drumatom

User Manual

by accusonus

MEMBER OF THE PLUGIN ALLIANCE

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Contents

1 Introduction

Drumatom is a novel drum processing tool that offers a fresh perspective on leakage suppression. At its heart lies an advanced patent-pending algorithm that will scan your drum tracks, detect bleed and help you dial in as little (or as much) as you want.

The user has two separate software tools at his/her disposal: drumatom (the standalone application) and drumatom player (the plugin). The standalone application is the functional core, performing all necessary analysis of audio information and file handling. The plugin can open sessions saved by the standalone application, allowing for easy DAW integration. It should be noted that the plugin will not analyze drum tracks (it's currently simply impossible in real-time) and will load already analyzed groups instead. In short, using the standalone application is necessary to make any meaningful use of the plugin.

1.1 Overview

So what's the idea behind drumatom?

A modern production often involves the drummer performing through multiple microphones, specifically set to capture the sound of each individual component of the drum kit. Ideally, each microphone should only pick up the sound of the intended percussion element (i.e. a snare microphone should only record the sound of the snare drum). In practical everyday applications though, things are not so simple. Each drum is bound to interact - more or less - with all microphones. In other words, the hihat's sound will find its way ("leak") to the snare drum's microphone.

"Drum spill" is known to sound engineers since the dawn of recording technology, but the audio DSP research community seemed oblivious to it for a long time. To this day, recording and mixing professionals use a number of simple and empirical methods to address it.

By designing drumatom, we sought out to utilize the latest advances in DSP, in order to provide a dedicated solution to the leakage issue. Our software is based on our proprietary 'Advanced Audio Analysis - A^3' technology and is the outcome of many years of research and development. The origins of our technology can be broadly placed in the general family of Blind Source Separation (BSS) techniques, using notions of artificial intelligence. However, A^3 is far more than that. Advanced principles of acoustics, signal processing, psychoacoustics and music theory are combined in one novel technology. Running an extremely sophisticated algorithm under a simple and intuitive user interface, drumatom lets you adjust, reduce or eliminate leakage in a way that was previously not possible with conventional tools.

1.2 System Requirements

Drumatom will only work with a 64-bit operating system. Minimum specs for the standalone application are as follows:

- Windows: Windows 7, 8
- OSX: v10.6 and upwards

4GBs of RAM are the absolute minimum for operation. 8GBs or more are highly recommended.

1.3 Supported Audio

Drumatom supports loading of .wav and .aiff file types for both Windows and Mac. Mac users may also use .caf files.

- Bitrates: 16, 24, 32 bits

- Sampling rates: 44.1, 48, 88.2, 96, 192 kHz

Please note that drumatom does not currently support loading of files with different sample rate in the same Group (i.e we don't do any up or down sampling).

WARNING ON FILE SIZE You can - theoretically - load files of any length, but keep in mind that drumatom uses a good deal of RAM and temporary hard disk space during analysis. There's a good chance that analyzing extremely long files (for example an entire gig recorded in multiple 60 minute tracks) will result in unstable behavior. It is strongly suggested that you edit the tracks in an external editor before loading them. You can then assign the tracks to multiple groups.

1.4 Installation

Drumatom is quite straightforward to setup and activate. Please refer to the included activation manual for detailed information.

2 Drumatom UI and Controls

The drumatom UI consists of four areas:

- The track/group selection list.
- The lower bar, where you will find the transport and group control buttons.
- The top bar displaying a waveform of the current processed audio file.
- The main control section.

Drumatom works by loading all the files from your multitrack drum session and allowing you to switch between them and process each individual track to your liking.

Let's see all the GUI elements one by one. We'll start with the track list, since it's the first area you'll be using when setting up a project.

2.1 Track/Group Selection

The first time you run drumatom, you'll be greeted with an empty user interface (Figure 1).

Your first step is to load up a multitrack session into drumatom. You can do this by dragging and dropping your audio files on the GUI, or by using the SELECT FILES button.

Figure 1: Initial Drumatom GUI

The individual drum channels are listed under TRACKS. These tracks belong to a drum group listed under GROUPS. Drumatom will name your group arbitrarily (i.e."Group-X"). You can rename it to something meaningful, usually the name of the corresponding song, by double-clicking on the name. Note that you can load multiple groups. For example, your GROUPS list may contain all the songs of an album project you're currently working on.

