

Package ‘praatpicture’

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Title 'Praat Picture' Style Plots of Acoustic Data

Version 1.4.2

Description Quickly and easily generate plots of acoustic data aligned with transcriptions similar to those made in 'Praat' using either derived signals generated directly in R with 'wrassp' or imported derived signals from 'Praat'. Provides easy and fast out-of-the-box solutions but also a high extent of flexibility. Also provides options for embedding audio in figures and animating figures.

License Apache License (>= 2)

Encoding UTF-8

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conv2sc *Convert capital letters to Unicode small caps*

Description

Helper function to convert capital letters into Unicode small caps. May not work for all font families. Note that there's no Unicode small cap 'X', so 'X' will just be converted to 'x'.

Usage

```
conv2sc(x)
```

Arguments

x A string where all capital letters should be converted to small caps.

Value

A string where all capital letters have been converted to small caps.

Examples

```
my_string <- 'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
conv2sc(my_string)
```

draw_arrow	<i>Draw arrow on praatpicture plot component</i>
------------	--

Description

Helper function for drawing arrows on plot components made with praatpicture. Do not use directly, instead use [praatpicture](#) with the draw_arrow argument.

Usage

```
draw_arrow(plot_component, args)
```

Arguments

plot_component String giving the name of the plot component to draw on.
args A list of vectors giving arguments used for drawing arrows. See [praatpicture](#) documentation.

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly  
datapath <- system.file('extdata', package='praatpicture')  
soundFile <- paste0(datapath, '/1.wav')  
praatpicture(soundFile, draw_arrow=c('spectrogram', 0.1, 500, 0.4, 2000))
```

draw_lines	<i>Draw straight lines on plot component</i>
------------	--

Description

Helper function for adding straight lines to plot components made with praatpicture. Do not use directly, instead use [praatpicture](#) with the draw_lines argument.

Usage

```
draw_lines(plot_component, args)
```

Arguments

plot_component String giving the name of the plot component to draw on.
args A list of vectors giving arguments used for drawing straight lines. See [praatpicture](#) documentation.

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, draw_lines=c('spectrogram',
h=seq(0,5000,by=1000), lty='dashed'))
```

draw_rectangle	<i>Draw rectangle on praatpicture plot component</i>
----------------	--

Description

Helper function for drawing rectangles on plot components made with [praatpicture](#). Do not use directly, instead use [praatpicture](#) with the `draw_rectangle` argument.

Usage

```
draw_rectangle(plot_component, args)
```

Arguments

`plot_component` String giving the name of the plot component to draw on.

`args` A list of vectors giving arguments used for drawing rectangles. See [praatpicture](#) documentation.

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, draw_rectangle=c('spectrogram', 0.1, 500, 0.4, 2000))
```

emupicture	<i>Make Praat Picture style plots in EMU</i>
------------	--

Description

Generate plots in the style of Praat Pictures from sound files and annotations in an EMU database.

Usage

```
emupicture(
  db_handle,
  session = "0000",
  bundle,
  pitch_ssffExt = NULL,
  formant_ssffExt = NULL,
  intensity_ssffExt = NULL,
  talking = FALSE,
  ...
)
```

Arguments

db_handle	The handle of an EMU database loaded into R.
session	String giving the name of the session where the sound file to plot is located. Default is 0000.
bundle	String giving the name of the bundle with the sound file to plot.
pitch_ssffExt	String giving the file extension for an SSFF track with pitch data to plot. Default is NULL.
formant_ssffExt	String giving the file extension for an SSFF track with formant data to plot. Default is NULL.
intensity_ssffExt	String giving the file extension for an SSFF track with intensity data to plot. Default is NULL.
talking	Boolean; should a video be created with embedded audio, as when using talking_praatpicture ? Default is FALSE.
...	Further arguments passed to praatpicture (or talking_praatpicture if talking = TRUE).

Value

No return value, produces a plot or a video.

See Also

See [praatpicture](#) for more details on how to customize plots and [talking_praatpicture](#) for more details on how to customize videos.

Examples

```
# Create demo data and load demo database
emuR::create_emuRdemoData(tempdir())
db_path <- paste0(tempdir(), '/emuR_demoData/ae_emuDB')
db <- emuR::load_emuDB(db_path)

emuR::list_bundles(db)
emupicture(db, bundle='msajc003', tg_tiers=c('Text', 'Tone'))

# Plot SSFF track data

emuR::list_ssffTrackDefinitions(db)
emupicture(db, bundle='msajc003', frames=c('sound', 'formant'),
proportion=c(30,70), formant_ssffExt='fms', formant_number=4)
```

formantplot

Plot formant object

Description

Function for plotting formant objects called by [praatpicture](#). Instead of using this function directly, just use `praatpicture('my_sound_file', frames='formant')`.

Usage

```
formantplot(
  fm,
  start,
  end,
  tfrom0 = TRUE,
  tgbool = FALSE,
  lines = NULL,
  focusTierColor = "black",
  focusTierLineType = "dotted",
  dynamicRange = 30,
  freqRange = c(0, 5500),
  plotType = "speckle",
  color = "black",
  ind = NULL,
  min_max_only = FALSE,
  highlight = NULL,
  axisLabel = "Frequency (Hz)",
  drawSize = 1,
  speckleSize = 1
)
```

Arguments

fm	Formant object loaded using <code>rPraat::formant.read</code>
start	Start time (in seconds) of desired plotted area.
end	End time (in seconds) of desired plotted area.
tfrom0	Logical; should time on the x-axis run from 0 or from the original time? Default is TRUE.
tgbool	Logical; should dotted lines be plotted corresponding to locations in a TextGrid? Default is FALSE.
lines	Numeric vector giving locations in seconds of locations from a TextGrid to be plotted with dotted lines. Default is NULL.
focusTierColor	String or vector of strings giving the color(s) to use for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth color. Default is 'black'.
focusTierLineType	String or vector of strings giving the line type(s) for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth line type. Default is 'dotted'.
dynamicRange	Dynamic range in dB for producing formant plots. When a formant plot of <code>plotType='speckle'</code> is drawn, no formants are shown in frames with intensity level <code>dynamicRange</code> below the maximum intensity. Default is 30. If set to 0, all formants are shown.
freqRange	Vector of two integers giving the frequency range to be used for producing formant plots. Default is <code>c(0, 5500)</code> .
plotType	String giving the type of formant plot to produce; default is <code>speckle</code> (a point plot), the only other option is <code>draw</code> (a line plot). Alternatively a vector <code>c('draw', 'speckle')</code> can be passed, in which case both are used.
color	String or vector of strings giving the name(s) of colors to be used for plotting formants. If one color is provided, all formants will be plotted in this color. If multiple colors are provided, different formants will be shown in different colors. Default is 'black'.
ind	Integer indexing waveform relative to other plot components. Default is NULL.
min_max_only	Logical; should only minimum and maximum values be given on the y-axis? Default is FALSE. Can also be a logical vector if some but not all plot components should have minimum and maximum values on the y-axis. Ignored for TextGrid component.
highlight	Named list giving parameters for differential highlighting of formants based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted TextGrid. Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>color</code>), <code>drawSize</code> or <code>speckleSize</code> (both numeric), and <code>background</code> (a string specifying a background color).
axisLabel	String giving the name of the label to print along the y-axis when plotting formants. Default is Frequency (Hz).

drawSize	Number indicating the line width if plotType is 'draw'. Default is 1. Controls the lwd argument of graphics::lines .
speckleSize	Number indicating the point size of if _plotType is 'speckle'. Default is 1. Controls the cex arguments of graphics::points .

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, frames='formant')
```

intensityplot	<i>Plot intensity object</i>
---------------	------------------------------

Description

Function for plotting intensity objects called by [praatpicture](#). Instead of using this function directly, just use `praatpicture('my_sound_file', frames='intensity')`.

