NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Computer Science and Engineering
College of Engineering

Sonification of Geometry
## Using Sound to Detect Geometric Boundary

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Project Objectives:

In computer graphics visualisation, perceiving information using visualisation may become more difficult. This is because datasets are becoming more complex and users have to mentally project a 2D projection to 3D to fully understand the nature of geometry. This project explores feasibility of using sound as an additional modality to improve user's perception of 3D shapes.

Exploration

1D and 2D exploration was conducted to test the feasibility of using sound to detect boundary of geometric shapes
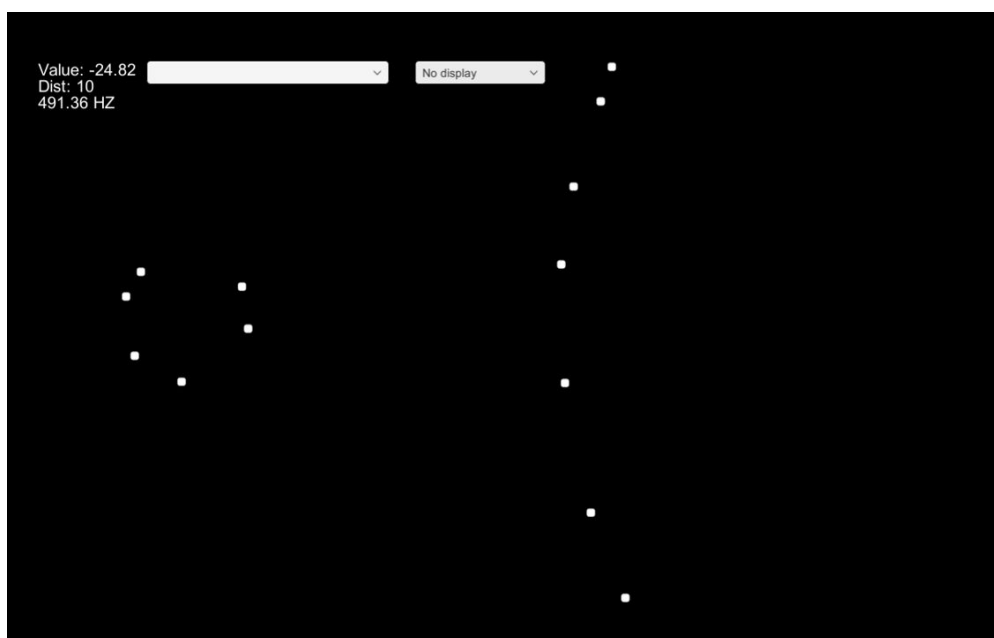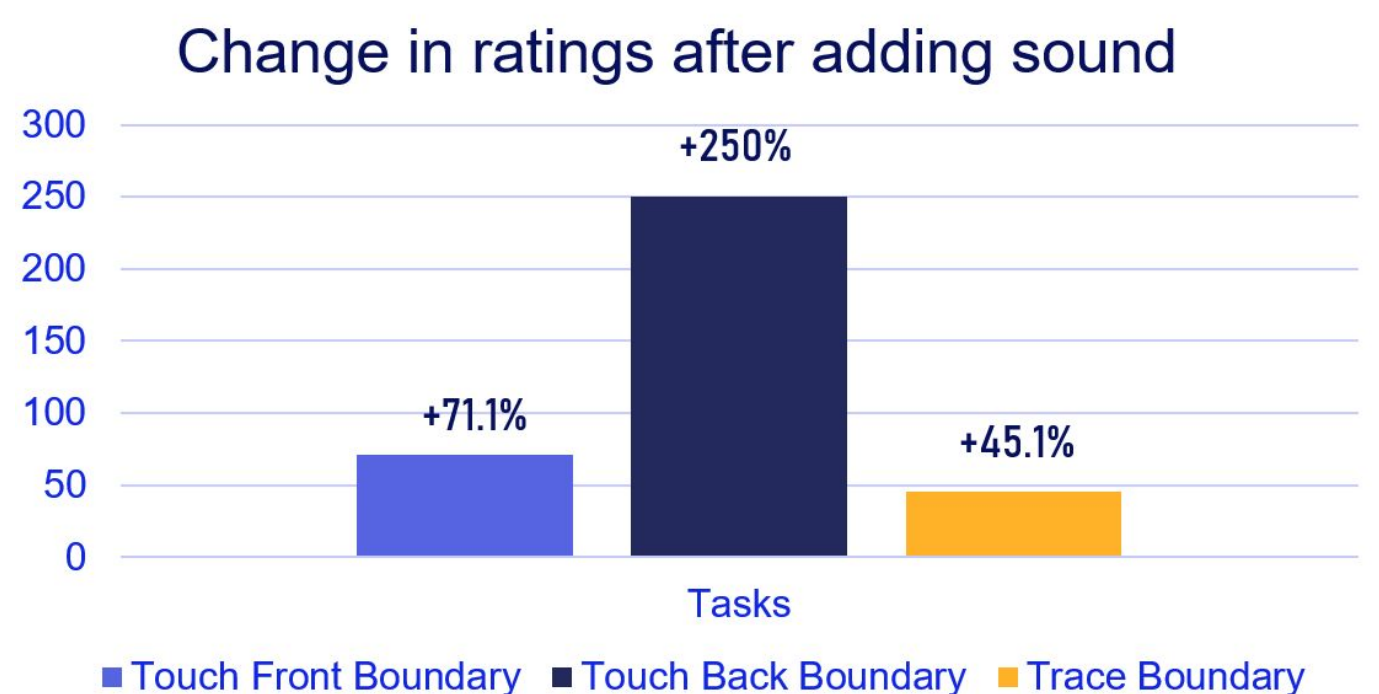