You can identify each track, by using the drop-down menu at the right. Why do that? You have to let drumatom "know" which file is which drum type. Please note that most of the times, drumatom will do that automatically, based on the name of the audio file. Drumatom currently supports the following drum types:

- Kick.

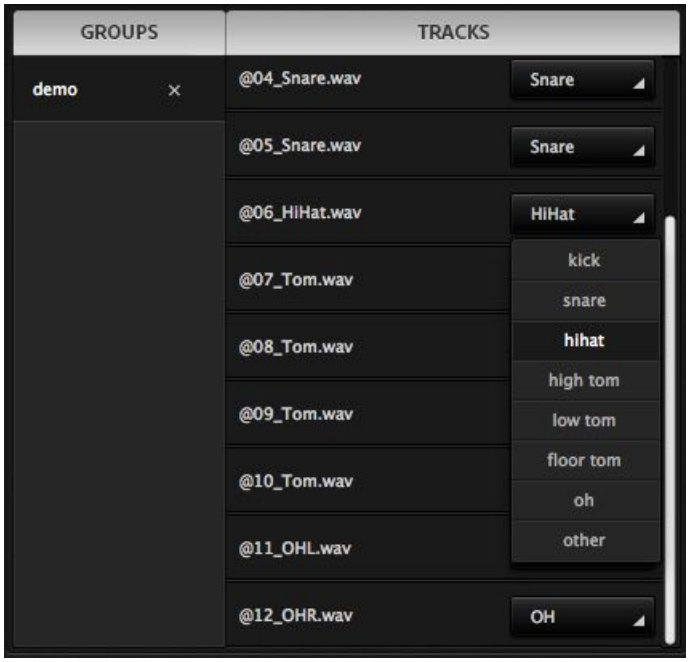

Figure 2: Choosing drum type

- Snare.
- HiHat. Analyzing a hihat track depends on the presence of a kick or snare track in the same group. Having both will produce the better sonic results. Note that this drum type can perform well in the case of individual cymbal tracks as well.
- Toms. There are three subtypes: High, Low and Floor. Choose the appropriate type depending on the audio material. These subtypes are purposefully tuned in a “loose” manner, so keep in mind that there’s a degree of overlap between them. Additionally, they have a big impact on the result, so be sure to experiment.
- Overhead. Tracks labelled as “OH” take part in the analysis process, but are not available for tweaking. Their controls will appear disabled (greyed out) after analysis.
- Other. Choose this drum type for any track that does not fall under any of the above categories. Tracks labelled as “Other” take part in the analysis, but are not tweakable.

Finally, once a group is analyzed, you have the option of exporting a single track by pressing the corresponding button, at the left of the drum type menu.

Useful operations You can select multiple tracks or groups with the Cmd/Ctrl or Shift modifier, as you would do in Finder or Windows Explorer. You can also right click on a track or a group to reveal a set of basic operations (see Figures 3 and 4). These can be very handy when organizing sessions, or preparing session files for use within drumatom player.

2.2 Transport / Process / Export

On the lower part of drumatom’s interface, you’ll see the transport controls, a volume slider and two buttons labeled ANALYZE GROUP and EXPORT GROUP. The transport controls should be self-explanatory. Let’s

Figure 3: Track options

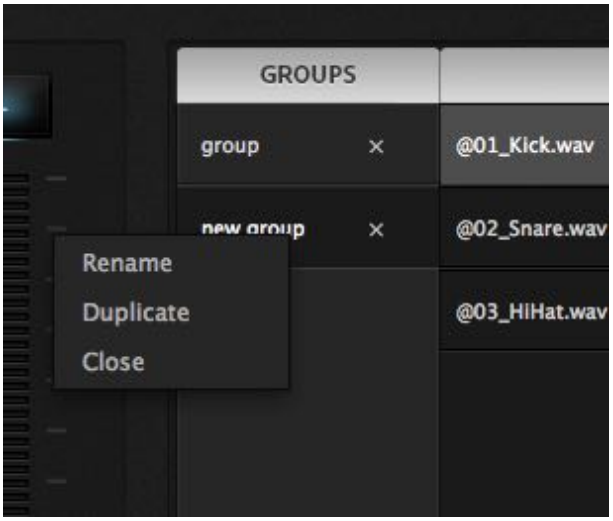

Figure 4: Group options

Figure 5: Transport controls

just note that the “play” button also works as “stop” and “pause”. The “next” and “previous” arrow buttons change the track being played.