Usage

```
intensityplot(
  it,
  start,
  end,
  tfrom0 = TRUE,
  tgbool = FALSE,
  lines = NULL,
  focusTierColor = "black",
  focusTierLineType = "dotted",
  range = NULL,
  color = "black",
  ind = NULL,
  min_max_only = TRUE,
  highlight = NULL,
  axisLabel = "Intensity (dB)",
  drawSize = 1
)
```


Arguments

<code>it</code>	IntensityTier object loaded using rPraat::it.read
<code>start</code>	Start time (in seconds) of desired plotted area.
<code>end</code>	End time (in seconds) of desired plotted area.
<code>tfrom0</code>	Logical; should time on the x-axis run from 0 or from the original time? Default is TRUE.
<code>tgbool</code>	Logical; should dotted lines be plotted corresponding to locations in a TextGrid? Default is FALSE.
<code>lines</code>	Numeric vector giving locations in seconds of locations from a TextGrid to be plotted with dotted lines. Default is NULL.
<code>focusTierColor</code>	String or vector of strings giving the color(s) to use for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth color. Default is 'black'.
<code>focusTierLineType</code>	String or vector of strings giving the line type(s) for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth line type. Default is 'dotted'.
<code>range</code>	Vector of two integers giving the intensity range to be used for producing intensity plots. Default is NULL, in which case the range is simply the minimum and maximum levels in the curve.
<code>color</code>	String giving the name of the color to be used for plotting intensity. Default is 'black'.
<code>ind</code>	Integer indexing waveform relative to other plot components. Default is NULL.
<code>min_max_only</code>	Logical; should only minimum and maximum values be given on the y-axis? Default is TRUE. Can also be a logical vector if some but not all plot components should have minimum and maximum values on the y-axis. Ignored for TextGrid component.
<code>highlight</code>	Named list giving parameters for differential highlighting of the intensity contour based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted TextGrid. Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>color</code>) and <code>drawSize</code> (integer), and <code>background</code> (a string specifying a background color).
<code>axisLabel</code>	String giving the name of the label to print along the y-axis when plotting intensity. Default is Intensity (dB).
<code>drawSize</code>	Number indicating the line width of the intensity contour. Default is 1. Controls the <code>lwd</code> argument of graphics::lines .

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, frames='intensity')
```

make_annot

Annotate praatpicture plot component

Description

Helper function for annotating plot components made with praatpicture. Do not use directly, instead use [praatpicture](#) with the `annotate` argument.

Usage

```
make_annot(plot_component, args)
```

Arguments

`plot_component` String giving the name of the plot component to annotate.

`args` A list of vectors giving arguments used for annotating. See [praatpicture](#) documentation.

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, annotate=c('spectrogram', 0.25, 1500,
'An annotation'))
```

make_TextGrid *Interactively create a TextGrid object*

Description

Annotate a sound file by interacting with waveform or spectrogram plots, resulting in a TextGrid object which can be used for creating various acoustic plots with time-aligned annotations with `praatpicture()`.

Usage

```
make_TextGrid(
  sound,
  tierNames,
  start = 0,
  end = 0,
  audioInViewer = TRUE,
  show = "wave",
  channel = 1,
  sampa2ipa = FALSE
)
```

Arguments

sound	String giving the file name of a sound file with the .wav extension.
tierNames	String or vector of strings giving the name(s) of tiers in the new TextGrid object.
start	Start time (in seconds) of desired plotted area. Default is 0.
end	End time (in seconds) of desired plotted area. Default is 0 (= the entire file).
audioInViewer	Logical; should audio be playable from the Viewer pane in RStudio?
show	String giving the type of plot to show. Default is wave, another option is spectrogram. Note that spectrogram plotting is relatively slow within this function.
channel	Number indicating which audio channel to show. Default is 1.
sampa2ipa	Logical; should SAMPA transcriptions be converted to IPA? Default is FALSE.

Details

Running this function will show either a waveform or a spectrogram in a separate X11 graphics device window. Click on this figure in the locations where you want to add boundaries to your TextGrid objects. This should be done sequentially, starting with the first boundary along the time axis and ending with the last. It does not matter where on the y-axis you click.

Once you have indicated all the desired boundaries, you will be prompted in the R console to say whether the tier is an interval tier or a point tier by typing y (for interval tier) or n (for point tier). Subsequently you will be prompted in the console to write labels corresponding to each interval or point.

If you are creating a TextGrid with multiple tiers (i.e., if tierNames is longer than 1), this process will be repeated for all tiers.

Value

A list object identical to those created by `rPraat::tg.read()` when loading TextGrid objects into R. This object can be passed to the `tg_obj` argument when using `praatpicture`.

See Also

`make_TextGrid()` is largely a wrapper around the function `tg_createTier()` which does most of the work.

Examples

```
## Not run:
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/2.wav')
tg <- make_TextGrid(soundFile, tierNames=c('Mary', 'John', 'Bell'))
# Follow the steps shown in the console

praatpicture(soundFile, tg_obj=tg)

## End(Not run)
```

pitchplot

Plot pitch object

Description

Function for plotting pitch objects called by `praatpicture`. Instead of using this function directly, just use `praatpicture('my_sound_file', frames='pitch')`.

Usage

```
pitchplot(
  pt,
  start,
  end,
  tfrom0 = TRUE,
  tgbool = FALSE,
  lines = NULL,
  focusTierColor = "black",
  focusTierLineType = "dotted",
  plotType = "draw",
  scale = "hz",
  freqRange = NULL,
  semitonesRe = 100,
  color = "black",
  ind = NULL,
  min_max_only = TRUE,
  highlight = NULL,
```

```

    axisLabel = NULL,
    drawSize = 1,
    speckleSize = 1
)

```

Arguments

<code>pt</code>	PitchTier object loaded using rPraat::pt.read
<code>start</code>	Start time (in seconds) of desired plotted area.
<code>end</code>	End time (in seconds) of desired plotted area.
<code>tfrom0</code>	Logical; should time on the x-axis run from 0 or from the original time? Default is TRUE.
<code>tgbool</code>	Logical; should dotted lines be plotted corresponding to locations in a TextGrid? Default is FALSE.
<code>lines</code>	Numeric vector giving locations in seconds of locations from a TextGrid to be plotted with dotted lines. Default is NULL.
<code>focusTierColor</code>	String or vector of strings giving the color(s) to use for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth color. Default is 'black'.
<code>focusTierLineType</code>	String or vector of strings giving the line type(s) for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth line type. Default is 'dotted'.
<code>plotType</code>	String giving the type of pitch plot to produce; default is <code>draw</code> (a line plot), the only other option is <code>speckle</code> (a point plot). Alternatively a vector <code>c('draw', 'speckle')</code> can be passed, in which case both are used.
<code>scale</code>	String giving the frequency scale to use when producing pitch plots. Default is <code>hz</code> ; other options are <code>logarithmic</code> (also in Hz), <code>semitones</code> , <code>erb</code> , and <code>mel</code> .
<code>freqRange</code>	Vector of two integers giving the frequency range to be used for producing pitch plots. Default is NULL, in which case the pitch range is automatically reset to <code>c(-12, 30)</code> for the <code>semitones</code> scale, <code>c(0, 10)</code> for the <code>erb</code> scale, and <code>c(50, 500)</code> for the Hz-based scales, following Praat defaults.
<code>semitonesRe</code>	Frequency in Hz giving the reference level for converting pitch frequency to semitones. Default is 100.
<code>color</code>	String giving the name of the color to be used for plotting pitch. Default is 'black'.
<code>ind</code>	Integer indexing waveform relative to other plot components. Default is NULL.
<code>min_max_only</code>	Logical; should only minimum and maximum values be given on the y-axis? Default is TRUE. Can also be a logical vector if some but not all plot components should have minimum and maximum values on the y-axis. Ignored for TextGrid component.
<code>highlight</code>	Named list giving parameters for differential highlighting of pitch based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight

	based on information in a plotted TextGrid. Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>color</code>), <code>drawSize</code> or <code>speckleSize</code> (both numeric), and <code>background</code> (a string specifying a background color).
<code>axisLabel</code>	String giving the name of the label to print along the y-axis when printing a pitch track. Default is NULL, in which case the axis label will depend on the scale.
<code>drawSize</code>	Number indicating the line width if <code>plotType</code> is 'draw'. Default is 1. Controls the <code>lwd</code> argument of <code>graphics::lines</code> .
<code>speckleSize</code>	Number indicating the point size of if <code>_plotType</code> is 'speckle'. Default is 1. Controls the <code>cex</code> arguments of <code>graphics::points</code> .

