

一、libsora安装

Librosa官网提供了多种安装方法,详细如下:

pypi

最简单的方法就是进行pip安装,可以满足所有的依赖关系,命令如下:

pip install librosa

conda

如果安装了Anaconda,可以通过conda命令安装:

conda install -c conda-forge librosa

source

直接使用源码安装,需要提前下载源码(https://github.com/librosa/librosa/releases/),通过下面命令安装:

- 1 tar xzf librosa-VERSION.tar.gz
- 2 cd librosa-VERSION/
- 3 python setup.py install

二、librosa常用功能

核心音频处理函数

这部分介绍了最常用的音频处理函数,包括音频读取函数load(),重采样函数resample(),短时傅里叶变换stft(),幅度转换函数amplitude_to_db()函数hz_to_mel()等。这部分函数很多,详细可参考librosa盲网 http://librosa.github.io/ librosa/core.html

音频处理

teed (path), sr, mono, offset, duration,))	Load an audio file as a floating point time series.
to, see [y]	Force an audio signal down to mono.
resemble (y, orig_st; target_st), res_type;))	Resample a time series from orig_sr to target_or
$get_torution\ ((y, st, S, n_H), hop_length,))$	Compute the duration (in seconds) of an audio time series.
extronovelate (y/, mox_slow, axis))	Bounded auto-correlation
sers_crossings (y/, threshold,))	Find the zero-crossings of a signal y: Indices i such that sign
clains ((times, frames, sr, hop_length,))	Returns a signal with the signal cases placed at each spec

频谱表示

uses (y(, n,ftt, hop,length, win,length,))	Short-time Fourier transform (STFT)
svers (offs, matrix), hop_length, win_length,)	Inverse short-time Fourier transform (ISTFT).
Marrier (rf., sr. n., fft, hop, length,))	Compute the instantaneous frequency (as a proportion
out (y), sr, hop_length, fmin, n_bins,))	Compute the constant-Q transform of an audio signal.
sout (C), sr, hop, length, fmin,))	Compute the inverse constant-Q transform.
tyleria_xye (yl, sr, top_length, fmin,))	Compute the hybrid constant-Q transform of an audio-
pseuto_cup (yf, sr, top_length, fmin,))	Compute the pseudo constant-Q transform of an audio
sars (y(, sr, win_length, hop_length,))	Time-frequency representation using IR filters [R99].
net (y), t, min, n, fint, kind, beta,))	The fast Mellin transform (FMT) [R1112] of a uniformly
Settery_terminics (x, freqs, h_range(, kind,))	Compute the energy at harmonics of time-frequency re
settence (S, freqs, h_range(, weights,))	Harmonic sallence function.
phase_recodor (D, rate(, hop_length))	Phase vocades.
magnines (D), power()	Separate a complex-valued spectrogram D into its mag-

幅度转换

exptinues_to_en (50, ref., amin, top_,650)	Convert an amplitude spectrogram to dB-scaled spectr
ds_ts_emplifiate (5,60(,105))	Convert a dB-scaled spectrogram to an amplitude spec
powr_to_do (K), ref. amin, top_db()	Convert a power spectrogram (amplitude squared) to d
46_51_power (5,450,145)	Convert a dB-scale spectrogram to a power spectrogra
perceptual_velgering (5, frequencies, "forargo)	Perceptual weighting of a power spectrogram:
Auxigening (frequencies), min_db()	Compute the A-weighting of sitset of frequencies: 10