The volume slider is used to adjust drumatom’s monitoring volume. There’s also a clip indicator, that will light up when the signal hits values above 0 dBFS. It’s important to note that the volume slider does NOT control the processor’s output gain in the traditional sense. Any change made to the volume control will not be applied to the files. It only regulates your monitoring levels and is there for your convenience.

The ANALYZE GROUP button commands the algorithm to analyze the loaded audio files, collect the relevant data and prepare the material for processing by the user. Once you press ANALYZE GROUP, a progress bar will show up.

Please note that time needed for analysis will vary, depending on your system. Drumatom’s engine is being constantly optimized, so be sure to check for updates often. Once the group is analyzed, you can start applying FOCUS and FINE TUNE on your files.

The rather self-explanatory EXPORT GROUP function will render the processed tracks on your hard disk. Press this button to export a complete drum group. If you’d like to export a single track, highlight it in the tracks list and press the corresponding button (see previous section 3.1).

IMPORTANT If you want to keep different versions of the same group, be sure to export them in different folders. By default, drumatom will overwrite files with identical names during exporting.

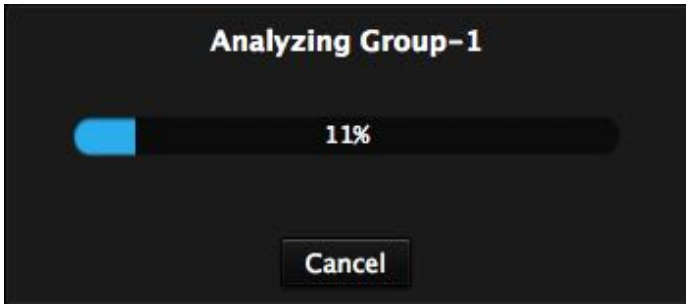

Figure 6: Analysis progress bar

2.3 Waveform Display

Drumatom features a clean and crisp waveform display, allowing you to visualize the effect of the processing and easily select audio sections for preview.

You can zoom in or out of the timeline, by using the vertical slider on the left. Press and hold the left mouse button to highlight a selection. Once a portion of the audio is highlighted, the cursor will loop through it. When a loop is active, you can extend/reduce its length by pressing and holding the right mouse button and dragging the cursor.

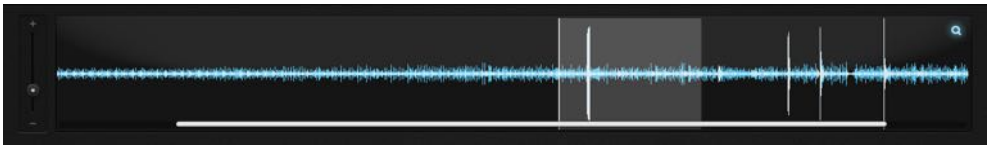

Figure 7: Waveform view

You can also increase the waveform size, using the magnifying glass button found on the upper right corner. This can be useful when dealing with tracks recorded at a relatively low level.

You can take advantage of this feature to focus on specific problematic sections in your drum channels. Keep in mind that the blue waveform represents the original signal, overlaid by the white waveform of the processed one.

2.4 Main Section

The main section is where all the magic happens. You can achieve a wide range of sounds using a relatively small array of knobs.

2.4.1 Focus

The FOCUS knob is the single most important control in drumatom. When the FOCUS knob is at its minimum value, no processing is taking place. By turning it clockwise, you can reduce the selected track's leakage and let the original sound shine through. By turning it fully clockwise, you get the maximum possible leakage suppression.

