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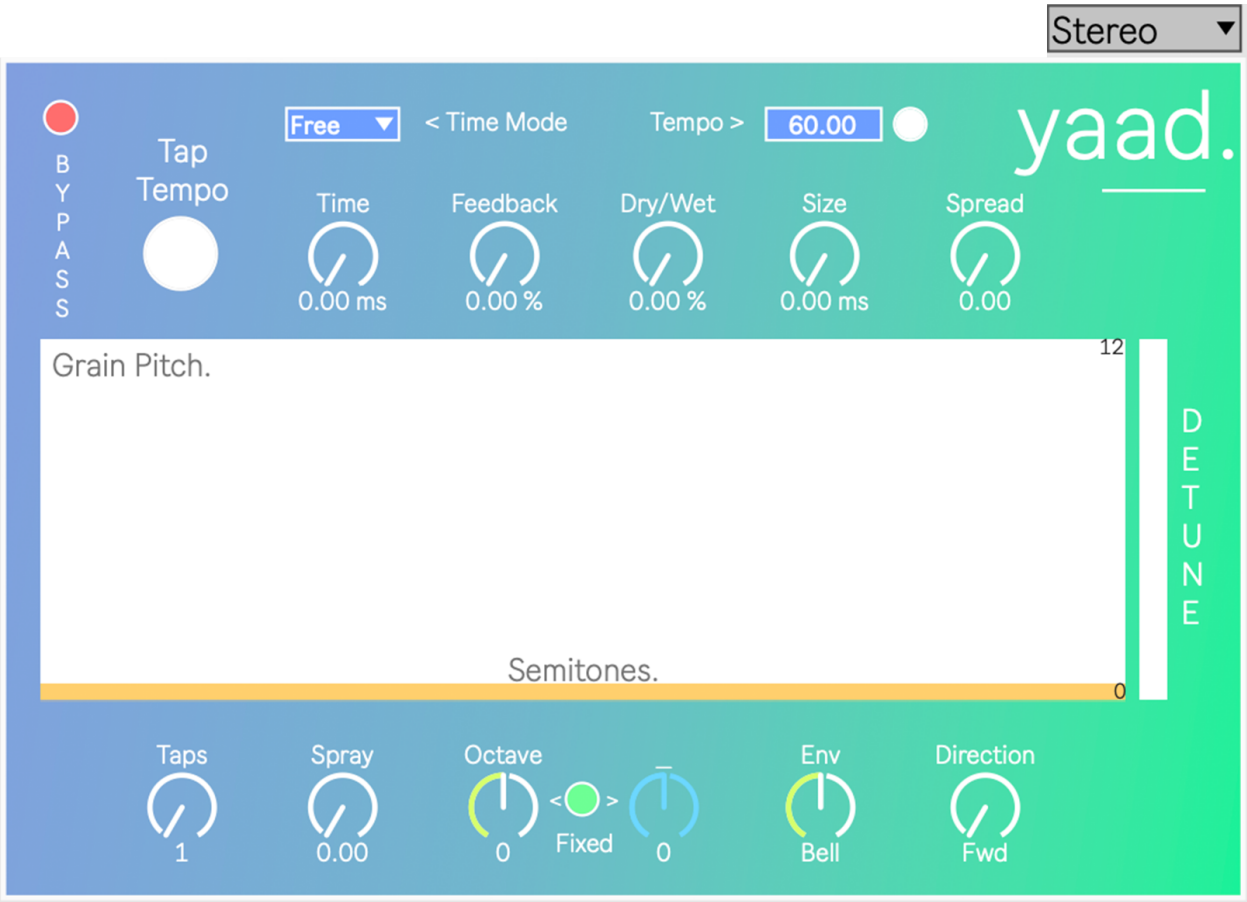
Yaad.

Introduction

Yaad is a variable multi-tapped delay line granular processor of real-time input implemented with GenExpr and JavaScript in the Max/MSP environment.

