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**Reliable and Energy-efficient Hybrid Screen Mirroring Multicast System**

**Abstract:**

This paper presents a reliable and energy-efficient hybrid screen mirroring multicast system for sharing high-quality real-time multimedia service with adjacent mobile devices over WiFi network. The proposed system employs overhearing-based multicast transmission scheme with Raptor codes and NACK-based retransmission to overcome well-known WiFi multicast problems such as low transmission rate and high packet loss rate. Furthermore, to save energy at mobile devices, the proposed system not only shapes the screen mirroring traffic, but also determines the target sink device and Raptor encoding parameters such as the number of source symbols, symbol size, and code rate while considering the energy consumption and processing delay of the Raptor encoding and decoding processes. The proposed system is fully implemented in Linux-based single board computers and examined in real WiFi network. Compared to existing systems, the proposed system can achieve good energy efficiency while providing a high-quality screen mirroring service.

**Existing System:**

To handle this problem, it is necessary to enable WiFi multicast for screen mirroring. Unfortunately, there are several well-known problems in the WiFi multicast. One of the most serious problems is unreliable packet delivery caused by the absence of acknowledgment and packet retransmission request. Another problem is that the send-er selects a low transmission rate and high transmission power level to deliver the data even to the farthest receiv-er from the sender.

Therefore, the existing WiFi multicast is not suitable to provide a high-quality screen mirroring service, which requires high video bitrate and error ro-bustness. To solve this problem and provide multicast video streaming over WiFi network, some research efforts have been devoted to overhearing and forward error correction (FEC)-based multicast transmission.

In this method, the sender delivers the data to the target receiver using unicast transmission while the non-target receivers overhear the unicast transmission. Because the rate adaptation and MAC-layer retransmission are oper-ated by the unicast transmission between the sender and the target receiver, high transmission rate can be achieved. Moreover, FEC schemes are employed to provide reliable data delivery to the non-target receivers who cannot uti-lize the MAC-layer retransmission. Recently, some foun-tain codes-based video streaming methods have been proposed to provide error-resilient multimedia services in the literature

**Proposed System:**

We propose a reliable and energy-efficient hybrid screen mirroring multicast system for sharing high-quality screen content among adjacent mo-bile devices. In the proposed system, the overhearing-based multicast scheme is employed to overcome well-known problems of the WiFi multicast. To mitigate the video quality degradation caused by packet loss, the pro-posed system utilizes systematic Raptor codes as an FEC scheme and NACK-based retransmission scheme as an ARQ scheme for error correction. Raptor codes are a class of fountain codes and a block-based FEC scheme that provide systematic coding, flexibility, coding efficiency, and rateless codes. These characteristics are very useful for transmitting delay-sensitive data over er-ror-prone wireless networks. The proposed system is de-signed to minimize energy consumption at the source device and sink devices while still providing a high-quality screen mirroring service. To achieve this goal, an energy consumption model of a WiFi network interface is derived, and then simple but effective energy consump-tion and delay models for Raptor encoding and decoding processes are obtained. Based on the derived models, the proposed system is designed to shape the screen mirror-ing traffic based on the buffer occupancy of the sink de-vice and determine the target sink device and Raptor en-coding parameters to minimize the overall energy con-sumption.