RELEASE HISTORY

MIRtoolbox 1.3.3

26 June 2011

Changes since version 1.3.2

Bug fixes

MIRENVELOPE

If the input was a series of audio signals, the internal state was not emptied after computing each signal, so that the next processed signal wrongly used it as initial state. Bug reported by Jens Hjortkjær.

MIRPULSECLARITY

The '*Mu*' default parameter was not the correct one, because it was relying on the use of the default parameter in *mirtempo*, but there was not such default parameter, so a bad value (1) was used instead.

MIRONSETS

The '*Reso*' option was not consistent for series of peaks too close two-by-two, depending on their relative size.

MIRPEAKS

The '*Reso*' option was not consistent for series of peaks too close two-by-two, depending on their relative size.

MIRNOVELTY

When using the '*TimeLag*' option, the convolution kernel was erroneously flipped upside-down, leading to significant errors.

The '*TimeLag*' checkerboard kernel was erroneously truncated and the Gaussian envelope did not respect the '*TimeLag*' change of coordinate.

The '*Horizontal*' checkerboard kernel contained translation errors up to 1-sample wide.

MIRAUDIO

(Since 1.0) When the input is already a *miraudio* object, its '*Label*' information is lost. Consequently, this happens also to *mirfeatures*, for instance.

The combination of '*Extract*' and '*Frame*' options lead to error.

MIRSPECTRUM

There was an error of up to 1 sample in the frequency labelling. Bug found by Hendrik Schreiber.

The '*Smooth*' option provoked an erroneous overall rescaling of the values. Bug found by Hendrik Schreiber.

The '*dB*' option was always using 10 as multiplying factor, even when the input was not a power spectrum, for which the value 20 should be used instead. Bug found by Hendrik Schreiber.

The '*Log*' option (not documented, replaced by '*dB*') was not consistent in term of rescaling when called on a *mirspectrum* object.

The '*Phase*' information was conserved even when its value was not defined anymore (for instance once computing the power of the spectrum, or once recombining into bands, etc.).

In the '*Bark*' option, when highest bands were not used (for lower sampling rates), nothing was displayed.

ARRAYVIEWFUNC

(Since 1.3.2) The *Matlab Variable Editor* was broken due to the 'hijacking' of some *Matlab* internal code by *MIRtoolbox*. Bug reported by John Smith.

MIRKEY

(Since 1.3) The display of frame-decomposed curves omitted the mode information (major/minor).

MIRLENGTH

The unit was always '*s*', even when using the '*Unit*', '*Sample*' option.

MIRSAVE

Segmented audio input were saved with a spurious fade-in effect throughout the whole signal, that could become very large when the number of segments becomes high.

Improvements

MIRFLUCTUATION

Result normalized with respect to the total duration of the input data, so that the result does not grow linearly with respect to the duration. Issue raised by Hendrik Schreiber.

MIRSPECTRUM

New option '*NormalLength*' that normalizes with respect to the audio input duration.

MIRNOVELTY

The input similarity matrix is rescaled in order to optimize the convolution with the checkerboard kernel.

MIRSIMATRIX

The '*TimeLag*' matrix is symmetrical (N rows over the diagonal, N below), similar to the '*Horizontal*' matrix.

The matrix computation has been tuned to a 1-sample precision, imposing for instance the '*Horizontal*' and '*TimeLag*' matrices to have an odd number of rows 2N+1, with N rows over the diagonal, N below, and the diagonal itself. If the '*Width*' argument is even, it is automatically increased by one.

MIRPEAKS

New '*Loose*' option associated with the '*Reso*' option that tolerate peaks that would initially be considered as too close to another peak, if that second peak is actually removed in the end. From a suggestion by Pasi Saari.

MIRSEGMENT

If the segmentation is based on the peak picking from a frame-decomposed scalar curve, the audio waveform a will be segmented at the middle of each frame containing a peak (instead of the beginning of those frames).

It is now possible to segment *mirdesign* objects based on evaluated *mirdata*.

MIRMODE

'*Sum*' option computes the score difference for each separate key and then sums in the end.

MIRTEMPO

'*Mu*' option, being equal to 0 as default, requires a subsequent parameter if called, in order to avoid confusion.

MIRONSETS

The '*Mu*' parameter is no more just a boolean, it is related to the *Mu* value, which can be modified.

MIRDATA, MIRDESIGN

New '*Length*' field indicating the audio input length (in s.).

Modifications

MIREMOTION

Default frame length set to 2 s instead of 1 s, in order to get a frame long enough for pulse clarity estimation. The hop parameter remains equal to 1 s.

DISPLAY

When trying to visualize a *MIRtoolbox* variable in the *Matlab Variable Editor*, a message invite to evaluate it directly in the *Command Window*.

MIRtoolbox 1.3.2

19 January 2011

Changes since version 1.3.1

Bug fixes

M I R P E A K S

The '*Threshold*' was erroneously ignored since version 1.3.

When '*Interpol*' was used in frame-decomposed data, the abscissae positions of peaks were defined with respect to the first frame only.

When '*Interpol*' was used with peak tracking, a bug could appear when the number of frames was bigger than the number of bins per frame.

The detection of data expressed mainly along channels instead of along time (such as mirfluctuation) was interfering with the existence of segment containing only one sample.

M I R F L U X

The '*City*' distance was erroneous (the absolute value was omitted). For that same option, the unnecessary normalization by the vector length has been removed as well.

M I R S T A T

For unwrapped chromagram peaks, the positions were considered as sample index instead of actual MIDIpitch value.

M I R S E G M E N T

The '*RMS*' segmentation was somewhat inconsistant for several reasons.

It was not possible to use the $2*n$ matrix segmentation if the first input was already an evaluated *miraudio* object.

M I R C L U S T E R

(Since 1.2) Returned an error when calling with multiple features grouped in a cell array.

Could not display clustering of *mirkeystrength*.

M I R E M O T I O N

The '*Folder*' keyword did not work properly: only the analysis of the first audio file was returned.

The factors contributing to each emotion dimension and class for successive frames where not combined properly.

MIRENVELOPE

The '*Diff*' and '*HalfwaveDiff*' options returned error when the envelope contains only one sample.

In the '*Spectro*' option, the output sampling rate was set to 0 if one chunk contained only one frame.

MIRONSETS

Returned an error when '*Pitch*' option was used directly with a file name.

Since 1.2.3, there was a superfluous call to *mirframe* at the end of the *init* phase, before the actual call to *mirframe* in the *main* phase. This excessive call to *mirframe* did not produce errors but would now return a warning.

MIRINHARMONICITY

(Since 1.2.3) Might return an error when called directly with a file name.

MIRPLAY

Stack overflow when used with improper argument. Now returns a proper error message.

Returned an error when *mirplay* was used with other *mirscalar* data than *mirpitch*.

(Since 1.3.1) Returned an error when calling *mirplay* using as for first argument a file name (or '*Folder(s)*') altogether with the '*Increasing*' (or '*Decreasing*') option.

DISPLAY

An error was returned if any segment contains zero or one sample only.

MIRAUTOCOR

'*Enhanced*' operation returned an error if the input contains only one sample.

MIRGETDATA

An error was returned if one segment contains only one frame whereas other segment contains several frames.

MIREVAL

Frame positions were not always concatenated in chunk recompositions, leading to an error.

Peak tracks as well as attack and release positions were not stored when analyzing a folder of audio files.

MIREXPORT

Labels were not exported properly for structured variables.

MIRFUNCTION

(Bug in 1.2.4) 'Out of memory' error could appear when an operator was applied to a long segmented audio file.

MIRSIMATRIX, MIRNOVELTY

The diagonal width was 2 samples shorter than the one actually specified.

Improvements

MIRSPECTRUM

New '*OctaveRatio*' unit available for the '*MinRes*' option, allowing automated trimming of low frequency register in order to match an octave-based resolution.

MIRCHROMAGRAM

Based on the new '*OctaveRatio*' option in *mirspectrum*, the frequency range can be trimmed at low frequencies where the octave resolution cannot be ensured, with the issue of a warning message.

ARRAYVIEWFUNC

In order to avoid a bug in Matlab, the Matlab Variable Editor is forced not to display *MIRtoolbox* objects.

MIRSIMATRIX

New '*TimeLag*' option that is distinguished from '*Horizontal*'. There was previously a confusion between both transformations.

MIRNOVELTY

New '*TimeLag*' / '*Horizontal*' option.

MIRONSETS

The '*Threshold*' parameter used by *mirpeaks* can be controlled as well.

New '*Min*' and '*Max*' parameter defining the frequency range used in the '*Pitch*' option, with new default values.

MIRSPECTRUM

New '*WarningRes*' outputting a warning message if the input signal frequency resolution is not good enough.

