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PATENT TECHNOLOGY SUMMARY

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TECHNOLOGY NAME:
Methods of Using Head Related Transfer Function Enhancement for Improved Vertical-Polar Localization in Spatial Audio Systems

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METHODS OF USING

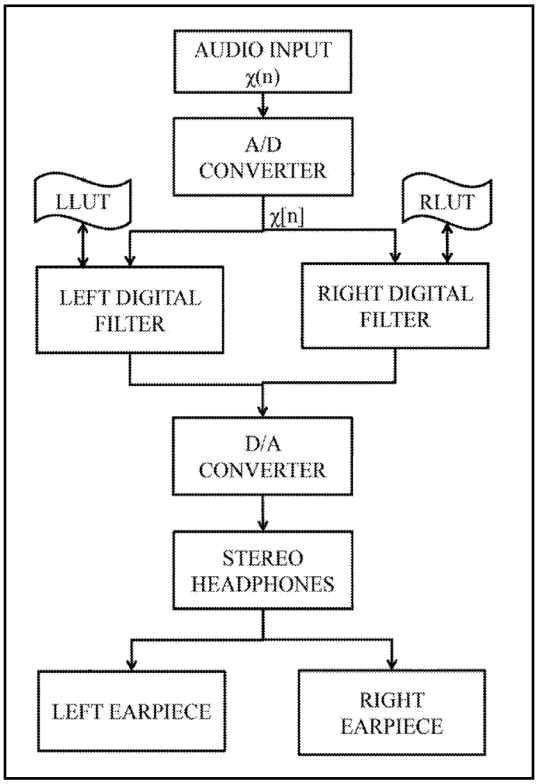
Head Related Transfer Function Enhancement for Improved Vertical-Polar Localization in Spatial Audio Systems

BACKGROUND

Head related transfer functions (HRTFs) are digital audio filters that reproduce direction-dependent changes that occur in the magnitude and phase spectra of an auditory signal within the cone of confusion reaching the left and right ears when the location of the sound source changes relative to the listener. HRTFs can be a valuable tool for adding realistic spatial attributes to arbitrary sounds presented over stereo headphones. However, conventional HRTF-based virtual audio systems have rarely been able to reach the same level of localization accuracy that would be expected for listeners attending to real sound sources in the free field.

INVENTION SUMMARY

The invention overcomes the foregoing problems and other shortcomings, drawbacks, and challenges of convention implementations of HRTFs in spatial audio systems. The method enhances vertical polar localization of a head related transfer (HRTF). It includes splitting an audio signal and generating left and right output signals by determining a log lateral component of the respective frequency- dependent audio gain that is equal to a median log frequency-dependent audio gain for all audio signals of that channel having a desired perceived source location. A vertical magnitude of the respective audio signal is enhanced by determining a log vertical component of the respective frequency-dependent audio gain that is equal to a product of a first enhancement factor and a different between the respective frequency-dependent audio gain at the desired perceived source location and the lateral magnitude of respective audio signal. The output signals are time delayed according to an interaural time.



A schematic representation of a spatial audio system according to one embodiment of the present invention. (Courtesy illustration)