

FOSTERING IMMERSION AND EXPRESSIVENESS IN MULTIMODAL VIRTUAL ENVIRONMENTS USING SONIC INTERACTION DESIGN

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Introduction

Until recently, technological constraints kept sound as a often disregarded element in digital media such as games and immersive virtual environments. However, the increasingly powerful hardware available enables new possibilities and allows for new strategies in emergent Media fields like Sonic Interaction Design (SID) to create better and more immersive systems.

This research project focuses on the creation of sound spaces, user interaction with those spaces and the meaning conveyed by sound in those specific contexts.

This integrated approach aims at the research and the development of sound tools and methods that are capable of enhancing the listener's sense of presence and immersion into Virtual Environments (VE).



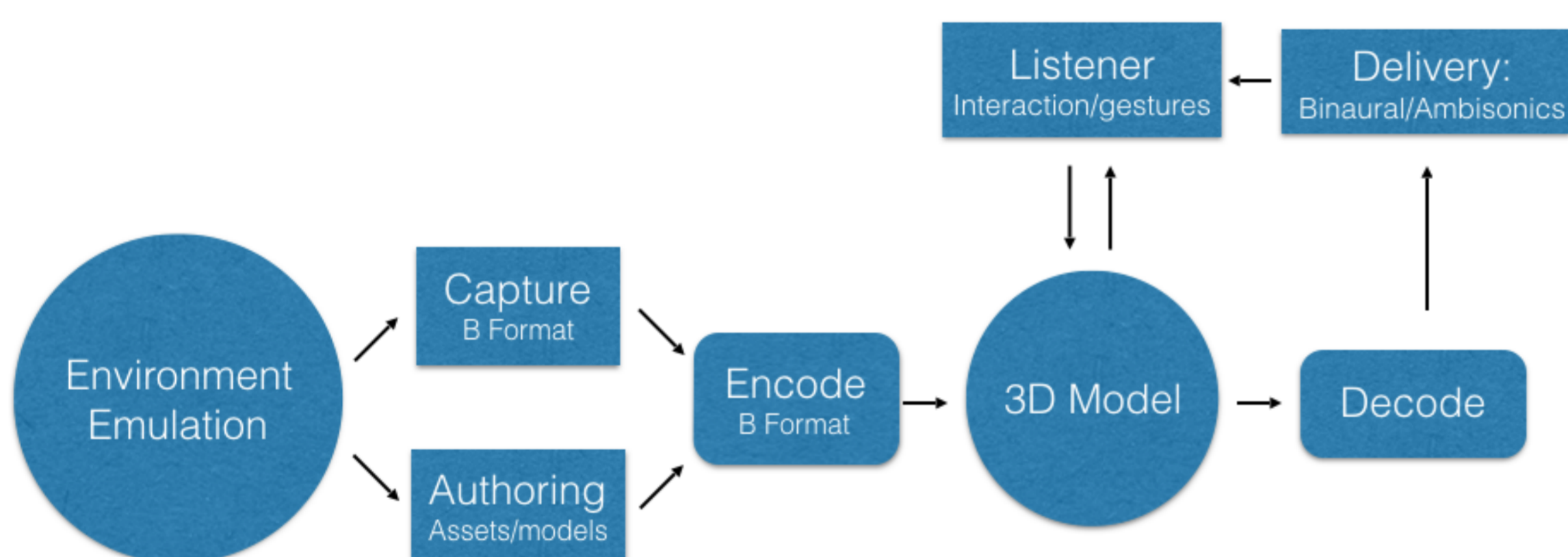
How is the immersion of the users in a virtual environment related to the sonic interaction design methodologies and the technologies used to design it?

Problem

- Designing 3d interactive Sound Scenes.
- Understand immersion in relation to sound design methodologies.

Hypotheses

- The importance of both expressiveness and fidelity of sounds depends on their function within a sound scene.
- Expressive procedural sound design can be used for a small number of interactive elements and combined with high fidelity recorded audio for other soundscape elements.
- Spatialization related techniques can be used to integrate procedural sound design audio sources and pre-recorded audio sources, further enhancing the immersion within the virtual environment.

