**Audio Augmented Reality: Take Real-Time Sound Replacement as An Example**

**Abstract**

音频增强现实（AAR）通过在现实世界的听觉环境中叠加虚拟声音来增强用户体验。本研究探讨了音频增强现实中的实时声音替换这一创新应用，其中将日常声音（如人声）实时转换成其他有趣的声音（如狗叫声或雷声）。利用先进的音频处理技术和深度学习算法，本研究实现了高效且实时的声音替换，展示了音频增强现实在娱乐、教育、虚拟培训、游戏和艺术创作等领域的潜在应用价值。实验结果表明，该系统能够在保持音频质量的前提下，实现快速和准确的声音替换，提供沉浸式的用户体验。另外，本研究还可对声音替换技术在隐私保护和辅助听觉设备中的应用前景进行探讨，展示了音频增强现实广泛而深远的影响力。通过本研究，我们希望能为AAR的发展提供新的思路和应用方向，推动这一技术在更多领域的创新和应用

Audio augmented reality (AAR) enriches the user experience by overlaying virtual sounds in the real-world auditory environment. This study explores the innovative use of real-time sound replacement in AAR, where everyday sounds (like human voices) are transformed into other interesting sounds (like a dog barking or thunder) instantly. Leveraging advanced audio processing technology and deep learning algorithms, this research achieves efficient and real-time sound replacement, demonstrating the potential application value of AAR in entertainment, education, virtual training, games, and artistic creation. The system's ability to swiftly and accurately replace sounds while preserving audio quality ensures an immersive user experience. Furthermore, this study uncovers the potential of sound replacement technology in privacy protection and assistive hearing devices, highlighting the broad impact of AAR. By presenting these findings, we aim to inspire new ideas and application avenues for AAR, fostering its innovation and application in diverse fields and instilling optimism about its future.

**Introduction**