

Package ‘voice’

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Type Package

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BugReports <https://github.com/filipezabala/voice/issues>

Description Tools for voice analysis, speaker recognition and mood inference.

Gathers 'R' and 'Python' tools to solve problems concerning voice and audio in general.

Depends R (>= 4.0.0)

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audio_time	<i>Returns the total time of audio files in seconds</i>
------------	---

Description

Returns the total time of audio files in seconds

Usage

```
audio_time(x, filesRange = NULL, recursive = FALSE)
```

Arguments

x	Either a WAV file or a directory containing WAV files.
filesRange	The desired range of directory files (default: NULL, i.e., all files).
recursive	Logical. Should the listing recursively into directories? (default: FALSE) Used by <code>base::list.files</code> .

Value

A tibble containing file name <chr> and audio time <dbl> in seconds.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern <- glob2rx('*.*wav'), full.names = TRUE)

# Tibble containing file name and audio time
(at <- voice::audio_time(unique(dirname(path2wav))))
str(at)
```

 diarize

Who spoke when?

Description

Diarization of WAV audios.

Usage

```
diarize(
  fromWav,
  toRttm = NULL,
  autoDir = FALSE,
  pycall = "~/miniconda3/envs/pyvoice38/bin/python3.8",
  token = NULL
)
```

Arguments

fromWav	Either a file or a directory containing WAV files.
toRttm	A directory to write RTTM files. If the default toRttm = NULL is used, './voiceAudios/rttm' is created and used.
autoDir	Logical. Must the directories tree be created? Default: FALSE. See 'Details'.
pycall	Python call. See https://github.com/filipezabala/voice for details.
token	Access token needed to instantiate pretrained speaker diarization pipeline from pyannote.audio. #1. Visit https://hf.co/pyannote/speaker-diarization and accept user conditions. #2. Visit https://hf.co/pyannote/segmentation and accept user conditions. #3. Visit https://hf.co/settings/tokens to create an access token. More details at https://github.com/pyannote/pyannote-audio .

Details

When `autoDir = TRUE`, the following directories are created: `'../mp3'`, `'../rttm'`, `'../split'` and `'../musicxml'`. Use `getwd()` to find the parent directory `'../'`.

Value

RTTM files in NIST standard. See `'voice::read_rttm'`.

Examples

```
## Not run:
library(voice)

wavDir <- list.files(system.file('extdata', package = 'wrassp'),
  pattern = glob2rx('*.*wav'), full.names = TRUE)

voice::diarize(fromWav = unique(dirname(wavDir)),
  toRttm = tempdir(),
  token = NULL) # Must enter a token! See documentation.

(rttm <- dir(tempdir(), '[Rr][Tt][Tt][Mm]$', full.names = TRUE))
file.info(rttm)

## End(Not run)
```

duration	<i>Duration of sequences</i>
----------	------------------------------

Description

Duration of sequences

Usage

```
duration(x, windowShift = 5)
```

Arguments

`x` A vector containing symbols and NA.
`windowShift` Window shift to duration in ms (default: 5.0).

Value

A data frame with duration in number of lines/ocurrences (`dur_line`), milliseconds (`dur_ms`) and proportional (`dur_prop`).

Examples

```
library(voice)
duration(letters)
duration(c('a','a','a',letters,'z'))

nts <- c('NA','NA','A3','A3','A3','A3','A#3','B3','B3','C4','C4','C4','C4',
'C4','C4','C#4','C4','C4','C4','B3','A#3','NA','NA','NA','NA','NA','NA','NA',
'NA','NA','NA','NA','NA','NA','NA','NA','NA','NA','D4','D4','D4','C#4',
'C#4','C#4','C4','C4','B3','B3','A#3','A#3','A3','A3','G3','G#3','G3','F#3')
duration(nts)
```

enrich_rttm

Enrich RTTM files

Description

Enrich Rich Transcription Time Marked (RTTM) files obtained from `'voice::read_rttm'`.

Usage

```
enrich_rttm(listRttm, silence.gap = 0.5, as.tibble = TRUE)
```

Arguments

<code>listRttm</code>	A list containing RTTM files.
<code>silence.gap</code>	The silence gap (in seconds) between adjacent words in a keyword. Rows with <code>tdur <= silence.gap</code> are removed. (default: 0.5)
<code>as.tibble</code>	Logical. Should it return a tibble?

Value

A list containing either data frames or tibbles obtained from standard RTTM files. See `'voice::read_rttm'`.

References

<https://www.nist.gov/system/files/documents/itl/iad/mig/KWS15-evalplan-v05.pdf>

See Also

`voice::read_rttm`

Examples

```

library(voice)

url0 <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/rttm/sherlock0.rttm'
destfile0 <- paste0(tempdir(), '/sherlock0.rttm')
download.file(url0, destfile = destfile0)
url1 <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/rttm/sherlock1.rttm'
destfile1 <- paste0(tempdir(), '/sherlock1.rttm')
download.file(url1, destfile = destfile1)

rttm <- voice::read_rttm(dirname(destfile0))
(er <- voice::enrich_rttm(rttm))
class(er)
lapply(er, class)

```

expand_model

Expand model

Description

Expand model given y and x variables.

Usage

