A Study on Estimation of Retransmission Rate of Background Traffic for Various Scan Rates with Scan Response Delay

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***Abstract*— For efficient network scan to narrow-band wireless networks, this paper proposes a method to estimate the retransmission rate of the background traffic at the target scan rate from a scan response delay obtained at a different scan rate. First, through computer simulations considering a Wi-SUN sensor network with two different network situations and multiple scan rates, we derive a regression function using the least-squares method for the mean of the scan response delay and the COR of the background traffic, and the COR of background traffic and the retransmission rate of background traffic. Then, we propose the new estimation scheme of the retransmission rate of the background traffic. First, Network situation estimator estimates the situation of the target network from observed value and estimated value regarding the variance of scan response delay. Second, COR estimator estimates the COR of the background traffic from the mean of scan response delay, the estimated situation of target network, and the scan rate which is used for observing the scan response delay. Third, Retransmission rate estimator estimates the retransmission rate of the background traffic from the COR of the background traffic the estimated situation of the target network, and a scan rate of estimation target. Through computer simulations, it is confirmed that the proposed method can estimate the retransmission rate of the target network with the average error lower than 5.8% regardless of the situation of the target network and the scan rate.**

***Keyword*— Network scan, Wi-SUN, QoS estimation, Network simulation**

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