FonaDyn v2.0 release notes

New features

New time-domain metrics: three new voice map layers display (1) the contact quotient Q_{ci} , (2) the normalized peak dEGG Q_{Δ} , and (3) the Index of contacting I_c , all averaged per voice field cell. See the Handbook's description of these new metrics. A recent academic paper describes them in greater detail.

Keep data: this is a new check box, to the left of the Start button. When Keep Data is checked, the current cluster and voice map data are *not* cleared on Start. Data keeps accumulating into the same voice map, and FonaDyn can continue to update the cluster centroids while reading or recording new Voice+EGG data. This makes the Batch facility more useful.

The **Batch facility** now works as intended. It is useful for processing several files, and also for picking examples for playback from a list, for instance in live presentations. When starting a Batch, remember first to uncheck Keep Data, and then check it again as soon as the Batch has started. Otherwise the voice map and cluster data will be cleared between files (which can also be useful).

Time plots: the former SampEn window has been enhanced to a more general "Plots" window. It can optionally show running time series plots also of Q_{ci} , Q_{Δ} , *Ic* and the audio Crest factor; for the latest 1…10 seconds. In these plots, each dot is a value for one EGG cycle.

The SampEn time curve is no longer shown by default, although the sample entropy calculations are always done. To reduce screen clutter, the SampEn controls are now hidden unless "Sample Entropy" is checked.

Load Map: previously saved `_VRP.csv` files can now be reloaded for inspection, and for continued data accumulation. For continued accumulation to be meaningful, the loaded map must be used with a matching set of cluster centroids `_clusters.csv`, describing the clusters that were used to make the loaded map.

A **colour scale** bar has been added to the voice map display. Also, the displayed layer can be switched by left-clicking near either end of this bar. This is a little quicker than selecting a layer from the drop-down list.

A **cycle threshold** has been added to the voice map display. This can "clean up" voice maps that are noisy at low SPLs, for example. The number shown is the minimum number of cycles that must have occurred in a cell, for the cell to be plotted. This number can be changed at any time, even when FonaDyn is running. This cycle threshold is for display only; it is not saved. `_VRP.csv` files always contain the full count of cycles collected into each cell.

To optimize screen space, you can **hide/show the panels** for Cluster data, Time Plots, Moving EGG and Voice Map by pressing Alt+C, Alt+P, Alt+M or Alt+V, respectively; the layout adapts dynamically. As before, you can also use Select Show: All Graphs in the top row to control the graph layout.

The Settings dialog box now includes an option to "Show additional diagnostic features". Some rarely used buttons and fields are now hidden, unless you check this box.

The Settings dialog box now includes an option to "Save all settings". When this box is checked, all settings in the whole user interface will be restored in the next FonaDyn session, if that session is started with the command `FonaDyn.rerun` rather than with `FonaDyn.run`.

The supplied Matlab® routines for handling FonaDyn output files have been improved and generalized. Most of them are now named with a “FonaDyn” prefix.

Changed behaviours and formats

Terminology: Following Peter Pabon’s recent thesis, section 1.1, the term “VRP” has been replaced by “Voice Map”. The reason is that the voice map display does not necessarily correspond to a person’s voice range (profile), unless that was the specific task when recording. However, the filename suffix for the voice map data files is still `_VRP.csv`. The coordinate system with f_o vs. SPL is called the ‘voice field’.

Return to directory: The default directory is now set to the Recordings directory, which you can specify in the SC startup file, or browse to, on the top line. When you browse repeatedly for files to Open or Save, FonaDyn now returns to the same directory as was used previously *for the given file type*; although only within one session. See also “Save all settings”, above; when selected, the default directory is also restored.

The display **colour saturation mapping** of cycle occurrences has been changed from lin(cycle count) to log(cycle count), which is far more useful. All colour mappings are defined in the source file `FonaDyn/classes/Views/VRPColorMap.sc`.

Voice maps of SampEn now render SampEn=0 as pale green, rather than not plotting anything.

The high-pass filter used for preconditioning the EGG signal has been improved somewhat: the stopband below 20 Hz attenuates by -60 dB or more (was -40 dB below 25 Hz).

In the period detection, the peak follower decay factor has been changed from 0.99 to 0.95. This has resulted in a more stable cycle detection at high f_o , with less doubling or tripling of cycles.

Pause with the space bar: After Start is pressed, the keyboard focus is set to the Pause button, so that you can pause/resume with the space bar, without having to click on Pause with the mouse.

When loading a `_cluster.csv` file, the “Pre-learned” option is selected automatically. If you want to classify new input using the loaded cluster centroids, remember to select “Learning: Off”.

More incidental information is posted to the SuperCollider IDE post window, such as names of files, and actions taken.

For performance and consistency, pixel smoothing has been turned off in some graphs, making the graphics somewhat cleaner.

The colour schemes have been renamed, and tweaked a little.

The cluster centroid display, when showing one centroid at a time, now plots small points at the actual locations of the centroid’s coordinates. To avoid clutter, this is not done when all centroids are plotted.

File format changes

Files of type `_VRP.csv` now contain three additional columns “dEGGmax” (for Q_Δ), “Qcontact” (for Q_{ci}), and “Icontact” (for I_c). The values in these columns are the averages in the corresponding fo-SPL cells in the voice map. Old `_VRP.csv` files are still parsed correctly, although the new dEGGmax,

Qcontact and Icontact data columns will of course be missing. If you have written programs that read or create such files, those programs may need to be revised. The number of columns in `_VRP.csv` files is now 10 + *nClusters*.

The `_Log.aiff` file type now contains additional tracks #8 for the Icontact (I_c), #9 for the dEGGmax (Q_Δ)and #10 for the Q_{ci}, all per EGG cycle. The remaining tracks have been moved up. If you have programs that read these files, they will need to be revised. The number of tracks in `_Log.aiff` files is now 10 + 2*(*nHarmonics*+1).

Bug fixes

FonaDyn versions up to 1.5 would become unstable and hang after running for more than 6 minutes and 20 seconds. This was a bug in computing the accumulated time. [fixed: Timestamp.scx]

Use of the **Reset Counts** button sometimes caused the server process to hang. This has been fixed. [KMeansRTv2.scx]

A PATH bug in `FonaDyn.run` would hang the program directly on startup, in certain circumstances. This has been fixed.

The audio **Crest factor** estimation was not reliable in earlier versions. It is now accurate, and cycle-synchronous. The crest factor values will be somewhat lower than in earlier versions. [source file VRPSDVRP.sc]

The old command Save VRP appended an unnecessary column delimiter (;) at the end of lines in files of type `_VRP.csv`, causing some other programs to parse an extra but empty column. This has been fixed, and the command is now called Save Map. The Load Map command will parse files with or without a trailing delimiter.

The voice map display background grid sometimes went blank when switching metrics or resizing the main window. This has been fixed.

The clock showing elapsed time now increments properly even when no phonation is occurring. Earlier, it did not.

When reordering clusters, the averaged cycle waveform (gray) was not reordered. This has been fixed.

The installation script `FonaDyn.install` is now more robust.

Discontinued features

The display of SampEn arrows has been removed, since it took time to compute, while its usefulness was unclear.

System and installation aspects

FonaDyn v2.0 requires SuperCollider 3.10.2 or higher for full functionality.

The FonaDyn plugins have been recompiled to the new UGen format that was introduced with SuperCollider 3.9.0. The FonaDyn plugins are now supplied for Windows 64-bit, Windows 32-bit, and MacOS. They are no longer compatible with SuperCollider versions 3.8.0 and earlier. Linux plugins need to be built for the user's system; please contact us for the source code for those.