```
expand_model(y, x, k)
```

Arguments

y	The Y variable.
x	The X variables.
k	Number of additive components.

Value

A char vector containing the expanded models.

Examples

```

library(voice)

expand_model('y', LETTERS[1:4], 1)
expand_model('y', LETTERS[1:4], 2)
expand_model('y', LETTERS[1:4], 3)
expand_model('y', LETTERS[1:4], 4)

# multiple models using apply functions

```

```

nx <- 10 # number of X variables to be used
models <- lapply(1:nx, expand_model, y = 'y', x = LETTERS[1:nx])
names(models) <- 1:nx
models
sum(sapply(models, length)) # total of models

```

extract_features	<i>Extract audio features</i>
------------------	-------------------------------

Description

Extracts features from WAV audio files.

Usage

```

extract_features(
  x,
  features = c("f0", "fmt", "rf", "rpf", "rcf", "rfc", "mfcc"),
  filesRange = NULL,
  sex = "u",
  windowShift = 10,
  numFormants = 8,
  numcep = 12,
  dcttype = c("t2", "t1", "t3", "t4"),
  fbtype = c("mel", "htkmel", "fcmel", "bark"),
  resolution = 40,
  usecmp = FALSE,
  mc.cores = 1,
  full.names = TRUE,
  recursive = FALSE,
  check.mono = FALSE,
  stereo2mono = FALSE,
  overwrite = FALSE,
  freq = 44100,
  round.to = NULL,
  verbose = FALSE,
  pycall = "~/miniconda3/envs/pyvoice38/bin/python3.8"
)

```

Arguments

x	A vector containing either files or directories of audio files in WAV format.
features	Vector of features to be extracted. (Default: 'f0', 'fmt', 'rf', 'rcf', 'rpf', 'rfc', 'mfcc'). The 'fmt_praat' feature may take long time processing. The following features may contain a variable number of columns: 'cep', 'dft', 'css' and 'lps'.

filesRange	The desired range of directory files (Default: NULL, i.e., all files). Should only be used when all the WAV files are in the same folder.
sex	= <code> set sex specific parameters where <code> = 'f'[emale], 'm'[ale] or 'u'[nknown] (Default: 'u'). Used as 'gender' by wrassp::ksvF0, wrassp::forest and wrassp::mhsF0.
windowShift	= <dur> set analysis window shift to <dur>ation in ms (Default: 5.0). Used by wrassp::ksvF0, wrassp::forest, wrassp::mhsF0, wrassp::zcrana, wrassp::rfcana, wrassp::acfana, wrassp::cepstrum, wrassp::dftSpectrum, wrassp::cssSpectrum and wrassp::lpsSpectrum.
numFormants	= <num> <num>ber of formants (Default: 8). Used by wrassp::forest.
numcep	Number of Mel-frequency cepstral coefficients (cepstra) to return (Default: 12). Used by tuneR::melfcc.
dcttype	Type of DCT used. 't1' or 't2', 't3' for HTK 't4' for feacalc (Default: 't2'). Used by tuneR::melfcc.
fbtype	Auditory frequency scale to use: 'mel', 'bark', 'htkmel', 'fcmel' (Default: 'mel'). Used by tuneR::melfcc.
resolution	= <freq> set FFT length to the smallest value which results in a frequency resolution of <freq> Hz or better (Default: 40.0). Used by wrassp::cssSpectrum, wrassp::dftSpectrum and wrassp::lpsSpectrum.
usecmp	Logical. Apply equal-loudness weighting and cube-root compression (PLP instead of LPC) (Default: FALSE). Used by tuneR::melfcc.
mc.cores	Number of cores to be used in parallel processing. (Default: 1)
full.names	Logical. If TRUE, the directory path is prepended to the file names to give a relative file path. If FALSE, the file names (rather than paths) are returned. (Default: TRUE) Used by base::list.files.
recursive	Logical. Should the listing recursively into directories? (Default: FALSE) Used by base::list.files.
check.mono	Logical. Check if the WAV file is mono. (Default: TRUE)
stereo2mono	(Experimental) Logical. Should files be converted from stereo to mono? (Default: TRUE)
overwrite	(Experimental) Logical. Should converted files be overwritten? If not, the file gets the suffix _mono. (Default: FALSE)
freq	Frequency in Hz to write the converted files when stereo2mono=TRUE. (Default: 44100)
round.to	Number of decimal places to round to. (Default: NULL)
verbose	Logical. Should the running status be showed? (Default: FALSE)
pycall	Python call. See https://github.com/filipezabala/voice for details.

Details

The feature 'df' corresponds to 'formant dispersion' (df2:df8) by Fitch (1997), 'pf' to 'formant position' (pf1:pf8) by Puts, Apicella & Cárdena (2011), 'rf' to 'formant removal' (rf1:rf8) by Zabala (2023), 'rcf' to 'formant cumulated removal' (rcf2:rcf8) by Zabala (2023) and 'rpf' to 'formant position removal' (rpf2:rpf8) by Zabala (2023).

Value

A Media data frame containing the selected features.

References

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Examples

