Penumbra: Expressive Shadow Puppetry in VR
Mark Sabini (msabini@cs.stanford.edu)
VR Design Lab @ the Center for Computer Research in Music and Acoustics, Stanford University

Introduction

Penumbra (2019) is the second in a series of experiments exploring expressive shadow puppetry. It builds off jalan-jalan (2019), a piece for laptop orchestra by Mark Sabini and Hillary Hermawan. However, unlike in jalan-jalan, the presence of the orchestra in Penumbra has been greatly reduced, further personalizing it and allowing the player to focus on experiencing shadow puppetry interactions that are possible only through VR.

Interactions

As Penumbra progresses, it explores the different interactions possible with the puppet.

I. The Stage: The player awaits the beginning of the shadow play and becomes familiar with the space.

II. The Bridge: The puppet appears onscreen, mimicking the setup of traditional wayang kulit.

III. The Walk: The screen expands to become fully cylindrical, and the puppet walks to the player's gaze.

IV. The Skies: The ceiling unfolds into a canopy full of bright, twinkling stars.

V. The Dance: The puppet comes off the screen, and the player and the puppet dance together.

VI. The Calling: The sun starts to rise, so the puppet looks up, moving by itself for the first time.

VII. The Recollection: The puppet returns to the screen, though it is visibly missing its baton.

VIII. The Artifact: The puppet walks offscreen and the lights come on. The player picks up the puppet's baton, which has materialized to become fully physical.

Space

The space was designed to encourage and enable new interactions with the shadow puppet, while staying true to the performative aspect of jalan-jalan. As shown in a), the stage itself accommodates a fully cylindrical screen. As shown in b), the stage also utilizes virtual hemispherical speaker arrays (“hemis”) to spatialize the sound and provide haptic feedback.

Figure 1: Control Scheme
The player simultaneously manipulates the puppet, stage, and music using the controllers.

Figure 2: Elements of the Space
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Figure 3: Progression of Scenes and Interactions
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