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Timbre Transfer For A Smart Acoustic Guitar

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*Table 1: Spearman correlations for MDS dimensions of each playing style with the pruned timbre descriptors (representation noted in parentheses; significant correlations in bold: * p<.05, ** p<.01, *** p<.001).*

Playing style	**Picking**				**Strumming**				**Fingerstyle**			
Dimension	1	2	3	4	1	2	3	4	1	2	3	4
Spectro-temporal variation (ERB)	-0.24	0.22	-0.04	-0.52	0.47	0.35	0.2	0.48	0.24	0.35	0.14	-0.47
Frame Energy (Harmonic)	0.24	-0.03	0.53	0.16	0.08	-0.32	0.02	-0.39	-0.12	0.47	0.08	**0.67***
Harmonic Energy (Harmonic)	**-0.89*****	0.16	-0.12	0.3	0.41	-0.49	**0.73***	-0.04	-0.42	-0.24	0.04	0.16
Noisiness (Harmonic)	**0.92*****	-0.42	0.1	-0.16	-0.39	0.56	**-0.72***	0.03	0.54	0.13	0.25	-0.25
Odd to even harmonic ratio (Harmonic)	-0.18	-0.48	-0.39	0.19	0.36	-0.48	0.59	0.53	-0.36	0.35	0.02	**0.64***
Spectral Centroid (Harmonic)	**0.65***	-0.49	0.15	-0.04	-0.41	0.47	**-0.71***	-0.21	**0.82****	-0.32	0.33	-0.53
Spectral Kurtosis (Harmonic)	**-0.67***	-0.09	-0.02	0.04	-0.01	-0.12	0.62	0.01	-0.52	0.47	-0.02	0.62
Spectral Slope (Harmonic)	0.62	**-0.67***	0.27	0.04	-0.45	0.1	-0.5	-0.32	**0.79****	-0.53	0.47	-0.3
Spectro-temporal variation (Harmonic)	0.32	-0.3	-0.2	**-0.73***	**0.75***	-0.25	0.44	0.12	**0.88*****	-0.38	0.27	-0.5
Spectral Decrease (STFT)	-0.01	-0.31	0.31	0.36	-0.45	-0.38	-0.16	-0.39	-0.35	-0.24	-0.05	0.6
Spectro-temporal variation (STFT)	0.05	-0.24	-0.04	-0.62	0.14	0.37	-0.3	0.47	0.47	0.05	0.1	**-0.78****
Effective Duration (TEE)	0.1	0.27	**-0.73***	0.08	0.54	0.04	0.07	-0.18	0.26	0.1	0.24	0.49

Finding

How are acoustic guitars perceived in relation to one another? We conducted a guitar timbre listening test which revealed a dependence of a steel-string acoustic guitar’s timbral profile on the playing style.

Question

What kinds of model architectures would be best suited for guitar-to-guitar timbre transfer?

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