

# MEAPsoft

An audio reorganization tool

Ron Weiss

LabROSA, Columbia University

January 03, 2007

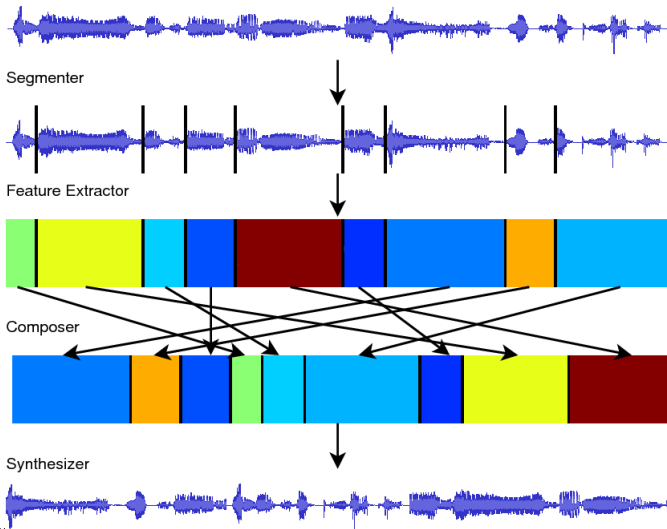


# MEAPsoft is...

- a collection of tools for chopping up and rearranging audio
- free software (released under the GNU GPL)
- written in Java - runs on all major OSES
- easy to extend
- includes command line and graphical interfaces



# MEAPsoft in a Nutshell





- The segmenter cuts up a piece of audio into short chunks
  - can segment at each beat (sound)
  - or at musical onsets/events (e.g. drum hits, piano notes, etc.) (sound)
- Outputs a simple text file:

```
# filename onset_time chunk_length [features]
# Features:
LIB.wav 0.4959999918937683 0.8320000171661377
LIB.wav 1.3279999494552612 0.8159999847412109
LIB.wav 2.1440000534057617 0.8479999899864197
LIB.wav 2.992000102996826 0.8159999847412109
LIB.wav 3.808000087738037 0.8320000171661377
LIB.wav 4.639999866485596 0.4480000138282776
LIB.wav 5.0879998207092285 0.36800000071525574
```

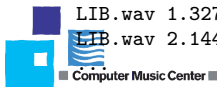


# Feature Extractor



- A feature extractor computes a numerical description of some property of each chunk
- MEAPsoft comes with a wide variety of feature extractors:
  - average power of each chunk
  - dominant pitch contained in each chunk
  - vector features - average spectrum
- Same file format:

```
# filename onset_time chunk_length [features]
# Features: 1.0*com.meapsoft.feateextractors.AvgFreqSimple(1)
LIB.wav 0.4959999918937683 0.8320000171661377 131.1313173559165
LIB.wav 1.3279999494552612 0.8159999847412109 132.5598836892704
LIB.wav 2.1440000534057617 0.8479999899864197 145.0378544970976
```





- A “composer” is an algorithm for matching and rearranging a collection of chunks based on their features
- Takes a feature file and outputs an edit decision list:

```
# dst_time src_filename src_onset_time src_chunk_length [commands]
0.0 LIB.wav 0.4959999918937683 0.8320000171661377
0.8320000171661377 LIB.wav 7.935999870300293 0.8159999847412109
1.6480000019073486 LIB.wav 1.3279999494552612 0.8159999847412109
...
```

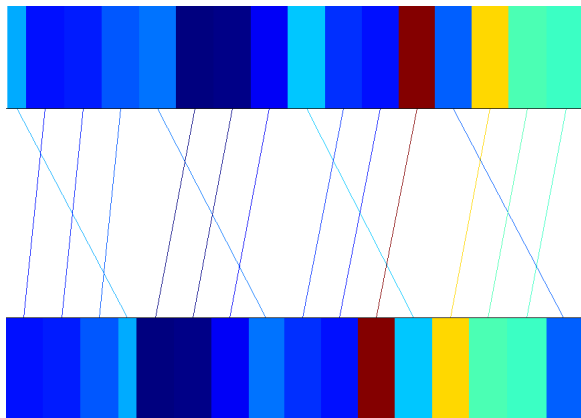
- Simple Java interface - very easy to write your own
- MEAPsoft comes with a variety of sample composers

- e.g. palindrome composer - play each chunk forward, then backward (sound)



# Beat Rotate Composer

Rot composer rotates the beats within each measure

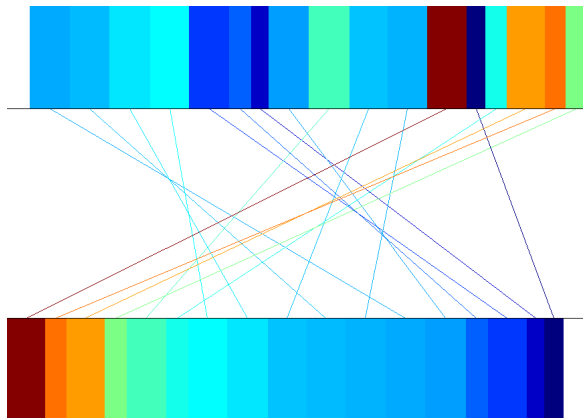


sound



# Sort Composer

Sort composer sorts the list of chunks according to their feature values.

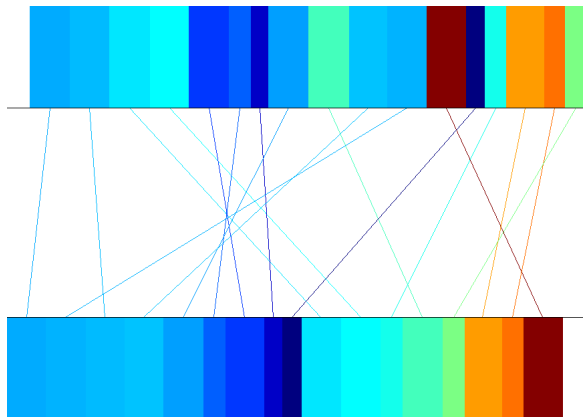


sound



# Nearest Neighbor Composer

Nearest neighbor composer performs a semi random walk. Each chunk is chosen such that its features are closest to those of the previous chunk.



sound



# The End

- Download MEAPsoft from:  
<http://labrosa.ee.columbia.edu/meapsoft>
- Development by: Ron Weiss, Douglas Repetto, Mike Mandel, Dan Ellis, Victor Adan, Jeff Snyder
- Additional contributions by: John Arroyo, Johanna Devaney, Dan Iglesia, Graham Poliner
- Sponsors
  - The Columbia Academic Quality Fund
  - LabROSA
  - The Computer Music Center

