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A Study on Using Network Coding for Packet Transmissions in Wireless Sensor Networks

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Abstract : A wireless sensor network (WSN) is composed by a large number of sensors and one or a few base stations, where the sensor is responsible for detecting specific event information, which is sent back to the base station(s). However, how to save electricity consumption to extend the network lifetime is a problem that cannot be ignored in the wireless sensor networks. Since the sensor network is used to monitor a region or specific events, how the information can be reliably sent back to the base station is surly important. Network coding technique is often used to enhance the reliability of the network transmission. When a node needs to send out M data packets, it encodes these data with redundant data and sends out totally M + R packets. If the receiver can get any M packets out from these M + R packets, it can decode and get the original M data packets. To transmit redundant packets will certainly result in the excess energy consumption. This paper will explore relationship between the quality of wireless transmission and the number of redundant packets. Hopefully, each sensor can overhear the nearby transmissions, learn the wireless transmission quality around it, and dynamically determine the number of redundant packets used in network coding.

Keywords : energy consumption, network coding, transmission reliability, wireless sensor networks
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