

Memory Efficient Adaptation of Vector Quantizers to Time-Varying Channels

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ABSTRACT

Channel-optimized vector quantization (COVQ) is approximated by the novel channel-adaptive scaled vector quantization (CASVQ). This new method uses a reference codebook that is optimal for one specific channel condition. However, for a bit error rate being different from the design assumption for the reference codebook, all codevectors are scaled by a common factor, which depends on the channel condition. It is shown by simulations that a performance close to that of COVQ can be achieved in many practically important situations. Without a significant increase in complexity, the new CASVQ scheme can be adapted to time-varying channels by adjusting the scaling factor to the current bit error probability. Another advantage is that only one codebook needs to be stored for all error probabilities, while for COVQ either the performance degrades significantly due to channel mismatch, or a large set of codebooks must be available at the encoder and the decoder.