Texturizer
Exploring sonic textures via tactile interaction

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1. Introduction

The Texturizer is a tangible acoustic interface that intends to provide a platform for sonic exploration through granular sound synthesis. The interface is designed to track acoustic signals generated by the tactile gestures of the fingers on a traditional snare drum. These acoustic signals are captured using a condenser microphone attached to the instrument and are utilized within the Max/MSP programming environment to trigger aural events such as a granular synthesizer and electroacoustic sound-shapes.

Initially, the Texturizer was designed as a tool for electronic music composers and performers seeking a unique approach to their creative process. Composers can use the interface as a sonic palette to inspire and envision sonic textures in their musical pieces and performers can use it as a flexible controller for their performance. The Max/MSP patch is designed for easy reconfiguration, providing artists with the flexibility to craft distinct sonic palettes.

Beyond serving as a creative tool for artists, the Texturizer opens up accessibility to a vast array of sonic possibilities spanning from the tangible to the abstract, enriching the sonic experience for anyone who engages with it.

figure 1. The Texturizer

figure 2. The Texturizer

2. Interaction

A well-known and well understood form of physical engagement is utilized by using a snare drum as the foundation for the interface. Due to cultural construct, it can be safe to presume that users will interact by touching or striking the snare drum's membrane. In the initial stages of the design, it was considered that the interaction would involve the use of snare brushes, primarily because they allow for continuous movement, which is necessary for the granular synthesizer's continuous aural feedback. While using snare brushes proves to be a successful interaction method for musicians or individuals who are familiar with the technique of brush drumming, it may not be intuitive for a broader audience. Upon observing various users with snare brushes as their interaction tool, it became evident that hitting the drum's membrane, similar to using regular drumsticks, was a more intuitive approach for them than employing continuous motions. Furthermore, it was found that using fingertips provided a more satisfying interaction. The continuous motion of the user's fingertips created a stronger perceptual connection between the action and the resulting aural feedback. Additionally, fingertip interaction is less noisy, enabling users to better discern the feedback over the sound produced by the drum.

The interaction design considered two important motions: continuous and discrete. Continuous movement generates a signal flow that is tracked to trigger continuous sounds in a granular synthesizer. On the other hand, discrete movements generate a signal flow of short duration, which is then tracked to control the selection of sound files for synthesis in the granular synthesizer. Additionally, the discrete sound will trigger a synthesized sound of short duration with a different sound texture and quality compared to the sounds produced in the granular synthesizer.

3. Design & Max Patch

A lavalier condenser microphone is used as the acoustic sensor for the interface. This specific snare drum allows for the microphone to be securely attached directly inside the resonant body of the drum, thanks to the orifices on the side of the drum. (fig. 3) This allows for better portability and enhanced control in tracking the sounds produced by the interaction while minimizing tracking of room noise.

Figure 3. Orifices on the side of the snare drum

Figure 4. Signaling the placement of the lavalier microphone. The capsule is directly inside the drum.

3.1 Acoustic event detection

The Max Patch is designed so that each time a signal exceeds a pre-defined threshold, an event is triggered. As mentioned earlier, there are two main events the acoustic signal will trigger, each defined by its own predefined threshold: the granular synthesizer and the change in the selection of audio files used in the granular synthesizer, accompanied by a

sound of short duration. (figure 5) Because the discrete signal has a higher threshold than the continuous signal, a timer was introduced into the signal flow to prevent bleeding in the feedback of the granular synthesizer. If the signal picked up by the microphone lasts for less than a certain threshold, the granular synthesizer won't be triggered, enabling the user to better appreciate the other sounds produced by the discrete signal. (figure 6).

In addition, the Max Patch enables users to control several parameters of the granular synthesizer, including the duration of the sample or grain, the starting and ending points for reading sound files, grain frequency, the rate at which a 'Bang' will trigger the granular synthesizer, and finally, it includes a preset object for storing parameters within the Patch.