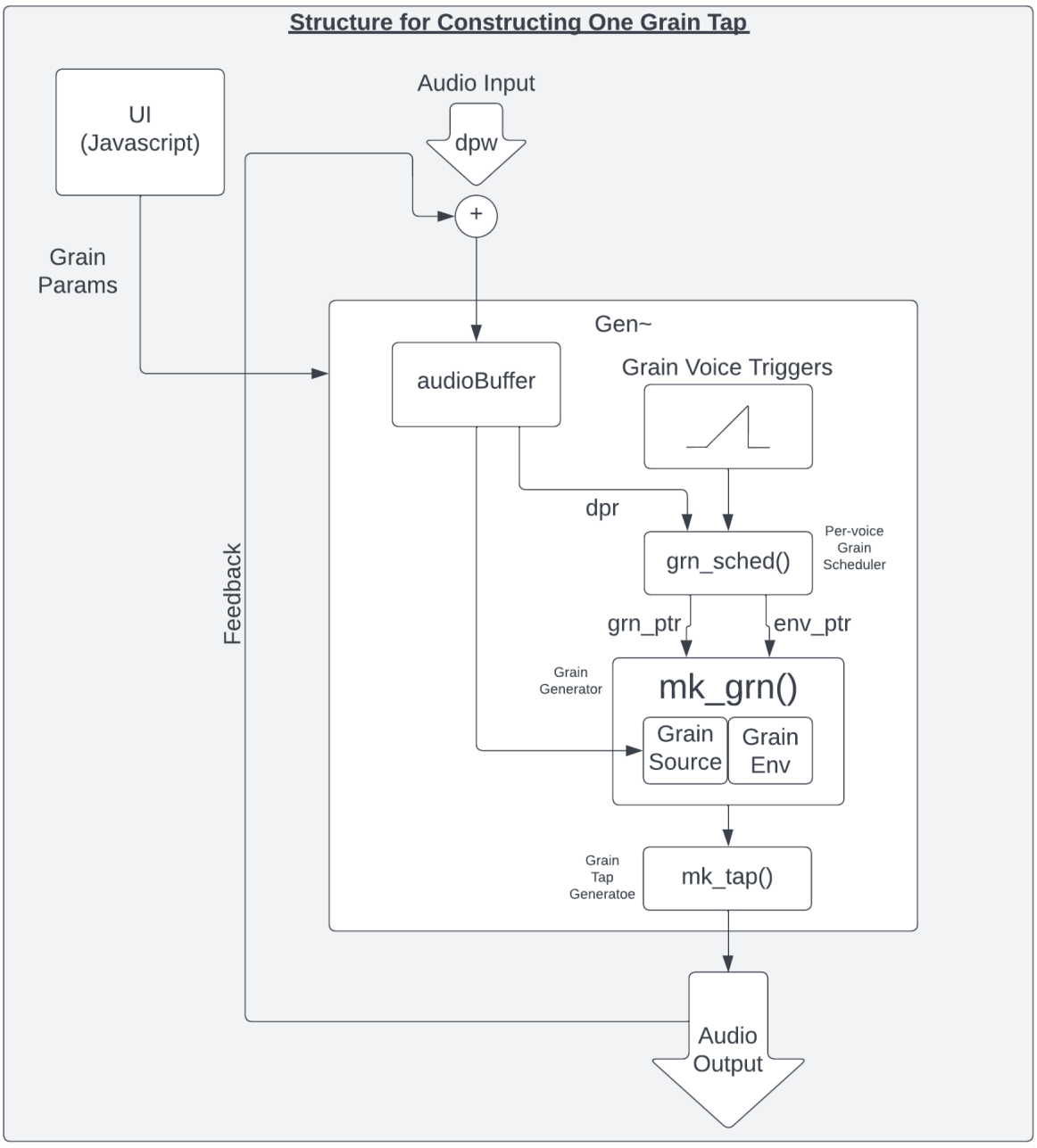


Tapped Delay Line Granular Synthesis uses a delay line that is used to store samples from a real-time input stream. This form is appropriate for "effects" processing of real-time input. Each grain source implements an independent delay tap on the delay line. Each delay tap may read the delay line from a different