MIRCHROMAGRAM

Warns if the input audio frequency resolution is too short to obtain satisfying frequency resolution.

'*Frame*' default parameters have been changed, in order to improve the frequency resolution.

MIRSAVE

New '*SeparateChannels*' option to save separate channels in separate files.

MIRPITCH

New '*Sum*' option to toggle off the summation of the channels and keep the channel decomposition.

MIRENVELOPE, MIRONSETS, MIRTEMPO, MIRPULSECLARITY

New '*Log*' option to compute the logarithmic representation of the envelope curve.

MIRFRAME

Hop factor is not rounded initially but for each frame computation separately, avoiding progressive shifting of the frames.

MIRPLAY

New '*Burst*' toggle controlling the burst noise between segments.

MIREVAL

The list of audio files to analyze (with their respective path) can be stored in one single TXT file.

Allow the design of *mirstruct* objects with non-framed-decomposed temporary files such as envelope curves.

Check that the first input is a flowchart (i.e., a *mirdesign* object).

Careful taking into consideration of chunking and framing when there is resampling specified in the flowchart.

Detect whether *mirstruct* has been improperly used without *tmp* field.

MIRPEAKS

'*Track*' parameter is now expressed in the abscissae unit, instead of a mere number of samples.

Tracks are displayed with superposed white and black crosses, to improve readability.

When '*Nearest*' is toggled on, '*Total*', if initially set to 1, is ignored, i.e., set to *Inf*.

Peaks in *mirsimatrix* can be displayed.

MIRFLUCTUATION

'*MinRes*' option controlling the minimal frequency resolution.

M I R O N S E T S

'*KernelSize*' option added in '*Pitch*' method.

M I R S T A T

New *Class* field storing the label for classification purposes.

M I R E X P O R T

When exporting into ARFF file, another text file is created that contains the corresponding file names.

M I R E N V E L O P E

In the '*Spectro*' option, a warning message is displayed if there is no frame decomposition at all.

M I R A U D I O

In the '*Extract*' option, a warning message is displayed if the whole audio file is shorter than the specified temporal region to be extracted.

Returns an error if the first argument is an array that is not a column array.

M I R M I D I

Outputs also note dynamics, related to the height of the corresponding amplitude envelope peaks.

Accepts segmented *mirpitch* objects as input.

New '*Mono*' option that, when toggled off, keeps the channel decomposition of the audio input.

Returns an error if *MIDI toolbox* is not found.

M I R C E P S T R U M

Improved speed and robustness.

M I R C L A S S I F Y

Properly returns an informative error when the specified analytic feature is frame-decomposed.

Accepts also arrays of numbers as analytic features.

Modification

M I R C E P S T R U M

Minimal delay set to .0002 s. instead of .0005 s. '*Min*' option better documented.

M I R E N V E L O P E ,   M I R O N S E T S ,   M I R T E M P O ,   M I R P U L S E C L A R I T Y

The '*Log*' option is renamed '*Mu*'.

MIRtoolbox Release History 0.8-1.3.3

MIRSTAT

For wrapped chromagram peaks and keystrength peaks, no computation is performed (because it should require some kind of circular statistics).

UNCELL

One dimension collapsing step has been removed.

MIRFRAME

Produces a warning if the input is already decomposed into frames.

MIRFILTERBANK

Produces a warning if the input is already decomposed into channels.

MIREMOTION

Warns that the emotion model is calibrated with *MIRtoolbox* 1.3 only (and not with versions 1.3.1 and 1.3.2).

Architecture Improvement

MIRDESIGN

New option *'SeparateChannels'* and parameter *'Channel'* that force the computation of each channel separately.

Third-Party Changes

MP3INFO

New mp3info.exe version 0.8.5 for Windows.

MIRtoolbox 1.3.1

17 August 2010

Changes since version 1.3

Bug fixes

M I R S P R E A D

The spread of any distribution, considered as the standard deviation, was computed erroneously: the correct formula used now is **sqrt(** *sum((p-c).^2.*d) ./ sum(d)* **)**, where *d* is the distribution of frequencies *d* and corresponding positions *p* and *c* is the centroid of that distribution. The erroneous formula used previously was **sqrt(** *sum((p-c).^2.*d)* **)** *./ sum(d)*.

M I R S K E W N E S S ,   M I R K U R T O S I S

These operators were affected by the bugs in *mirspread* because their results were dependent on the standard deviation of the distributions given by *mirspread*.

MIRtoolbox 1.3

19 May 2010

Changes since version 1.2.5

New feature

MIREMOTION
Predicts emotion dimensions and classes from audio features.

Bug fixes

MIRONSETS
In the '*Scheirer*' preset, the envelope extraction was based on spectrogram instead of low-pass filter.

Improvements

MIRTEMPO
'*Track*' option for frame-decomposed tempo extraction based on peak tracking. (not documented yet)

MIRSTAT
'*AlongFiles*' option computes frame-related stat between files. (not documented yet)

Also accepts '*AlongFiles*' results.

Keep the file names in a *FileNames* field.

MIRPITCH
The pitch extraction remains consistant over time, using the same global threshold frame after frame.

The display of '*Mono*' curves is clearer.

MIRPEAKS
'*Track*' option improved, better than the reference by Mc Aulay & Quatieri. Track graphical display also improved.

'*Total*' and '*Interpol*' can be used in '*Track*' option as well.

'*Contrast.*' is used even when '*Total*' is set to 1, in order to remove the highest peak when it is not contrastive enough.

MIRtoolbox Release History 0.8-1.3.3

When '*Normalize*' is set to '*Local*', this concerns uniquely the '*Contrast*' parameter, whereas the '*Threshold*' filter, following a more independent point of view, relates now to the global normalization.

MIRCHROMAGRAM

'*Tuning*' option that indicates the frequency related to chroma C.

'*ChromaFreq*' field that returns the central frequency of each chroma.

MIREXPORT

Returns a proper error when data to be exported has not been evaluated yet.

DISPLAY

Avoid displaying more than 15 channels, display as image instead of curves if necessary.

Modification

MIRAUTOCOR

The range of lag can be extended up to half of the total window length, whereas previously it could not exceed a third of that length. The results related to those highest lags might be somewhat less robust for pitch extraction for instance, but this case would not appear in reality. On the contrary, allowing the lag to reach half of the total window is useful for rhythmic analysis of small audio samples.

Architecture Improvement

MIRFUNCTION

New function option *specif.chunkframebefore* that enables the chunk by chunk computation of frame decomposition during the *init* phase of the function, whereas the *main* part of the function can use the whole result altogether.

MIRtoolbox 1.2.5

16 April 2010

Changes since version 1.2.4

Improvement

M I R S P E C T R U M
New '*ConstantQ*' options that performs a Constant Q Transform.

M I R A U D I O
New '*Channels*' options that extract a given range of channels.

Bug fixes

M I R F R A M E
The '*Hz*' unit sometimes returned error.

M I R A U D I O
In frame-decomposed chunk mode, if the '*Extract*' option was used, chunks tend to contain an excessively low amount of frames.

MIRtoolbox 1.2.4

18 March 2010

Changes since version 1.2.3

New feature

M I R M I D I
Attempts a conversion of audio into MIDI.

M I R R E A D
'Folders' analyses subfolders recursively.

AIFF files can be read.

M I R P A R A L L E L (B E T A)
Parallel processing of multiple audio files.

Bug fixes

M I R S P E C T R U M
The '*MinRes*' option was not always taken into consideration.

The '*Frequency*' data contained systematic error up to 1 sample in the worst case.

M I R A U D I O
(Bug in 1.2.1) The '*Extract*' option was not properly considered in the case of chunk decomposition in frame-based mode.

Could not trim segmented audio.

M I R P U L S E C L A R I T Y
(Bug in 1.2.2) The '*Frame*' option was not taken into account.

The '*Attack*' option did not perform the averaging of the attack slopes.

M I R T E M P O
(Bug in 1.2.2) The '*Frame*' option was not taken into account.

MIRONSETS

(Bug in 1.2.2) The '*Frame*' option, when used for the final frame decomposition of the resulting onset curve, was not taken into account.

MIRPITCH

Did not initialize correctly when connected in flowcharts to *mirautocor*, *mirspectrum* or *mircepstrum*.

MIREVAL

(Bug in 1.2.1) In the case of implicit frame decomposition and explicit segmentation, the chunk decomposition was not congruent with the segment decomposition.

(Bug in 1.2.3) In features using '*Average*' chunk recombination, segments were erroneously considered as chunks that would be finally summed in the end, and were for that reason scaled by their dimensions.

Chunk decomposition is not available in non-frame mode for some features. A new error message explains the fact.

One sample error in chunk decomposition for implicit frames, leading to possible error message.

