video quality based on network state, offering practical guidelines for optimizing system design and adaptive streaming strategies. These results contribute to enhancing the reliability and efficiency of remote monitoring applications in fields such as surveillance, industrial automation, and telemedicine.

Keywords: network performance parameters, video transmission quality, remote monitoring system, impact analysis