point to create delay effects, at different playback rates to create pitch-shifting effects, and at different playback directions to create time forward/reversal effects. If a delay time has a playback rate greater than unity, then the grain pointers are offset backwards in time to avoid the non-causal case of trying to read 'future samples'. The amount of offset is calculated based on the requested delay time, grain size, playback rate and direction. and grain size.

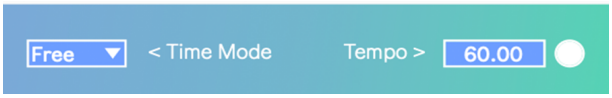
Program Structure

See code for implementation details!



Feature Overview

Time Mode.

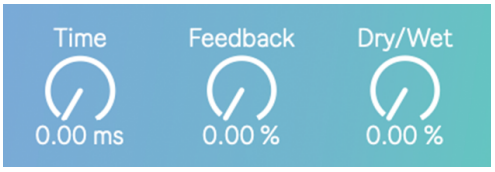


There are two time-modes available:

Free: In this mode, Delay time and grain parameters are set in milliseconds. The "Spray" parameter adjusts the spread between the delay taps (See "Spray" parameter below). The offsets are not quantized.

Tempo: In this mode, Delay time and grain parameters are set in note durations. The tempo can be adjusted either by changing the "Tempo Box" or tapping on the "Tap Tempo" button. The "Spray" parameter adjusts the spread between the delay taps (See "Spray" parameter below), but the offsets are quantized to the nearest note duration.

Delay Parameters.



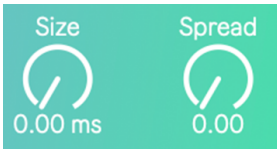
Time: Sets the delay time for the first tap, either in milliseconds (Free mode) or in note durations (Time mode). If more than one tap is used, the taps are offset in reference to the delay time using the spray parameter.

Feedback: Amount of signal that to feedback into the input.

Dry/Wet: Adjusts the balance between the original signal and the affected signal.

Ping-Pong/Stereo: Choose between Stereo or Ping-Pong, where the delay bounces back and forth between the left and right channels.

Grain Parameters.



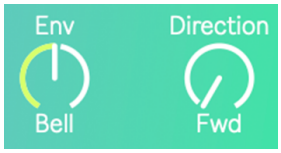
Size: Sets the grain size. The smaller the size, the more grains per second are created and vice-versa.

Spread: Set the stereo spread of each grain. Grains are spread randomly in the stereo space based on bounds set by this dial.

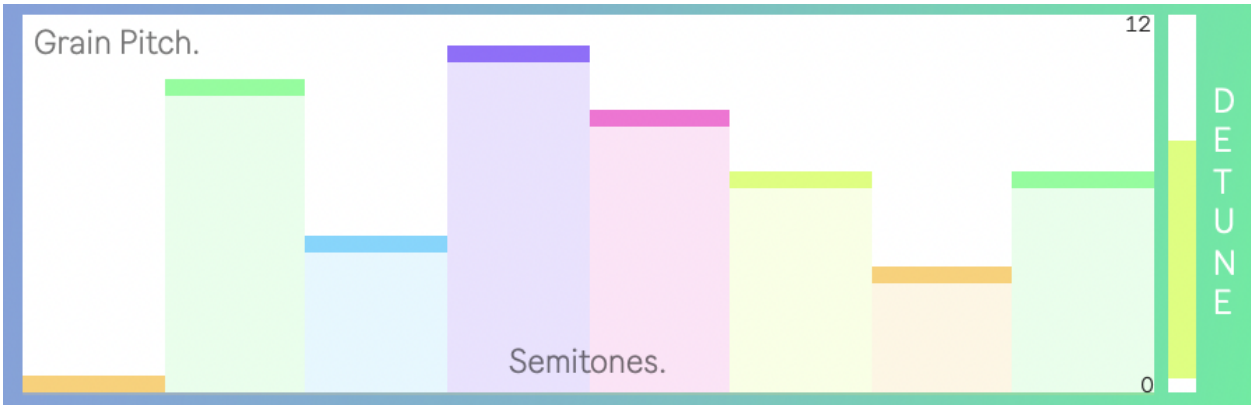
Envelope: Choose the grain envelope to use. The options to choose from are:

