

Branch-dependent time- and timbre-related features of audio logos

Isabella Czedik-Eysenberg¹, Christoph Anzenbacher^{1,2}, Christoph Reuter¹, Michael Oehler³

¹ Musicological Department, University of Vienna

² amp, Audible brand and corporate communication, Munich

³ MHMK - Macromedia University for Media and Communication, Cologne



Background

In the recent years audio logos became also more and more the focus of music psychological attention. In a number of studies audio logos have already been examined concerning their melodic comprehensibility, their impact in cross modal perception, their noticability in difficult auditory environments etc. pp. (North et al. 2004; Spence & Driver 2004; Allan 2007; Bronner & Hirt 2007; Anzenbacher 2012; Anzenbacher, Reuter & Oehler 2013; Langeveld et al. 2013). However the question of typical acoustical features of audio logos remained still unanswered.

Aims and leading questions

- What are the typical acoustical features of audio logos (in respect to time and timbre-related descriptors)?
- Which instruments are most commonly used in audio logos and in which manner is voice/text included?
- Are there certain acoustic attributes, which are especially peculiar to the audio logos of certain industrial branches?

Methods and Stimuli

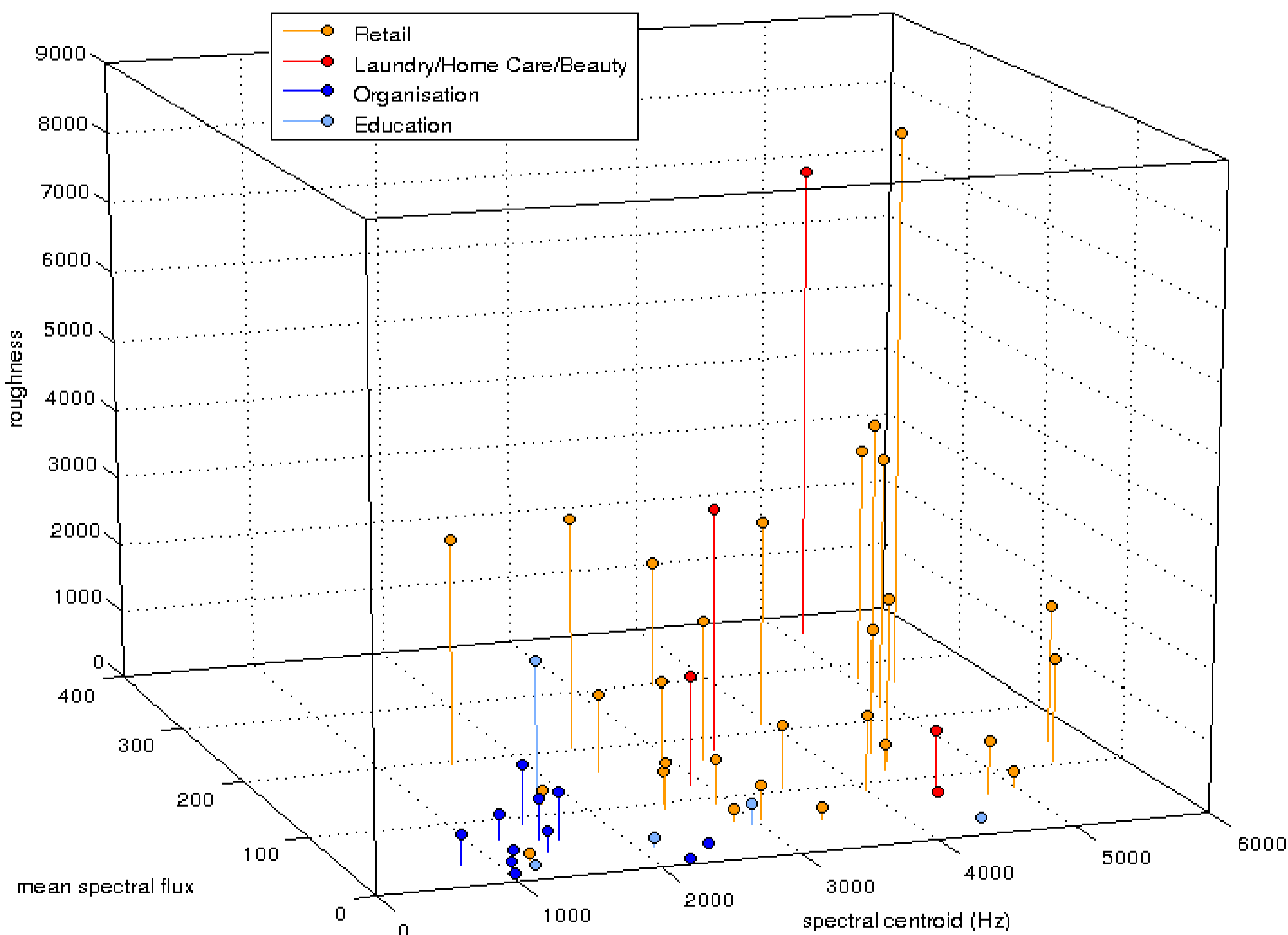
In a study with 364 audio logos from different industrial sectors auditory properties have been investigated via a combination of Matlab/MIRtoolbox (Lartillot & Toiviainen 2007) and musicological analysis. They were examined for timbre specific descriptors, segment and contour properties as well as for occurrences of voice and/or specific instruments:

- spectral centroid
- spectral flux
- roughness
- low energy rate
- rms / dynamic ranges
- first attack time
- length / duration
- inharmonicity
- key / tonality
- unpleasantness
- contour
- occurrence of voice
- manner (of voice usage)
- number of segments
- instruments

The audio logos were compared/correlated with each other in terms of their individual industrial branch by means of an ANOVA and Tukey post-hoc analysis.

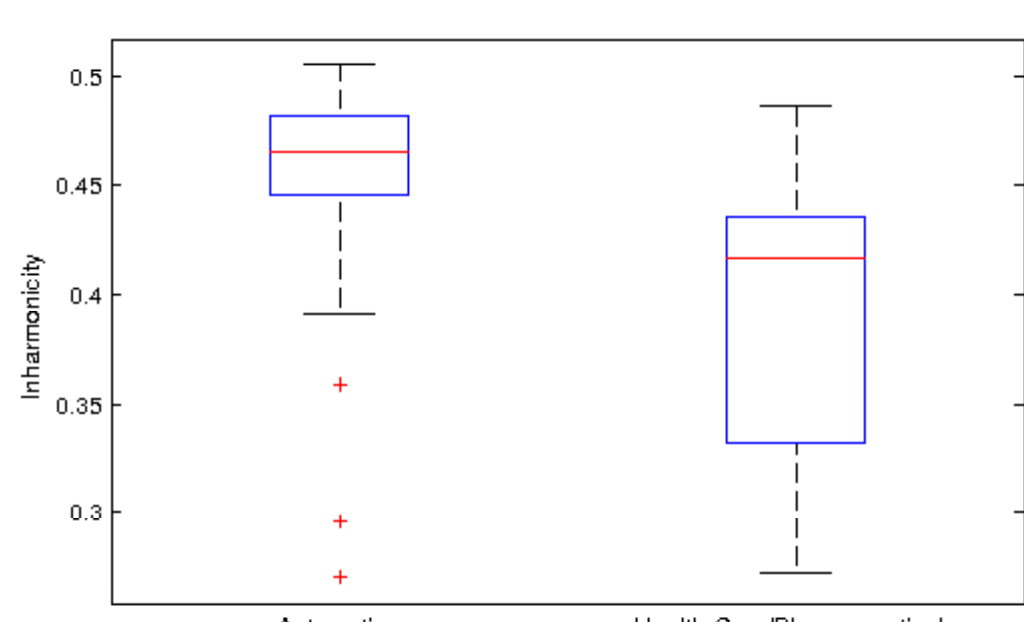
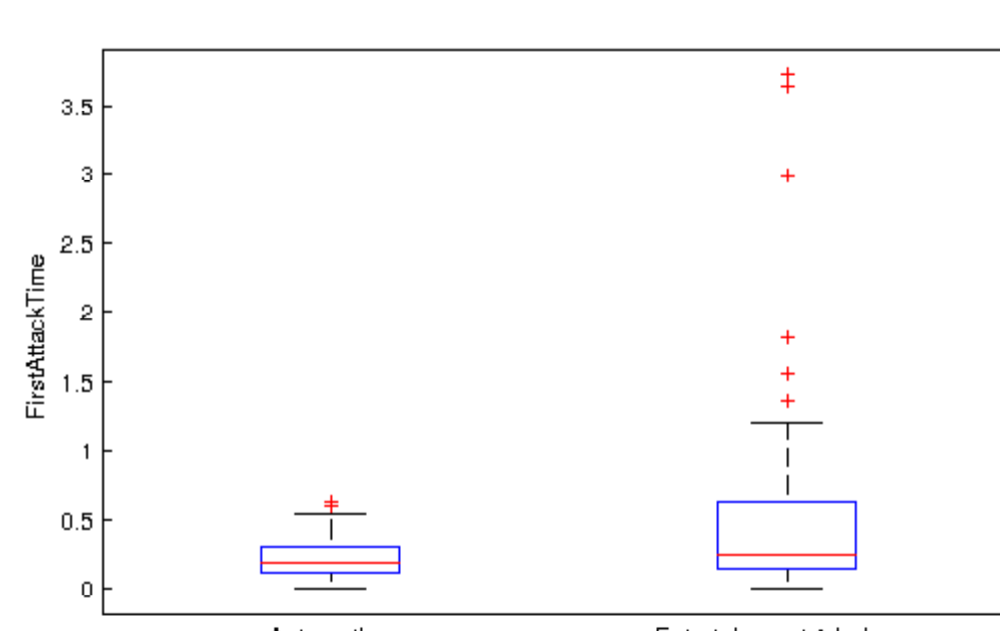
Results