```

library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern = glob2rx('*.*wav'), full.names = TRUE)

# minimal usage
M1 <- extract_features(path2wav)
M2 <- extract_features(dirname(path2wav))
identical(M1,M2)
table(basename(M1$wav_path))

# limiting filesRange
M3 <- extract_features(path2wav, filesRange = 3:6)
table(basename(M3$wav_path))

```

feat_summary

Features summary

Description

Returns summary measures of 'voice::extract_features'.

Usage

```

feat_summary(
  x,
  groupBy = "wav_path",
  wavPath = unique(x$wav_path),
  wavPathName = "wav_path",
  features = "f0",
  filesRange = NULL,
  sex = "u",
  windowShift = 10,
  numFormants = 8,
  numcep = 12,
  dcttype = c("t2", "t1", "t3", "t4"),
  fbtype = c("mel", "htkmel", "fcmel", "bark"),
  resolution = 40,
  usecmp = FALSE,
  mc.cores = 1,
  full.names = TRUE,
  recursive = FALSE,
  check.mono = FALSE,
  stereo2mono = FALSE,
  overwrite = FALSE,
  freq = 44100,

```

```

    round.to = 4,
    verbose = FALSE
)

```

Arguments

x	An Extended data frame to be tagged with media information.
groupBy	A variable to group the summary measures. The argument must be a character vector. (Default: groupBy = 'wav_path').
wavPath	A vector containing the path(s) to WAV files. May be both as dirname or basename formats.
wavPathName	A string containing the WAV path name. (Default: wavPathName = 'wav_path').
features	Vector of features to be extracted. (Default: 'f0').
filesRange	The desired range of directory files (default: NULL, i.e., all files). Should only be used when all the WAV files are in the same folder.
sex	= <code> set sex specific parameters where <code> = 'f'[emale], 'm'[ale] or 'u'[nknown] (Default: 'u'). Used as 'gender' by wrassp::ksvF0, wrassp::forest and wrassp::mhsF0.
windowShift	= <dur> set analysis window shift to <dur>ation in ms (Default: 5.0). Used by wrassp::ksvF0, wrassp::forest, wrassp::mhsF0, wrassp::zcrana, wrassp::rfcana, wrassp::acfana, wrassp::cepstrum, wrassp::dftSpectrum, wrassp::cssSpectrum and wrassp::lpsSpectrum.
numFormants	= <num> <num>ber of formants (Default: 8). Used by wrassp::forest.
numcep	Number of Mel-frequency cepstral coefficients (cepstra) to return (Default: 12). Used by tuneR::melfcc.
dcttype	Type of DCT used. 't1' or 't2', 't3' for HTK 't4' for feacalc (Default: 't2'). Used by tuneR::melfcc.
fbtype	Auditory frequency scale to use: 'mel', 'bark', 'htkmel', 'fcmel' (Default: 'mel'). Used by tuneR::melfcc.
resolution	= <freq> set FFT length to the smallest value which results in a frequency resolution of <freq> Hz or better (Default: 40.0). Used by wrassp::cssSpectrum, wrassp::dftSpectrum and wrassp::lpsSpectrum.
usecmp	Logical. Apply equal-loudness weighting and cube-root compression (PLP instead of LPC) (Default: FALSE). Used by tuneR::melfcc.
mc.cores	Number of cores to be used in parallel processing. (Default: 1)
full.names	Logical. If TRUE, the directory path is prepended to the file names to give a relative file path. If FALSE, the file names (rather than paths) are returned. (Default: TRUE). Used by base::list.files.
recursive	Logical. Should the listing recursively into directories? (Default: FALSE) Used by base::list.files.
check.mono	Logical. Check if the WAV file is mono. (Default: TRUE)
stereo2mono	(Experimental) Logical. Should files be converted from stereo to mono? (Default: TRUE)

overwrite	(Experimental) Logical. Should converted files be overwritten? If not, the file gets the suffix _mono. (Default: FALSE)
freq	Frequency in Hz to write the converted files when stereo2mono=TRUE. (Default: 44100)
round.to	Number of decimal places to round to. (Default: NULL)
verbose	Logical. Should the running status be showed? (Default: FALSE)

Details

filesRange should only be used when all the WAV files are in the same folder.

Value

A tibble data frame containing summarized numeric columns using (1) mean, (2) standard deviation, (3) variation coefficient, (4) median, (5) interquartile range and (6) median absolute deviation.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern = glob2rx('*.wav'), full.names = TRUE)

# creating Extended synthetic data
E <- dplyr::tibble(subject_id = c(1,1,1,2,2,2,3,3,3),
  wav_path = path2wav)

# minimal usage
feat_summary(E)

# canonical data
feat_summary(E, groupBy = 'subject_id')
```

get_bit

Get bit rate

Description

Get bit rate from WAV file.