Value

No return values, called internally by `praatpicture` and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, frames='pitch')
```

praatanimation

Make animations from Praat Picture-style plots of acoustic data

Description

Animate some aspect of a Praat Picture-style plot of acoustic data, potentially aligned with transcriptions.

Usage

```
praatanimation(
  sound,
  width = 1080,
  height = 720,
  frameRate = 24,
  n_frames = 50,
  loop = TRUE,
  outputFile = NULL,
  outputFormat = "gif",
  useViewer = TRUE,
  verbose = TRUE,
  pointsize = 25,
  start = 0,
  end = 0,
  spec_freqRange = c(0, 5000),
  spec_windowLength = 0.005,
```

```

    spec_dynamicRange = 50,
    spec_timeStep = 1000,
    pitch_timeStep = NULL,
    pitch_floor = 50,
    pitch_ceiling = 600,
    pitch_freqRange = c(50, 500),
    pitch_semitonesRe = 100,
    formant_timeStep = NULL,
    formant_windowLength = 0.025,
    formant_dynamicRange = 30,
    formant_freqRange = c(50, 5500),
    intensity_timeStep = NULL,
    intensity_minPitch = 100,
    intensity_range = NULL,
    ...
)

```

Arguments

sound	String giving the file name of a sound file with the .wav extension.
width	Number giving the desired width of the resulting animation in pixels; default is 1080.
height	Number giving the desired height of the resulting animation in pixels; default is 720.
frameRate	Number giving the desired frame rate of the resulting animation in Hz; default is 24, i.e. 24 frames per second.
n_frames	Number giving the desired number of frames of the resulting animation; default is 50.
loop	Logical; should the animation be looped? Default is TRUE. Ignored when outputType is mp4.
outputFile	String giving the desired file name of the animation. Default is NULL, in which case GIF files are named praatgif.gif and MP4 files are named praatvid.mp4. If you choose a different name, make sure that the file extension matches the selected outputType.
outputFormat	String giving the desired file type; default is gif, the only other option is mp4.
useViewer	Logical; should the animation be shown in the Viewer pane in RStudio? Default is TRUE; if true, the animation is only saved in a temporary directory, but can be downloaded from a browser.
verbose	Logical; should status messages be printed in the console as figures are being generated? Default is TRUE.
pointsize	Number; which point size should be used for text in the animation? Default is 25. See <code>grDevices::png()</code> for more details.
start	Start time (in seconds) of desired plotted area. Default is 0. Alternatively, a vector giving the first and last start time in the animation.
end	End time (in seconds) of desired plotted area. Default is 0 (= the entire file). Alternatively, a vector giving the first and last end time in the animation.

<code>spec_freqRange</code>	Vector of two integers giving the frequency range to be used for plotting spectrograms. Default is <code>c(0, 5000)</code> . Alternatively, a vector of four integers giving the first and last lowest frequency, followed by the first and last highest frequency in the animation; i.e., <code>c(0, 0, 5000, 10000)</code> will produce an animation where the upper frequency boundary gradually increases from 5000 Hz to 10,000 Hz.
<code>spec_windowLength</code>	Window length in seconds for generating spectrograms. Default is <code>0.005</code> . Alternatively, a vector giving the first and last window lengths in the animation.
<code>spec_dynamicRange</code>	Dynamic range in dB for generating spectrograms. The maximum intensity minus <code>spec_dynamicRange</code> will all be printed in white. Default is <code>50</code> . Alternatively, a vector giving the first and last dynamic range values in the animation.
<code>spec_timeStep</code>	How many time steps should be calculated for spectrograms? Default is <code>1000</code> . Alternatively, a vector giving the first and last time step values in the animation.
<code>pitch_timeStep</code>	Measurement interval in seconds for tracking pitch. Default is <code>NULL</code> , in which case the measurement interval is equal to <code>0.75 / pitch_floor</code> . Alternatively, a vector giving the first and last measurement intervals in the animation.
<code>pitch_floor</code>	Frequency in Hz; no pitch candidates considered below this frequency. Default is <code>75</code> . Alternatively, a vector giving the first and last pitch floors to be used in the animation.
<code>pitch_ceiling</code>	Frequency in Hz; no pitch candidates considered above this frequency. Default is <code>600</code> . Alternatively, a vector giving the first and last pitch ceilings to be used in the animation.
<code>pitch_freqRange</code>	Vector of two integers giving the frequency range to be used for producing pitch plots. Default is <code>c(50, 500)</code> . If the frequency scales <code>semitones</code> or <code>erb</code> are used, the pitch range is automatically reset to the Praat defaults for these scales (<code>c(-12, 30)</code> and <code>c(0, 10)</code> , respectively). Alternatively, a vector of four integers giving the first and last lowest frequency, followed by the first and last highest frequency in the animation (see <code>spec_freqRange</code> for usage details).
<code>pitch_semitonesRe</code>	Frequency in Hz giving the reference level for converting pitch frequency to semitones. Default is <code>100</code> . Alternatively, a vector giving the first and last semitone reference levels to be used in the animation.
<code>formant_timeStep</code>	Measurement interval in seconds for tracking formants. Default is <code>NULL</code> , in which case the measurement interval is equal to <code>formant_windowLength / 4</code> . Alternatively, a vector giving the first and last measurement intervals to be used in the animation.
<code>formant_windowLength</code>	The effective duration of the analysis window used for tracking formants in seconds; the actual duration of the analysis window is twice this value. Alternatively, a vector giving the first and last window lengths to be used in the animation.
<code>formant_dynamicRange</code>	Dynamic range in dB for producing formant plots. When a formant plot of <code>formant_plotType = 'speckle'</code> is drawn, no formants are shown in frames with

intensity level `formant_dynamicRange` below the maximum intensity. Default is 30. If set to 0, all formants are shown. Alternatively, a vector giving the first and last dynamic range levels to be used in the animation.

`formant_freqRange`
Vector of two integers giving the frequency range to be used for producing formant plots. Default is `c(0, 5500)`. Alternatively, a vector of four integers giving the first and last lowest frequency, followed by the first and last highest frequency in the animation (see `spec_freqRange` for usage details).

`intensity_timeStep`
Measurement interval in seconds for tracking intensity. Default is NULL, in which case the measurement interval is equal to $0.8 * \text{intensity_minPitch}$. Alternatively, a vector giving the first and last measurement intervals to be used in the animation.

`intensity_minPitch`
Lowest pitch in Hz used when calculating intensity; default is 100. Alternatively, a vector giving the first and last minimum pitch levels to be used in the animation.

`intensity_range`
Vector of two integers giving the intensity range to be used for producing intensity plots. Default is NULL, in which case the range is simply the minimum and maximum levels in the curve. Alternatively, a vector of four integers giving the first and last lowest level, followed by the first and last highest level in the animation (see `spec_freqRange` for usage details).

... Further arguments passed to `praatpicture`.

Value

No return value, produces an animated figure.

See Also

This function is a wrapper for either `gifski::save_gif()` or `av::av_capture_graphics()` used to produce animations based on `praatpicture()`. For more detail on your options, see the `praatpicture()` help file.

Examples

```
## Not run:
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')

# Show increasing frequency range
praatanimation(soundFile, spec_freqRange=c(0,0,4000,12000))

# Transition from narrowband to broadband spectrogram
praatanimation(soundFile, spec_windowLength=c(0.005,0.03))

# Etc.

## End(Not run)
```

 praatpicture

Make Praat Picture style plots of acoustic data

Description

Generate plots of acoustic data aligned with transcriptions similar to those made with Praat Picture. The default is to produce a plot with a relatively small waveform, somewhat larger spectrogram, and the first tier of a TextGrid.

Usage

