

Formant measurement errors: Preliminary results from synthetic speech

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This presentation introduces the preliminary results from the latest phase of work on the variability of formant measurements. The initial study (Harrison, 2004) and subsequent IAFPA conference presentations (Harrison, 2005 & 2006) examined the magnitude of the variation in formant measurements caused by altering analysis settings. Formant measurements were made using the automatic formant tracker in three different programs whilst analysis parameters were systematically varied. The source material was a word list read by two male speakers recorded simultaneously via a microphone and at the distant end of a telephone line.

The main limitation of the study was that owing to the nature of formants it was not possible to know what their true values were. The consequence being that it was only possible to consider the variation in relative terms rather than as absolute errors. The current phase of work overcomes this problem by using synthesised speech as the source material. The speech is synthesised using the source-filter method. This allows the actual formant values to be specified in the synthesis process.

A further limitation of the initial study was that the word list contained multiple instances of only 5 different vowels. Even though they represented the extremes of the vowel space and a central vowel they did not provide comprehensive coverage of the whole space. The use of a speech synthesiser and the ability to specify formant values has allowed the source material in the current work to represent the entire F1-F2 vowel space.

These factors have made it possible to observe how the absolute error for each formant varies over the whole vowel space across different analysis settings. This newly generated data will be presented in various ways including three-dimensional error surface plots which provide a very clear visualisation of the error variation across the vowel space. Some preliminary interpretation of the results will be provided as well as a discussion of the ways in which this new phase of work will develop.

References

- Harrison, P. T. (2004). Variability of Formant Measurements. MA Dissertation, Department of Language and Linguistic Science, University of York, York, UK. (<http://www.jpfrench.com/docs/harrison-formant-dissertation.pdf>)
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