Joint Estimation of Observation-Error-Probability and Iterative Decoding in Wireless Sensor Networks

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Abstract:

We propose for a parallel wireless sensor network (WSN) a decoding technique that well exploits the correlation knowledge of the sensing data to be transmitted from each sensor to the fusion center (FC). In this temporary document (TD), we derive an algorithm to estimate the observation error-probabilities, representing the correlation, of the links between the sensing object and sensors. The convergence of the algorithm is also evaluated as well as the bit-error-rate (BER) performances in additive white Gaussian noise (AWGN) and Rayleigh fading channel. We found that the gap in BER performance of the proposed joint estimation compared with that of full (perfect) knowledge of observation error-probability is only around 0.305 dB in per-link signal-to-noise power ratio (SNR), depending on the numbers of sensors.