时频转换

No., TH., MARK (Proguencies) Get MIDII note number(s) for given frequencies MARK_TH_, No. (Notes) Get the frequency (Hz) of MIDII note(s) MARK_TH_, NARK (Initial), Octave, cents(s) Convert one or more MIDI numbers to note strings. MARK_TH_, NARK (Inote), "Rewargs) Convert one or more note numes to frequency (Hz) MARK_TH_, MARK (Inote), round_mid(s) Convert one or more spelled notes to MIDII number(s), MARK_TH_, MARK (Irrequencies), MIDII number(s). MARK_TH_, MARK (Irrequencies), MIDII number(s).		
Samples_ta_frames (samples), hop_length, n_fft() Converts sample indices to time (in seconds). Samples_ta_frames (blmen), sr, hop_length, n_fft() Converts time stamps into STFT frames. Stam_ta_frames (blmen), sr() Convert timestamps (in seconds) to sample indices. Sa_fra_note (brequencies, "fixearps) Convert one or more frequencies (in Hz) to the nearest statu_fra_note (indices, "fixearps) Get the frequency (Hz) of MIDI note() statu_fra_note (indid), octave, cents() Get the frequency (Hz) of MIDI note() satu_fra_note (indid), octave, cents() Convert one or more sofe names to frequency (Hz) satu_fra_note (indid, note(), note()) satu_fra_note (indid, note(), note()) convert one or more spelled notes to MIDI number(). Satu_fra_note (indid, note(), note()) Convert one or more spelled notes to MIDI number(). Satu_fra_note (indid, note(), note()) Convert Hz to Mets Convert Hz to Mets Convert melibin numbers to frequencies satu_fra_note(, MS)) Convert melibin numbers to frequencies convert melibin numbers to frequencies. 477_frequencies (sr, n_fft) Alternative implementation of sp.fft.ffthreqs	frames, to, samples (frames), hop, length, n, M()	Converts frame Indices to audio sample Indices
Convert sample indices to time (in seconds). time_ta_ta_seques (times), sr, hop_length, n_fft() time_ta_seques (times), sr() time_ta_seques (times), sr() Convert timestamps (in seconds) to sample indices. ta_ta_nate (frequencies, "favorp) Get MIDI note number(s) for given frequencies elat_ta_nate (indic), octave, cents() elat_ta_nate (indic), octave, cents() convert one or more MIDI numbers to note strings. elat_ta_nate (indic), reserve) Convert one or more note numes to frequency (Hz) elat_ta_nate (inder, reserve) Convert one or more note numes to frequency (Hz) elat_ta_nate (inder, reserve) Convert one or more spelled notes to MIDI number(s). ta_ta_nate (frequencies), http:// convert the to Mels Convert Hz to Mels Convert the quencies (Hz) to (fractional) octave number els_ta_nate (inels), http:// convert melibin numbers to frequencies.	frame, n., size (frames(, sr, hop_length, n_ff())	Converts frame counts to time (seconds)
time_to_ne_tomes (timen(, sr, hop_length, n_fft) Convert timestamps (in seconds) to sample indices. to_to_nests (frequencies, "favorgs) Convert timestamps (in seconds) to sample indices. to_to_nests (frequencies) for the frequency (hz) of thick for given frequencies stat_to_nests (middl, octave, cents)) Convert one or more MiDI numbers to note strings. sots_to_nests (note, "leavings) Convert one or more note number to mote strings. convert one or more spelled notes to MiDI number() to_to_nest (note), round_mid() Convert one or more spelled notes to MiDI number(). to_to_nest (frequencies(, hth)) Convert the to Mets Convert the to Mets Convert the to Mets Convert melibin numbers to frequencies ext_to_ne (inct(, hth)) Convert melibin numbers to frequencies. ext_to_ne (inct(, hth)) Convert melibin numbers to frequencies. ext_to_ne (inct(, hth)) Convert octaves numbers to frequencies. ext_to_ne (inct(, hth)) Convert octaves numbers to frequencies.	saytes_to_frames (samples), hop_length, n_fft()	Converts sample indices into STFT frames.
Take_te_seepher (timen(, or)) Convert timentumps (in seconds) to sample indices. Ac_te_wate (frequencies, "Takeargs) Convert one or more frequencies (in Hz) to the nearest sets_te_wate (frequencies) Act MIDI note number(s) for given frequencies Act the frequency (Hz) of MIDI note(s) Act the frequency (Hz) of MIDI note(s) Act the frequency (Hz) of miDI numbers to note strings. Act the_nets (note, "favoregs) Convert one or more things numbers to frequency (Hz) Act to_mat (frequencies(, Mth)) Convert one or more spelled notes to MiDI number(s). Ac_te_mat (frequencies(, Mth)) Convert Hz to Mels Convert frequencies (Hz) to (fractional) octave numbers act_te_mat (ore)(, Add(s)) Convert melibin numbers to frequencies acts_te_mat (ore)(, Add(s)) Convert melibin numbers to frequencies acts_te_mat (ore)(, Add(s)) Convert octaves numbers to frequencies. Alternative implementation of ap.#E.#threqs	samples_to_time (tamples(, tr))	Convert sample indices to time (in seconds).
