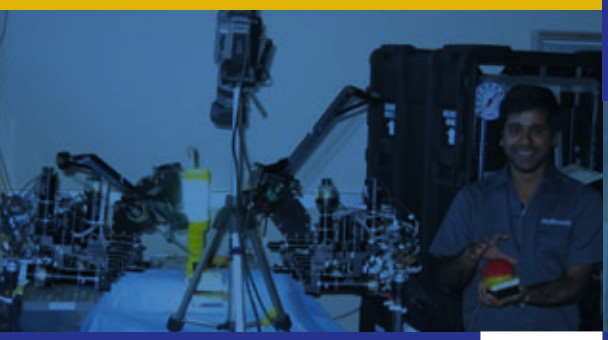

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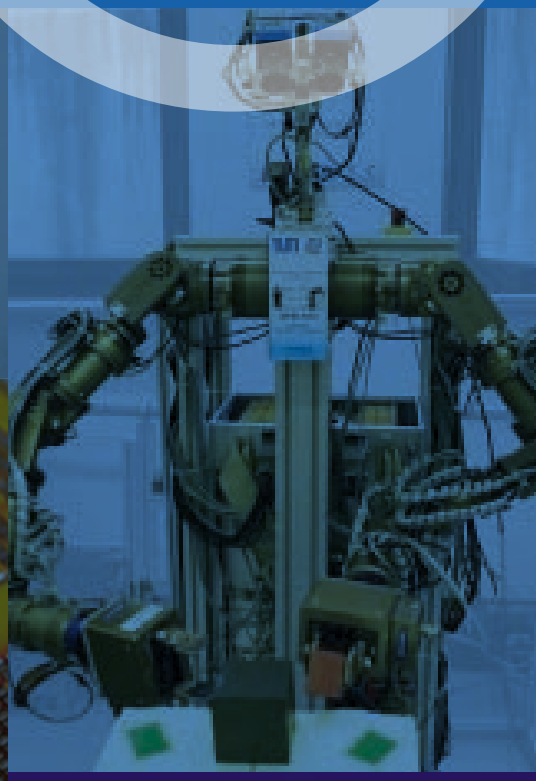
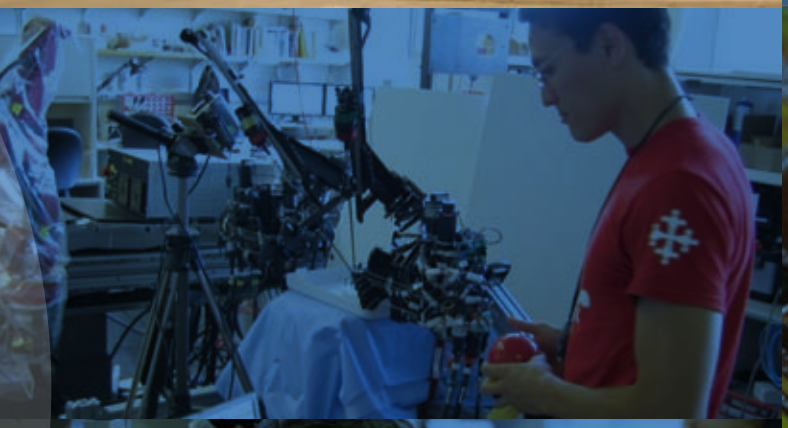
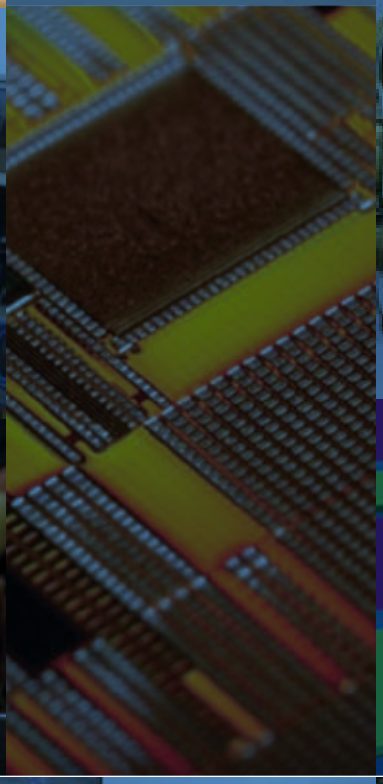
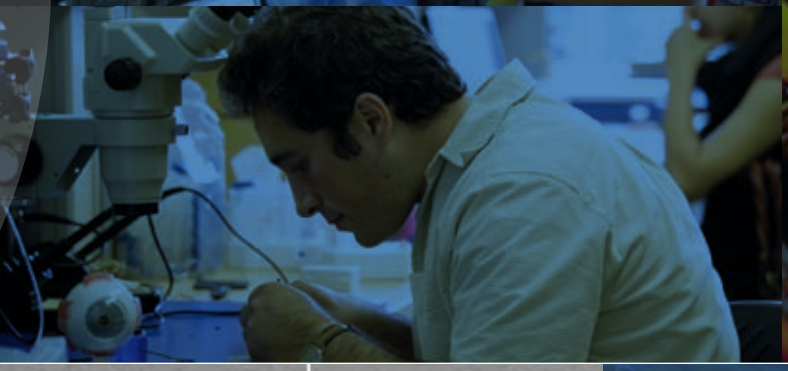
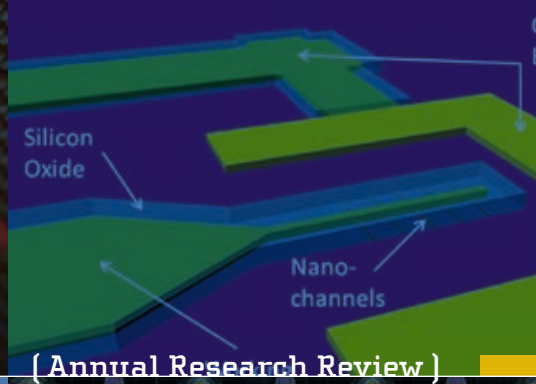