Audio logos of the branches "laundry/home care/beauty" and "retail" are more or less similar in their acoustical properties (spectral centroid, spectral flux (mean), roughness and duration), while they differ significantly from the audio logos of "organisation" and "education".



	retail vs. organisation		laundry... vs. organisation		retail vs. education		laundry... vs. education	
	p	d	p	d	p	d	p	d
spectral centroid	0.0001	2.14	0.0010	3.56	0.1200	0.89	0.0590	1.42
roughness	0.0120	1.13	0.0160	1.13	0.0160	0.97	0.1370	1.05
spectral flux	0.0001	1.84	0.0040	1.45	0.0310	1.34	0.1190	1.17
length	0.0001	1.87	0.0010	1.97	0.0410	1.42	0.0310	1.73

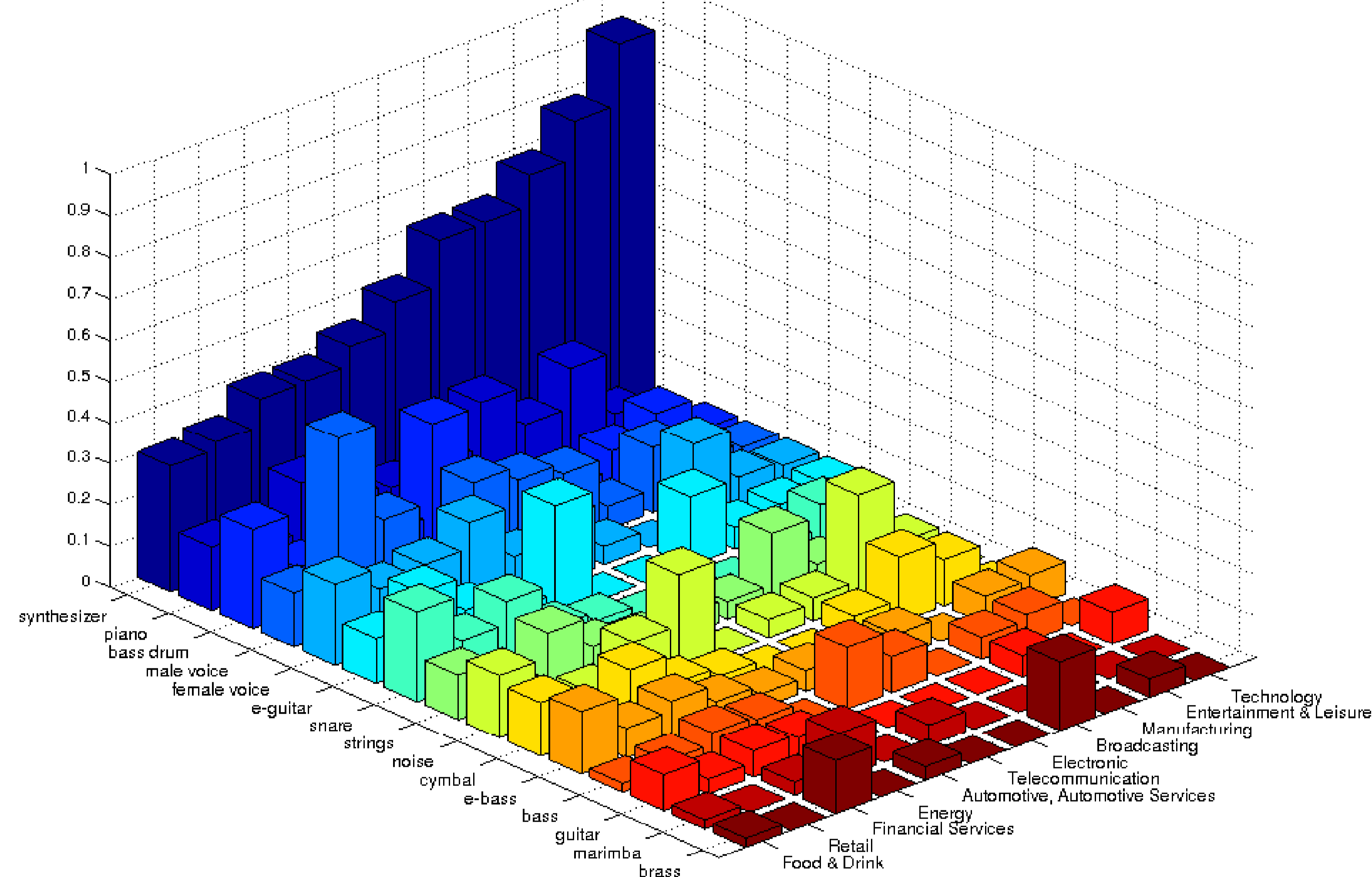
Furthermore a t-test showed that the first attack significantly faster at audio logos of "automotive" than at "entertainment & leisure" (p = 0.011, d = 0.60).