Tec., tec., and a (frequencies) Convert one or more frequencies (in Hz) to the neuron tec., tec., and a (mote) Get MIDI note number(s) for given frequencies stat., tec., and (mote) Get the frequency (Hz) of MIDI note(s) stat., tec., and (mote) Convert one or more MIDI numbers to note strings. sets., tec., and (mote), "fewar(s) Convert one or more note numes to frequency (Hz) sets., tec., and (frequencies), finds) Convert one or more spelled notes to MIDI number(s). tec., tec., and (frequencies), finds) Convert the to Mels tec., tec., and (frequencies), finds) Convert frequencies (Hz) to (fractional) octave number set., tec., tec	tim, to, trans (time), sr, hop, length, n, ft()	Converts time stamps into STFT frames.
Ref., Tec, No. (Index) Get MIDII note number(s) for given frequencies	tim_to_septos (times(, sr))	Convert timestamps (in seconds) to sample indices.
#445_No_No (notes) #445_No (note	tc,tx,sets (frequencies, "foxorpi)	Convert one or more frequencies (in Hz) to the nearest
#445_No_Avex (Inidit), octave, cents() **Avex_No_Avex (Inidit), octave, cents() **Avex_No_Avex (Inidit), octave, cents() **Avex_No_Avex (Inidit), round_mid() **Avex_No_Avex (Initit), round_mid() **Convert frequencies (Hz) to (Inicitional) octave number (Initit), round_note(), ro	hc,hc,eas (frequencies)	Get MIDI note number(s) for given frequencies
netx_tx_axis (note, "fewargs) Convert one or more note names to frequency (Hz) netx_tx_axis (note), round_mid() Convert one or more spelled notes to MiDi number(s). Nc_tx_axis (frequencies), hth) Convert Hz to Mels Convert frequencies (Hz) to (fractional) octave number net_tx_axis (mels), hth) Convert melibin numbers to frequencies octs_tx_axis (octs), A440() Convert octaves numbers to frequencies. 411_Arequencies (bt, n_ft) Alternative implementation of sp.fft.fftfreqs	4645_54_54 (10095)	Get the frequency (Hz) of MIDI note(s)
Netw_ta_wiell (note), round_mid() To_ta_est (frequencies), NtN() To_ta_est (frequencies), NtN() To_ta_est (frequencies), NtN() To_ta_est (frequencies), NtN() Convert frequencies (Nt) to (fractional) octave number set_ta_est (mels), NtN() Convert melibin numbers to frequencies ests_ta_est (octs), A440() Convert octaves numbers to frequencies. FFL_frequencies (bt, n_fft) Alternative implementation of sp.ffLfft/reqs	misti_to_nets (mid(, octove, cents))	Convert one or more MIDI numbers to note strings.
nc_tx_set (frequencies(_Athi)) Convert Hz to Mels nc_tx_sets (frequencies(_Athi)) Convert frequencies (Hz) to (fractional) octave number set_tx_tx_set (mels(_Athi)) Convert melibin numbers to frequencies setx_tx_tx_set (octs(_Athi)) Convert octaves numbers to frequencies. setx_frequencies (octs, n_ft) Alternative implementation of sp.ft.ft/freqs	nets_to_bs (note, "Inverge)	Convert one or more note names to frequency (Hz)
he_he_wors (frequencies(_AA40)) Convert frequencies (Hz) to (fractional) octave number set_he_he (mels(_MS)) Convert melibin numbers to frequencies ocks_he_he (octs(_AA40)) Convert octaves numbers to frequencies. FFL_frequencies (br, n_MS) Alternative implementation of np.Mt.Mtfreqs	sets_to_elet (note), round_mid()	Convert one or more spelled notes to MIDI number(s).
set_tx_tx_bx (mels(_htk)) Convert melitin numbers to frequencies ortx_tx_bx (octs(_A440)) Convert octaves numbers to frequencies. FFL_frequencies (or, n_fft) Alternative implementation of np.fft.fft/requ	tc,tx,sct (frequencies(,166))	Convert Hir to Mels
ects_ts_ts_ts (octs(_A440)) Convert octaves numbers to frequencies. ##1_frequencies (or, n_fft) Alternative implementation of np.fft.ffthags	te_te_ects (frequencies(_A440))	Convert frequencies (Hz) to (fractional) octave number
FFL, frequencies (SC, n, fft) Alternative implementation of np.fft.ffthregs	set, n., n. (min), hth)	Convert melibin numbers to frequencies
	octs,to,to (octs(,A440))	Convert octaves numbers to frequencies.
cqt_frequencies (n_bitrs, fmin(, _) Compute the certier frequencies of Constant Q biris.	FTI, frequencies (SC, II, PE)	Alternative implementation of np.Rt.Rtfreqs
	cqt_frequencies (t_bits, fmin(,))	Compute the center frequencies of Constant Q Sins.

