

Formant Measurement Errors from Real Speech

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Previous research on formant measurement errors carried out by the author has focused on synthetic speech, where the formant values specified in the synthesis process are considered as the true values that are used to calculate the errors associated with each measurement (Harrison 2008, 2010). Whilst the results have provided an insight in to the behaviour of errors in the specific circumstances examined, it is not clear how applicable the findings are to real speech. One way to address this is to compare the results from the synthetic speech with measurement errors from real speech.

This presentation examines the formant measurement errors obtained from various analyses of a subset of the TIMIT corpus. The ‘ground truth’ formant values used to calculate the measurement errors are from the MSR-UCLA VTR-Formant Database (Deng et al 2006), which has been created specifically to test the performance of automatic formant estimation methods.

Initially, the speech material was analysed with Praat’s standard formant measurement tool and the results were compared with those from the synthetic speakers. In general terms, the performance with the real speech was worse than with the synthetic material. This result is to be expected given the synthetic speech can be considered as ideal and it conforms to the speech production model on which the LPC-based formant analysis method relies.

In an attempt to achieve better performance with the TIMIT speech the recordings were then analysed with two different formant trackers, Praat’s inbuilt tracker and the CAbS tracker (Clermont et al 2007), as well as a process that revealed the best potential performance from an LPC-based analysis. These results showed an improvement against Praat’s standard measurement process. The results from each of the tests will be presented and discussed in greater detail. The implications for both automatic and manual measurement of formants with software such as Praat are also considered.

References

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