Implementation
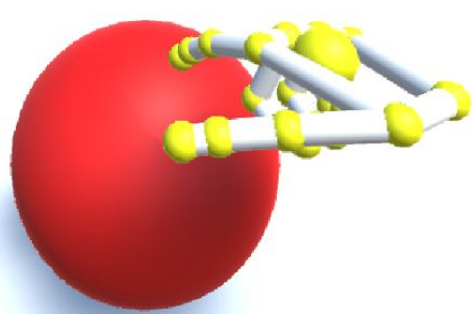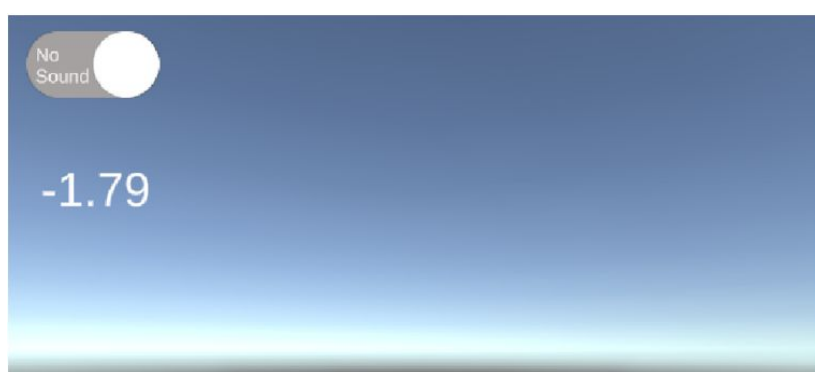
1. Procedural sound generation
2. Implicitly-defined geometric sound models
3. Distance between fingertip and boundary is sonified
4. Sound plays within vicinity of object

unity **LEAP** **MOTION**

Results

Change in ratings after adding sound

+71.1%   +250%   +45.1%

Tasks

■ Touch Front Boundary ■ Touch Back Boundary ■ Trace Boundary

Conclusion

User studies show that participants find it easier to detect boundary when using sound as additional modality. This is especially when objects are occluded from sight. Thus, the addition of sound is useful as an additional modality to help users better understanding 3D geometric objects by detecting the boundary of the object.