特征提取

本部分列举了一些常用的频谱特征的提取方法,包括常见的Mel Spectrogram、MFCC、CQT等。函数详细信息可参考http://librosa.github.io/librosa/feature.html

```
Compute a chromagram from a waveform or power
chross_soft ($c. sc. S. norm, n. ft. ...))
                                                 specinogram.
                                                 Constant-Q chromagram
chroma_cut (5; sr. C. hop_length, fmin, ....))
                                                 Computes the chroma variant 'Chroma Energy
chrose, cess (b; sr, C, hop, length, fmin, ...))
                                                 Normalized' (CENS), following [R0101].
eclapectrogram (St. N. S. R., M. ....))
                                                 Compute a met-scaled spectrogram
etu (S. M. S. A. MEXI)
                                                 Mel-frequency cepstral coefficients
                                                 Compute root mean square (FBMS) energy for each
ress (gr. 5, frame_length, top_length, ...))
                                                 frame, either from the audio samples y or from a
                                                 spectrogram 5
spectral_centrald (by. St. St. N. St. ...)
                                                 Compute the spectral centroid
Compute p'th-order spectral bandwidth
Compute spectral contrast [R3535]
spectral_Clateess (ly. S. II, III, hop |kingth. ....))
                                                 Compute spectral flatness
spectral_reliant (b, st, S, n_m, _);
                                                 Compute roll off frequency
                                                 Get coefficients of fitting an nth-order polynomial to
poly, features (Ex. St. S. n., III, hop, length, ...))
                                                 the columns of a spectrogram.
                                                 Computes the tonal centroid features (tonnetz).
toneto (b), or, chroma()
                                                 following the method of [RD737].
                                                 Compute the zero-crossing rate of an audio time.
zero_crossing_rate (y)_frame_length, ...()
                                                 Section.
```

绘图显示

包含了常用的频谱显示函数specshow(), 波形显示函数waveplot(), 详细信息请参考http://librosa.github.io/librosa/display. html

speciation (data), x_coords, y_coords, x_axis,))	Display a spectrogram/chromagram/cqt/etc.
sevepter (sf, sr, max_points, x_axis,)	Plot the amplitude envelope of a waveform.
reap (data), robust, crusp_seq, crusp_bool,))	Get a default colormop from the given data.
timeformatter ((log))	A tick formatter for time axes.
Noteforestor ((ottave, major))	Ticker formatter for Notes
Legisteraetter ((mijor))	Ticker formatter for logarithmic frequency
Orosaforsatter	A formatter for chroma axes
Tometalorsetter	A formatter for forhitzawar-lin. ne t/xxxx15806

