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Abstract
Code excited linear prediction (CELP), which includes the short-term prediction (STP), the long-term prediction, (LTP) and the stochastic codebook search, is the major codec in the low rate speech communications. Stochastic excitation signal is the important component for the quality of the coded speech. Algebraic code excited LPC (ACELP) which has been patented is of good quality for coded speech. Therefore, ITU, 3GPP and MPEG-4 all have adopted it as the standard. In order to reduce the computational complexity, the focused search and the depth first search are suggested in the standards. Furthermore, a new search algorithm, pulse replacement search approach, has been created. In this paper, based on the hill-climbing algorithm, we proposed the generalized pulse-replacement search algorithm to reduce the computational complexity of ACELP as well as to preserve the original quality of coded speech. Besides, the generalized pulse-replacement search algorithm is able to have several derived search approaches. Combining with the candidate technology, the proposed approaches can reduce about 95.5% computational load for full search approach, with perceptually intangible degradation in performance. Alternatively, the proposed approaches can reduce about 87% computational load for depth first search approach, with perceptually intangible degradation in performance.
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