

一种语音编码算法的高吞吐率实现

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摘 要: 本文通过对 G.729 语音编码算法的分析, 根据实时语音处理的特性, 设计一种以三帧语音数据为整体的帧轮转结构; 对于算法中的相关值计算过程、滤波过程、以及硬件设计时 SRAM 的读取特性, 结合并行结构和流水线结构, 实现了语音编码算法的高吞吐量设计. 完成相同计算所需时钟周期仅为优化后 DSP 设计的 1/68. 采用一组加入 pink-noise 噪音的语音对设计芯片进行了编解码后的 PESQ 音质评分测试, 在信噪比不小于 5 dB 的情况下, 语音 PESQ 评分均大于 4.0 分, 完成了高吞吐率、高音质的语音实时压缩.

关键词: 语音压缩; 并行结构; ASIC; G.729

High throughput implementation of a speech coding algorithm

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Abstract: Through the algorithm's analysis and the characteristic of real-time speech signal processing, a frame rotation structure have been designed. In addition, the paralleled and pipelined structures are designed for the correlation calculation, the filtering, and the read-write accessing of SRAM processes during the algorithm's chip development. And, a storage address control logic is designed, therefore, our design's clock cycle is only 1/68 of the DSP hardware platform operation of each frame's speech coding. Finally, the PESQ test is completed with a set of pink-noise mixture speeches. The experimental results indicate that the PESQ are all scored above 4.0 when the SNR is not lower than 5 dB. These prove that real-time, highly compressed bit-ratio, high quality speech coding functions are successfully achieved in our design of the chip.

Key words: speech coding; parallel structure; ASIC; G.729

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