

Testing a Prototype Timbre Morpher

Duncan Williams, Tim Brookes,
Institute of Sound Recording, University of Surrey

Literature Review

What is timbre anyway?
Which timbral paradigm is most appropriate for a timbre morpher?

A paradigm with multidimensional, acoustical correlates, and meaningful descriptors was adopted

Attribute selection and coding

What are the acoustic correlates of common timbral attributes?

Which attributes should we choose to test our timbre morpher?

Listener Evaluation

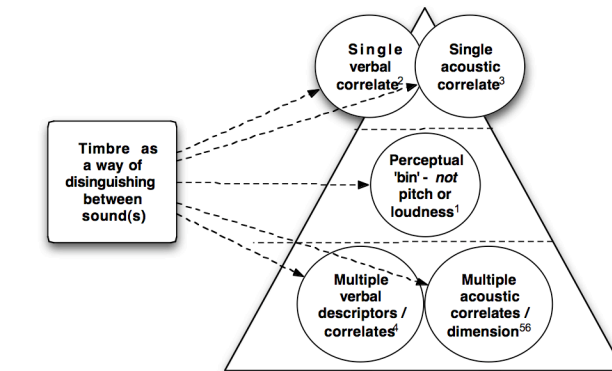
Stimulus set of morphed signals evaluated by pairwise comparison and subsequent MDS analysis

Movement in MDS analysis labeled through verbal elicitation

Labeling confirmed in quality control experiment

Please feel free to try the demonstrator today!

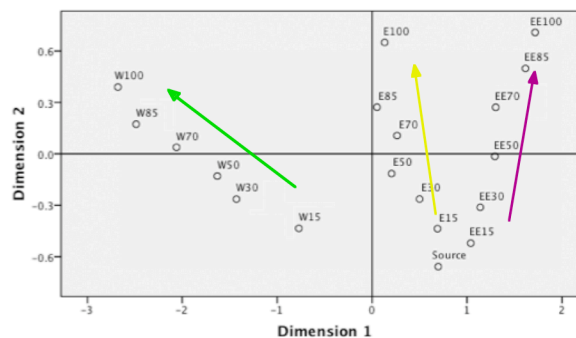
References



Attribute	Correlate
Bright	Spectral Centroid
Warm	Ratio of LF/HF
Soft	Attack envelope
Rough	Content in critical bands
Thick	Ratio of harmonic / noisy content

A combination of spectral, temporal, and overlapping correlates were chosen, followed by informal testing to confirm the acoustic correlation of the chosen attributes

Coding the confirmed underlying acoustic manipulation was then carried out in MATLAB

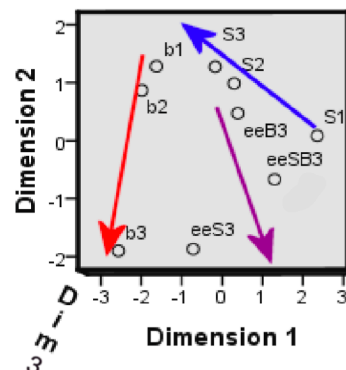


Statistical indicators of MDS timbre space dimensionality:

S-stress < 0.1
RSQ dcrse < 0.05
RSQ > 0.95

Above – 2D plot of timbre space comprising warmth (green), everything (yellow), and everything else (purple) stimuli

Right - 3D plot of timbre space comprising softness (blue) and brightness (red) stimuli, shown at a rotation of 85 degrees – movement in the everything else dimension is shown in purple 7



1. ASA, *American Standard Acoustical Terminology* 45 (1960)
2. S. Pellman, *The Colour of Sound* (1994)
3. J. F. Schouten, *Reports of the 6th international congress on acoustics, Tokyo GP-6-2, 35* (1968)
4. P. M. C Traube, P Depalle, *Conference on interdisciplinary musicology, Graz* (2004)
5. J. M. Grey, *J. Acoustic. Soc. Am.* 61, 1270 (1976)
6. E. Zwicker, H Fastl, *Psychoacoustics Facts and Models* 3rd Ed, 240 (2006)
7. D. Williams, T Brookes, *Audio Engineering Society Convention 126, 1778* (2009)