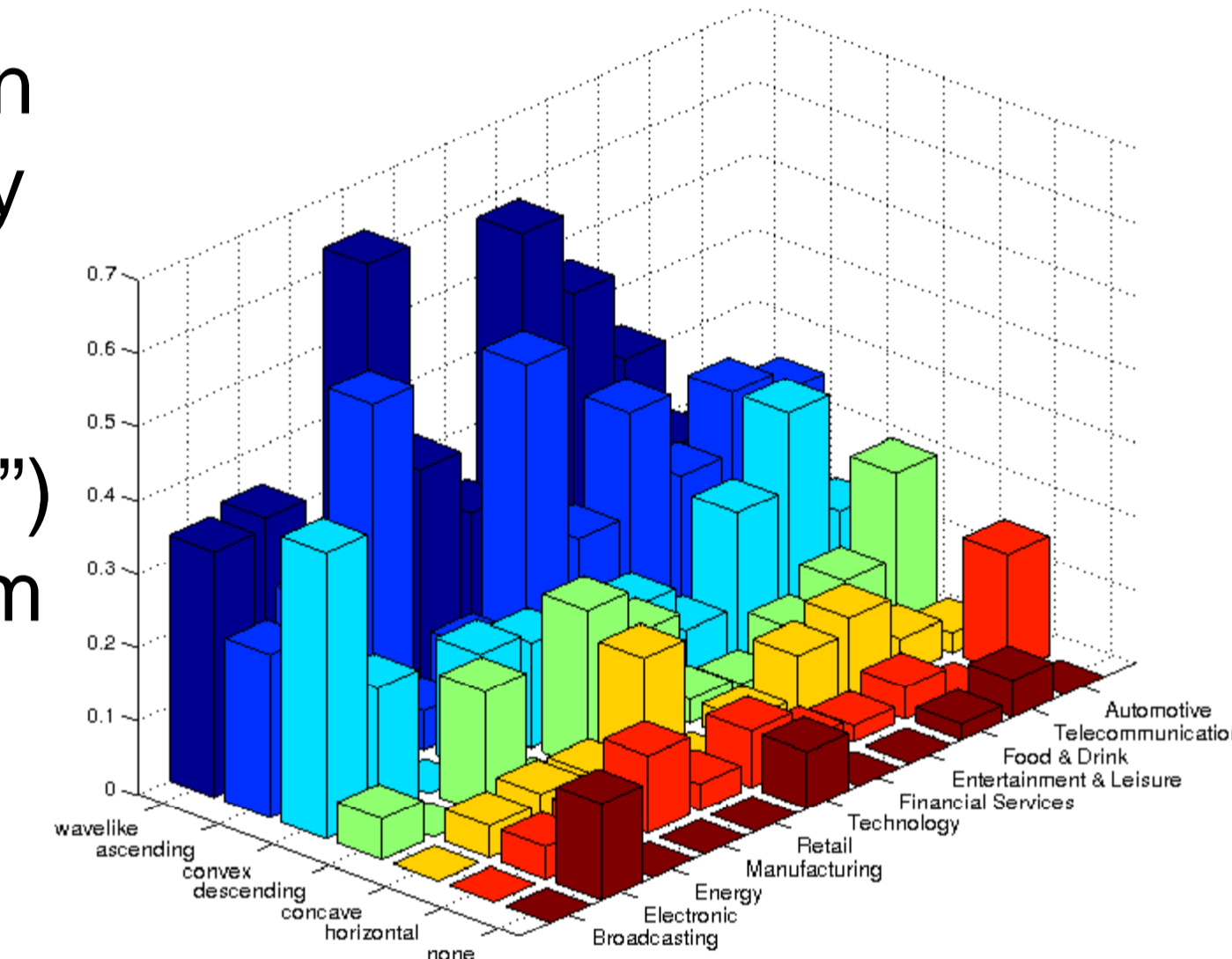
Within the branch "automotive / automotive services" audio logos have a significantly higher inharmonicity than those of "health-care / pharmaceuticals" (Tukey post-hoc test p=0.009).