Usage

```
get_bit(x)
```

Arguments

x Wave object from 'tuneR::readWave'.

Value

Integer indicating the bit rate from a WAV file.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern <- glob2rx('*.*wav'), full.names = TRUE)

rw <- tuneR::readWave(path2wav[1])
voice::get_bit(rw)

rw1 <- lapply(path2wav, tuneR::readWave)
sapply(rw1, voice::get_bit)
```

get_dur	<i>Time duration</i>
---------	----------------------

Description

Get time duration from WAV file.

Usage

```
get_dur(x)
```

Arguments

x Wave object from 'tuneR::readWave'.

Value

Numeric indicating the time duration in seconds from a WAV file.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern <- glob2rx('*.*wav'), full.names = TRUE)

rw <- tuneR::readWave(path2wav[1])
voice::get_dur(rw)

rw1 <- lapply(path2wav, tuneR::readWave)
sapply(rw1, voice::get_dur)
```

get_left	<i>Get left channel</i>
----------	-------------------------

Description

Get left channel from WAV file.

Usage

```
get_left(x)
```

Arguments

x Wave object from ‘tuneR::readWave’.

Value

Numeric vector indicating the left channel from a WAV file.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern <- glob2rx('*.*wav'), full.names = TRUE)

rw <- tuneR::readWave(path2wav[1])
l <- voice::get_left(rw)
head(l)
length(l)
```

get_right	<i>Get right channel</i>
-----------	--------------------------

Description

Get right channel from WAV file.

Usage

```
get_right(x)
```

Arguments

x Wave object from ‘tuneR::readWave’.

Value

Numeric vector indicating the right channel from a WAV file.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern <- glob2rx('*wav'), full.names = TRUE)

rw <- tuneR::readWave(path2wav[1])
r <- voice::get_right(rw)
head(r)
length(r)
```

get_samp.rate	<i>Get sample rate</i>
---------------	------------------------

Description

Get sample rate from WAV file.

Usage

```
get_samp.rate(x)
```

Arguments

x Wave object from 'tuneR::readWave'.

Value

Integer indicating the sample rate from a WAV file.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern <- glob2rx('*wav'), full.names = TRUE)

rw <- tuneR::readWave(path2wav[1])
voice::get_samp.rate(rw)

rw1 <- lapply(path2wav, tuneR::readWave)
sapply(rw1, voice::get_samp.rate)
```

get_tbeg *Time beginning*

Description

Get time beginning from a data frame in RTTM standard.

Usage

```
get_tbeg(x)
```

Arguments

x A data frame in RTTM standard. See 'voice::read_rttm'.

Value

Numeric vector containing the time beginning in seconds.

Examples

```
library(voice)

url0 <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/rttm/sherlock0.rttm'
download.file(url0, destfile = paste0(tempdir(), '/sherlock0.rttm'))

rttm <- voice::read_rttm(tempdir())
(gtb <- voice::get_tbeg(rttm$sherlock0.rttm))
class(gtb)
```

get_tdur *Time duration*

Description

Get time duration from a data frame in RTTM standard.

Usage

```
get_tdur(x)
```

Arguments

x A data frame in RTTM standard. See 'voice::read_rttm'.

Value

Numeric vector containing the time duration in seconds.

Examples

```
library(voice)

url0 <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/rttm/sherlock0.rttm'
download.file(url0, destfile = paste0(tempdir(), '/sherlock0.rttm'))

rttm <- voice::read_rttm(tempdir())
(gtd <- voice::get_tdur(rttm$sherlock0.rttm))
class(gtd)
```

interp	<i>Interpolate vectors</i>
--------	----------------------------

Description

Interpolate vectors, compressing to `compact.to` fraction. May remove zeros.

Usage

```
interp(
  y,
  compact.to,
  drop.zeros = FALSE,
  to.data.frame = FALSE,
  round.off = NULL,
  weight = NULL
)
```

Arguments

<code>y</code>	A vector or time series.
<code>compact.to</code>	Proportion of remaining points after compaction, between (including) 0 and 1. If equals to 1 and <code>keep.zeros = TRUE</code> , the original vector is presented.
<code>drop.zeros</code>	Logical. Drop repeated zeros? Default: FALSE.
<code>to.data.frame</code>	Logical. Convert to data frame? Default: FALSE.
<code>round.off</code>	Number of decimal places of the interpolated <code>y</code> Default: NULL.
<code>weight</code>	Vector of weights with same length of <code>y</code> . Default: NULL.

Value

A list of interpolated `x` and `y` values with length near to `compact.to*length(y)`.

See Also

`rm0`, `interp_mc`, `interp_df`

Examples