```

praatpicture(
  sound,
  start = 0,
  end = 0,
  tfrom0 = TRUE,
  tUnit = "s",
  frames = c("sound", "spectrogram", "TextGrid"),
  proportion = c(30, 50, 20),
  mainTitle = "",
  mainTitleAlignment = 0,
  start_end_only = TRUE,
  min_max_only = TRUE,
  drawSize = 1,
  speckleSize = 1,
  wave_channels = "all",
  wave_channelNames = FALSE,
  wave_color = "black",
  wave_lineWidth = 1,
  wave_highlight = NULL,
  tg_obj = NULL,
  tg_file = NULL,
  tg_tiers = "all",
  tg_focusTier = tg_tiers[1],
  tg_focusTierColor = "black",
  tg_focusTierLineType = "dotted",
  tg_tierNames = TRUE,
  tg_alignment = "central",
  tg_edgeLabels = "keep",
  tg_specialChar = FALSE,
  tg_color = "black",
  tg_highlight = NULL,
  spec_channel = NULL,
  spec_freqRange = c(0, 5000),
  spec_windowLength = 0.005,
  spec_dynamicRange = 50,
  spec_timeStep = 1000,

```

```

spec_windowShape = "Gaussian",
spec_colors = c("white", "black"),
spec_axisLabel = "Frequency (Hz)",
spec_highlight = NULL,
pitch_timeStep = NULL,
pitch_floor = 75,
pitch_ceiling = 600,
pitch_plotType = "draw",
pitch_scale = "hz",
pitch_freqRange = NULL,
pitch_semitonesRe = 100,
pitch_color = "black",
pitch_plotOnSpec = FALSE,
pitch_ssff = NULL,
pitch_axisLabel = NULL,
pitch_highlight = NULL,
formant_timeStep = NULL,
formant_maxN = 5,
formant_windowLength = 0.025,
formant_dynamicRange = 30,
formant_freqRange = c(50, 5500),
formant_number = NULL,
formant_plotType = "speckle",
formant_color = "black",
formant_plotOnSpec = FALSE,
formant_ssff = NULL,
formant_axisLabel = "Frequency (Hz)",
formant_highlight = NULL,
intensity_timeStep = NULL,
intensity_minPitch = 100,
intensity_range = NULL,
intensity_color = "black",
intensity_plotOnSpec = FALSE,
intensity_ssff = NULL,
intensity_axisLabel = "Intensity (dB)",
intensity_highlight = NULL,
time_axisLabel = NULL,
highlight = NULL,
draw_lines = list("formant", h = seq(0, 10000, by = 1000), lty = "dotted"),
draw_rectangle = NULL,
draw_arrow = NULL,
annotate = NULL,
gender = "u",
...
)

```

Arguments

sound String giving the file name of a sound file with the .wav extension.

<code>start</code>	Start time (in seconds) of desired plotted area. Default is 0.
<code>end</code>	End time (in seconds) of desired plotted area. Default is 0 (= the entire file).
<code>tfrom0</code>	Logical; should time on the x-axis run from 0 or from the original time? Default is TRUE.
<code>tUnit</code>	String giving the unit of time to print along the x-axis. Possible options are 's' (default) for seconds and 'ms' for milliseconds.
<code>frames</code>	String or vector of strings giving the frames that the plot should consist of. Default is sound, spectrogram, TextGrid. This requires a file with the extension .TextGrid and the same base name as the sound file. Other options are pitch, formant, and intensity. See details for more information.
<code>proportion</code>	Integer or vector of integers of the same size as frames giving the proportion in percents of the plotting area to be taken up by the individual frames. Default is c(30,50,20). If more or less than three frames are plotted and no proportions are given, frames will be of equal size.
<code>mainTitle</code>	String giving a title to print at the top of the plot. The default is an empty string, i.e. no title.
<code>mainTitleAlignment</code>	Number indicating the vertical alignment of the plot title, where 0 (default) indicates left-alignment, 1 indicates right-alignment, 0.5 indicates central alignment, etc, following the conventions of the <code>adj</code> argument of <code>graphics::mtext</code> .
<code>start_end_only</code>	Logical; should there only be ticks on the x-axis for start and end times? Default is TRUE.
<code>min_max_only</code>	Logical; should only minimum and maximum values be given on the y-axis? Default is TRUE. Can also be a logical vector if some but not all plot components should have minimum and maximum values on the y-axis. Ignored for TextGrid component.
<code>drawSize</code>	Number indicating the line width of plot components where the <code>_plotType</code> is 'draw' (i.e., pitch, formants, or intensity rendered as line plots). Default is 1. Controls the <code>lwd</code> argument of <code>graphics::lines</code> .
<code>speckleSize</code>	Number indicating the point size of plot components where the <code>_plotType</code> is 'speckle' (i.e. pitch or formants rendered as point plots). Default is 1. Controls the <code>cex</code> arguments of <code>graphics::points</code> .
<code>wave_channels</code>	Vector of numbers or strings giving either numeric identifiers of audio channels to plot or the names of audio channels to plot. Also understands 'all', which plots all channels and is the default.
<code>wave_channelNames</code>	Should names of audio channels be printed on the y-axis? If TRUE, names will be grabbed from the audio metadata if available. Alternatively, if two channels are available, they will be named <code>left</code> and <code>right</code> . If more or less than two channels are available, channels are named <code>Cn</code> , where <code>n</code> is the number of the channel. Alternatively, a vector of strings can be provided with channel names. Default is FALSE.
<code>wave_color</code>	String giving the name of the color to be used for plotting the waveform. Default is 'black'. Alternatively a vector of strings, if different colors should be used for different channels.

<code>wave_lineWidth</code>	Number giving the line width to use for plotting the waveform. Default is 1.
<code>wave_highlight</code>	Named list giving parameters for differential highlighting of the waveform based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted TextGrid. Further contains the argument <code>color</code> (string, see <code>wave_color</code>), and <code>background</code> (a string specifying a background color).
<code>tg_obj</code>	A TextGrid object returned by the <code>make_TextGrid()</code> function.
<code>tg_file</code>	Path of file to be used for plotting TextGrid. Default is NULL, in which case the function searches for a TextGrid sharing the same base name as sound with the <code>.TextGrid</code> extension.
<code>tg_tiers</code>	Vector of numbers or strings giving either numeric identifiers of TextGrid tiers to plot or the names of TextGrid tiers to plot. Also understands 'all', which plots all tiers and is the default.
<code>tg_focusTier</code>	For which tier(s) should lines be shown on all acoustic plots giving the locations of boundaries? Vector of number or strings giving either numeric identifiers of TextGrid tiers or the names of TextGrid tiers to plot. Default is <code>tg_tiers[1]</code> , i.e. the first tier given in the <code>tg_tiers</code> argument. Additionally accepts the string <code>none</code> , in which case no lines are shown on acoustic plots, and <code>all</code> , in which case lines from all tiers are shown on acoustic plots.
<code>tg_focusTierColor</code>	String or vector of strings giving the color(s) to use for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the <code>n</code> th tier will be plotted in the <code>n</code> th color. Default is 'black'.
<code>tg_focusTierLineStyle</code>	String or vector of strings giving the line type(s) for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the <code>n</code> th tier will be plotted in the <code>n</code> th line type. Default is 'dotted'.
<code>tg_tierNames</code>	Logical; should TextGrid tier names be printed along the y-axis? Default is TRUE.
<code>tg_alignment</code>	String giving the desired alignment of text in the TextGrids. Default is <code>central</code> ; other options are <code>left</code> and <code>right</code> . Alternatively, a vector of strings if different alignments are needed.
