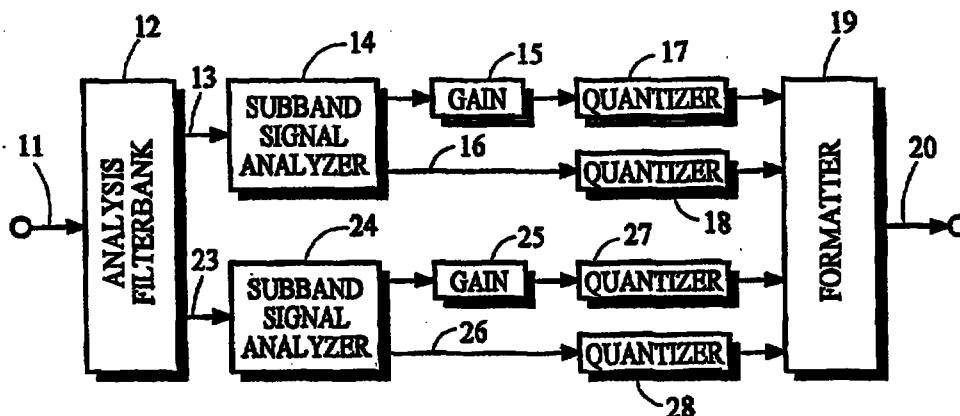




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(54) Title: USING GAIN-ADAPTIVE QUANTIZATION AND NON-UNIFORM SYMBOL LENGTHS FOR AUDIO CODING



(57) Abstract

Techniques like Huffman coding can be used to represent digital audio signal components more efficiently using non-uniform length symbols than can be represented by other coding techniques using uniform length symbols. Unfortunately, the coding efficiency that can be achieved by Huffman coding depends on the probability density function of the information to be coded and the Huffman coding process itself requires considerable processing and memory resources. A coding process that uses gain-adaptive quantization according to the present invention can realize the advantage of using non-uniform length symbols while overcoming the shortcomings of Huffman coding. In gain-adaptive quantization, the magnitudes of signal components to be encoded are compared to one or more thresholds and placed into classes according to the results of the comparison. The magnitudes of the components placed into one of the classes are modified according to a gain factor that is related to the threshold used to classify the components. Preferably, the gain factor may be expressed as a function of only the threshold value. Gain-adaptive quantization may be used to encode frequency subband signals in split-band audio coding systems. Additional features including cascaded gain-adaptive quantization, intra-frame coding, split-interval and non-overloading quantizers are disclosed.