2.4.2 Fine Tune

The FINE TUNE knob works alongside FOCUS, giving you the freedom to do detailed adjustments. FINE TUNE works in a reverse fashion. By turning it clockwise, some of the dry signal is added back (to be more precise, the signal added is the *difference between the original and the current FOCUS output*). In

Figure 8: The Main Controls

essence, it's something akin to a Dry/Wet implementation. You may ask: why not just push back FOCUS a little bit? Well, you won't get the same result. FINE TUNE has a finer range of values. The two controls are designed to interact with each other and produce an effect greater than the sum of its parts.

TIP Hold down Cmd/Ctrl to do finer adjustments. Double click on a knob to manually type a value.

2.4.3 Bypass

Use this button to do quick comparisons between the original and the processed audio signal.

2.4.4 A/B Switch

You can compare different FOCUS and FINE TUNE settings, by using the A/B switch. Please note that the switch position is saved along with the session.

2.4.5 Suppression Meter

The suppression meter is an extremely helpful tool that lets you visualize the extent to which processing happens. Think of it as the equivalent to a compressor's GR meter. It's designed to mimic traditional LED metering tools and give you a precise indication of how many dBs of suppression are applied.

2.4.6 Summary

Let's take a minute to summarize this section, provide a more in-depth look into the workflow and discuss the results you should expect when using drumatom.

When processing your drum channels, the FOCUS knob is your starting point. By turning it fully clockwise, you'll achieve the maximum possible suppression. Depending on the situation at hand and the nature of the recorded files, the MAX setting will usually completely remove leakage. In some cases (especially if the leakage is too prominent), resorting to extreme settings might also make your drums sound unnatural. This is currently unavoidable. When your drum recording contains excessive amounts of leakage, or when your recorded track contains a very small number of drum hits (as typically happens for example in the case

of toms), it's practically impossible to perfectly identify the main sound. If you want to make an analogy, think about a de-noise tool: the performance of the tool depends on the type and level of noise.

The best way to use FOCUS is to start from the MIN setting. Slowly and carefully work from there. A lot of times, a few dB of suppression will work wonders in the mix, especially when applied to several tracks. Toggle BYPASS to do a comparison between the original and the processed version. Keep an eye on the suppression meter and the waveform view to get a picture of what's happening.

If you're not completely satisfied with what you hear, you might find that finer adjustments are needed. That's what the FINE TUNE knob is there for. Start turning that knob clockwise and listen: some of that bleed will come back, albeit in a delicate and discreet fashion. Experimenting with different settings of FOCUS and FINE TUNE is the heart of drumatom's operation. These two controls are designed to work in tandem. Take your time to explore the interactions and listen to the effect. You'll soon feel quite familiar!

3 Menu Options

3.1 File

New Group (Command+N / Ctrl+N) Creates a new group to load channels.

Open Group(s) (Command+O / Ctrl+O) Opens an existing saved group.

Save Group (Command+S / Ctrl+S) Saves the currently selected group.

Save Group as... (Shift+Command+S / Shift+Ctrl+S) Saves the currently selected group as a new file.

Save All Groups Use this to save all of your groups in one go.

Drumatom uses its own type of files (.dls) to store your sessions. Each .dls file may contain an analyzed drumatom group. It's important to know that .dls files are designed to be self-contained: each file contains all the original audio files of the group, as well as all analysis data. You can transfer .dls files from one computer to another, share sessions, transfer tracks etc. When loading an analyzed group, you can change FOCUS and FINE TUNE settings without having to analyze it again. Saving and loading groups will be your biggest ally in reducing the dead time needed for processing.

Settings The Settings window consists of three tabs: Audio Setup, Abbreviations Setup and Folder Setup.
The Audio Setup allows you to choose audio driver type, audio interface and virtual outputs.
The Abbreviations Setup allows you to control the way drumatom "recognizes" file names. Type your common naming schemes for each track, separated by semicolons.
The Folder Setup lets you specify a custom location for drumatom temp files. Also it allows you to save the processed group in the original group folder by default (offering a similar behaviour to drumatom v1).