<code>tg_edgeLabels</code>	String specifying how to handle TextGrid labels in interval tiers that fall partially before <code>start</code> or partially after <code>end</code> . Default is 'keep', where labels are kept at the center of the interval. Other options are 'center', where labels are recentered to the visible part of the interval, or 'discard', where such labels are ignored.
<code>tg_specialChar</code>	Logical; should Praat typesetting for special font types such as italic, bold, and small caps be converted into corresponding R-readable special font types. Default is FALSE, since special characters can create unfortunate text alignment artefacts. See https://www.fon.hum.uva.nl/praat/manual/Text_styles.html .
<code>tg_color</code>	String or vector of strings giving the name of the color(s) to be used for the text in TextGrids. Default is 'black'. If a vector is provided, different colors are used for different tiers.

<code>tg_highlight</code>	Named list giving parameters for differential highlighting of TextGrid intervals. This list should contain information about which intervals to highlight, using the <code>tier</code> and <code>label</code> . Further contains the argument <code>color</code> , and <code>background</code> (a string specifying a background color).
<code>spec_channel</code>	Numeric giving the channel that should be used to generate the spectrogram. Default is 1. Generating spectrograms from multiple channels is not currently possible with <code>praatpicture</code> .
<code>spec_freqRange</code>	Vector of two integers giving the frequency range to be used for plotting spectrograms. Default is <code>c(0, 5000)</code> .
<code>spec_windowLength</code>	Window length in seconds for generating spectrograms. Default is <code>0.005</code> .
<code>spec_dynamicRange</code>	Dynamic range in dB for generating spectrograms. The maximum intensity minus <code>spec_dynamicRange</code> will all be printed in white. Default is <code>50</code> .
<code>spec_timeStep</code>	How many time steps should be calculated for spectrograms? Default is <code>1000</code> .
<code>spec_windowShape</code>	String giving the name of the window shape to be applied to the signal when generating spectrograms. Default is <code>Gaussian</code> ; other options are <code>square</code> , <code>Hamming</code> , <code>Bartlett</code> , <code>Hanning</code> , or <code>Blackman</code> . Note that the Gaussian window function provided by the <code>phonTools</code> package and used in <code>praatpicture()</code> does not have the same properties as the Gaussian window function used for spectral estimation in Praat; plotting a simple sine wave with high dynamic range will produce sidelobes in <code>praatpicture()</code> but not in Praat. It's recommended to use Blackman windows instead if you have this problem.
<code>spec_colors</code>	Vector of strings giving the names of colors to be used for plotting the spectrogram; default is <code>c('white', 'black')</code> . The first value is used for plotting the lowest visible amplitude, and the last for plotting the highest visible amplitude. Vectors with more than two color names can be used for plotting values in between in different colors.
<code>spec_axisLabel</code>	String giving the name of the label to print along the y-axis when plotting a spectrogram. Default is <code>Frequency (Hz)</code> .
<code>spec_highlight</code>	Named list giving parameters for differential highlighting of the spectrogram based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted TextGrid. Further contains the argument <code>colors</code> (vector of strings, see <code>spec_colors</code>).
<code>pitch_timeStep</code>	Measurement interval in seconds for tracking pitch. Default is <code>NULL</code> , in which case the measurement interval is equal to <code>0.75 / pitch_floor</code> .
<code>pitch_floor</code>	Frequency in Hz; no pitch candidates considered below this frequency. Default is <code>75</code> .
<code>pitch_ceiling</code>	Frequency in Hz; no pitch candidates considered above this frequency. Default is <code>600</code> .
<code>pitch_plotType</code>	String giving the type of pitch plot to produce; default is <code>draw</code> (a line plot), the only other option is <code>speckle</code> (a point plot). Alternatively a vector <code>c('draw', 'speckle')</code> can be passed, in which case both are used.

<code>pitch_scale</code>	String giving the frequency scale to use when producing pitch plots. Default is <code>hz</code> ; other options are <code>logarithmic</code> (also in <code>Hz</code>), <code>semitones</code> , <code>erb</code> , and <code>mel</code> .
<code>pitch_freqRange</code>	Vector of two integers giving the frequency range to be used for producing pitch plots. Default is <code>NULL</code> , in which case the pitch range is automatically reset to <code>c(-12, 30)</code> for the <code>semitones</code> scale, <code>c(0, 10)</code> for the <code>erb</code> scale, and <code>c(50, 500)</code> for the <code>Hz</code> -based scales, following Praat defaults.
<code>pitch_semitonesRe</code>	Frequency in <code>Hz</code> giving the reference level for converting pitch frequency to semitones. Default is <code>100</code> .
<code>pitch_color</code>	String giving the name of the color to be used for plotting pitch. Default is <code>'black'</code> . If <code>pitch_plotOnSpec=TRUE</code> , axes will follow the same color scheme. Also if <code>pitch_plotOnSpec=TRUE</code> , a vector of two strings can be passed, in which case the second color is used for background highlighting.
<code>pitch_plotOnSpec</code>	Boolean; should pitch be plotted on top of spectrogram? Default is <code>FALSE</code> .
<code>pitch_ssf</code>	An object of class <code>AsspDataObj</code> containing a pitch track. Default is <code>NULL</code> .
<code>pitch_axisLabel</code>	String giving the name of the label to print along the y-axis when printing a pitch track. Default is <code>NULL</code> , in which case the axis label will depend on the scale. If <code>pitch_plotOnSpec=TRUE</code> , this label will be printed on the right-hand y-axis label.
<code>pitch_highlight</code>	Named list giving parameters for differential highlighting of pitch based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted <code>TextGrid</code> . Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>pitch_color</code>), <code>drawSize</code> or <code>speckleSize</code> (both numeric), and <code>background</code> (a string specifying a background color).
<code>formant_timeStep</code>	Measurement interval in seconds for tracking formants. Default is <code>NULL</code> , in which case the measurement interval is equal to <code>formant_windowLength / 4</code> .
<code>formant_maxN</code>	Integer giving the maximum number of formants to track. Default is <code>5</code> .
<code>formant_windowLength</code>	The effective duration of the analysis window used for tracking formants in seconds; the actual duration of the analysis window is twice this value.
<code>formant_dynamicRange</code>	Dynamic range in <code>dB</code> for producing formant plots. When a formant plot of <code>formant_plotType='speckle'</code> is drawn, no formants are shown in frames with intensity level <code>formant_dynamicRange</code> below the maximum intensity. Default is <code>30</code> . If set to <code>0</code> , all formants are shown.
<code>formant_freqRange</code>	Vector of two integers giving the frequency range to be used for producing formant plots. Default is <code>c(0, 5500)</code> .

formant_number	Number of formants to plot. Default is NULL, in which case all available formants are plotted.
formant_plotType	String giving the type of formant plot to produce; default is speckle (a point plot), the only other option is draw (a line plot). Alternatively a vector c('draw', 'speckle') can be passed, in which case both are used.