MIRSEGMENT

An error was returned if the segmentation data did not contain any peak or attack point.

The default rank parameters when '*MFCC*' is used was 1 instead of 1:13.

MIRAUTOCOR, MIRSPECTRUM, MIRRMS, MIRSUM

The chunk recombination of multichannel data may return an error.

MIRMFCC

Frame-decomposed representation of a single component was displayed erroneously.

MIRBEATSPECTRUM

This function was erroneously called *mirbeatstrength* instead, inconsistent with the documentation.

Improvements

MIRONSETS

The frame parameters related to the spectrogram can be modified using the new '*SpectroFrame*' option (set to the new defaults – much faster – used in *mirenvelope*), cf. below.

MIRNOVELTY

Results improved significantly through a modification of the checkerboard kernel.

MIRtoolbox Release History 0.8-1.3.3

MIRSIMATRIX

Much faster computation in manual mode (when '*Width*' is specified), especially if the computation is performed directly in the '*Horizontal*' representation.

MIRSEGMENT

mirsegment(..., 'RMS') segments at positions of long silences.

Accepts segment overlapping, specified using a 2*n matrix of starting and ending temporal positions.

mirsegment('Design') optimized through the suppression of a redundant routine.

MIRAUTOCOR

mirautocor(..., 'Center', c) controls the center value of the resonance curve.

MIREXPORT

Uses labels for classification purposes when exporting into ARFF files.

MIRtoolbox version number stored in the exported file.

MIRSTAT

If the input is a structure array: Conserves the labels used in the input data and stores it into a new field *Class*.

MIRPITCH

mirpitch(f,a,r) enables to import frequencies and amplitudes from Matlab.

Output of *mirpeaks* can be used as input of *mirpitch*.

New '*Amplitude*' field, storing the amplitude related to each pitch component. This information is also used in *mirplay*.

MIRREAD

When audio files cannot be read, error messages related to all accepted types of file reader are returned for information.

Avoid errors when a chunk cannot be read (this can happen with *MP3read*).

MIRTEMPO

mirtempo(..., 'Sum', 0) does not recombine the channels at all.

MIRMFCC

When the number of coefficients does not exceed 5, frame-decomposed data are displayed by a super-position of curves, instead of the usual 2D pseudocolor plot representing multidimensional data.

MIRSCALAR

Multi-dimensional scalar data (such as basic emotion sets) are allowed.

MIROPTIONS

Issues an error if the '*Hop*' factor used in '*Frame*' is set to zero.

MIRNOVELTY

Accepts (multi-channel) *mirscalar* (such as *mirflux* for instance) as input.

Clarification

MIRENVELOPE

The '*Frame*' parameter is not used any more for the frame decomposition of the resulting envelope, but for the specification of the frame configuration used in the envelope computation itself. The default option has changed.

MIRPEAKS

The '*Track*' parameter should actually be expressed in number of samples. It is now fixed by default to Inf.

MIRSEGMENT

Due to a conflict between the user's manual and the online documentation, both '*Pitch*' and '*Aucotor-Pitch*' are accepted.

All options strictly related to the '*Novelty*' strategy are explicitly reorganised as such.

Architecture modification

MIREVAL

Instead of a simple *mirdesign* input, a cell array of *mirdesign* objects can be specified as well.

The improvement of evaluation of complex flowcharts now includes the '*Stat*' option.

MIRPITCH

New *mirpitch* class, subclass of *mirscalar*.

Third parties

MIRDIST

The Earth Mover Distance executable is now also available for Windows 32 bits and Mac OS X 64 bits platforms.

MIRtoolbox Release History 0.8-1.3.3

MIRtoolbox 1.2.3

14 October 2009

Changes since version 1.2.2

Improvements

MIREVAL

For the evaluation of complex flowcharts, during the chunk decomposition of the temporary variable, the underlying dependent variables are computed chunk after chunk, in order to avoid storing the complete chunk recomposition of the temporary variable.

Multiple output can now be accessed using a simpler and more intuitive syntax.

If no second output is specified, the evaluation can perform chunking at an earlier stage, hence reducing memory costs.

MIRCLUSTER

Can accept *mirdesign* objects as input.

MIRSPECTRUM

New option '*Bands*' to control the number of Mel bands.

MIREVENTDENSITY

Returns the onset curve as second output.

MIRMFCC

Returns the mel-log-spectrum as second output.

New option '*Bands*' to control the number of Mel bands.

Bug fixes

MIREVENTDENSITY

The chunk were summed, where they should be averaged.

MIRONSETS

The peak picking of the autocorrelation function now includes the '*NoBegin*' and '*NoEnd*' options in order to avoid picking the extremes of the curves as tempo candidates.

MIRHCDF

Behaved incorrectly if the input was already a *mirscalar* object.

MIREVAL

The over-chunks averaging of multi-channel data was sometimes breaking the matrix structure.

MIRSEGMENT

The second output was empty when the input was not already a *miraudio* object.

% DISPLAY

% Vectors containing only one sample in X-axis were erroneously considered as scalar data, leading to an error.

Modifications

MIREVAL

As a consequence of the improvement concerning complex flowchart evaluation and multiple output evaluation, the related design syntax has been modified.

Despite previous change, *mirtemporal* features, such as *mirenvelope*, should be allowed to be decomposed into chunks.

MIRFUNCTION

Multi-output features whose first output required to be averaged chunk by chunk should have *specif.combinechunk = {'Average', ...}*

MIRFEATURES

As a consequence of the improvement concerning complex flowchart evaluation, the structure of the output has been modified.

MIRGETDATA

Multi-segment data containing variable number of peaks is transformed into a single matrix of column vectors, where exceeding points are filled with *NaN* values.

Architecture modification

MIREVAL

Can combines chunks containing structured data.

MIRTYPE
Now accepts cell array input.

CONCATCHUNK
Now accepts *mirscalar* data.

MIRSTRUCT

mirstruct now inherits from the *mirdesign* class, and contains a new field *tmp* pointing to temporary design.

If the '*tmp*' data turns to be an actual evaluated data, the *mirstruct* object is transformed into a simple *struct*.

MIRDESIGN

It is possible to explicitly prevent frame-like chunk decomposition for certain features (such as *mirenvelope*) using *specif.framedchunk* = 0

mirdesign had to be modified too in order to accept *mirstruct* as a child.

'*Tmp*' is renamed '*InterChunk*', '*TmpOf*' and '*NOut*' removed.

MIRtoolbox 1.2.2

11 September 2009

Changes since version 1.2.1

Bug fixes

MIRAUTOCOR

The autocorrelation function was erroneously shifted one sample right in the lag domain, adding a small systematic error to all autocorrelation estimation, such as pitch extraction.

The adapted curve rescaling used in '*Enhanced*' was somewhat unstable in the presence of very small local maxima, and did not handle correctly all possible cases.

MIRONSETS

The '*PostDecim*' option was not performed in chunk decomposition mode.

The frame decomposition was performed in a wrong moment in chunk decomposition mode.

The '*Klapuri99*' model might sometimes lead to errors due to the summation of two representations (onset function and its derivates) that have a difference of length of one sample.

MIRAUDIO

'*Extract*' in chunk decomposition mode lead to an error.

'*Mono*' did not work correctly in chunk decomposition mode.

MIRSPECTRUM

'*Mask*' option on an input already decomposed into bands returned an error.

'*Terhardt*' option on an input already decomposed into bands zeroed the signal.

The '*Resonance*' default when toggled on was not set to '*Fluctuation*' when the input was a design object of a '*Mel*'-spectrum.

MIRSEGMENT

When the segmentation points are given explicitly (as a *MIRtoolbox* object containing peaks), the attack phases were sometimes searched for, even when no attack phase was analysed, returning an error.

MIRENVELOPE

A validity check error in the '*Spectro*' option – concerning the absence of frame decomposition – was sometimes erroneously triggered during chunk decomposition.

MIRtoolbox Release History 0.8-1.3.3

MIRDIST

'Cosine' problem if one input = 0. The result will be set to NaN.

DISPLAY

Now better generalized to segmented multi-channel data.

+

The abscissa axis were not updated correctly.

MIRSUM

An error was returned for miraudio created from numeric array imported by user.

Improvement

MIROPTIONS

'Frame' can accept the value *'Both'* for field *'When'*.

MIRERROR

A proper error message is returned whenever any *MIRtoolbox* function (except *miraudio*) is called with a simple numeric array as input.

Modification

MIRTEMPO

'Prod' option toggled off by default, as the previous default value 1:6 resulted in a bad predictor.

MIRFILTERBANK

'Decomposing into a filterbank…' message removed.