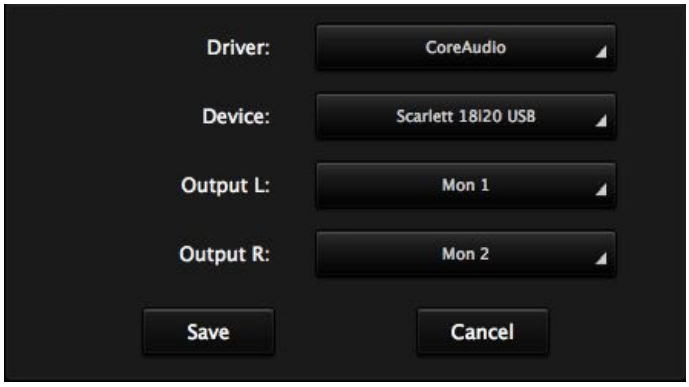

Figure 9: Audio Setup window

3.2 Import

Keep in mind that these operations can also be accomplished quickly via dragging and dropping files or folders.

Import Track(s) (Command+I / Ctrl+I) Import a number of audio tracks into the currently selected group.

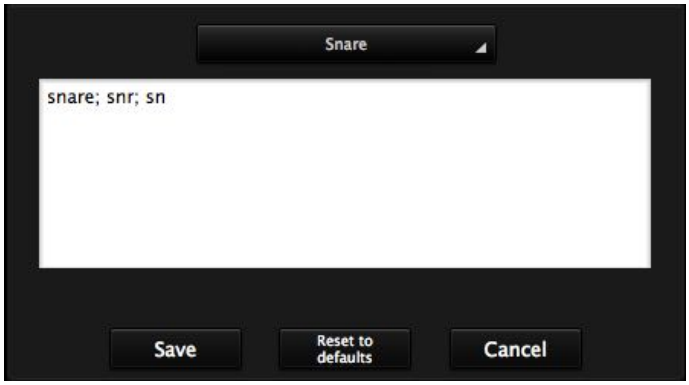

Figure 10: Abbreviations Setup window

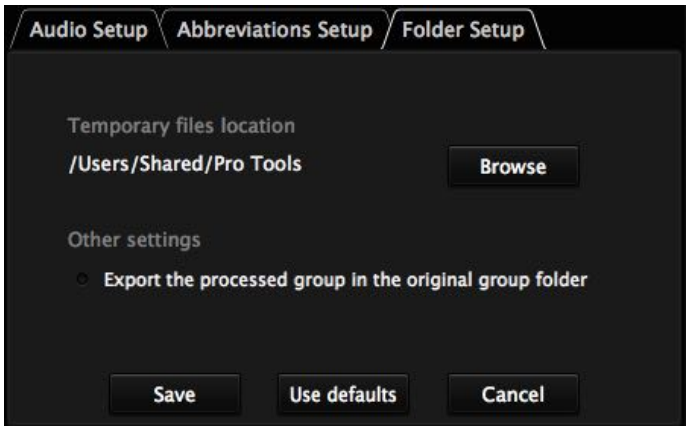

Figure 11: Folder Setup window

Import Folder(s) (Command+F / Ctrl+F) When using this option, a folder of drum tracks will be imported as a new group.

Import Track(s) from DLS This is a very useful new feature. It allows you to combine tracks from saved sessions into a new session. Navigate your disk to find the desired dls file. Once you've selected it, a list of tracks will appear. Highlight the ones you wish to import, by clicking on the dot at the left. Keep in mind that applying further changes (switching drum type for example), means that you'll have to analyze the group again.

3.3 Analyze

Analyze Group (Command+P / Ctrl+P) Analyzes the currently selected group.

Analyze Group(s) (Shift+Command+P / Shift+Ctrl+P) Analyzes all of the imported groups sequentially.

3.4 Export

Export Track (Command+E / Ctrl+E) Exports the currently selected track.

Export Group (Command+X / Ctrl+X) Export the currently selected group.

Figure 12: Import tracks from DLS

Important If you want to keep different versions of the same group, be sure to export them in different folders. By default, drumatom will overwrite files with identical names during exporting.

Export All Groups (Shift+Command+X / Shift+Ctrl+X) : Exports all groups sequentially.