```

library(voice)

v1 <- 1:100
(c1 <- interp(v1, compact.to = 0.2))
length(c1$y)
plot(1:100, type = 'l')
points(c1$x, c1$y, col='red')

# with weight
(c2 <- interp(v1, compact.to = 0.2, weight = rev(v1)))
plot(c1$y)
points(c2$y, col = 'red')

(v2 <- c(1:5, rep(0,10), 1:10, rep(0,5), 10:20, rep(0,10)))
length(v2)
interp(v2, 0.1, drop.zeros = TRUE, to.data.frame = FALSE)
interp(v2, 0.1, drop.zeros = TRUE, to.data.frame = TRUE)
interp(v2, 0.2, drop.zeros = TRUE)
interp(v2, 0.2, drop.zeros = FALSE)

(v3 <- c(rep(0,10), 1:20, rep(0,3)))
(c3 <- interp(v3, 1/3, drop.zeros = FALSE, to.data.frame = FALSE))
lapply(c3, length)
plot(v3, type = 'l')
points(c3$x, c3$y, col = 'red')

(v4 <- c(rnorm(1:100)))
(c4 <- interp(v4, 1/4, round.off = 3))

```

 interp_df

Interpolate data frames

Description

Interpolate data frames using multicore, compressing to `compact.to` fraction. May remove zeros.

Usage

```

interp_df(
  x,
  compact.to,
  id = colnames(x)[1],
  colnum = NULL,
  drop.x = TRUE,
  drop.zeros = FALSE,
  to.data.frame = TRUE,
  round.off = NULL,
  weight = NULL,

```

```
    mc.cores = 1
  )
```

Arguments

x	A data frame.
compact.to	Proportion of remaining points after interpolation. If equals to 1 and keep.zeros = TRUE, the original vector is presented.
id	The identification column. Default: colname of the first column of x.
colnum	A char vector indicating the numeric colnames. If NULL, uses the columns of the numeric class.
drop.x	Logical. Drop columns containing .x? Default: TRUE.
drop.zeros	Logical. Drop repeated zeros or keep 1 zero per null set? Default: FALSE.
to.data.frame	Logical. Should return a data frame? If FALSE returns a list. Default: TRUE.
round.off	Number of decimal places of the interpolated y. Default: NULL.
weight	Vector of weights with same length of y. Default: NULL.
mc.cores	The number of cores to mclapply. Default: 1.

Value

A data frame of interpolated values with nrow near to compact.to*length(x).

See Also

interp, interp_mc

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern = glob2rx('*wav'), full.names = TRUE)

# getting Media data frame via lean call
M <- extract_features(dirname(path2wav), features = c('f0', 'fmt'),
  mc.cores = 1, verbose = FALSE)

(cM.df <- interp_df(M[,-(1:2)], 0.1, mc.cores = 1))
(cM.df2 <- interp_df(M[,-(1:2)], 0.1, drop.x = FALSE, mc.cores = 1))

dim(M)
dim(cM.df)
dim(cM.df2)
(cM.list <- interp_df(M[,-(1:2)], 0.1, to.data.frame = FALSE, mc.cores = 1))
```

 interp_mc

Interpolate vectors using multicore

Description

Interpolate vectors using multicore

Usage

```
interp_mc(
  y,
  compact.to,
  drop.zeros = FALSE,
  to.data.frame = FALSE,
  round.off = NULL,
  weight = NULL,
  mc.cores = 1
)
```

Arguments

<code>y</code>	A numeric vector, matrix or data frame.
<code>compact.to</code>	Proportion of remaining points after compression. If equals to 1 and <code>keep.zeros = TRUE</code> , the original vector is presented.
<code>drop.zeros</code>	Logical. Drop repeated zeros? Default: FALSE.
<code>to.data.frame</code>	Logical. Convert to data frame? Default: FALSE.
<code>round.off</code>	Number of decimal places of the interpolated y. Default: NULL.
<code>weight</code>	Vector of weights with same length of y. Default: NULL.
<code>mc.cores</code>	The number of cores to mclapply. Default: 1.

Value

A list of x and y convoluted values with length near to `compact.to*length(y)`.

See Also

`rm0`, `interp`, `interp_df`

Examples

```
library(voice)
# Same result of interp() function if x is a vector
interp(1:100, compact.to = 0.1, drop.zeros = TRUE, to.data.frame = FALSE)
interp_mc(1:100, compact.to = 0.1, drop.zeros = TRUE, to.data.frame = FALSE)

interp(1:100, compact.to = 0.1, drop.zeros = TRUE, to.data.frame = TRUE)
```

```
interp_mc(1:100, compact.to = 0.1, drop.zeros = TRUE, to.data.frame = TRUE)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
pattern = glob2rx('*wav'), full.names = TRUE)

# getting Media data frame
M <- voice::extract_features(dirname(path2wav), mc.cores = 1, verbose = FALSE)

M.num <- M[,-(1:3)]
nrow(M.num)
cm1 <- interp_mc(M.num, compact.to = 0.1, drop.zeros = TRUE,
to.data.frame = FALSE, mc.cores = 1)
names(cm1)
lapply(cm1$f0, length)
```

is_mono

Verify if an audio is mono

Description

Verify if an audio is mono

Usage

```
is_mono(x)
```

Arguments

x Path to WAV audio file.