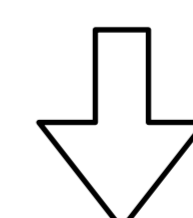
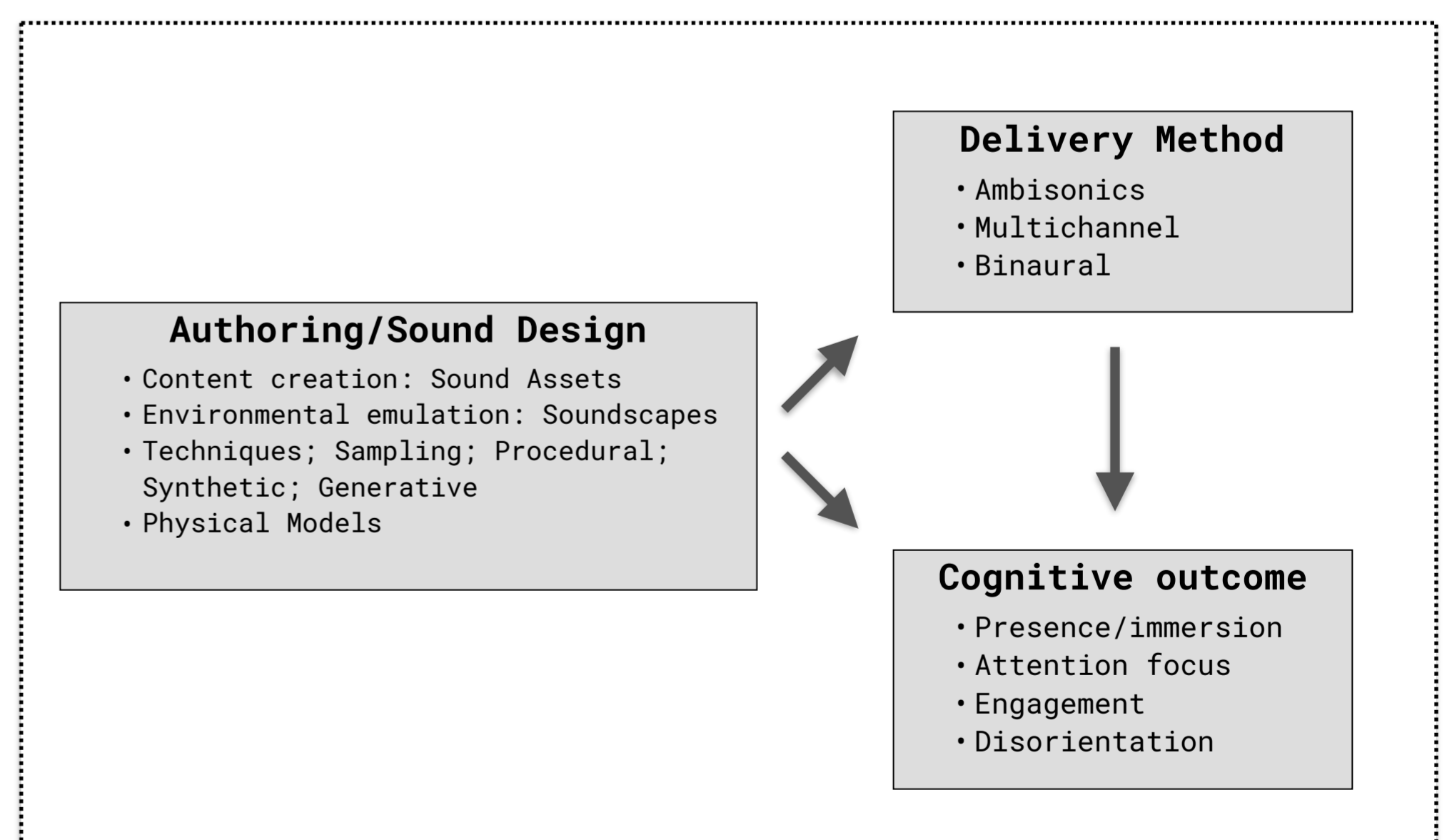


Objectives

- Understand what is the impact of different methodologies and technologies of sonic interaction design in the listeners' cognition, specifically in terms of immersion and sense of presence.
- Develop a sonic interaction design methodology, along with related technology, for virtual immersive environments that focuses on fostering user immersion and sense of presence.

Contributions

- Provide a better understanding of the boundaries and trade-offs between the expressiveness of procedural sound design and the realism of recorded sounds.
- Propose a methodology for a hybrid approach within a common interactive sound space.
- Optimize sound spatialization techniques for sonic interaction design in immersive virtual environments.



API Design:

- Generative module
- Processing module (DSP): Panning; Filters; Space render; Synthesizers;
- Sound databases: Classes; Hierarchies; Structures;
- Mixing module: Amplitude; Sound prioritisation; Space distribution;