When exporting a whole group, drumatom will also render the tracks labeled “oh” and “other”. These will typically be the original (dry) overhead and cymbal tracks. It’s important to note that drumatom will not alter these tracks in any way: they are simply exported along with the processed ones, so that you have the full kit at your disposal. This can also be handy when working in a different computer or transferring your session to a different studio.

4 Tips, Techniques and Workarounds

Drumatom employs novel technology to produce a type of processing that is unlike anything achieved until now. This original design comes with a cost in CPU cycles, some unpredictability due to the AI principles, as well as a learning curve. Simply put, don't expect to get perfect results from the first time you use it. Don't worry though, we're here to help.

CPU and RAM issues The drumatom application needs a fast CPU, but above all it needs a 64-bit system with a good deal of RAM. 4GB should be the minimum to get it working, but 8GB and upwards is the way to go if you want to load multiple drum groups with no problems. If you encounter crashes or sluggish response, it's probably because of insufficient memory. Try loading a single group at a time, or avoiding too many tracks (for example if you have overhead mics, you might consider not loading room mics).

Understanding the logic behind drumatom In order to use the drumatom application efficiently, you have to tap into its mentality. It's quite unique in the way it works. Imagine it as an assistant that you have to "train" in order to help you. Try to focus on what information you are feeding it: when you load/remove a track, choose a drum type, or load different combinations of the same kit, drumatom attempts to correctly identify the direct signal portions. Most of the tips here revolve around these basic concepts.

Sort your drum kit Don't forget to select the type of drum component for each channel, using the drop-down menu. Kicks and snares are straightforward enough. Hi-hat or ride channels should be labelled as "hihat". Toms have their own category and can be a bit more tricky. Drumatom "understands" three types of toms: high, low and floor. Choosing the correct type according to the tom's diameter, general size and tonality will help drumatom identify it properly in the timeline. Sometimes, you'll need to experiment by choosing different types of toms and see what works better for each case. Don't forget to press ANALYZE GROUP each time you do that!

Avoid extremely long tracks As said before, drumatom can be quite intensive, especially during analysis. Analyzing a group will produce information much larger in size (usually 5 to 10 times the size of the group). Stuffing all that data into RAM can quickly fill it up, which when combined with the staggering amount of calculations, leads to unpredictable behavior. Beware: loading a group of hour-long audio files WILL lead to a crash! Eventually computers will get more powerful and typical RAM size will increase to 32 or 64 GBs.

Avoid empty tracks Sometimes, a track might be almost devoid of direct signal information. For example, a floor tom channel might feature only a couple of hits along the course of several minutes. Most of the times, this will "confuse" drumatom. It's expected: drumatom will attempt to "train" itself to identify the tom, but the information will not be sufficient. This might also interfere with the rest of the tracks, producing inconsistent results. A simple workaround is to avoid loading that track altogether. This will ensure that the algorithm is not burdened with false information, while also cutting a few CPU cycles and saving some RAM along the way.

Experiment with different track combinations Apart from avoiding some tracks, you can also try loading different combinations of tracks. Sometimes a kick, a snare and two overheads will be enough to reduce kick and snare bleed. Loading all channels might not be necessary, or might even produce false information (as mentioned in the previous paragraph). Keep in mind that the underlying artificial intelligence principles introduce a certain level of unpredictability. Each project requires some tweaking and testing to get the best

possible results. Extra tip: A good way to work is to load different channel combinations of the same song in one session. You can create a new group for each combination. Use the batch analysis option (Menu bar > Analyze > Analyze Group(s)) and go make a coffee. When the analysis is done, you'll be able to compare the performance among groups and render the tracks that you find more useful.

Room and overhead mics During our tests we found that loading both room and overhead mics produces minor improvements, if any. Usually, loading just the overheads will yield the same result quality, while using less CPU and RAM.

Find the sweet spot The FOCUS and FINE TUNE knobs need slow, careful handling. The sweet spot will vary from track to track. Just turning FOCUS clockwise will usually not be enough to get the sound you want, so remember to use FINE TUNE as well. Keep in mind also, that FINE TUNE behaves in relation to the current position of FOCUS.

Use the FINE TUNE control The FINE TUNE control is very important. What does it do? It *adds back the difference between the processed and the original signal*. Think of it as a dry/wet control, specifically tailored to the intricacies of drumatom. Apart from helping you shape your sound in detail, FINE TUNE means that you don't have to set up a dry/wet signal chain in your DAW.