Results

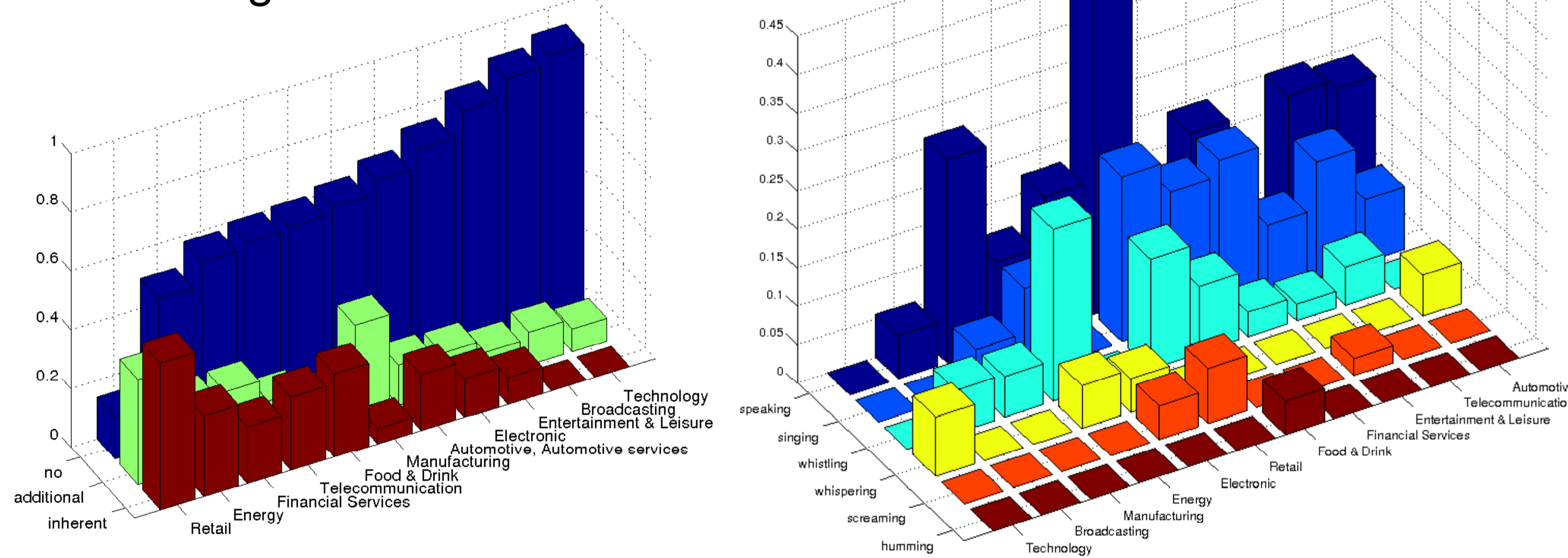
The instrumentation also seems to be specific for certain branches: Audio logos of technology-driven branches like "technology", "manufacturing", "entertainment & leisure", "electronic" and "broadcasting" are mostly characterised by synthetic sounds. E-guitar and male voice are common sounds of the retail and automotive branch. In the latter one as well as in "manufacturing" noises (e.g. motor noise) are also very noticeable. Brass instruments are often heard in "broadcasting" and "financial services" audio logos.



In respect to the melodic contour of an audio logo mostly wavelike (especially "manufacturing" and "financial services") and ascending structures (particularly "energy" and "technology") can be found. Convex structures seem to be typical for "broadcasting" and "telecommunication".



Audio logos of the technology-driven industries are mostly without the use of human voice, while in "retail" and service-orientated branches singing and speaking is the normal case. Besides to spoken and sung slogans (e.g. "food & drink"), whistling and whispering (e.g. "energy") is also common in audio logos.



Conclusion

- It can be shown that audio logos have typical auditory and musical features with some notable characteristics depending on different industrial branches.
