

Exploring the Impact of Audio-Visual Information in Omnidirectional Videos on User Behaviors for Virtual Reality

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Recent advances in Virtual reality (VR) technology have caused omnidirectional videos (ODVs) to emerge as an increasingly important vehicle for the delivery of immersive content provision. Unlike traditional videos, with the support of head-mounted displays (HMDs), the ODVs would bring a deeper sense of immersion to users. Ambisonics, which refers to a complete three-dimensional spherical audio scene, is used to present ODVs' audio content. The ODVs allow audience attention to be directed concurrently by both audio and visual stimuli. As a result, understanding how audio-visual information affects user behaviors is significant to improve the quality of experience of ODVs for VR applications. Thus far, research in this area is limited, a situation which this dissertation seeks to remedy. With this aim, we collected an audio-visual dataset containing trajectories and conducted a quantitative statistical analysis of the user navigation patterns. This analysis included visualization of viewport center trajectories and head-motion analysis while users were watching omnidirectional videos under ambisonics, mono, and mute. It was observed that there were variations in user behaviours when watching ODVs, which correlated with the three different audio modalities. We believe that this research contributes to the existing literature on the audio-visual perception of ODVs.