FACTOID
user manual

Introduction

Factoid is a Max For Live device that allows you to create endless rhythmical variations of audio clips. It uses machine learning to decompose a sound into up to 8 layers. Those layers can then be randomly shifted in time to change the rhythmical structure of the clip.

When a clip is loaded into Factoid, it is analyzed using a machine learning technique called matrix factorization. This produces a set of waveforms (the layers or elements) that are displayed superposed, each one with a different color. Each of the waveform layers can individually be shifted in time by clicking on the RANDOMIZE button. The interface allows to choose the number of desired layers for factorization, and to control the time randomization in terms of quantization and frequency contents.

Installation

Factoid requires an Ableton Live 9 (64 bit) or 10 version with Max For Live installed.

To start using Factoid, just drag and drop the factoid.amxd file into the audio effects area of an audio track in Ableton Live 9 or 10. If you're installing an updated version of Factoid, it is recommended that you delete the old factoid.amxd file.

For a quick start guide, click on the icon on the upper part of the main interface.

Usage

To factorize (decompose) a clip, drag and drop any Live clip into the main display area. Factorization will start immediately, with the number of components selected in the "components" drop-down menu (from 2 to 8 components). See the last section of this manual ("Factorization How-To") for some hints on how to select the number of components.

> ⚠️ Although it is possible to drag and drop audio files from Live's browser or even from the Mac OS Finder or Window's file explorer, we recommend to drag and drop clips that are already present on the Live set, otherwise timing issues can arise when using "host" playback (see below).
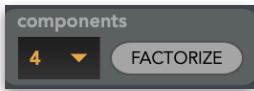
If you wish to re-factorize the same clip with a different number of components, change the number of components from the "components" drop-down menu and click on the "FACTORIZE" button.

During factorization, a red cancel button will show up to the right of the progress bar: ❎ Click on it to interrupt the ongoing factorization.

> ⚠️ Factoid is designed to work efficiently with short loops (less than 30 seconds). In that case, factorization should only take a few seconds. You can however factorize any clip, without length limitation, but keep in mind that for long clips, it can be a CPU and memory-demanding process. If it takes too long, remember that you can always cancel factorization once started.

Once factorization is completed, you will see the extracted layers displayed as superimposed waveforms in different colors. Roughly, darker colors (towards violet) correspond to layers with predominantly low-frequency contents and brighter colors (towards yellow) correspond to layers with predominantly high-frequency contents. For example, with a drum loop, the kick will likely be displayed in violet, and the hi-hat in yellow.

Right after factorization, the layers are in their original position: if you click on the playback button, you will hear the original sound. Time randomization will then happen each time you click on the "RANDOMIZE" button.

> ⚠️ If something strange happens while using Factoid (a file does not load, a factorization takes too long,…) you can have a look at the Max window to see if there are any error messages. You can open the Max window by right-clicking the title bar on the Factoid device window on the audio effects area, and selecting "Open Max Window". If the error message is not self-explanatory, contact me at software@jjburred.com!

Randomization controls
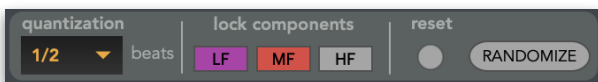
Randomization can be controlled in two ways: by choosing the possible target positions of the shifted layers (**quantization** setting) and by selecting which components are allowed to shift (**lock components** setting).

Quantization

The quantization setting, expressed in beats or fractions of a beat, determines the possible positions of the layers after randomization. For example, a 1/2 beat quantization means that the components are allowed to shift forward or backwards by a random number of half-beat steps. Quantization ensures that the resulting rhythm variation keeps the original underlying beat at the appropriate tempo. For short drum loops, it is most effective to use fractionary quantization settings.

The upper part of the quantization drop-down menu corresponds to duple meter fractions and multipliers, and the lower part of the menu to triple meter fractions and multipliers.

You can also choose to randomize without quantization ("none" in the quantization drop-down menu). In this case, the rhythm will be randomly scrambled and the original beat will likely be lost. It can be useful to create melodic or harmonic textures from non-percussive loops.

Lock components

You can choose which layers are allowed to shift using the "lock components" setting. When the LF button is on, the one-third of layers containing predominantly low-frequency contents won't shift when clicking on RANDOMIZE. The same applies for the MF button (mid-frequencies) and for the HF button (high frequencies).

As an example, when activating LF locking with a drum loop, the components corresponding to the kick drum won't move, while the rest of the elements (snare, hi hat...) will shift in time to create rhythmic variations.

Reset button

The reset button next to the RANDOMIZE button undoes the random shifts and gets back the original sound without the need of re-factorizing.

Main transport
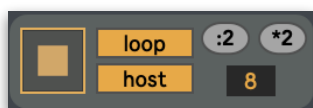
To the lower left of the device is the panel to control the playback of Factoid's processed audio. Keep in mind that Factoid is not a real-time audio effect, but rather a clip-processing device with its own playback controls.