- A cosine "percussive" envelope with a short attack and long release.
- A cosine bell envelope
- A cosine "swell" envelope with a long attack and short release.

Direction: Set the direction of playback. One can choose from forward, reverse or random which randomly chooses between forward and reverse playback.



Pitch Parameters.

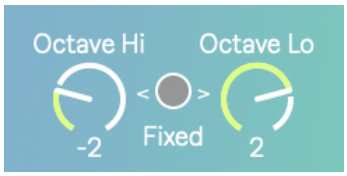


Grain Pitch: Individually set the pitch (playback rate) of each delay tap in a range of 12 semitones.

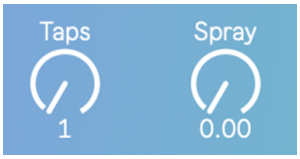
Detune: Apply random pitch variations (0 to 100 cents) to each grain constituting a delay tap based on bounds set by this dial.

Octave: The octave dial has two states which can be toggled by clicking the fixed button:

- In its fixed state, Only one octave dial is active and it affects the octave of playback of all grains in all taps.
- In its range state, Two octave dials are active and one can choose between two octave ranges. Then the octave of playback of all grains in all taps will be randomly selected within the range provided.



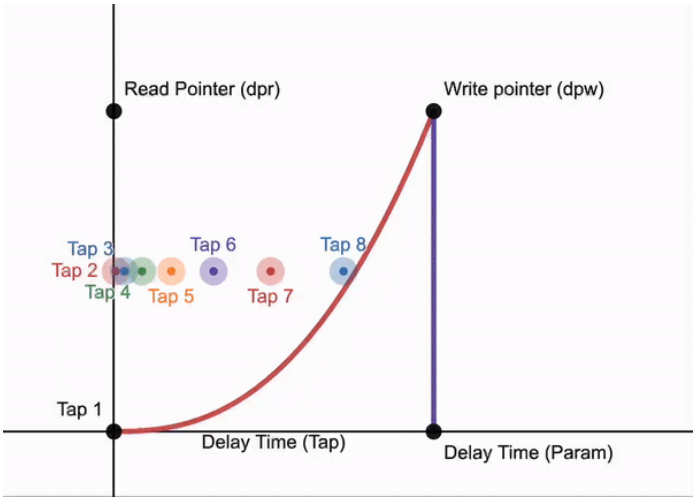
Tap Parameters.



Taps: Set the number of taps into the delay buffer. One can have up to 8 taps from the delay buffer.

Spray: This sets the amount of offset between the delay taps based on the following equation:

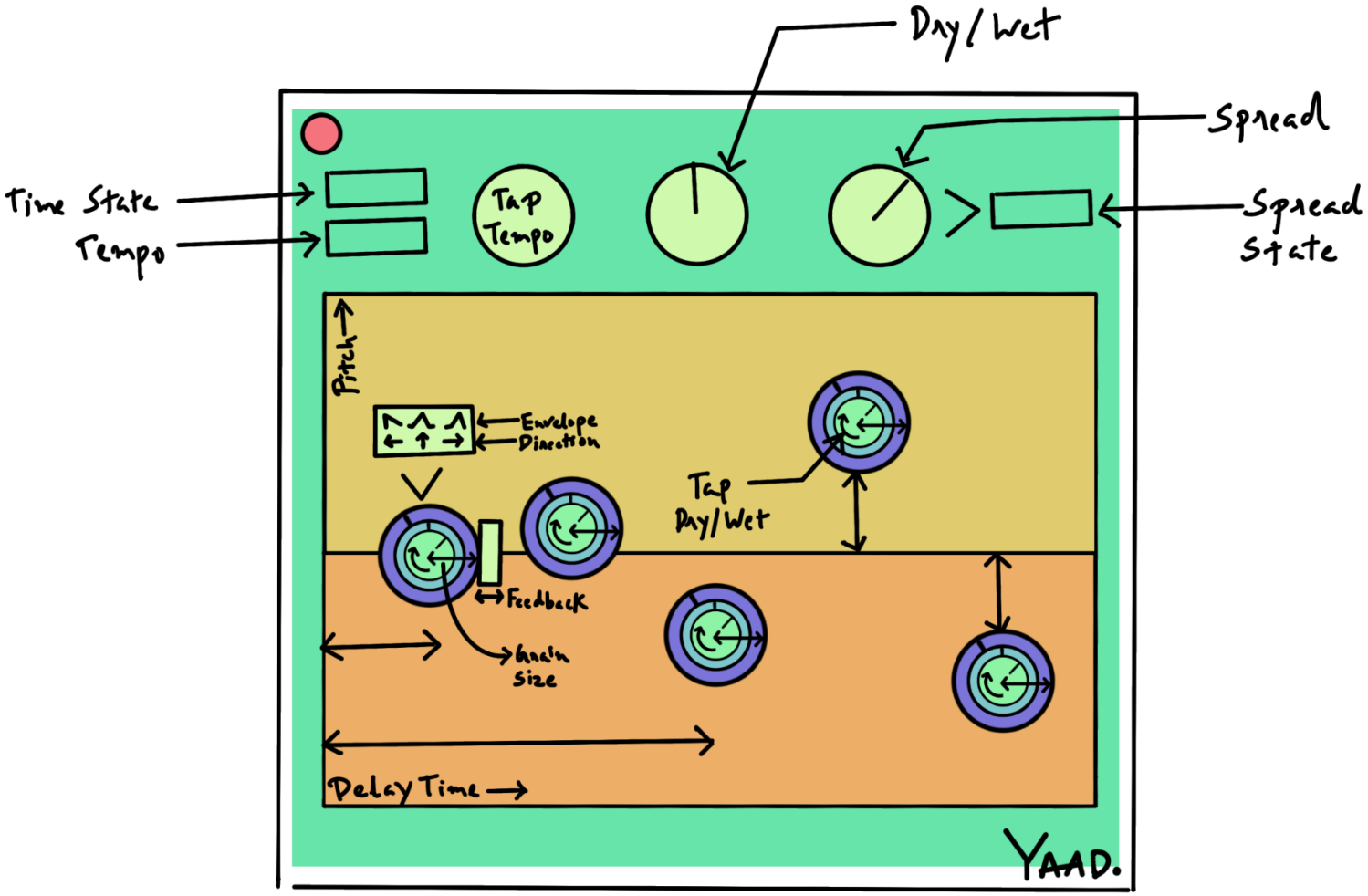
$$Y = X^a \quad \{0 \leq a \leq 10\} \qquad (1)$$



A demonstration of how the "Spray" parameter affects the offsets between the taps.

Future Work:

- Shift to an object-oriented design in C++ for cross-platform implementation.
- Implementation of "Tap" objects independent schedulers to facilitate independent control from tap parameters.
- Decoupling grain size and grain frequency to facilitate grain overlaps.
- Designing a more intuitive interface for interaction.



An alternate, possibly more accessible interface design for Yaad.