formant_color	String or vector of strings giving the name(s) of colors to be used for plotting formants. If one color is provided, all formants will be plotted in this color. If multiple colors are provided, different formants will be shown in different colors. Default is 'black'. If formant_plotOnSpec=TRUE and the length of this vector twice the number of formants plotted, the first half of strings will be used for the formants' primary colors and the second half will be used for background highlighting. If the length of this vector is one more than the number of formants plotted, the last string will be used for background highlighting.
formant_plotOnSpec	Boolean; should formants be plotted on top of spectrogram? Default is FALSE.
formant_ssf	An object of class AsspDataObj containing formant tracks. Default is NULL.
formant_axisLabel	String giving the name of the label to print along the y-axis when plotting formants. Default is Frequency (Hz).
formant_highlight	Named list giving parameters for differential highlighting of formants based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the start and end arguments which must be numbers or numeric vectors, or using the tier and label arguments to highlight based on information in a plotted TextGrid. Further contains the optional arguments color (string or vector of strings, see formant_color), drawSize or speckleSize (both numeric), and background (a string specifying a background color).
intensity_timeStep	Measurement interval in seconds for tracking intensity. Default is NULL, in which case the measurement interval is equal to $0.8 * \text{intensity_minPitch}$.
intensity_minPitch	Lowest pitch in Hz used when calculating intensity; default is 100
intensity_range	Vector of two integers giving the intensity range to be used for producing intensity plots. Default is NULL, in which case the range is simply the minimum and maximum levels in the curve.
intensity_color	String giving the name of the color to be used for plotting intensity. Default is 'black'. If intensity_plotOnSpec=TRUE, axes will follow the same color scheme. Also if intensity_plotOnSpec=TRUE, a vector of two strings can be passed, in which case the second color is used for background highlighting.
intensity_plotOnSpec	Boolean; should intensity be plotted on top of spectrogram? Default is FALSE.
intensity_ssf	An object of class AsspDataObj containing intensity tracks. Default is NULL.

<code>intensity_axisLabel</code>	String giving the name of the label to print along the y-axis when plotting intensity. Default is Intensity (dB). If <code>intensity_plotOnSpec=TRUE</code> , this label will be printed on the right-hand y-axis label.
<code>intensity_highlight</code>	Named list giving parameters for differential highlighting of the intensity contour based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted <code>TextGrid</code> . Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>intensity_color</code>) and <code>drawSize</code> (integer), and <code>background</code> (a string specifying a background color).
<code>time_axisLabel</code>	String giving the name of the label to print along the x-axis. Default is <code>NULL</code> , in which case <code>Time (s)</code> is printed if <code>tUnit = 's'</code> and <code>Time (ms)</code> is printed if <code>tUnit = 'ms'</code> .
<code>highlight</code>	Named list giving parameters for differential highlighting of part of the plot based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted <code>TextGrid</code> . Further contains the optional arguments <code>color</code> (a string), <code>drawSize</code> and <code>speckleSize</code> (both numeric), and <code>background</code> (a string specifying a background color). This argument is used to highlight all plot components, use the <code>*_highlight</code> arguments for highlighting individuals plot components.
<code>draw_lines</code>	Use for drawing straight lines on plot components. Takes an argument of type <code>list</code> which should contain a) a string giving the plot component to draw straight lines on, and b) arguments to pass on to <code>graphics::abline</code> . Should have a named argument <code>h</code> for horizontal lines, or <code>v</code> for vertical lines, or <code>a,b</code> for the intercept and slope of the line otherwise. Alternatively a nested list can be passed if more (sets of) lines should be drawn. If multiple audio channels are plotted and lines should be added to one of these, use the channel identifier instead of a string giving the frame to draw on. The default value is <code>list('formant', h=seq(0,10000,by=1000), lty='dotted')</code> . According to Praat defaults, this means that if formants are plotted in a separate frame, horizontal dotted lines (<code>lty</code>) are shown at 1000 Hz intervals. To override this behavior, simply pass <code>draw_lines=NULL</code> .
<code>draw_rectangle</code>	Use for drawing rectangles on plot components. A vector containing a) a string giving the plot component to draw a rectangle on, and b) arguments to pass on to <code>graphics::rect</code> . Alternatively a list of such vectors, if more rectangles should be drawn. If multiple audio channels are plotted and a rectangle should be added to one of these, use the channel identifier instead of a string giving the frame to draw on.
<code>draw_arrow</code>	Use for drawing arrows on plot components. A vector containing a) a string giving the plot component to draw an arrow on, and b) arguments to pass on to <code>graphics::arrows</code> . Alternatively a list of such vectors, if more arrows should be drawn. If multiple audio channels are plotted and an arrow should be added to

	one of these, use the channel identifier instead of a string giving the frame to draw on.
annotate	Use for annotating plot components. A vector containing a) a string giving the plot component to annotate, and b) arguments to pass on to <code>graphics::text</code> . Alternatively a list of such vectors, if more annotations should be made. If multiple audio channels are plotted and annotations should be added to one of these, use the channel identifier instead of a string giving the frame to draw on.
gender	String indicating the gender of the speaker; default is u for unknown, other legal values are m and f. Used to tweak pitch and formant tracking parameters.
...	Further global plotting arguments passed on to <code>par()</code> .

Details

When available, pitch, formant, and intensity tracks are loaded from Praat files with the same base name as sound; i.e., if your sound file is called 1.wav and there is a Praat file called 1.Formant in the same directory, this file is used for plotting formants. Pitch files should have either the `PitchTier` or `Pitch` extension, and intensity files should have the `IntensityTier` extension.

If no such files are available, the signal processing tools in the `wrassp` package are used; pitch is tracked with the function `wrassp::ksvFO`, formants are tracked with `wrassp::forest`, and intensity is tracked with `wrassp::rmsana`. Parameters are set to mimic Praat as closely as possible, e.g. using a Gaussian-like window shape `KAISER2_0`, but results will differ from Praat simply because the tracking algorithms differ; as far as I know, the Burg algorithm used by Praat for tracking formants isn't implemented in R, nor is the autocorrelation method for tracking pitch.

Spectrograms are generated with the function `phonTools::spectrogram`. The code portion that actually adds the spectrogram to a plot is based on `phonTools::plot.spectrogram` but rewritten to use a bitmap raster for rendering the image if the graphics device allows for it, which significantly speeds up rendering the spectrogram.

Value

No return value, produces a figure.

Examples