MIRtoolbox 1.2.1

20 July 2009

Changes since version 1.2

Bug fixes

MIRONSETS

Chunk decomposition was not performed correctly in the case of implicit frame decomposition (such as with the '*Spectro*' method, chosen by default), leading to an incomplete sampling of the final curve.

MIRENVELOPE

mirenvelope('Filename') returned a temporally reversed curve (whereas *mirenvelope(miraudio('Filename'))* did not).

MIRAUTOCOR

Chunk decomposition returned an error.

DISPLAY

Error returned when displaying particular segmented curves, due to an incomplete cluster displaying routine.

MIREVAL

The temporary data (.tmp) was constantly recomputed when the input was a *mirdesign* object.

MIRFEATURES

Some temporary data (.tmp) were not properly defined and thus constantly recomputed.

MIRSPECTRUM

For the *'Mel'* option, a warning concerning excessively low frequency resolution was returned for cases where the problem was instead related to a low sampling rate.

Improvement

MIRFEATURES, MIREVAL

The computation of each successive field and subfield is indicated on the Command Window.

MIRtoolbox Release History 0.8-1.3.3

MIRtoolbox 1.2

4 June 2009

Major changes since version 1.1

New features

M I R D I S T
Distance between analysed files.

M I R Q U E R Y
Query by example.

M I R P U L S E C L A R I T Y
Pulse clarity.

M I R E V E N T D E N S I T Y
Frequency of note events.

M I R B E A T S P E C T R U M
Beat spectrum, characterising tempo based on similarity matrix.

M I R M A P
Statistical mapping between predictors and ratings.

M I R C L U S T E R
Extended: Clustering of frames within one audio file.

M I R M E A N , M I R S T D
Average and standard deviation along frames.

L O G , + , *
Partially generalized to diverse data.

Improvements

MIRCHROMAGRAM

- The '*Normal*' option (or '*Norm*') accepts an integer indicating the chosen norm: 1 (1-norm), 2 (2-norm, or euclidian), ..., *Inf* (*Inf*-norm, or max). The option is toggled on by default, to the value *Inf*.

- The range of spectrum computation can be specified with the options '*Min*' and '*Max*'. The actual higher frequency limit is further increased in order to ensure that the frequency range covers an integer number of octaves, for the sake of balance between chromas. Similarly, if the spectrum was already given as input of the function, the frequency range exceeding the last whole octave is truncated.

- The '*Res*' option specifies the resolution of the chromagram in number of bins per octave. Default value, $r = 12$.

- The minimal frequency resolution of the FFT is set such that the two first bins of the chromagram can be conveniently separated.

- The weighting window is normalized in order to keep a constant superficie for each chroma.

MIRFILTERBANK

- New '*Manual*' filterbank type for user-defined set of non-overlapping low-pass, band-pass and high-pass filters (Scheirer, 1998).

- New '*Order*' option to specify the filter order of the manual filterbank.

- New '*Hop*' option to allow overlapping between manually specified channels.

- New predefined filterbanks '*Mel*', '*Bark*', '*Scheirer*' (Scheirer, 1998) and '*Klapuri99*' (Klapuri, 1999).

MIRENVELOPE

- New class of methods '*Spectro*' based on the computation of spectrogram and optionally its decomposition into bands of various kinds ('*Mel*', '*Bark*', '*Cents*'), further upsampling ('*UpSample*'), or complex spectral flux computation ('*Complex*').

- New '*FilterType*' option accepting either '*IIR*' (default filter type, also used in previous versions) or '*HalfHann*', a half-raised cosine convolution used in (Scheirer, 1998).

- New '*PreDecim*' option for decimation before the low-pass filtering. ('*Down*' option can now also be called '*PostDecim*').

- New '*Log*' option for logarithm computation before the eventual differentiation, or '*Power*' option for squaring of the results.

- New '*Lambda*' option for summing both half-wave rectified and non-differentiated envelopes, and more detailed implementation of Klapuri et al. (2006) model ('*Klapuri06*').

- New option '*ZeroPhase*' to toggle on or off the use of zero-phase digital filtering.

- New option '*Trim*' to remove the transitory phase at the beginning of the envelope curves.

- The delay caused by the filtering in the '*Smooth*' option is nullified.

MIRONSETS

- New pre-selections '*Scheirer*' and '*Klapuri*', implementing onset detection models proposed respectively in (Scheirer, 1998) and (Klapuri, 1999).

- More options related to *mirenvelope* can be specified in *mironsets*.

MIRPEAKS

- The '*Reso*' option can accept numerical value. In this case, the difference between neighbour peaks should be higher than this value. Besides, the strategy of peak selection can be specified using a new '*First*' keyword if necessary.

- New option '*Only*' keeping from the original curve only the data corresponding to the peaks.

- New option '*Track*' enabling to track approximately aligned peaks along time.

MIRSPECTRUM

- The Mel-scale transformation requires a minimal frequency resolution of 66 Hz in the spectral representation. If the 'Mel' option is performed in the same *mirspectrum* command that performs the actual FFT, then the minimal frequency resolution is implicitly ensured, by forcing the minimal frequency resolution ('*MinRes*' parameter) to be equal or below 66 Hz. If on the contrary the '*Mel*' is performed in a second step, and if the frequency resolution is worse than 66 Hz, then a warning message is displayed.

- New '*Phase*' option that controls the computation of the FFT phase information.

MIRAUTOCOR

- The '*Resonance*' option includes a new resonance curve '*vanNoorden*', the default curve being called '*Toiviainen*'.

- Before performing the enhancement ('*Enhanced*' option), the left part of the curve is modified in order to remove any discontinuity. See Users' Manual for more details.

- The '*coeff*' option is generalized to multi-channel data, such that the normalization at zero lag appears once the channels are summed back.

MIRSAVE

- Segmented, channel and/or frame-decomposed audio file can be saved, the segments are separated by bursts of noise.

- Envelopes can be saved in the same way, they are filled with white noise.

- To avoid trimming, the waveform is normalised from 0 to 1. If there are several waveforms as input ('*Folder*'), all waveforms are normalised by the same value, which is the global maximum of all signals.

MIRPLAY

- New '*Increasing*' and '*Decreasing*' option to order the files to be played according to a specified feature or array of numbers.

- New '*Every*' option that enables to play only a sample of a collection of audios.

MIRAUDIO

- Can load MP3 files.

- New '*Mono*' option to control the channels summation.

- When creating a *miraudio* object from an array of numbers, the number of bits per sample, previously unspecified, is set by default to 32 (highest quality).

- The '*Label*' option now accepts string arrays again.

- When using the '*Extract*' option, it is possible to specify whether to extract at the beginning, in the middle, or at the end of the audio file.

MIRSEGMENT

- Can accept the '*Design*' keyword, and load each successive segment separately if necessary.

MIRCLUSTER

- Can also clusters data decomposed into frames using a specific method.

MIRFEATURES

- New '*Segment*' option.

MIRATTACKSLOPE

- New '*Contrast*' option.

MIRFLUCTUATION

- Model closer to original (Pampalk et al.) model, based on '*Terhardt*' filtering, '*Bark*' (instead of '*Mel*') spectrum scale and '*Mask*' transformation.

MIRSIMATRIX

- Accepts Matlab matrices as input.

- Analyse successive segments separately.

MIRNOVELTY

- Analyse successive segments separately.

MIRINHARMONICITY

- '*f0*' accepts numeric values.

UNCELL

- Can handle multiple channels separately.

MIRSTAT

- Generalized to multichannel.

MIRENTROPY

- New '*Center*' options that centers the input data before transforming it into a probability distribution.

Modifications

MIRTONALCENTROID, MIRHCDF
- The frame length is now equal to .743 s.

MIRENTROPY
- Negative values were previously avoided by shifting the curve such that the minimum was set to 0. Now, there are no curve shifting any more: negative values in the input data are simply ignored.

MIRSTAT
- Same modification concerning the entropy estimation as the modification above related to *mirentropy*.

MIRAUDIO
- '*Extract*' option can also be called '*Excerpt*'.

MIRPLAY
- '*Frame*' option has now the same effect that for other *MIRtoolbox* functions: it toggles on the frame decomposition and specifies the frame parameters.

MIREXPORT

- Discrimination between data with first dimension higher or lower than 24, shifted to 50.

MIRPEAKS

- Suppress the apparently unused '*InverseThreshold*' option.

MIRONSETS

- Default envelope extraction strategy is now '*Spectro*' instead of '*Filter*'.

- Default '*Contrast*' is now .01 instead of .05.

- Smoothing parameter for '*Attack*' and '*Release*' options associated to a dedicated '*Gauss*' option.

Bug fixes

MIRSPECTRUM
- In '*Mel*' transformation, the logarithmic transformation was omitted.

