Coded Multicast for Wireless Data

Multicast (one-to-many) Communication

Wireless Coded Multicast Diagram

Reference

8810-7224

Inventor(s)

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Patent Status

Patent pending in the US, Canada, Korea, Taiwan, China and India

Stage of Development

Working prototype

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Background

Wireless-channel fading and the loss of the integrity of transmitted data is a major problem for all wireless communication systems especially when it comes to multicasting bandwidth-demanding video content associated with the emergence of Internet Protocol TV (IPTV) services. Channel fading can occur for a variety of reasons (eg. distance of user from base station, moving vehicle transmission, city buildings, etc.) which makes efficient multicasting a major challenge for wireless service providers.

In wireless video multicast, it is necessary to pick a certain transmission rate that majority of receivers in each coverage area could be able to receive the data with minimal loss. This will lead to underutilizing the capacity of the end-users with good wireless channel condition. At the same time, end-users with low wireless channel quality might still suffer from poor signal reception. In general, the transmission speed (modulation scheme) would be selected very conservatively to assure the reception of the signal by the majority of subscribers. This conservative transmission rate selection is the main cause of insufficient use of frequency spectrum and would waste a lot of service providers' infrastructure capacity.

To address this channel quality problem, coding/decoding techniques for optimizing bandwidth utilization have been used; however the overall performance is still heavily dependent on the quality of the receiver's wireless channel.
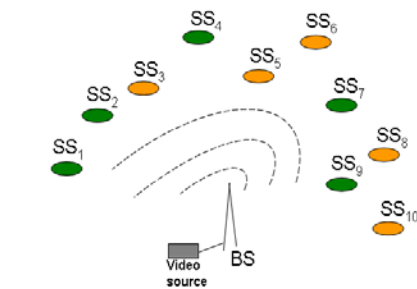
Description of the Invention

UW researchers have developed a novel methodology that generates a proprietary coded intelligent multicast signal that combines Scalable Video Coding (SVC), Multiple Description Coding (MDC) and Superposition Coding (SPC) together to maximize the received video quality for all intended receivers, regardless of receiver channel quality status.
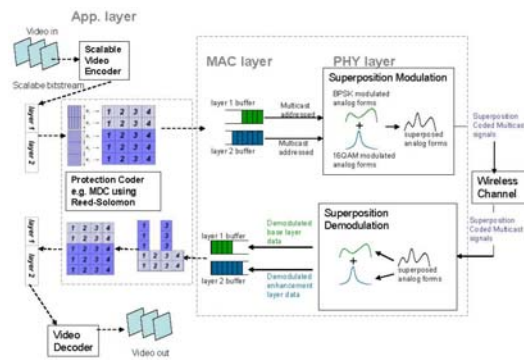
Advantages

The invention significantly improves the quality of the end-users experience while optimizing the use of the service provider's bandwidth in multicast applications through providing a solution to address wireless channel fading. The technology is compatible with emerging wireless technologies such as LTE, WiMAX and WCDMA. It can also be implemented over WiFi.

Potential Applications

➢ Premium video multicast (live events and scheduled TV programming) in entertainment industry leading to optimal use of service providers' frequency spectrum and consistent video experience for wireless/mobile end-users.

➢ Efficient wireless advertising where HD video and/or still images are to be sent to multiple digital displays.

➢ Inside home HD video multicast.

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