Dealing with complex or inconsistent performances A drummer will often perform differently during a track. For example, a snare channel may contain regular hits, as well as brushes or rim-shots. In these cases, it's always good to split the tracks and process separate parts. This will help drumatom identify the signals correctly.

Combining drumatom with other tools Drumatom can also complement traditional tools and provide a comprehensive correcting solution. Any type of gate will perform much better after a track has been processed by drumatom. Same goes for most time-domain tools. Just make sure NOT to process your tracks before importing them into drumatom.

5 FAQ

Is drumatom meant to replace my gates and drum trigger software tools? Drumatom is a very sophisticated software tool, employing innovative technology. It aims to provide a fresh perspective on dealing with the leakage issue. It's meant to be an additional tool in your arsenal, hopefully one that fills an important gap in your everyday needs as a professional. Drumatom is not meant to replace anything. As all advances in audio technology, drumatom is all about helping you get the job done.

How will drumatom help me improve my sound? Not worrying about unwanted leakage turns mixing into a process that's all about achieving a great sound and less about fixing things. Use compressors and equalizers the way you always wanted, get crazy with creative effects, improve the headroom of your rhythm section and capture the natural sound of a skilled drummer working on a well-tuned drumset. Using drum replacement tools? Drumatom will work hand-in-hand with them, cleaning up your sound and making sure they detect the correct hits.

What kind of results should I expect from drumatom? As always: a capable drummer, an experienced engineer and a decent studio space will help you make the most out of drumatom. Our technology is designed to work well in most typical scenarios. However, when your drum recording contains excessive amounts of leakage, or when your recorded track contains a very small number of drum hits (as typically happens for example in the case of toms), it's practically impossible to perfectly identify the main sound. If you want to make an analogy, think about a de-noise tool: the performance of the tool depends on the type and level of noise. Quiet studio conditions will not produce the same results as noisy live recordings.

Does drumatom work for instruments other than drums? The short answer: officially, no. It's intended for drums and tuned to work great with drum sounds. However, when used in live recordings, it can eliminate leakage from other instruments quite successfully. We are exploring the possibility to develop more specialized tools based on the same technology in the future. In the meantime, experimentation never hurts!

Is drumatom phase-accurate? Yes. Drumatom will not introduce any phase inconsistencies. In fact, reducing leakage can help in correcting time-domain misalignments in hi-hats and cymbals.

Can I mix drumatom outputs with my original drum recordings? Since it's phase-accurate, yes. Feel free to do so. Keep in mind however that drumatom already gives you enough controls to get the balance you like. Becoming familiar with the interaction of FOCUS and FINE TUNE will help you avoid mixing more channels in your sequencer. And of course you can use the drumatom player for in-DAW leakage suppression.

Can I use the drumatom application without the plugin? Yes, you can. Drumatom player provides a much better workflow though, since you can tweak the controls in realtime in your DAW.

Is the offline analysis really necessary? A real-time implementation of our algorithm is currently not possible using modern processing resources. It is designed in such a way that it collects data from the whole duration of your drum tracks. In other words, drumatom works by having knowledge of what happens across the timeline of your recording. Having said that however, we're constantly looking into improving our technology and taking it a step further. As computers get even more powerful, you'll see many wonderful things from Accusonus in the future.

Should I prepare my audio files before loading them into drumatom? No. In fact, it's better that you load up the files as they were recorded. Try to apply a minimum set of processing before drumatom. Set up a good recording signal path and try to avoid extreme compression and equalization. This will ensure that you get the best possible result. After processing and exporting the files with drumatom, you're free to tweak your sound to your heart's content!

What if I load a single drum channel? What results can I expect? Loading several channels or a full multitrack will provide sufficient data for the algorithm to properly identify the original sound. That's how drumatom is intended to work. If that's not possible, you may try loading a single channel. It's not guaranteed to work, but you might be pleasantly surprised with the result.

6 Contact Accusonus

Have any questions? Suggestions maybe? Still wrapping your head around drumatom? You can reach us at support@accusonus.com