- In '*Mel*' transformation, the coefficients were badly scaled: the triangular weighting functions were not scaled such that each triangle has same unit area.

MIRMFCC
- In the Discrete Cosine Transform, the zeroth rank – related to the stationary energy – should be multiplied by a particular constant. This multiplication was instead applied erroneously to the first rank – related to the cosine of lowest frequency.

MIRFLUX
- When using the default '*Euclidian*' distance for the '*Dist*' option, the results were erroneously divided by the frame size.

MIRENTROPY
- If the input was audio, the entropy was computed directly from the waveform, and not from the FFT.

MIRCLASSIFY
- The correctness rate was normalized with respect to the size of the test database, instead of the size of the training database.

MIRFEATURES
- The '*Stat*' option was not taken into account.

MIRONSETS
- The post-processing operations of *mirenvelope* (summation, resampling, filtering, half-wave rectification) were called in the wrong order, leading to a significant distortion of the results.

- For the '*Pitch*' option, the initialization phase did not specify the output type.

- The '*Sampling*' option did not work because the concurrent '*Down*' option was always toggled on.

- The '*Detect*' option was not taken into account.

MIRENVELOPE

- The envelope extraction was still now working with chunk decomposition, because a debug switch was left in the code.

- Some error with channel decomposed input.

MIRPEAKS

- An error was returned by *filtfilt* when using the '*Extract*' with too short signals .

MIRAUTOCOR

- '*Min*' ,'*Max*' and '*Enhanced*' options were not adapted when input was already an autocorrelation function represented in frequency domain.

MIREVAL

- The combination of the results did not work for results containing text arrays.

- The chunk recombination did not work for operators not returning data (such as *mirplay*), for *mirkeysom*.

AND MORE...

Not every correction or improvement has been tracked between versions 1.1 and 1.2 unfortunately.

MIRtoolbox 1.1

10 April 2008

Changes since version 1.0

New general-use features

MIRLENGTH
Temporal length of audio signal.

MIRSPECTRUM
- '*Cents*' option decomposes the spectrum in MIDI-cents.

- '*Collapsed*' option collapses all the octaves and shows the repartition of spectrum energy along the 1200 "cent-classes".

- '*Smooth*' and '*Gauss*' filtering available here as well.

MIRLOWENERGY
- '*ASR*' option computes Average Silence Ratio.

MIRWAITBAR
- Toggles on/off the display of progress bars.

MIRVERBOSE
- Toggles on/off the text display of ongoing operations in the Command Window.

Improvements
Accesses to field objects have been significantly optimized throughout the toolbox by using the *isfield* option instead of *ismember*.

MIRENVELOPE
- Zero-phase filtering (*filtfilt*) is now implemented for chunk decomposition as well, through the integration in the toolbox of a new memory management mechanism based on temporary file. The initial conditions integrated in filtfilt are not taken into consideration yet.

- A new '*Sampling*' option enable a resample of the envelope at any rate. (On the contrary, the '*Down*' sampling parameter has to be an integer.)

- The '*Down*' sampling can also be performed afterwards, by calling *mirenvelope* a second time.

- The '*Gauss*' filtering actually used only the second half of the gaussian kernel. Now the whole kernel is used.

MIRAUTOCOR

- The '*Enhanced*' post-processing operation is improved with the addition of an optimized curve centering mechanism (for the determination of the Y-axis origin, used for half-wave rectification and enhancement procedure). Indeed, if the Y-axis origin is too high, relevant peaks might be erroneously removed by the half-wave rectification; reversely, if the Y-axis is too low, the enhancement procedure might be too destructive.

- Normalization of filterbank-decomposed autocorrelation is carried out through a global normalization of all the filterbanks such that the sum of the channels will give a properly normalized autocorrelation.

MIRSCALAR

- Scalar values of non-frame decomposed but filterbank-decomposed objects are represented now in a curve, displaying successively the successive channel values.

- When the unit is '/1', the displayed unit is "(between 0 and 1)".

- When the unit is not specified, no unit is displayed.

- Diamonds are filled in curve displays, improving their visibility.

MIRFLUX

- Chunks are now one-frame overlapped, avoiding missing value at chunk transition.

- '*Frame*' option integrated.

MIRPEAKS

- The peak selection based on the '*Contrast*' strategy has been optimized.

- '*Extract*' option extracts from the initial curves all the "bells" ("curve portions" between two local minima) containing peaks.

MIRCENTROID, MIRSPREAD, MIRKURTOSIS, MIRSKEWNESS

- Analyze each multiple curve portion separately.

MIRONSETS

- New strategy '*Pitch*' based on novelty of similarity matrix of frame-decomposed autocorrelation.

- New options '*Attack*' and '*Release*' replacing the previous *mirattack* function. Attacks and releases are explicitly displayed in the onset curve. The attack and release phase detection has been improved with the use of a zero-phase low-pass filtering.

- The set of options has been reorganized and enriched, enabling to call options related to preliminary operations. It is now possible to call *mironsets* several times iteratively. The toggle state of the '*Detect*' option is persistent throughout these iterative calls.

- Similarly to *mirenvelope*, a new '*Sampling*' option enable a resample of the onset curve at any rate. (On the contrary, the '*Down*' sampling parameter has to be an integer.)

- The output is explicitly titled "Onset curve".

MIRTEMPO

- The onset detection curve can be based on the new strategy '*Pitch*'.

- The set of options has been enriched, enabling to call options related to preliminary operations.

- Better estimation using peak interpolation.

MIRPITCH

- Better estimation using peak interpolation.

- *mirspectrum* can be passed as input. The *cepstrum* method is selected by default.

MIRFRAME, 'FRAME'

- '*Hop*' factor can be expressed in '*Hz*' unit, with proper control of the sample size rounding error.

- Frame decomposition of segmented audio can be graphically displayed.

MIRERROR

Error messages sent by *MIRtoolbox* can now be displayed in dialog windows.

MIRNOVELTY

- The beginning and ending of the novelty curve, featuring very low values due to border effects, is automatically removed from the resulting curve.

- New '*Normal*' option that enable to control the use of curve normalization.

- Code finally integrated into the *mirfunction* framework, and adapted to chunk decomposition.

MIRSIMATRIX

- Code finally integrated into the mirfunction framework.

- Adequate ordinate labeling of the graphical display in '*Horizontal*' mode.

- Can compute and display multi-channel similarity matrices.

MIRRMS

A '*Root*' option controls the application of the root operation.

MIRLOWENERGY

- The new '*Root*' option used in *mirrms* can be specified here as well.

- The '*Threshold*' can be changed.

- The RMS curve is returned as second output.

- '*Frame*' option integrated.

MIREVAL

- The evaluation of a *mirdesign* object now returns all the possible outputs available in the related function, in a cell array. For this reason, all the *mirtoolbox* operators called with *mirdesign* objects ('*Design*' and the successive outputs) now returns as a first design output one design object related to all the outputs of the operator. The other design outputs are simply methods for selecting the related output in the resulting cell array. Actually it is unnecessary – and even non-recommended – to use several *mirdesign* outputs from each of these functions, because it would force several evaluation of that function.

MIREXPORT

- Field containing only *NaN* values are automatically removed.

- When exporting structured data, all the fields names are explicitly mentioned in the variable titles.

MIRSTAT

- Concatenation of results improved by calling the *uncell* routine.

MIRSEGMENT

- An array of temporal positions can be specified as input.

MIRROUGHNESS

- Optimized using matrix computation.

- Also returns the computed spectrum and its peaks.

- Similarly to *mirregularity*, if the input is a mirspectrum with picked peaks, the peak picking is not performed once again.

MIRZEROCROSS

- Optimized using matrix computation.

MIRPITCH

- Pitch extraction can be smoothed using '*Median*' filtering.

MIRAUDIO

- Unit '*s*' or '*sp*' can be specified for the '*Extract*' option.

MIRSPECTRUM

- Can guarantee a minimal frequency resolution '*MinRes*'.

- A particular frequency resolution '*Res*' can be imposed as well.

- Alternatively, the '*Length*' of the FFT can be directly specified.

MIRATTACKTIME, MIRATTACKSLOPE

- Thanks to the integration of attack detection in *mironsets*, these functions can call *mironsets* more efficiently.

MIRHARMONICITY

The computation is based on a f0 estimated using *mirpitch*.

MIRGETDATA

The resulting matrix is represented in a maximally compact way.

MIRFILTERBANK

- When more than 20 channels are used, the output is represented as a bit-mapped image where color levels show signal amplitude.

- '*Channel*' can also be written '*Channels*'.

- '*Channel*' can also be used for '*2Channels*'.

MIRSPECTRUM

- '*Mel*' band conversion significantly faster.

MIRSAVE

- Accept file name and '*Folder*' as input.