Value

Logical. 'TRUE' indicates a mono (one-channel) file. 'FALSE' indicates a non-mono (two-channel) file.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
pattern = glob2rx('*wav'), full.names = TRUE)

is_mono(path2wav[1])
sapply(path2wav, is_mono)
```

mozilla_id_path	<i>Sample IDs and paths</i>
-----------------	-----------------------------

Description

A dataset containing sample IDs and paths from Ardila et al (2019) 'Common voice: A massively-multilingual speech corpus', used in Zabala (2023) 'voice: new approaches to audio analysis'. The considered sample contains 34,425 rows associated with 838 IDs ($p_s = 2.4\%$).

Usage

```
mozilla_id_path
```

References

Ardila R, Branson M, Davis K, Henretty M, Kohler M, Meyer J, Morais R, Saunders L, Tyers FM, Weber G (2019). "Common voice: A massively-multilingual speech corpus." arXiv preprint [arXiv:1912.06670](https://arxiv.org/abs/1912.06670). URL <https://arxiv.org/abs/1912.06670>.

See Also

[extract_features](#).

Examples

```
library(voice)
mozilla_id_path
```

notes	<i>Assign notes to frequencies</i>
-------	------------------------------------

Description

Returns a vector of notes for equal-tempered scale, A4 = 440 Hz.

Usage

```
notes(x, method = "spn", moving.average = FALSE, k = 11)
```

Arguments

x	Numeric vector of frequencies in Hz.
method	Method of specifying musical pitch. (Default: spn, i.e., Scientific Pitch Notation).
moving.average	Logical. Must apply moving average? (Default: FALSE).
k	Integer width of the rolling window used if moving.average is TRUE. (Default: 11).

Details

The symbol '#' is being used to represent a sharp note, the higher in pitch by one semitone on Scientific Pitch Notation (SPN).

Value

A vector containing the notes for equal-tempered scale, A4 = 440 Hz. When 'method = 'spn'' the vector is of class 'ordered factor'. When 'method = 'octave'' the vector is of class 'factor'. When 'method = 'midi'' the vector is of class 'integer'.

References

<https://pages.mtu.edu/~suits/notefreqs.html>

See Also

notes_freq

Examples

```
library(voice)
notes(c(220,440,880))
notes(c(220,440,880), method = 'octave')
notes(c(220,440,880), method = 'midi')
```

notes_freq

Frequencies on Scientific Pitch Notation (SPN)

Description

Returns a tibble of frequencies on Scientific Pitch Notation (SPN) for equal-tempered scale, A4 = 440 Hz.

Usage

```
notes_freq()
```

Details

The symbol '#' is being used to represent a sharp note, the higher in pitch by one semitone. The SPN is also known as American Standard Pitch Notation (ASPN) or International Pitch Notation (IPN).

Value

A tibble with frequencies for equal-tempered scale, A4 = 440 Hz.

References

<https://pages.mtu.edu/~suits/notefreqs.html>

See Also

notes

Examples

```
library(voice)
notes_freq()
```

read_rttm

Read RTTM files

Description

Read Rich Transcription Time Marked (RTTM) files in fromRttm directory.

Usage

```
read_rttm(fromRttm)
```

Arguments

fromRttm A directory/folder containing RTTM files.

Details

The Rich Transcription Time Marked (RTTM) files are space-delimited text files containing one turn per line defined by NIST - National Institute of Standards and Technology. Each line containing ten fields:

type Type: segment type; should always by SPEAKER.

file File ID: file name; basename of the recording minus extension (e.g., rec1_a).

chn1 Channel ID: channel (1-indexed) that turn is on; should always be 1.

tbegin Turn Onset – onset of turn in seconds from beginning of recording.

tdur Turn Duration – duration of turn in seconds.

ortho Orthography Field – should always by <NA>.

stype Speaker Type – should always be <NA>.

name Speaker Name – name of speaker of turn; should be unique within scope of each file.

conf Confidence Score – system confidence (probability) that information is correct; should always be <NA>.

slat Signal Lookahead Time – should always be <NA>.

Value

A list containing data frames obtained from standard RTTM files. See 'Details'.

References

<https://www.nist.gov/system/files/documents/itl/iad/mig/KWS15-evalplan-v05.pdf>

See Also

voice::enrich_rttm

Examples

```
library(voice)

url0 <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/rttm/sherlock0.rttm'
download.file(url0, destfile = paste0(tempdir(), '/sherlock0.rttm'))
url1 <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/rttm/sherlock1.rttm'
download.file(url1, destfile = paste0(tempdir(), '/sherlock1.rttm'))

