Motion-based Control for Guitar Effects Processing

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Guitarists who use analog and digital effects processors to manipulate the audio fromtheir instrument while performing usually control these effects using knobs, dials, and switches on one or more effects pedals. Musicians often use their hands to make precise modifications to the settings of these processors before a performance and then manipulate them with their feet as they play to produce varying audio effects. We propose moving some of this control away from the feet and onto the instrument itself. Specifically, this project explores using the orientation, position, and motion of the instrument itself as a way of modulating effects.

Rock guitarists in particular, already exhibit a large amount of motion and often swing shake and gesture with their guitars while performing. However, aside from basic strumming motions and hand movements along the fretboard, these gestures often have little to do with the actual playing of the instrument. Instead, these motions tend to be part of the performance, adding visual impact and variety to the guitarist's stage routine. Motion-based control has the potential to dovetail nicely with these existing performance actions, coupling the physical performance more closely with the audio and providing performers with a fluid new way of varying the character of their sound.
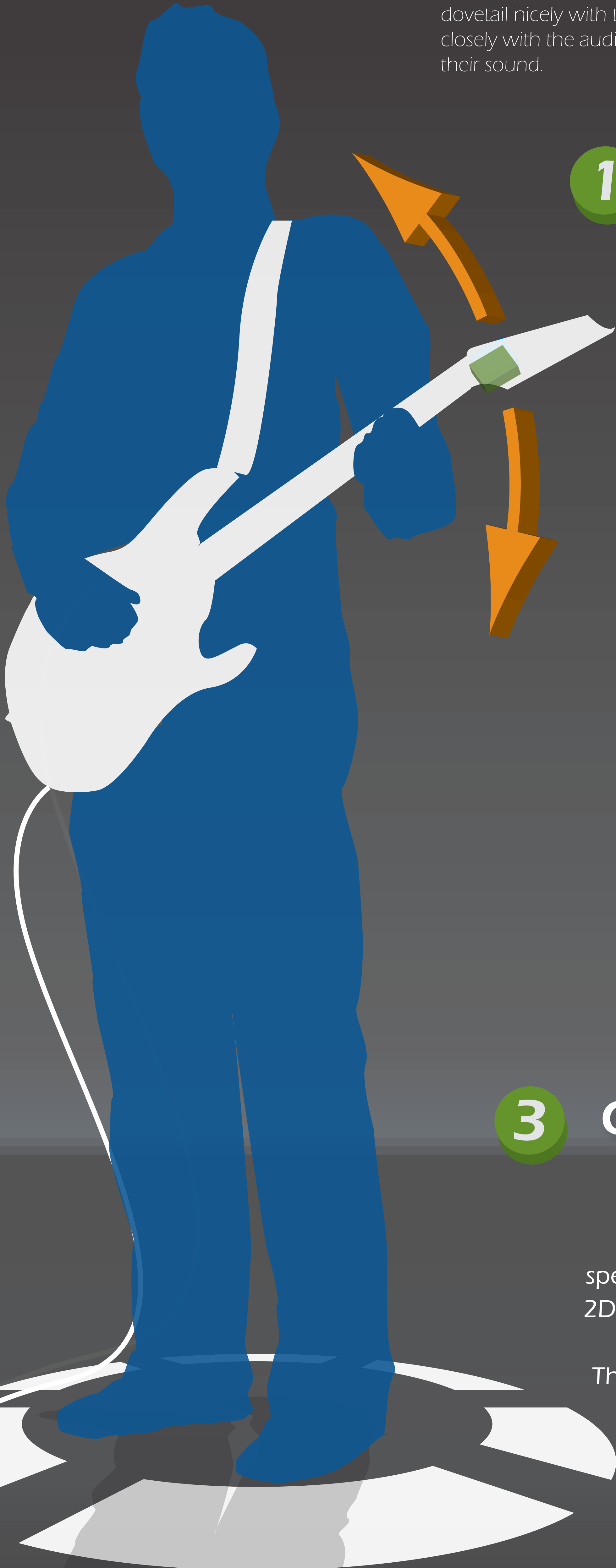
1 MOTION INPUT

A bluetooth accelerometer mounted on the neck of the guitar tracks motion provides motion data. Data is routed to a laptop computeralong with an amplified audio channel from the guitar.

2 DATA PROCESSING

Accelerometer data is processed in an intermediate application and then passed to Pure Data (Pd) - an open-souce patch-based programming environment similar to MAX/MSP.

Audio inputs arrive simultaneously along with sensor inputs from a miavcrocontroller which can be used to supplement the accelerometer input.
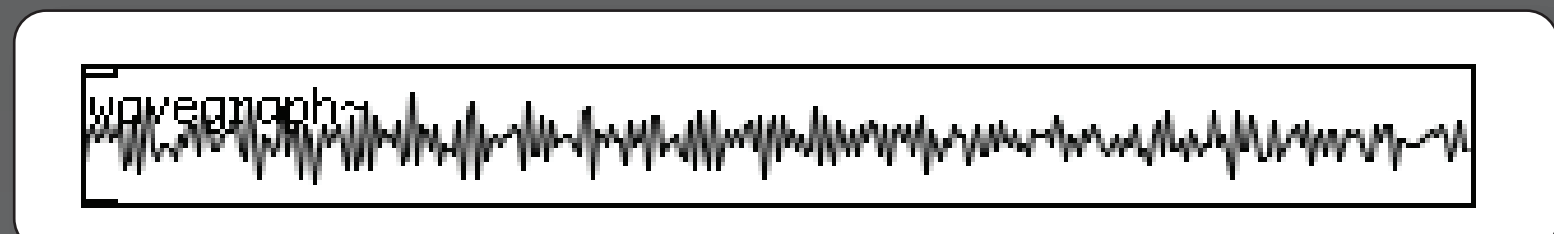
3 CALIBRATION & APPLYING EFFECTS

Using an onscreen tool, a guitarist can calibrate the range of effects and map specific effects to axes in the 2D space of effects accesible via the accelerometer. These scaled and calibrated outputs can be piped to control a variety of different digital effects processing patches.