```
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile)
```

shiny_praatpicture *Run praatpicture as Shiny app*

Description

Interactive version of [praatpicture](#)

Usage

```
shiny_praatpicture()
```

Value

No return values

Examples

```
## Not run:  
shiny_praatpicture()  
  
## End(Not run)
```

specplot

Plot spectrogram

Description

Function for plotting spectrograms called by [praatpicture](#). Instead of using this function directly, just use `praatpicture('my_sound_file', frames='spectrogram')`.

Usage

```
specplot(  
  sig,  
  sr,  
  t,  
  start,  
  end,  
  tfrom0 = TRUE,  
  freqRange = c(0, 5000),  
  windowLength = 0.005,  
  dynamicRange = 60,  
  timeStep = 1000,  
  windowShape = "Gaussian",  
  colors = c("white", "black"),  
  pitch_plotOnSpec = FALSE,  
  pt = NULL,  
  pitch_plotType = "draw",  
  pitch_scale = "hz",  
  pitch_freqRange = NULL,  
  pitch_axisLabel = NULL,  
  pitch_color = "black",  
  pitch_highlight = NULL,  
  formant_plotOnSpec = FALSE,  
  fm = NULL,
```

```

formant_plotType = "speckle",
formant_dynamicRange = 30,
formant_color = "black",
formant_highlight = NULL,
intensity_plotOnSpec = FALSE,
it = NULL,
intensity_range = NULL,
intensity_axisLabel = "Intensity (dB)",
intensity_color = "black",
intensity_highlight = NULL,
tgbool = FALSE,
lines = NULL,
focusTierColor = "black",
focusTierLineType = "dotted",
ind = NULL,
min_max_only = TRUE,
highlight = NULL,
axisLabel = "Frequency (Hz)",
drawSize = 1,
speckleSize = 1
)

```

Arguments

<code>sig</code>	Numeric vector corresponding to a sound signal.
<code>sr</code>	Integer giving the sampling rate of the signal.
<code>t</code>	Numeric vector giving times corresponding to the signal.
<code>start</code>	Start time (in seconds) of desired plotted area.
<code>end</code>	End time (in seconds) of desired plotted area.
<code>tfrom0</code>	Logical; should time on the x-axis run from 0 or from the original time? Default is TRUE.
<code>freqRange</code>	Vector of two integers giving the frequency range to be used for plotting spectrograms. Default is <code>c(0, 5000)</code> .
<code>windowLength</code>	Window length in seconds for generating spectrograms. Default is <code>0.005</code> .
<code>dynamicRange</code>	Dynamic range in dB for generating spectrograms. The maximum intensity minus <code>dynamicRange</code> will all be printed in white. Default is <code>50</code> .
<code>timeStep</code>	How many time steps should be calculated for spectrograms? Default is <code>1000</code> . Note that this takes a while to plot, so for fiddling with plotting parameters it is a good idea to choose a smaller value.
<code>windowShape</code>	String giving the name of the window shape to be applied to the signal when generating spectrograms. Default is <code>Gaussian</code> ; other options are <code>square</code> , <code>Hamming</code> , <code>Bartlett</code> , <code>Hanning</code> , or <code>Blackman</code> . Note that the <code>Gaussian</code> window function provided by the <code>phonTools</code> package and used in <code>praatpicture()</code> does not have the same properties as the <code>Gaussian</code> window function used for spectral estimation in Praat; plotting a simple sine wave with high dynamic range will produce sidelobes in <code>praatpicture()</code> but not in Praat. It's recommended to use <code>Blackman</code> windows instead if you have this problem.

<code>colors</code>	Vector of strings giving the names of colors to be used for plotting the spectrogram; default is <code>c('white', 'black')</code> . The first value is used for plotting the lowest visible amplitude, and the last for plotting the highest visible amplitude. Vectors with more than two color names can be used for plotting values in between in different colors.
<code>pitch_plotOnSpec</code>	Boolean; should pitch be plotted on top of spectrogram? Default is <code>FALSE</code> .
<code>pt</code>	Pitch object loaded using <code>rPraat::pt.read</code> or similar object.
<code>pitch_plotType</code>	String giving the type of pitch plot to produce; default is <code>draw</code> (a line plot), the only other option is <code>speckle</code> (a point plot). Alternatively a vector <code>c('draw', 'speckle')</code> can be passed, in which case both are used.
<code>pitch_scale</code>	String giving the frequency scale to use when producing pitch plots. Default is <code>hz</code> ; other options are <code>logarithmic</code> (also in <code>Hz</code>), <code>semi tones</code> , <code>erb</code> , and <code>mel</code> .
<code>pitch_freqRange</code>	Vector of two integers giving the frequency range to be used for producing pitch plots. Default is <code>NULL</code> , in which case the pitch range is automatically reset to <code>c(-12, 30)</code> for the <code>semi tones</code> scale, <code>c(0, 10)</code> for the <code>erb</code> scale, and <code>c(50, 500)</code> for the <code>Hz</code> -based scales, following Praat defaults.
<code>pitch_axisLabel</code>	String giving the name of the label to print along the y-axis when printing a pitch track. Default is <code>NULL</code> , in which case the axis label will depend on the scale.
<code>pitch_color</code>	String or vector of strings giving the name of the color to be used for plotting pitch. Default is <code>'black'</code> . If a vector of two strings is passed, the second color will be used for background highlighting.
<code>pitch_highlight</code>	Named list giving parameters for differential highlighting of pitch based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted <code>TextGrid</code> . Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>pitch_color</code>), <code>drawSize</code> or <code>speckleSize</code> (both numeric).
<code>formant_plotOnSpec</code>	Boolean; should formants be plotted on top of spectrogram? Default is <code>FALSE</code> .
<code>fm</code>	Formant object loaded using <code>rPraat::formant.read</code> or similar object.
<code>formant_plotType</code>	String giving the type of formant plot to produce; default is <code>speckle</code> (a point plot), the only other option is <code>draw</code> (a line plot). Alternatively a vector <code>c('draw', 'speckle')</code> can be passed, in which case both are used.
<code>formant_dynamicRange</code>	Dynamic range in <code>dB</code> for producing formant plots. When a formant plot of <code>formant_plotType='speckle'</code> is drawn, no formants are shown in frames with intensity level <code>formant_dynamicRange</code> below the maximum intensity. Default is <code>30</code> . If set to <code>0</code> , all formants are shown.
<code>formant_color</code>	String or vector of strings giving the name(s) of colors to be used for plotting formants. If one color is provided, all formants will be plotted in this color.

If multiple colors are provided, different formants will be shown in different colors. Default is 'black'. If the length of this vector twice the number of formants plotted, the first half of strings will be used for the formants' primary colors and the second half will be used for background highlighting. If the length of this vector is one more than the number of formants plotted, the last string will be used for background highlighting.

formant_highlight	Named list giving parameters for differential highlighting of formants based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted <code>TextGrid</code> . Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>formant_color</code>), <code>drawSize</code> or <code>speckleSize</code> (both numeric).
intensity_plotOnSpec	Boolean; should intensity be plotted on top of spectrogram? Default is FALSE.
it	Intensity object loaded using <code>rPraat::it.read</code> or similar object.
intensity_range	Vector of two integers giving the intensity range to be used for producing intensity plots. Default is NULL, in which case the range is simply the minimum and maximum levels in the curve.
intensity_axisLabel	String giving the name of the label to print along the y-axis when plotting intensity. Default is Intensity (dB).
intensity_color	String or vector of strings giving the name of the color to be used for plotting intensity. Default is 'black'. If a vector of two strings is passed, the second color will be used for background highlighting.
intensity_highlight	Named list giving parameters for differential highlighting of the intensity contour based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted <code>TextGrid</code> . Further contains the optional arguments <code>color</code> (string or vector of strings, see <code>intensity_color</code>) and <code>drawSize</code> (integer).
tgbool	Logical; should dotted lines be plotted corresponding to locations in a <code>TextGrid</code> ? Default is FALSE.
lines	Numeric vector giving locations in seconds of locations from a <code>TextGrid</code> to be plotted with dotted lines. Default is NULL.
focusTierColor	String or vector of strings giving the color(s) to use for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth color. Default is 'black'.
focusTierLineStyle	String or vector of strings giving the line type(s) for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth line type. Default is 'dotted'.

ind	Integer indexing waveform relative to other plot components. Default is NULL.
min_max_only	Logical; should only minimum and maximum values be given on the y-axis? Default is TRUE. Can also be a logical vector if some but not all plot components should have minimum and maximum values on the y-axis. Ignored for TextGrid component.
highlight	Named list giving parameters for differential highlighting of the spectrogram based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the start and end arguments which must be numbers or numeric vectors, or using the tier and label arguments to highlight based on information in a plotted TextGrid. Further contains the argument colors (vector of strings, see colors).
axisLabel	String giving the name of the label to print along the y-axis when plotting a spectrogram. Default is Frequency (Hz).
drawSize	Number indicating the line width of plot components where the _plotType is 'draw' (i.e., pitch, formants, or intensity rendered as line plots). Default is 1. Controls the lwd argument of graphics::lines .
speckleSize	Number indicating the point size of plot components where the _plotType is 'speckle' (i.e. pitch or formants rendered as point plots). Default is 1. Controls the cex arguments of graphics::points .

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, frames='spectrogram')
```

talking_praatpicture *Make Praat Picture style plots of acoustic data with embedded audio*

Description

Generate simple MP4 video files with Praat Picture style plots of acoustic data with time-aligned transcriptions and embedded audio to use in presentations etc.

Usage

```
talking_praatpicture(
  sound,
  start = 0,
  end = 0,
  audio_start = start,
```

```

    audio_end = end,
    width = 1080,
    height = 720,
    pointsize = 25,
    outputFile = "praatvid.mp4",
    useViewer = TRUE,
    ...
)

```

Arguments

sound	String giving the file name of a sound file with the .wav extension.
start	Start time (in seconds) of desired plotted area. Default is 0.
end	End time (in seconds) of desired plotted area. Default is 0 (= the entire file).
audio_start	Start time (in seconds) of embedded audio. By default it is the same as start, i.e. the embedded audio is the portion of the sound file that is being plotted.
audio_end	End time (in seconds) of embedded audio. By default it is the same as end, i.e. the embedded audio is the portion of the sound that is being plotted.
width	Number giving the desired width of the resulting animation in pixels; default is 1080.
height	Number giving the desired height of the resulting animation in pixels; default is 720.
pointsize	Number; which point size should be used for text in the animation? Default is 25. See <code>grDevices::png()</code> for more details.
outputFile	String giving the desired file name. Default is praatvid.mp4.
useViewer	Logical; should the video be shown in the Viewer pane in RStudio? Default is TRUE; if true, the video is only saved in a temporary directory, but can be downloaded from a browser.
...	Further arguments passed to praatpicture.

Value

No return value, produces a video file.

See Also

This function is a wrapper for `av::av_capture_graphics()` used to produce plots similar to those made with `praatpicture()` with embedded audio. For more detail on your options, see the `praatpicture()` help file.

Examples

```

## Not run:
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
talking_praatpicture(soundFile)

## End(Not run)

```

 tgplot

Plot TextGrid

Description

Function for plotting TextGrids called by [praatpicture](#). Instead of using this function directly, just use `praatpicture('my_sound_file', frames='TextGrid')`.