(rttm <- voice::read_rttm(tempdir()))
class(rttm)
lapply(rttm, class)
```

rm0

Compress zeros.

Description

Transforms n sets of $m > n$ zeros (alternated with sets of non zeros) into n sets of n zeros.

Usage

```
rm0(y)
```

Arguments

y A vector or time series.

Value

Vector with n zeros.

Examples

```

library(voice)

(v0 <- c(1:20,rep(0,10)))
(r0 <- rm0(v0))
length(v0)
length(r0)
sum(v0 == 0)

(v1 <- c(rep(0,10),1:20))
(r1 <- rm0(v1))
length(r1)

(v2 <- rep(0,10))
(r2 <- rm0(v2))
length(r2)

(v3 <- c(0:10))
(r3 <- rm0(v3))
length(r3)

(v4 <- c(rep(0,10), 1:10, rep(0,5), 10:20, rep(0,10)))
(r4 <- rm0(v4))
length(r4)
sum(v4 == 0)

```

smooth_df

Smooth numeric variables in a data frame

Description

Smooth numeric variables in a data frame

Usage

```
smooth_df(x, k = 11, id = colnames(x)[1], colnum = NULL, mc.cores = 1)
```

Arguments

x	A data frame.
k	Integer width of the rolling window. Default: 11.
id	The identification column. Default: colname of the first column of x.
colnum	A char vector indicating the numeric colnames. If NULL, uses the columns of the numeric class.
mc.cores	The number of cores to mclapply. By default uses 1.

Value

Vector of interpolated values with length near to `compact.to*length(x)`.

See Also

`extract_features`

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern = glob2rx('*.*wav'), full.names = TRUE)

# minimal usage
M <- extract_features(path2wav, features = c('f0', 'fmt'))
(Ms <- smooth_df(M[-(1:2)]))
dim(M)
dim(Ms)
```

splitw

Split Wave

Description

Split WAV files either in `fromWav` directory or using (same names) RTTM files/subdirectories as guidance.

Usage

```
splitw(
  fromWav,
  fromRttm = NULL,
  toSplit = NULL,
  autoDir = FALSE,
  subDir = FALSE,
  output = "wave",
  filesRange = NULL,
  full.names = TRUE,
  recursive = FALSE,
  silence.gap = 0.5
)
```

Arguments

fromWav	Either WAV file or directory containing WAV files.
fromRttm	Either RTTM file or directory containing RTTM files. Default: NULL.
toSplit	A directory to write generated files. Default: NULL.
autoDir	Logical. Must the directories tree be created? Default: FALSE. See 'Details'.
subDir	Logical. Must the splitted files be placed in subdirectories? Default: FALSE.
output	Character string, the class of the object to return, either 'wave' or 'list'.
filesRange	The desired range of directory files (default: NULL, i.e., all files). Must be TRUE only if fromWav is a directory.
full.names	Logical. If TRUE, the directory path is prepended to the file names to give a relative file path. If FALSE, the file names (rather than paths) are returned. (default: TRUE) Used by base::list.files.
recursive	Logical. Should the listing recursively into directories? (default: FALSE) Used by base::list.files. Inactive if fromWav is a file.
silence.gap	The silence gap (in seconds) between adjacent words in a keyword. Rows with tdur <= silence.gap are removed. (default: 0.5)

Details

When autoDir = TRUE, the following directories are created: '../mp3', '../rttm', '../split' and '../musicxml'. Use getwd() to find the parent directory '../'.

Value

Splited audio files according to the correspondent RTTM file(s). See 'voice::diarize'.

See Also

voice::diarize

Examples

```
## Not run:
library(voice)

urlWav <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/wav/sherlock0.wav'
destWav <- paste0(tempdir(), '/sherlock0.wav')
download.file(urlWav, destfile = destWav)

urlRttm <- 'https://raw.githubusercontent.com/filipezabala/voiceAudios/main/rttm/sherlock0.rttm'
destRttm <- paste0(tempdir(), '/sherlock0.rttm')
download.file(urlRttm, destfile = destRttm)

splitDir <- paste0(tempdir(), '/split')
dir.create(splitDir)
splitw(destWav, fromRttm = destRttm, toSplit = splitDir)
```

```
dir(splitDir)
## End(Not run)
```

tag	<i>Tag a data frame with media information</i>
-----	--

Description

Tag a data frame with media information

Usage

```
tag(
  x,
  groupBy = "wav_path",
  wavPath = unique(x$wav_path),
  wavPathName = "wav_path",
  tags = c("feat_summary"),
  sortByGroupBy = TRUE,
  filesRange = NULL,
  features = "f0",
  sex = "u",
  windowShift = 5,
  numFormants = 8,
  numcep = 12,
  dcttype = c("t2", "t1", "t3", "t4"),
  fbtype = c("mel", "htkmel", "fcmel", "bark"),
  resolution = 40,
  usecmp = FALSE,
  mc.cores = 1,
  full.names = TRUE,
  recursive = FALSE,
  check.mono = FALSE,
  stereo2mono = FALSE,
  overwrite = FALSE,
  freq = 44100,
  round.to = 4,
  verbose = FALSE
)
```