三、常用功能代码实现

读取音频

```
1 >>> import librosa
  >>> # Load a wav file
3
  >>> y, sr = librosa.load('./beat.wav')
4
  >>> y
  array([ 0.0000000e+00,
                             0.00000000e+00,
                                               0.00000000e+00, ...,
            8.12290182e-06,
                             1.34394732e-05,
                                               0.00000000e+00], dtype=float32)
7
  >>> sr
8
  22050
```

Librosa默认的采样率是22050,如果需要读取原始采样率,需要设定参数sr=None:

```
1 | >>> import librosa
2 | >>> # Load a wav file
3 | >>> y, sr = librosa.load('./beat.wav', sr=None)
4 | >>> sr
5 | 44100
```

可见, 'beat.wav'的原始采样率为44100。如果需要重采样,只需要将采样率参数sr设定为你需要的值:

提取特征

提取Log-Mel Spectrogram 特征

Log-Mel Spectrogram特征是目前在语音识别和环境声音识别中很常用的一个特征,由于CNN在处理图像上展现了强大的能力,使得音频信号的频谱愈加广泛,甚至比MFCC使用的更多。在librosa中,Log-Mel Spectrogram特征的提取只需几行代码:

```
1  >>> import librosa
2  >>> # Load a wav file
3  >>> y, sr = librosa.load('./beat.wav', sr=None)
4  >>> # extract mel spectrogram feature
5  >>> melspec = librosa.feature.melspectrogram(y, sr, n_fft=1024, hop_length=512, n_mels=128)
6  >>> # convert to log scale
7  >>> logmelspec = librosa.power_to_db(melspec)
8  >>> logmelspec.shape
9  (128, 194)
```

可见,Log-Mel Spectrogram特征是二维数组的形式,128表示Mel频率的维度(频域),194为时间帧长度(时域),所以Log-Mel Spectrogram将号的时频表示特征。其中,n_fft指的是窗的大小,这里为1024;hop_length表示相邻窗之间的距离,这里为512,也就是相邻窗之间有50%的overlapmel bands的数量,这里设为128。

提取MFCC特征

MFCC特征是一种在自动语音识别和说话人识别中广泛使用的特征。关于MFCC特征的详细信息,有兴趣的可以参考博客http://blog.csdn.net/zzc15806/article/details/79246716。在librosa中,提取MFCC特征只需要一个函数:

```
1  >>> import librosa
2  >>> # Load a wav file
3  >>> y, sr = librosa.load('./beat.wav', sr=None)
4  >>> # extract mfcc feature
5  >>> mfccs = librosa.feature.mfcc(y=y, sr=sr, n_mfcc=40)
6  >>> mfccs.shape
7  (40, 194)
```

关于mfcc,这里就不在赘述。

Librosa还有很多其他音频特征的提取方法,比如CQT特征、chroma特征等,在第二部分"librosa常用功能"给了详细的介绍。

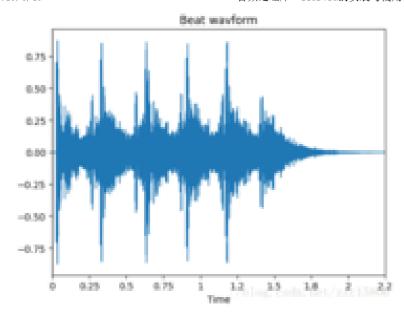
绘图显示

绘制声音波形

Librosa有显示声音波形函数waveplot():

```
1  >>> import librosa
2  >>> import librosa.display
3  >>> # Load a wav file
4  >>> y, sr = librosa.load('./beat.wav', sr=None)
5  >>> # plot a wavform
6  >>> plt.figure()
7  >>> librosa.display.waveplot(y, sr)
8  >>> plt.title('Beat wavform')
9  >>> plt.show()
```