- **Play/stop** button**:** to start/stop Factoid's audio output
- **Loop** button: to turn clip looping on/off
- **Host** button: when on, Factoid's playback is in sync with Live's tempo and transport. Factoid's output will be warped to match the set's tempo. In host mode, the play/stop button will blink when clicked until Live's main transport is started or until the first beat of the next measure is reached.
- **:2** and ***2** buttons (only available in host mode): play at double or half the clip's detected tempo
- **Beats** 8 : the beat display window shows the number of beats detected from the clip. When in host mode, you can click and edit the number of beats to change how the clip is synchronized with the Live set.

⚠ The original clip's transposition and detune settings will also affect Factoid's output, in both host and free modes.

Playback region selection
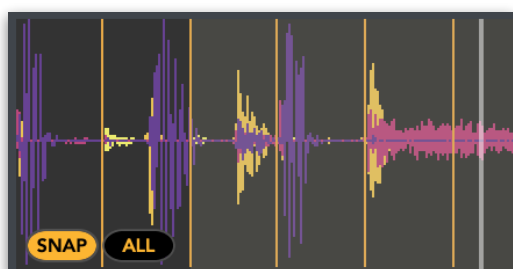
You can select a playback region by dragging over the output waveform. If in loop mode, playback will loop inside that region. To go back to playing back the whole waveform, click on the **ALL** button above the waveform.

To quantize a playback region to subdivisions of the beats, as determined by the quantization drop-down menu, click on the **SNAP**

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button before selecting the region. Vertical bars corresponding to the beats will be displayed. Note that, in order for this to align with the Live set, the loop has to contain a whole number of beats, and playback must be in "host" mode.

Mixer panel

The mixer panel controls the main output volume of the device.

- **Dry/wet:** mix of the original, unprocessed master sound, with Factoid's output. It is sometimes effective (e.g. with drum or percussive loops) to keep some of the original sound in the mix in order to create rhythmic variations on top of the original rhythm.
- **Gain:** output gain of the device

Automation and MIDI-mapping

All Factoid parameters are controllable by Live's automation envelopes and MIDI and key mappings. The automation envelopes are available in Arrangement view.

Usage from Max

It is possible to load and use Factoid from plain Max, without Ableton Live, thanks to the `amxd~` object. To load it into a patcher, just drag and drop the factoid.amxd file onto it.

Connect stereo audio out to the first two outlets.

Playback in host mode can be used with Max's global transport.
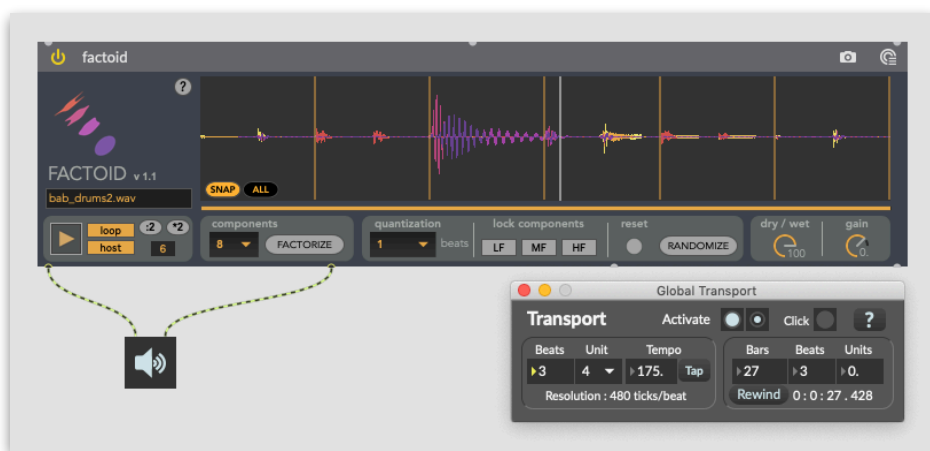
Factorization how-to

Choosing the right number of components is crucial for obtaining good factorizations. Of course, this will depend on the complexity of the input sound and on the type of elements you would like to obtain. You'll see that it is mostly a trial-and-error process, but here are some guidelines that might help you:

- If your input clip contains a few simple sound events (for example, a drum loop or a sequence of a few notes), Factoid will likely separate them into components. For example, if you have a melody containing 7 different pitches (not counting the repeated ones), doing a factorization with 7 components will often (but not always!) result in one element per pitch.

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- In the same scenario of a simple clip with few events, if you factorize into more components than events in the original sound, Factoid will start "delving" deeper to extract more underlying structures. For instance, if your clip contains 3 piano notes and you factorize into 8 components, some components will contain the noisy and impulsive parts of the attack phases, and other will contain the harmonic sustain and/or release parts of the different pitches.
- For complex input clips (loops containing several instruments, song excerpts or full songs), the decomposition is more unpredictable, but can often detect interesting elements such as a rhythmical motif of the bass, a guitar lick, an underlying pad, impulsive noises, etc.

Support

For assistance, bug reports and any suggestions, please contact software@jjburred.com

If you're sending in a bug report, please include the following information:

- Your Factoid version
- Your OS version
- Your Ableton Live version
- Your Max (Max For Live) version (this can be found by opening the Max editor by clicking the button on the device window)
- Any possible error messages displayed in the Max console
- If possible, the audio clip that produced the issue