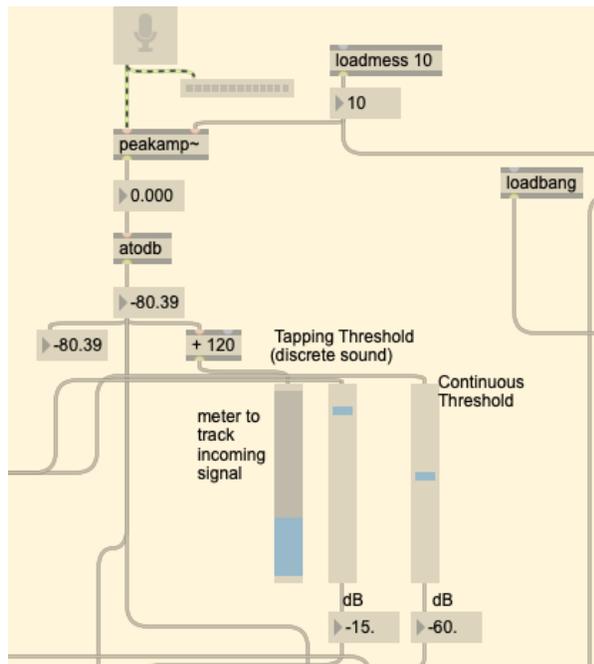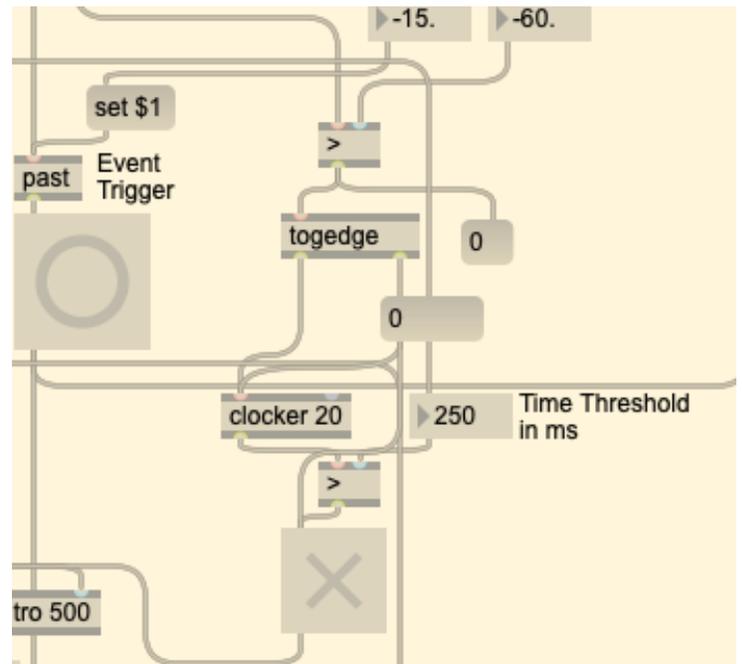**Figure 6. Two thresholds set in dB.**   **Figure 7. Time Threshold in ms.**

4. Conclusion

For an enhanced user experience, it is strongly recommended that users wear headphones. This not only helps avoid feedback and prevents constant triggering of events, which could disrupt the use of the interface, but it also provides a superior sonic experience, as the sounds are specifically designed to be appreciated through headphones.

At its core, the Texturizer is designed as a tool to open up accessibility to the bewildering world of sound. Following the philosophy of Denis Smalley, who states that 'the art of music is no longer limited to the sounding models of instruments and voices,' I believe that this interface could serve as a valuable tool for sonic exploration in the context of sound art, composition, and performance, as well as simply being a fun interface to play with and explore.

References

Smalley. (1997). *Spectromorphology: explaining sound-shapes* (Organised Sound 2(2): 107–26). Cambridge University Press.