输出图形为:

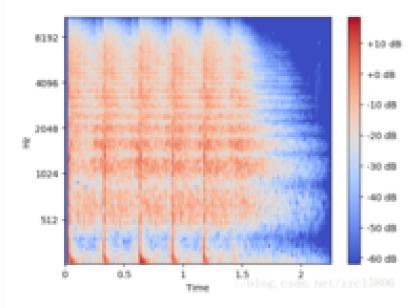


绘制频谱图

Librosa有显示频谱图波形函数specshow():

```
1  >>> import librosa
2  >>> import librosa.display
3  >>> # Load a wav file
4  >>> y, sr = librosa.load('./beat.wav', sr=None)
5  >>> # extract mel spectrogram feature
6  >>> melspec = librosa.feature.melspectrogram(y, sr, n_fft=1024, hop_length=512, n_mels=128)
7  >>> # convert to Log scale
8  >>> logmelspec = librosa.power_to_db(melspec)
9  >>> # plot mel spectrogram
10  >>> plt.figure()
11  >>> librosa.display.specshow(logmelspec, sr=sr, x_axis='time', y_axis='mel')
12  >>> plt.title('Beat wavform')
13  >>> plt.show()
```

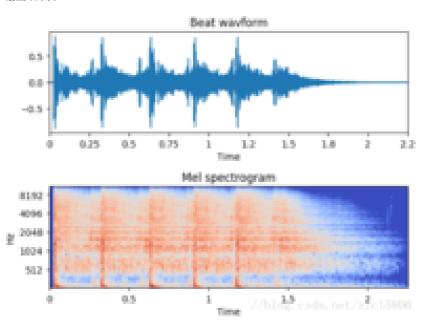
输出结果为:



将声音波形和频谱图绘制在一张图表中:

```
6 >>> melspec = librosa.feature.melspectrogram(y, sr, n_fft=1024, hop_length=512, n_mels=128)
                                                                                               7 >>> # convert to log scale
   >>> logmelspec = librosa.power_to_db(melspec)
    >>> plt.figure()
 9
10
    >>> # plot a wavform
    >>> plt.subplot(2, 1, 1)
11
12
    >>> librosa.display.waveplot(y, sr)
   >>> plt.title('Beat wavform')
13
14
   >>> # plot mel spectrogram
15
   >>> plt.subplot(2, 1, 2)
   >>> librosa.display.specshow(logmelspec, sr=sr, x_axis='time', y_axis='mel')
16
   >>> plt.title('Mel spectrogram')
17
18 >>> plt.tight layout() #保证图不重叠
19 >>> plt.show()
```

输出结果为:



到这里,librosa的安装和简单使用就介绍完了。事实上,librosa远不止这些功能,关于librosa更多的使用方法还请大家参考librosa官网 http://librosa.github.io/librosa/index.html

参考: http://librosa.github.io/librosa/index.html



想对作者说点什么

使用librosa&SVM实现语言情感识别

阅读数 661

任务:语言情感分类音频处理库:librosalibsora安装Librosa官网提供了多种安装方法,详细如下:最简单的方法就...博文来自:as472780551的博客

Librosa音频处理 (一) 阅读数 1250

Librosa是一个用于音乐和音频分析的python包,如果没学过《数字信号处理》需要先了解一下相关的基础知识,傅... 博文 来自: seTaire的博客

【python】Windows中编译安装libsamplerate和scikits.samplerate

阅读数 2519

librosa缘由librosa是一个音频和音乐处理的Python包,我用它来做音频的特征提取。但是在使用时,发现librosa.lo... 博文 来自: Jason Ding的专栏

Python函数之librosa.load()函数

阅读数 725

librosa.load()函数用途:读取文件,可以是wav、mp3等格式。官方介绍:https://librosa.github.io/librosa/gener...博文来自:qq_29884019的博客

音频特征提取工具librosa

阅读数 601

前言 本文主要记录librosa工具包的使用,librosa在音频、乐音信号的分析中经常用到,是python的一个工具包,这... 博文 来自: qq_21210467的博客

python音频特征值提取librosa机器学习下载

python音频特征值提取librosa机器学习先将一段pcm格式的WAV文件进行解码,结果以0~1的double型,左右声道分别...