MIRCEPSTRUM

- If '*Complex*' is not used, the phase unwrapping is not performed, and no phase is returned.

MIRPLAY

- Envelopes are normalized before sonification, enabling an audible sonification of differentiated envelopes.

Modifications

MIRROUGHNESS

- Normalizations have been removed because they cause problematic effects For instance, when dissonant partials were progressively added, roughness might sometimes decrease.

- The peak picking is more tolerant (*'Contrast'* equal to .01 instead of .1) in order to collect as many partials as possible.

- Frame decomposition toggled on by default, as it does not make sense to compute sensory dissonance using a long-term spectrum.

MIRTEMPO

- Default number of channels in filterbank decomposition reduced from 40 to 10.

- *'NormalWindow'* option related to *mirautocor* is toggled off long periodicities seem less prominent that shorter ones, so maybe high lags do not need to be re-emphasized. This parameter is also available as an option of *mirtempo*.

- Uses the *'coeff'* normalization option for *mirautocor*. This has no effect in the tempo estimation, but ensures normalized coefficients for the autocorrelation curve.

MIRONSETS

- The *'Contrast'* option is now set to .001.

- Peaks are chronologically ordered.

MIRENVELOPE

- The *'Hilbert'* option is now toggled off by default, because Matlab's *hilbert* function does not seem to always work properly.

MIRPITCH

- Maximal pitch set by default to 2400 Hz. Because there some to be some problems with higher frequency, due probably to the absence of pre-whitening in our implementation of Tolonen and Karjalainen approach.

- No default limitation concerning the number of peaks to detect. A new *'Mono'* option is added, corresponding to *'Total'* = 1.

- Default value for *'Enhanced'* set to 110.

MIRtoolbox Release History 0.8-1.3.3

- The '*Generalized*', which can also be called more specifically '*Compress*' as it actually refers to magnitude compression, is always set by default to 0.5.

- The '*Contrast*' option is set by default to 0.1.

- For '*Frame*' decomposition, the default frame length is set to 46.4 ms and the default hop length is 10 ms, following Tolonen & Karjalainen (2000).

MIRAUTOCOR
- The normalization option is set to '*coeff*' instead of '*none*'

MIRCHROMAGRAM
- Abscisse of unwrapped chromagram is labeled "chroma", and of wrapped chromagram "chroma class".

MIRSEGMENT
- Segments are graphically highlighted with curved rectangles. This enables to distinguish between segments and frames (both now be displayed simultaneously).

MIRAUDIO
- The 'Label' option cannot accept string arrays any more.

Clarifications

MIRPULSECLARITY
- The simplistic and unreliable function from previous versions of the toolbox (and for these reasons not previously developed in the user manual) has been removed. A new version is under construction.

MIRFLATNESS
- The result is simply the ratio between the geometric and the arithmetic means, and no more the logarithm of that ratio.

MIRLOWENERGY
- The output unit is specified.

MIRAUTOCOR
- The normalization options (from *xcorr* options) work also with chunk decompositions.

- The '*Window*' option is now obsolete, the windowing option can be specified directly in the '*NormalWindow*' option. (Since there is no much sense to window the input signal if '*NormalWindow*' is not performed.) '*NormalWindow*' can be performed even without any actual windowing by setting the '*NormalWindow*' parameter to '*Rectangular*'.

- When the input is a spectrum, no windowing is performed by default. When the input is an envelope, the '*NormalWindow*' is set to '*Rectangular*' by default.

- '*Resonance*' can accept '*no*' and '*off*' as equivalent to 0.

MIRPEAKS
- Better explanation of the '*Normalize*' option in the *help*. The default value is in fact '*Global*'.

MIRCENTROID, MIRSPREAD, MIRKURTOSIS, MIRSKEWNESS
- The minimum of the input distribution is shifted to 0, in order to avoid negative values.

MIRAUDIO
In the '*Trim*' option, the trimmed signal was forced to began at time $t = 0$ seconds. This time-shifting has been suppressed.

MIRCEPSTRUM
- The output is by default in the quefrency domain, even if the input is a mircepstrum in the frequency domain.

MIRCHUNKLIM
- Verify that the argument is a number, in order to avoid any further error.

MIRFEATURES
- Completely reorganized into musical dimensions.

- Non-framed-decomposed version of the features are discarded.

- Tempo estimation and attack characterization use distinct versions of onset detection using respectively differentiated and non-differentiated envelopes.

MIRSTAT
- For data that can have variable number of values for each successive frame (such as peaks for instance), the statistics is concentrated on the first value of each frame (which corresponds to the best peak in *mirpeaks*, by default).

- Does not work with multi-channel objects.

MIRFLUX
- The default values for the frame decompositions are clarified in the help.

MIRTEMPO, MIRAUTOCOR
- The '*Resonance*' positive value is replaced by the more specific option '*ToiviainenSnyder*', enabling further resonance options for future versions of the toolbox.

MIRSPECTRUM

- The '*Resonance*' value '*Meter*' can be also called more specifically '*ToiviainenSnyder*'.

- '*Resonance*' can accept '*no*' and '*off*' as equivalent to 0.

- The '*Normal*' option now performs the division by the euclidian norm, as previously specified in the documentation.

MIRAUTOCOR

- A value of 1 for the '*Enhanced*' option is from now on considered as a "true" boolean value and is associated therefore to the default value, i.e., [210].

MIRBRIGHTNESS

- A warning is displayed if the frequency range of the spectrum is below the threshold.

MIRFUNCTION, MIRDISPLAY

- Removed reference to the notion of "file" when display "Computing" messages, in case the initial data was not an audio file, but a *Matlab* array.

MIRREGULARITY

- Checks that the '*fo*' input has same frame decomposition than the main input.

MIRKEY

- The second output is called key clarity.

New technical-level features

MIRFRAMENOW

- For all the operators, '*Frame*' accepts the same syntax, including the use of length unit and hop unit. For that purpose, operators that need to specify frame decomposition in their own flowchart can simply call the new script *mirframenow*.

MIROPTIONS

- When an operator is applied a second time on its first output, the options that were toggled off during the first call are prevented from being toggled on by default here. Requirement If the output type name of the operator is not of same name than the operator itself, it is necessary to add for that purpose a '*Title*' field to the '*Specif*' field of the operator, that indicates the operator name.

- The *opposite* field is now optional.

- If a *choice* field is specified, the suitability of the called parameter is checked. The value 0 (off) can be inserted in the choice array.

MIRtoolbox Release History 0.8-1.3.3

- The *key* field can accept a cell array of possible variants for the same key.

- A new field *chunkcombine* enables to specify the post-processing options that need to be performed during the chunks recombination.

- The *When* option can accept a new value '*Both*' that enables to store the option both for processing and post-processing.

MIRFUNCTION

- The *mirdesign* class includes a new field *FrameOverlap* enabling a chunk overlap of a specifiable number of frames.

- From now on, the *main* routine of each function has to deal with the possibility of an empty *option* parameter, corresponding to a simple a posteriori call of that function (just using the *postoption* parameters).

- Besides, the first argument of the *main* routine can be an array of cells, containing the multiple output returned by the *init* routine.

GETTMP, SETTMP

- Ensures an automatic transmission between successive chunks of the whole *Tmp* fields related to all the steps of the computation.

MIRCOMPUTE

- The called function can return several values (as an array of cells).

MIREVAL

- The input can be a cell array of (cell arrays of) design objects.

UNCELL

- Can adapt to data of various size, as long as one dimension remains constant.

Bug fixes

MIRAUTOCOR

- The '*Enhanced*' option was highly erroneous.

- The scaling assumes that the curves were defined from the origin of the abscissae. If this was not the case, the enhancement procedure gave completely wrong results.

- The negative parts of scaled autocorrelation curves were also subtracted to the initial curve.

- The default value when '*Enhanced*' is called without parameters was 2 instead of 2:10.

- '*Resonance*' could not be computed with filterbank decompositions.

- The autocorrelation of the window for the '*NormalWindow*' option did not take into account the *xcorr* normalization option.

- The '*Normal*' keyword was not optional, contrary to what is said in the documentation.

- The '*Min*' and '*Max*' options did not work for autocorrelation of spectrum.

- When '*Window*' was toggled off, the input signal was not centered.

- Input containing *NaN* values returned solely *NaN*s.

MIRENVELOPE
- The chunk decomposition was not working correcly discontinuities were present between the chunks.

- Due to the two-way filtering, the actual time constant was doubled.

MIRAUDIO
- The '*Extract*' option did not work properly and returned error.

- The '*Extract*' option was ignored when the input was already a *miraudio* object.

- The '*Trim*' option was toggled on by default.

- The '*Normal*' option was not always considered when *miraudio* was called several times recursively in case of chunk decomposition.

