BESA Connectivity 2.0 - Update History

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Approved, Changed on: August 6th 2024 at 11:22:24 AM (UTC)

BESA Connectivity 2.0 - Update History

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BESA Connectivity Release Notes

Version 2.0.1.0

Improvements

General

Key	Release Notes
BC-714	In both workflows, memory usage was improved such that the Windows page file can be used now, increasing the available memory. Please note, however, that computation speed can be affected when physical memory is insufficient and the page file is used.
BC-709	The ffmpeg library used for video generation was updated to version 7.0.

Time-Frequency

Key	Release Notes

Connectivity

Key	Release Notes
BC-947	The text display quality on high-resolution screens (4K and higher) was improved.
BC-684	The loading of a Connectivity project is now much faster after some steps were optimized in the loading process.
BC-675	An auto-thresholding option was added to the Connectivity 3D View and Circular View. For each frequency, the connectivity value distribution over the baseline interval is computed. For non-directional connectivity methods (e.g. Coherence), the threshold is set to the value corresponding to the 95th centile of the distribution. For directional methods (e.g. Imaginary Part of Coherency), the threshold is set to the value corresponding to the 97.5th centile. In case of averaging over a frequency range, the threshold values are also averaged over that range to provide the auto-thresholding value. If no baseline interval is provided, then the full interval will be used to compute the statistical threshold.

Bugfixes

General

Key	Release Notes
BC-698	In cases of memory shortage during computation, it could happen that the program crashed when exporting analysis results.
BC-674	When loading several data files, the number of trials were not always shown for all data files.
BC-669	In waveform and time-frequency displays, the stimulus was sometimes shown at a wrong position if the reduced sampling rate was low (e.g. when choosing complex demodulation with 250 ms time sampling).

Time-Frequency

Key	Release Notes
BC-707	In the time-frequency workflow, it was not possible to load exported files that had dots in the base name (e.g. when exporting from an ICA-corrected file with name Original.ica.foc).
BC-705	If two raw data files had the same name, but were located in different folders, they could not be loaded into a time-frequency batch workflow.
BC-699	In the time-frequency workflow, it was not possible to cancel multitaper computation.
BC-697	In time-frequency workflow, if no padding was applied for multitapering, results were wrongly scaled.
BC-624	In Time-Frequency TSE display, the factor 100 was missing when showing the scale in percentage. Percentage values were shown as e.g. 0.5 instead of 50.

Connectivity

Key	Release Notes
BC-708	Sometimes a time-frequency project with more than two conditions could not be loaded in a connectivity workflow.
BC-686	In Connectivity circular graph, sometimes channels were missing when using sources with coordinates along the midline.
BC-683	In Connectivity display, when switching from circular graph view to 3D view, then changing to a connectivity method of a different type (e.g. from non-directional to directional), and changing back to 3D view, the scaling information was not updated correctly.
BC-682	When saving an image of the main window in the connectivity plot, the proportions could be changed, resulting in distorted circular or 3D plots.
BC-677	In Connectivity, the update speed after changing threshold values was improved.
BC-673	When loading a multi-subject time-frequency project into the Connectivity workflow, the grand average display in the Set Parameters work step was not shown correctly. It differed from the grand average display in the Time-Frequency workflow, which was the correct one.
BC-671	When invoking the Connectivity 3D plot with surface channels, a program crash could occur if spherical surface channel coordinates had an angle that was zero.

Residual anomalies

The following known problems could not be fixed for this release version, and remain in the software:

General

Key	Release Notes	Workaround
BC-965	BESA Connectivity may run out of memory during connectivity analysis for big data sets with a large number of conditions and subjects.	Avoid usage of other applications during computation and/or increase physical/virtual RAM size.
BC-813	Due to resampling data when computing Complex Demodulation, the epoch length may differ to the original data set. As a result, false data is shown at the end of the ERP waveform.	Use a shorter re-sampling interval that is not too long (e.g. 100 ms instead of 250 ms) to avoid the problem.
BC-650	When using the BESA Connectivity 2.0 installer to uninstall the BESA license key drivers and Visual C++ 2019 redistributable package, an error message is displayed.	Use the Settings / App section in Windows to uninstall the Visual C++ 2019 redistributable package.
BC-587	The scaling of TFC visualizations for Multitaper and Wavelet analysis may be changed when switching the displayed results of a time-frequency method.	Scale needs to be increased by a factor of 1.3 to obtain identical scaling for all time-frequency methods.
BC-476	In some workflow steps, it can happen that the "Previous" button does not move back to the previous step.	Manually select the previous work step on the panel at the left.

Time-Frequency

Key	Release Notes	Workaround

Connectivity

Key	Release Notes	Workaround
BC-859	In Connectivity 3D display with sensor data, hovering the mouse over a channel symbol does not provide information about the channel name.	Use the Top Viewer or Circular Graph plot to locate channel positions.
BC-581	In Connectivity connectome display mode, when zooming in, then moving the visible screen sub-section, then partially zooming out again, the positions of the channel labels may no longer match the channels.	Zoom completely out again. This will re-center the view.