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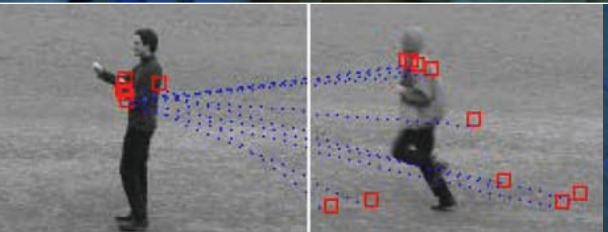


Using a Musician's Movement as a Control Signal for Audio Performance

ROBERT GAY — Undergraduate Student (EE & DXARTS)

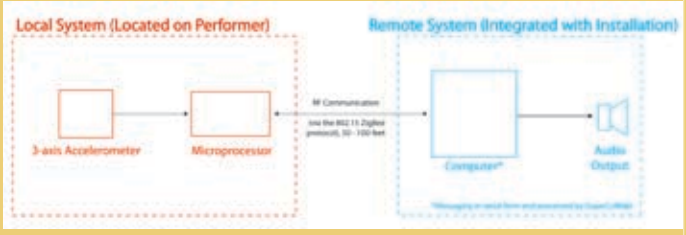
Musicians throughout history have yielded an increasing number of ways to interact in an interesting manner with their medium. Experimental approaches to audio performance can be found in a wide variety of musical genres, from Popular Rock to the Avante Garde. The purpose of this interdisciplinary project is to devise a dynamic system that can use an artist's body movement as a control for altering real-time audio. The design is aimed at being simple, affordable, and effective, allowing it to be used in a variety of performance applications, including audio installations, dance performances, and even the modern rock concert.

The original design intent for this motion-tracking system was to expand upon the "Speaker Performing Kiosk," an audio installation developed by Nicolas Varchausky at UW's Center for Digital Arts and Experimental Media (DXARTS). Upon success, the system could be very useful for both this audio installation, and for future installations and performances.

UW DXARTS graduate student Nicolas Varchausky performing in his "Speaker Performing Kiosk" at the Chapel Performance Space in Seattle, WA.

The most recent iteration of the design utilizes the output of small, tri-axis accelerometers that can be discretely placed nearly anywhere on the body from which the musician would like to gather feedback. A local microprocessor located at the hip transmits this movement information from the accelerometers at a range of 50-100 feet to a remote computer via radio frequency. These values are then collected in control buffers in the remote computer by SuperCollider, a real-time audio synthesis programming language.

Both velocity and acceleration information from the body can be collected for the musician's use. The control buffers are then read back immediately and used for alteration to a wide variety of audio parameters, including altering frequency content, amplitude, or spatial orientation of a chosen audio source.



The high-level block diagram of the system's signal path.

The system's prototype has been nearly completed, where wired communication between the accelerometer and SuperCollider has been established, and real-time synthesis has been achieved. The next step is to add the wireless component of the project and develop algorithms for conditioning the signal for use in a wide variety of situations, where all types of RF interference in live situations must be considered. Following this, a final iteration will then be fabricated, which will be more physically robust, reliable, and able to withstand the pressures of live performance. An extension of this research could then be to integrate the communication of the accelerometers' values through the Musical Instrumental Digital Interface (MIDI) protocol and provide a bundled installer to a user, allowing this device to be used easily with common multi-tracking and live performance commercial software.

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RESEARCH AREA: Sensing Systems & Signal Processing in the Arts