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Abstract
Vector quantization (VQ) is an important and efficient lossy data compression technique. To further improve the performance of VQ, the index coding scheme can served as post-processing step of VQ. In this thesis, we proposed two index coding method: Nearest-neighbor Differential Index Coding (NDIC) and Differential Search Order Coding (DSOC). Before vector-quantizing an image, we use Principal Component Analysis (PCA) to re-sort the codevectors in codebook. This pre-processing step will give the maximal co-relation among neighboring indexes.
Both NDIC and DSOC introduce the difference between current and neighboring index. In addition, we use a combination of VLC code to efficiently encode this difference. On the other hand, RLC strategy is used to reduce the redundancy caused by consecutive identical codewords. The experimental results in NDIC and DSOC are excellent in comparison with some famous index coding scheme. Besides, we simplified NDIC in order to efficiently execute algorithm in hardware.
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