Previous Versions

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Change History (valid revision number)

Version	Effective Date	Approvals	Version Notes
1	Tue, Aug 6, 2024, 11:14:15 AM	>> *Action: approve, MR, Approval: Approved (State:	None

Version	Effective Date	Approvals	Version Notes
		Approval, Tue, Aug 6, 2024, 11:14:15 AM)	
2	Tue, Aug 6, 2024, 11:22:24 AM	>> *Action: approve, MR, Approval: Approved (State: Approval, Tue, Aug 6, 2024, 11:22:24 AM)	None

Attachments

Attachment	Description
N/A	N/A

Template Change History

TEMPLATE	TEMPLATE Version	Effective Date	Version Notes
External Release Notes Template	1	Mon, 13 Mar 2023 15:57:29 GMT	None
External Release Notes Template	2	Tue, 21 Mar 2023 14:18:43 GMT	None
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External Release Notes Template	5	Fri, 23 Jun 2023 13:56:29 GMT	None

May 2023

BESA Connectivity 2.0 Update History

Version 2.0 May 2023

New features

Themes and user interaction

- The colour theme can be adjusted between *BESA White* and the previous *BESA Standard*.

Time-Frequency Analysis

- BESA Connectivity 2.0 offers a batch processing mode in time-frequency projects that allows loading data sets for multiple subjects simultaneously and processes all those data sets in one project. Up to 10 different conditions are supported. For each condition, it is possible to select several data sets in the Load Data dialog.
- Grand Average views and data exports of multi-subject time-frequency analysis are available.
- A multi-taper method is introduced to the time-frequency methods. Multitaper analysis uses several tapers to decompose the signal into its frequencies. Here, Slepian Sequences are used to construct the tapers, which are then used in a time-frequency decomposition of the signal. Multitapering combines the properties of the different tapers to control the leakage and smooth the signal in the frequency domain. The multitaper transformation uses a sliding time window with a length that decreases with increasing frequency.
- Data export:
    - Export project results: Averaged time-frequency results of all decompositions and data sets are exported. They can directly be read in to BESA Statistics.
    - Averaged TF data: Selected display type options (temporal-spectral evolution (TSE) or absolute (ABS) values for amplitude or power) are considered during export.

Connectivity Analysis

- Batch processing: When loading a time-frequency project containing multiple conditions with multiple data files, connectivity analysis for all those data files can be computed within one project.
- Grand Average views and data exports of multi-subject connectivity analysis are available.
- New connectivity methods:
    - Phase lag index (PLI) (Stam et al. 2007)
    - Weighted phase lag index (WPLI) (Vinck et al., 2011)
    - Directed phase lag index (dPLI) (Stam and van Straaten, 2012)
- Circular Graph View: This new visualization mode places the sources (or sensors) on a circle and shows the coupling strength as connections for the selected latency & frequency bin between all combinations of sources. The channels are automatically arranged in four quadrants (left anterior / right anterior / left posterior / right posterior) to facilitate interpretation.

May 2023

- Simultaneous averaging over time and frequency: when both averaging options are selected the matrix view changes to a visualization of a single tile per connection, thus enabling a connectome view for the selected time-frequency range.
- Freeze-Pane mode for TFC View: Channel labels will remain visible at the left-most column and top-most row of the matrix display even if the visualization is zoomed by the user.
- The 3D visualization takes into account the colors and sizes of the sources specified in the BESA Solution File Format (*.bsa).
- Data export:
    - Export project results: Connectivity results of all selected methods and data sets are exported. They can directly be read in to BESA Statistics.

Bugfixes

Time-Frequency Analysis

- Computation of average for time-frequency decomposition has been corrected. Previously, export of results used time-frequency decomposition of average waveforms. Now, the export uses the average of the time-frequency decompositions. (#1076)
- Information on channel and condition names are considered when exporting averaged time-frequency data. (#799)

Connectivity Analysis

- Sensor-level connectivity can now be shown for the 27-channel CSD montage. (#1052)
- During export of connectivity results based on wavelet decomposition, the wrong frequency range was listed in the header line of the exported file if the lowest frequency was below 4 Hz. This issue is now fixed. (#658)
- A crash of the application was fixed that occurred when selecting the *Show 3D Mode* checkbox for polygraphic data. (#647)

Known issues

The following known issues could not be fixed for this release, and remain in the software:

Time-Frequency Analysis

- For visualization of TSE (amplitude and power), values are not displayed as percentages. To obtain the percentage value, multiply by 100.

Connectivity Analysis

- 3D visualization of sensor data may cause issues on certain PCs, if a montage contains several channels with the same origin (e.g. bipolar channel montages). To avoid the issue, remove channels with identical locations from the montage before exporting data to BESA Connectivity.
- Saving results after connectivity analysis may cause error messages for large data sets. To avoid the issue, reduce the size of the data set, e.g. by using fewer connectivity methods, fewer conditions, or fewer time-frequency methods.