Arguments

x	An Extended data frame to be tagged with media information. See references.
groupBy	A variable to group the summary measures. The argument must be a character vector. (Default: groupBy = 'wav_path').

wavPath	A vector containing the path(s) to WAV files. May be both as dirname or basename formats.
wavPathName	A string containing the WAV path name. (Default: wavPathName = 'wav_path').
tags	Tags to be added to x. See Details. (Default: 'feat_summary').
sortByGroupBy	Logical. Should the function sort the Extended data frame x by groupBy? (Default: sortByGroupBy = TRUE).
filesRange	The desired range of directory files. Should only be used when all the WAV files are in the same folder. (Default: NULL, i.e., all files).
features	Vector of features to be extracted. (Default: 'f0').
sex	= <code> set sex specific parameters where <code> = 'f'[emale], 'm'[ale] or 'u'[nknown] (default: 'u'). Used as 'gender' by wrassp::ksvF0, wrassp::forest and wrassp::mhsF0.
windowShift	= <dur> set analysis window shift to <dur>ation in ms (default: 5.0). Used by wrassp::ksvF0, wrassp::forest, wrassp::mhsF0, wrassp::zcrana, wrassp::rfcana, wrassp::acfana, wrassp::cepstrum, wrassp::dftSpectrum, wrassp::cssSpectrum and wrassp::lpsSpectrum.
numFormants	= <num> <num>ber of formants (Default: 8). Used by wrassp::forest.
numcep	Number of Mel-frequency cepstral coefficients (cepstra) to return (Default: 12). Used by tuneR::melfcc.
dcttype	Type of DCT used. 't1' or 't2', 't3' for HTK 't4' for feacalc (Default: 't2'). Used by tuneR::melfcc.
fbtype	Auditory frequency scale to use: 'mel', 'bark', 'htkmel', 'fcmel' (Default: 'mel'). Used by tuneR::melfcc.
resolution	= <freq> set FFT length to the smallest value which results in a frequency resolution of <freq> Hz or better (Default: 40.0). Used by wrassp::cssSpectrum, wrassp::dftSpectrum and wrassp::lpsSpectrum.
usecmp	Logical. Apply equal-loudness weighting and cube-root compression (PLP instead of LPC) (Default: FALSE). Used by tuneR::melfcc.
mc.cores	Number of cores to be used in parallel processing. (Default: 1)
full.names	Logical. If TRUE, the directory path is prepended to the file names to give a relative file path. If FALSE, the file names (rather than paths) are returned. (Default: TRUE) Used by base::list.files.
recursive	Logical. Should the listing recursively into directories? (Default: FALSE) Used by base::list.files.
check.mono	Logical. Check if the WAV file is mono. (Default: TRUE)
stereo2mono	(Experimental) Logical. Should files be converted from stereo to mono? (Default: TRUE)
overwrite	(Experimental) Logical. Should converted files be overwritten? If not, the file gets the suffix _mono. (Default: FALSE)
freq	Frequency in Hz to write the converted files when stereo2mono=TRUE. (Default: 44100)
round.to	Number of decimal places to round to. (Default: NULL)
verbose	Logical. Should the running status be showed? (Default: FALSE)

Details

filesRange should only be used when all the WAV files are in the same folder.

Value

A tibble data frame containing summarized numeric columns using (1) mean, (2) standard deviation, (3) variation coefficient, (4) median, (5) interquartile range and (6) median absolute deviation.

Examples

```
library(voice)

# get path to audio file
path2wav <- list.files(system.file('extdata', package = 'wrassp'),
  pattern = glob2rx('*wav'), full.names = TRUE)

# creating Extended synthetic data
E <- dplyr::tibble(subject_id = c(1,1,1,2,2,2,3,3,3),
  wav_path = path2wav)
E

# minimal usage
tag(E)

# canonical data
tag(E, groupBy = 'subject_id')

# limiting filesRange
tag(E, filesRange = 3:6)

# more features
Et <- tag(E, features = c('f0', 'fmt', 'rf', 'rcf', 'rpf', 'rfc', 'mfcc'),
  groupBy = 'subject_id')
Et
str(Et)
```

write_list

Writes a list to a path

Description

Writes a list to a path

Usage

```
write_list(x, path)
```

Arguments

x	A list.
path	A full path to file.

Value

A file named 'list.txt' in 'path'.

Examples

```
## Not run:  
library(voice)  
  
pts <- list(x = cars[,1], y = cars[,2])  
listFile <- paste0(tempdir(), '/list.txt')  
voice::write_list(pts, listFile)  
file.info(listFile)  
system(paste0('head ', listFile))  
  
## End(Not run)
```


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