论坛

安装librosa遇到的问题

librosa audioread.NoBackendError

阅读数 2913

最近在做语音合成librosa合成出来的音频,读取时候报错audioread.NoBackendError代码debug进去发现withaud... 博文 来自: qq 37175369的博客

librosa, melspectrogram初阶

阅读数 1314

importlibrosaimportlibrosa.displayy,sr=librosa.load('E:\ML\\UrbanSound8K\\code\\UrbanSound8K\\audio... 博文 来自: c2c2c2aa的博客

在很多设计到语音识别合成等方面的项目里经常用到python的一个包librosa但是这个包直接用pip安装容易出现GCC... 博文 来自: weixin_40128276...

librosa 阅读数 59

ubuntu系统、python2.7.安装librosa,需要joblib==0.11.0版本,版本不匹配可能会报librosa:TypeError:expectedstri... 博文 来自: zz_hh_uu_的博客



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1219篇文章



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46篇文章 排名:干里之外

语音基音pitch的提取

MATLAB程序 corr是求一个序列自相关的。 算法具有一般性。 zerocros求一个序列的过零次数 可以作为VAD的一个简单算法。 maxx是一个p...

07-17 下载

音频特征提取——常用音频特征

阅读数 3050

作者:桂。链接:http://www.cnblogs.com/xingshansi/p/6815217.html 前言主要总结一下常用的音频特征,并给... 博文 来自:一摩尔自由的博客

MFCC python plot 阅读数 1103

#!/usr/bin/envpythonimportosfrompython_speech_featuresimportmfccfrompython_speech_featuresimport... 博文 来自: binqiang2wang

基于MFCC参数的元音识别 阅读数 503

基于MFCC参数的元音比对一、需求分析利用MFCC参数,对元音进行比对。读取每个元音的WAV文件,然后进行分... 博文 来自: 赵至柔的博客

出现错误: FileNotFoundError:Nosuchfileordirectory:'avconv'解决方法: 安装ffmpegubuntu16.04conda虚拟环... 博文 来自: weixin_37590425...

python2安装librosa出现TypeError: expected string or buffer

阅读数 619

版本不对应。需要卸载joblib0.12安装0.11pipuninstalljoblibpipinstalljoblib==0.11

博文 来自: qq_33266320的博客

【论文导读】Learning to Localize Sound Source in Visual Scenes

阅读数 747

论文题目: LearningtoLocalizeSoundSourceinVisualScenes作者: ArdaSenocak,Tae-HyunOh,JunsikKim,Ming... 博文 来自: z小白的博客

STFT和声谱图,梅尔频谱 (Mel Bank Features) 与梅尔倒谱 (MFCCs)

阅读数 1087

最近小编在做ASC (AcousticSceneClassification)问题,不管是用传统的GMM模型,还是用机器学习中的SVM或....博文 来自: lbaihao的专栏

人工智能学习图谱,学习AI的程序员需了解!

如何能够短时间内抓住技术重点,打造属于自己的"offer收割机"?

Ubuntu16.04下安装tensorflow (Anaconda3+pycharm+tensorflow+CPU)

阅读数 1万+

GPU版本安装教程: https://blog.csdn.net/zzc15806/article/details/806527491.下载并安装Anaconda1.1下载从... 博文 来自: z小白的博客

阅读数 1万+

TACONTRON:AFullyEnd-to-EndText-To-SpeechSynthesisModel通常的TTS模型包含许多模块,例如文本分析,... 博文 来自: yunnangf的博客

python音频特征值提取librosa机器学习

06-07

python音频特征值提取librosa机器学习先将一段pcm格式的WAV文件进行解码,结果以0~1的double型,左右声道分别存放。然后将16ms的...

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端到端的TTS深度学习模型tacotron(中文语音合成)