- The temporal scale was erroneously shifted 2 sample forward.

- The '*Sampling*' option was not working with multi-channels input.

MIRLOWENERGY, MIRGETDATA, MIRCENTROID, MIRSPREAD, MIRKURTOSIS, MIRSKEWNESS
- Could not be computed with filterbank decompositions.

MIRTEMPO
- Tempo was not extracted in many frames due to the fact that the *mirpeaks* used a global normalization.

- A false warning were sent when *mirtempo* was called with a spectral flux.

MIREVAL
- mirkey('Folder') returned error because the Mode field was not properly concatenated.

- empty mirstruct objects could not be evaluated.

MIRtoolbox Release History 0.8-1.3.3

- Various bugs in evaleach function.

M I R F L U X

- Produces an error if the last chunk contained only one frame.

V E R

- The Matlab ver command could not recognize MIRtoolbox.

M I R P L A Y

- The 'Channel' option did not work properly if the filterbank did not contain all the channels.

M I R G E T D A T A , G E T

- mirgetdata could not return the peaks of a framed object. Idem for get('PeakPosUnit').

- Returned the interpolated peaks of the first audio file only.

- Values were sometimes mistakenly considered as chromas, and converted into pitch class sets.

M I R C E P S T R U M

- 'Min' and 'Max' options caused errors.

M I R R O L L O F F

- Absolutely silent frames caused errors.

M I R S U M

- The 'Centered' option was ignored.'

- Summation of peaks did not work.

M I R S T A T

- Certain features not decomposed into frames were analyzed as if they were actually frame-decomposed, producing many fields filled with NaN values.

M I R F U N C T I O N

- Empty folder lead to error messages.

M I R F E A T U R E S

- The 'fo' argument passed to mirregularity was not correct, as it did not contain the same frame decomposition than the main argument.

MIREXPORT

- When saved in text files, data columns were erroneously shifted to the right, resulting in a large set of empty columns.

GET

- 'PeakMaxVal' returned error if any frame did not contain any peak.

- 'PeakPosUnit' returned error when used with mirscalar object.

MIRPEAKS

- Did not work with filterbank decompositions.

- in 'Valleys' mode, returned peak values were sign-inverted.

- Peak interpolations values were represented in rows instead of columns.

MIRSIMATRIX

- Analysis of very short audio sequences could return error if the length was lower than the kernel size.

- Error were returned when the input was a mirspectrum object.

MIRSPECTRUM

- When computing spectrum 'AlongBands', the description of the frame decomposition was not removed from the data representation (causing problems for the graphical display).

- The 'Normal' option did not work for frame or filterbank decompositions.

- The 'ZeroPad' option did not work with chunk decompositions.

- The 'Mel' option did not work with filterbank decompositions.

DISPLAY

- Analysis of segmented data are not always displayed correctly.

MIRFILTERBANK

- The low-pass filter of the high register channel in the '2Channels' filterbank did not have persistent memory, causing fake transitory phases.

- Calling mirfilterbank with already channel-decomposed data produced errors.

MIRSEGMENT

- The starting position of the first segment was erroneously set to zero, even if the initial temporal position was not zero.

- When computing a scalar feature from a segmented audio, only the first segment was displayed.

MIRtoolbox Release History 0.8-1.3.3

- Could not base the segmentation on non-scalar data.

- Various operators did not work for segmented input.

MIRINHARMONICITY
- Returned an error when no pitch was detected.

MIRLOWENERGY
- The frame structure was not modified.

MIRBRIGHTNESS, MIRZEROCROSS, MIRROLLOFF, MIRROUGHNESS, MIRREGULARITY, MIRINHARMONICITY
- Was not working with filterbank decompositions.

MIRKEYSTRENGTH
- Legend in graphs may sometimes contains erroneous marker symbols.

MIRHIST
- Returned an error when the input did not contain numerical data.

MIRtoolbox 1.0

(MIRtoolbox First Public Version)

21st September 2007

Changes since version 0.8.2

New general-use features

mirenvelope

Performs the envelope extraction from the Hilbert transform of the signal (optional, toggled on by default).

mirspectrum

New 'Power' and 'Sum' options for respectively power spectrum and spectral sum.

New 'Bark' option for Bark-band decomposition, 'Terhardt' option for outer ear modeling, 'Mask' for masking effects simulation.

mircepstrum

New 'Complex' option for complex cepstrum.

New 'Phase' output field.

New 'Min' option.

mirframe, 'Frame'

Units can be specified for the frame length and hop factor.

plus

When superposing miraudio objects, the longest audio are no more truncated, but on the contrary the shortest one are prolonged by silence.

When audio have different sampling rates, all are converted to the highest one.

mirtempo

Autocorrelations are enhanced by default, leading to better results.

mirchromagram, mirkeystrength

Default frame size and hop are much lower, leading to a better time resolution. Frequency resolution is ensured using zeropadding during the spectrum analysis.

mirpitch

New 'Multi' option, for multi-pitch extraction (equivalent to 'Total', Inf).

Default configuration improved

Default filterbank type is '2Channels', instead of Gammatone. If Signal Processing toolbox not installed, no filterbank decomposition.

Default method is 'Autocor' alone.

The 'Contrast option is set to 0 in this case.

''Enhanced' method set to [16] by default.

mirpeaks

New 'Normalize' option to specify if the normalisation of the signal from 0 to 1 is done frame by frame or for the whole frame once.

Clarifications

miraudio

More explanation about the 'Label' option.

MIRtoolbox Release History 0.8-1.3.3

The 'trim' option previously used the 90th percentile of RMS as the threshold unit reference. Now the RMS values are simply normalized between 0 and 1.

mirspectrum

Spectral product should be performed on the power spectrum.

mircepstrum

The inverse Fourier Transform is replaced by a direct Fourier Transform, to comply with the historical definition of cepstrum. The impact in the output is a rescaling and a half-wave rectification. And now the phase is stored in a 'Phase' field.

mirchromagram

Default frequency range for spectrum analysis has been fixed to 100-5000 Hz.

mirautocor

Default window is the hanning window, instead of the hamming window, as suggested in (Boersma 1993).

Maximum lags of the autocorrelation is set to a third of the signal length hence there is at least three periods to analyze, as suggested in (Boersma 1993).

If the 'Enhanced' option is not followed by any value, the default value is 210

mirenvelope

Checks that the 'Down' sampling rate is an integer and returns an error otherwise.

New technical-level features

miroptions

A new option type 'Integers' enable to specify vector of numbers as option parameters.

MIRtoolbox Release History 0.8-1.3.3

mirfunction

The syntax has been changed the main and post methods are specified separately.

Bug fixes

mirdisplay

Graphical representation of frame decompositions did not show the last frame.

mirspectrum

The spectral product ('Prod' option) was not computed properly due to errors in the compression operations, and the factors vector m related to the 'Prod' options was not properly taken into account.

The hamming window could not be recomputed (in the case the Signal Processing Toolbox is not installed) due to conflicts with the 'pi' constant.

mircepstrum

The modification a posteriori of mircepstrum objects was not possible.

mirdisplay

When displaying the results in figures, the caption added in the Command Window actually specifies the name of the output variable (instead of "ans").

mirsave

The .mir subextension was not appended when the extension was specified, leading to possible overwriting of old audio files.

miraudio

The default value for 'Label' was 0 (labelling each audio with its original file name) instead of '' (no labelling).

mireval

When using the 'Folder' keyword or evaluating a mirdesign object, the numbers of bits associated to the different audio files were not combined.

mirplay

An error was returned when playing mirenvelope objects.

mirenvelope

Did not detect properly when Signal Processing toolbox is not available. Now can manage without it.

mirfilterbank

Filterbank type specification was case sensitive.

mirautocor

Could not display properly the error message when windowing function name were not recognized.

mirpitch

Did not convert the cepstrum in the frequency domain, when used alone, leading to false results.

Could not handle with autocorrelation or cepstrum as input of the function.

mirroughness

The peak picking, due to the global normalization, did not pick many partials from spectrogram using default contrast value 0.1. Now the new 'Local' 'Normalize' option is used.

 The normalization of the roughness results has been improved. It is now a simple average.

evaleach

Errors were produced when the CombineChunk option was set to 'Average'.

Functions returning no output, such as mirplay, did not work with chunk decomposition.

MIRtoolbox 0.8.2(MIRtoolbox Beta #2)

1st September 2007

Changes since version 0.8.1

New general-use features

mirpeaks

New 'Interpol' option for more precise peak estimation using quadratic interpolation. Toggled on by default.

For frame decompositions, the data is normalized once for all frame, instead of frame by frame.

mirtempo

The 'ZeroPad' option related to the spectrum computation can be specified. Default value set to 10000 samples.

mirregularity

The 'Contrast' option used in mirpeaks can be controlled, and is set by default to .01.