- The approach of semi-automated content based music information retrieval offers opportunities for the classification of short audio sequences such as audio logos. For an automated semantic audio analysis, further research on a larger sample would be needed, in order to fully give consideration to the content and music psychological impact of audio logos.

Literature

Allan, D. (2007). *Sound Advertising*. Journal of Media Psychology, Vol.12/3.
 Anzenbacher, C. (2012). *Audiologos. Integrative Gestaltungsmaßnahmen vor dem Hintergrund der Musikpsychologie*, Baden-Baden: Nomos.
 Anzenbacher, C., Reuter, C. Oehler, M. (2013). *Sound quality vs. sound identity. The perceptibility of audio logos under everyday conditions of transmission and reception*. In: Audio Branding Academy Yearbook 2013/14. Baden-Baden: Nomos, pp. 127-135.
 Bronner, K.; Hirt, R. (2009). *Audio-Branding: Brands, Sound and Communication*. Baden-Baden: Nomos.
 Langeveld, L. et al. (2013). *Product Sound Design: Intentional and Consequential Sounds*, pp. 47-73.
 Lartillot, O. & Toiviainen, P. (2007). *MIR in Matlab (II): A Toolbox for Musical Feature Extraction From Audio*. In: Proceedings of the 8th International Conference on Music Information Retrieval 2007
 North, A.C., Hargreaves, D.J., MacKenzie, L., & Law, R. (2004). *The effects of musical and voice 'fit' on responses to adverts*. Journal of Applied Social Psychology, 34, pp. 1675-1708.