Usage

```
tgplot(
  tg,
  t,
  sr,
  start,
  end,
  tiers = 1,
  tfrom0 = TRUE,
  tierNames = TRUE,
  alignment = "central",
  edgeLabels = "keep",
  specialChar = FALSE,
  color = "black",
  highlight = NULL
)
```

Arguments

tg	TextGrid object loaded using rPraat::tg.read
t	Numeric vector giving times corresponding to the signal.
sr	Integer giving the sampling rate of the signal.
start	Start time (in seconds) of desired plotted area.
end	End time (in seconds) of desired plotted area.
tiers	Vector of number or strings giving either numeric identifiers of TextGrid tiers to plot or the names of TextGrid tiers to plot. Default is 1, which plots just the first tier.
tfrom0	Logical; should time on the x-axis run from 0 or from the original time? Default is TRUE.
tierNames	Logical; should TextGrid tier names be printed along the y-axis? Default is TRUE.
alignment	String giving the desired alignment of text in the TextGrids. Default is <code>central</code> ; other options are <code>left</code> and <code>right</code> . Alternatively, a vector of strings if different alignments are needed.

edgeLabels	String specifying how to handle TextGrid labels in interval tiers that fall partially before start or partially after end. Default is 'keep', where labels are kept at the center of the interval. Other options are 'center', where labels are recentered to the visible part of the interval, or 'discard', where such labels are ignored.
specialChar	Logical; should Praat typesetting for special font types such as italic, bold, and small caps be converted into corresponding R-readable special font types. Default is FALSE, since special characters can create unfortunate text alignment artefacts. See https://www.fon.hum.uva.nl/praat/manual/Text_styles.html .
color	String or vector of strings giving the name of the color(s) to be used for the text in TextGrids. Default is 'black'. If a vector is provided, different colors are used for different tiers.
highlight	Named list giving parameters for differential highlighting of TextGrid intervals. This list should contain information about which intervals to highlight, using the tier and label. Further contains the argument color, and background (a string specifying a background color).

Value

No return values, called internally by [praatpicture](#) and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, frames='TextGrid')
```

tg_createTier	<i>Interactively create a TextGrid tier</i>
---------------	---

Description

Function for creating TextGrid tiers called by [make_TextGrid](#). Instead of using this function directly, use [make_TextGrid](#).

Usage

```
tg_createTier(
  sound,
  tierName,
  start = 0,
  end = 0,
  show = "wave",
  channel = 1,
  sampa2ipa = FALSE
)
```

Arguments

sound	String giving the file name of a sound file with the .wav extension.
tierName	String giving the name of the tier.
start	Start time (in seconds) of desired plotted area. Default is 0.
end	End time (in seconds) of desired plotted area. Default is 0 (= the entire file).
show	String giving the type of plot to show. Default is wave, another option is spectrogram. Note that spectrogram plotting is relatively slow within this function.
channel	Number indicating which audio channel to show. Default is 1.
sampa2ipa	Logical; should SAMPA transcriptions be converted to IPA? Default is FALSE.

Value

A list object identical to a single tier created by `rPraat::tg.read()` when loading TextGrid objects into R.

Examples

```
## Not run:
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/2.wav')
tg <- make_TextGrid(soundFile, tierNames='Mary')
# Follow the steps shown in the console

praatpicture(soundFile, tg_obj=tg)

## End(Not run)
```

 tg_stylize

Convert Praat font styles to R font styles

Description

Helper function for converting Praat font styles such as italics, bold, and small caps into expressions that can be read by base R plots. Instead of using this function directly, just use `praatpicture('my_sound_file', frames='TextGrid', tg_specialChar=TRUE)`.

Usage

```
tg_stylize(lab)
```

Arguments

lab	A string or vector of strings with labels from a TextGrid.
-----	--

Value

A list with elements of class expression.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')

# With stylized text
praatpicture(soundFile, frames='TextGrid')

# Without stylized text
praatpicture(soundFile, frames='TextGrid', tg_specialChar=FALSE)
```

waveplot

Plot waveform

Description

Function for plotting waveforms called by [praatpicture](#). Instead of using this function directly, just use `praatpicture('my_sound_file', frames='sound')`.

Usage

```
waveplot(
  sig,
  bit,
  t,
  nchan = 1,
  color = "black",
  tgbool = FALSE,
  lines = NULL,
  focusTierColor = "black",
  focusTierLineType = "dotted",
  ind = NULL,
  line_comp = NULL,
  rect_comp = NULL,
  arr_comp = NULL,
  annot_comp = NULL,
  draw_lines = NULL,
  draw_rectangle = NULL,
  draw_arrow = NULL,
  annotate = NULL,
  channelNames = FALSE,
  lineWidth = 1,
  cn = NULL,
```

```

    min_max_only = TRUE,
    highlight = NULL
)

```

Arguments

<code>sig</code>	Numeric vector corresponding to a sound signal.
<code>bit</code>	Numeric; will generally be grabbed from a loaded WaveMC object.
<code>t</code>	Numeric vector giving times corresponding to the signal.
<code>nchan</code>	Numeric; how many channels will be plotted? Default is 1.
<code>color</code>	String giving the name of the color to be used for plotting the waveform. Default is 'black'. Alternatively, a vector of colors, if different channels should be plotted with different colors.
<code>tgbool</code>	Logical; should dotted lines be plotted corresponding to locations in a TextGrid? Default is FALSE.
<code>lines</code>	Numeric vector giving locations in seconds of locations from a TextGrid to be plotted with dotted lines. Default is NULL.
<code>focusTierColor</code>	String or vector of strings giving the color(s) to use for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth color. Default is 'black'.
<code>focusTierLineType</code>	String or vector of strings giving the line type(s) for plotting focus tier lines. If multiple tiers are focused, a vector of the same length can be passed, and the nth tier will be plotted in the nth line type. Default is 'dotted'.
<code>ind</code>	Integer indexing waveform relative to other plot components. Default is NULL.
<code>line_comp</code>	Vector of strings or numbers giving plot components to draw straight lines on. Default is NULL.
<code>rect_comp</code>	Vector of strings or numbers giving plot components to draw rectangles on. Default is NULL.
<code>arr_comp</code>	Vector of strings of numbers giving plot components to draw arrows on. Default is NULL.
<code>annot_comp</code>	Vector of strings of numbers giving plot components to annotate. Default is NULL.
<code>draw_lines</code>	List of arguments for drawing straight lines passed from <code>praatpicture()</code> . Default is NULL.
<code>draw_rectangle</code>	List of arguments for drawing rectangles passed from <code>praatpicture()</code> . Default is NULL.
<code>draw_arrow</code>	List of arguments for drawing arrows passed from <code>praatpicture()</code> . Default is NULL.
<code>annotate</code>	List of arguments for annotating passed from <code>praatpicture()</code> . Default is NULL.
<code>channelNames</code>	Logical; should names of audio channels be printed on the y-axis? Default is FALSE.
<code>lineWidth</code>	Number giving the line width to use for plotting the waveform. Default is 1.

<code>cn</code>	Vector of strings with channel names to be printed on the y-axis if <code>channelNames</code> is TRUE.
<code>min_max_only</code>	Logical; should only minimum and maximum values be given on the y-axis? Default is TRUE. Can also be a logical vector if some but not all plot components should have minimum and maximum values on the y-axis. Ignored for <code>TextGrid</code> component.
<code>highlight</code>	Named list giving parameters for differential highlighting of the waveform based on the time domain. This list should contain information about which parts of the plot to highlight, either done with the <code>start</code> and <code>end</code> arguments which must be numbers or numeric vectors, or using the <code>tier</code> and <code>label</code> arguments to highlight based on information in a plotted <code>TextGrid</code> . Further contains the argument <code>color</code> (string, see <code>color</code>), and <code>background</code> (a string specifying a background color).

Value

No return values, called internally by `praatpicture` and sibling functions.

Examples

```
# Don't use directly
datapath <- system.file('extdata', package='praatpicture')
soundFile <- paste0(datapath, '/1.wav')
praatpicture(soundFile, frames='sound')
```

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