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要　　旨（英文）

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要　旨

In the realm of various entertainment applications leveraging Virtual Reality (VR) technology, the expression of presence and immersion often involves the use of auditory cues to convey directionality and distance. One method for achieving this is through spatial audio technology, which captures and reproduces the spread of sound in either two or three dimensions. To capture 2D spatial information, a minimum of three-point measurements is fundamentally required, while for 3D spatial information, four-point measurements are necessary. However, widely adopted stereo formats generally cannot handle more than three channels simultaneously.

In response to this limitation, the Panoramic Stereo approach has been proposed as a technique capable of handling 2D spatial information with just two channels. This study aims to validate the proposed system's capability to acquire spatial information in both free-field and real-world environments. Additionally, it investigates the frequency characteristics of the proposed system and conducts psychological assessments to determine if listeners can effectively perceive sound source localization when using headphones for playback.

Furthermore, the study explores the feasibility of enabling free listening point reproduction through the application of multiple constraints. This involves assessing whether listeners can manipulate listening points using stereo signals without physically moving microphones.

Results indicate that the proposed system effectively captures 2D 360° spatial information using two channels, utilizing level differences and phase differences between the channels, particularly in the frequency range excluding low frequencies. Psychophysical evaluations support the conclusion that the system is successful in conveying spatial information perceptually. Moreover, the results from free listening point reproduction experiments demonstrate that two imposed constraints are adequate for achieving spatial sound reproduction at arbitrary listening points without physically moving the microphone.

Moving forward, it is essential to address the instability of phase differences between channels caused by microphone type and structure, understand the challenges posed by an increased number of sound sources, and investigate the impact of background noise on the proposed method. These considerations will contribute to the ongoing refinement and optimization of the proposed panoramic stereo approach for spatial sound in VR applications.