

Resonant Object Interface

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The Resonant Object Interface, or ROI for short, is an interface that transforms physical interaction into digital music control. In this system, the user alters the characteristics of the sound by touching a resonant surface, and these changes are analyzed and converted into control data in music software. The system consists of a vibration stimulus, a resonant surface, and a contact microphone. The stimulus sends a signal at a specific frequency to the surface; when the user touches the surface, these vibrations change, and the contact microphone detects this altered signal. This signal is then analyzed to measure the magnitudes of the harmonic components and convert them into MIDI data.

Its most important feature is its focus on physical and tactile interaction. The user controls the sound by directly touching an object instead of a screen or button. The system can theoretically work with different types of resonant surfaces, making ROI a suitable tool for experimental music production.

In terms of usage, the system is generally designed as a two-handed operation. One hand selects the notes, while the other hand changes the character of the sound via the resonant surface. It has been observed that experienced musicians found the system quite interesting, but some users initially had difficulty understanding it. Users with knowledge of acoustics and resonance, in particular, grasped the system more quickly.

In studies aimed at providing a more structured user experience, predefined sound effects were used. This allowed users to learn the system faster. Observations showed that it was more effective for users to use the system as a constantly changing means of expression rather than a fixed control point. Furthermore, most users described the experience as meditative.

In conclusion, ROI offers a powerful interface that combines physical interaction with digital music production. This system provides rich and nuanced control through touch and resonance, and in my opinion, it can be a very functional tool for experimental sounds, performances, and sound design. It reminded me of the Theremin.

Bibliography

Leitman, S., Carnegie, D. A., & Murphy, J. (2024). *Resonant object interface: Implementation and initial exploration of a tactile acoustic interface*. In Proceedings of the International Conference on New Interfaces for Musical Expression (NIME 2024), Utrecht, The Netherlands.