New technical-level features

mirdata

A new field 'Interpolable' checks if the abscissae data is numeric and therefore if interpolation can be used in peak picking.

Bug fixes

mirspread, mirskewness, mirkurtosis

The temporal positions were not used consistently in frame decompositions.

mireval

When using the 'Folder' keyword, audio files were not always ordered correctly.

mirpeaks

When 'Contrast' was set to 0, the 'Total' option was not taken into consideration.

Some options were not working for multimodal data (with matrices using the 4th dimension).

mirfunction

Results were not returned correctly when analyzing an empty folder.

mirregularity

Was not displayed properly as a scalar curve.

mirenvelope

With 'Frame' option, the frame decomposed was performed before the envelope extraction, which is not recommended at all.

MIRtoolbox 0.8.1(ISSSM workshop)

24th August 2007

Changes since version 0.8.0

Clarifications

mirinharmonicity

This function presupposes that there is only one fundamental frequency per frame.

mirchromagram

'Triangle' option documented.

mirpulseclarity

Values between 0 and 1.

New general-use features

mirenvelope

New 'Gauss' option for gaussian smoothing.

miraudio

'TrimBegin' can also be written 'TrimStart'.

mirspectrum

Default parameter for 'Prod', when called, set to 26

mirpeaks

Peaks in frame-decomposed matrices are represented in white instead of black.

mirpulseclarity

'Frame' option toggled off by default.

The intermediary spectrum computation can be returned as second output.

New technical-level features

mirfunction

A new specification option 'combineframes' enables to define a combination function for frame decomposed computations.

Bug fixes

miraudio

The conversion of the 'Extract' values (in seconds) to sample index was not rounded, leading to possible error messages.

A mirtemporal object could not be converted into a miraudio object.

mirsave

An error was returned when the second argument was '.au'.

An error was returned when the miraudio object contained only one audio file and when the second argument was '.au' or '.wav'.

mirflux

Options were not considered when the input was already a mirflux object.

Checks that 'Complex' option is used only for spectral flux.

mirexport

Attribute type ("NUMERIC") was missing in ARFF exported files.

mirlowenergy

Chunk decomposition produced error.

mirattacks

Peak positions were not formatted properly.

mirregularity

The 'Krimphoff' option was not implemented.

mirmode

The 'Sum' option was inconsistantly mispelled 'Dum'.

mirautocor, mirspectrum

The options were not handled properly if the input was a mirdesign object (should be checked later in all functions).

mirspectrum

A problem dealing with the key default of 'Resonance' has been temporarily solved but will require further traitment.

MIRtoolbox 0.8.0 (MIRtoolbox Beta)

1st August 2007

Changes since version 0.7.1

New general-use features

mironsets (NEW)

estimates note onset positions.

mirstat (NEW)

returns statistics of any feature mean, std, slope, periodicity.

mirmode (NEW)

estimates the mode.

mirattacks (NEW)

estimates the starting position of the note attacks.

(replace the previous mirattack function).

mirattacktime (NEW)

returns the duration of each note attack.

mirattackslope (NEW)

estimates the slope of each note attack.

mirexport

can now export in ARFF format and as Matlab variables.

can handle diverse input types.

mirzerocross

new options 'Per'('Sample' or 'Second') and 'Dir'('One' or 'Both').

mirpeaks

optimized (local minima are computed only when necessary).

new options 'Reso'('SemiTone'), 'SelectFirst' and 'Contrast'.

default value for 'Total' is Inf.

mirenvelope

new option 'Average'.

mirfeatures (NEW, replaces mirtimbre)

computes large sets of features that can be customized.

haspeaks (NEW)

for mirdata objects, indicate whether it contains any peak.

for mirdesign objects, indicate if it is designed to perform a mirpeaks call.

miroptions

Boolean options now also accept 'on','off','yes' and 'no' as values.

mirspread, mirskewness, mirkurtosis

Optimized algorithms.

MIRtoolbox Release History 0.8-1.3.3

mirchromagram

Abscisse of unwrapped chromagram is labeled "register".

miraudio

The 'FileName' keyword used in association with 'Label' keyword, being unnecessary, has been removed.

New technical-level features

mirtype (NEW)

In the initialisation function of each feature, it is now possible to know in advance the exact type returned by each input, even when these input are still in the state of mirdesign objects. This requires in return that each initialisation function specify its ouput(s) type.

Generalized chunk decomposition to multi-output functions.

mireval (previously eval)

can be applied not only on mirdesign objects, but also on structure arrays containing mirdesign objects.

reorders files lexico/numerically.

mirstruct

Multiple features to be extracted can be stored using this generalization of the Matlab structure array 'struct' type.

miroption

A new field 'position' in the options structure array optionally enables to define a specific argument positionin the function call syntax, that can be used as analternative to option keywords.

purgedata (NEW)

removes all the peaks of a given object.

mirgetdata

To ensure greater consistency, one-dimensional data are no more forced to be returned as column vectors. They can remain as row vector if they are for instance the result of a frame decomposition of a one-dimensional feature.

uncell (previously part of mirgetdata)

Replaces cell arrays by matrices. If the number of raws of the elementary matrices varies, the missing values are replaced by NaN in the final matrix.

get

Can be used to access properties of mirdata objects, even when these objects are first declared as mirdesign objects.

display (of mirscalar objects)

Better display of multi-channel non-frame-decomposed data.

mirdata

New field 'Peaks' indicating whether peaks have already been extracted or not.

mirfunction

New specifier field 'nochunk' enables to better control the position of the chunk decomposition along the process.

Bug fixes

MIRtoolbox Release History 0.8-1.3.3

miroptions

When minimum and maximum values for a given function are given in seconds instead of Hz (or reversely), the values were correctly inverted, but not swapped between the two parameters. This induced in particular bad behavior of the mirpitch function. A new 'opposite' field in the optionsstructure array enables this swapping.

The 'Frame' options was badly parsed.

mirtimes

When superposing the curve of the two operands, the union of their sampling were considered. The trouble is, that union may have different size depending on the exact matching of the sampling positions of the two curves, which inducederrors in chunk or frame decomposition. Hence, from now on, the sampling of the result is equal to the sampling of the first operand.

The normalization of the second curve, when flat, returned NaN.

mirregularity

The computation was performed on the rough spectrum whereas it should be done on spectral peaks only.

mirtempo

Post-processing options were not taken into account.

'Spectrum' option was not properly taken into account.

Did not return proper results when inputs were already envelopes.

mirflux

'Inc' option was not a boolean.

Resolves problem when there is only one frame.

mircentroid, mirentropy, mirflatness, mirhisto, mirkurtosis, mirregularity, mirskewness, mirspread

updated to the 0.7.1 syntax

Incorrect unit was associated to the results.

mirbrightness

prevent multiple calls of mirspectrum.

mirpulseclarity

0.7.1 rewriting improved.

The 'frame' option was not taken into consideration.

mirfilterbank

correct the generalization of the '2Channels' options to chunk decomposition.

final conditions of filters were not stored in conveniently sized data structures.

mirsummary

partially generalized to chunk decomposition.

mireval

The 'extract' option of miraudio function was applied twice.

In combinedata function, data whose segments do not need to be stored in cell array (such as warped chromagram) were not taken into account.

A bug occurred when coming across the mirspectrum 'AlongBands' option.

Ensures that the chunk made of frames does not exceed the maximum chunk size.

The peak values of different audio files were not combined properly.

The positions of successive chunks were not combined properly.

Functions that do not return output produced error.

mirdata

The get method for 'PeakPosUnit' returned error for empty segments.

mirinharmonicity

Potential non-detection of peak was not taken into account.

mirmfcc

If the argument was itself a mirmfcc, the initialisation function returned an error.

isframed

Previously only defined for mirdesign objects. Now generalized to any mirdata objects.

mirrms

Generalized to multi-channel inputs.

mirfunction

The 'frame' option was not taken into account if the input was already a mirdata object.

Initialisation scripts were not executed when the input of a function was a mirdata object.

Could not deal with empty data as input.

mirgetdata

Can deal with empty data as input.

mirenvelope

A bug inchunk mode dealing with option management.

The 'halfwavediff' was not implemented correctly.

mirscalar

Display of key strength curves returned an error.

mirpeaks

When several peaks have same value, the maximal number of peaks could be exceeded.

mircompute

Error in segment decomposition.

display

Textual y-axis legends of mirscalar objects were not correctly placed.

Empty graphs produced errors.

mirframe

If the input contains peaks, they were not updated in the frame decomposition. For the moment, the peaks are simply removed from the data.

mirplay

The parameter associated to the 'Sequence' option does not need to be a raw vector any more.