Forensic voice comparison with word-based acoustics: a likelihood ratio-based discrimination using F-pattern and tonal F0 trajectories over a disyllabic Cantonese word

Please indicate here whether you prefer:

an oral presentation (20 mins)

the 'Best Student Paper Award': **Yes, eligible.**

An experiment relating to estimation of strength of evidence in forensic voice comparison is described which explores the use of F-pattern and tonal F0 trajectories extracted over a disyllabic word as a whole, rather than over individual monosyllables as conventionally practiced. The first three formants and tonal F0 of Cantonese daihyat /taijat L.H/ 'first' from controlled but natural non-contemporaneous recordings of 23 male speakers are modelled with polynomials, and multivariate likelihood ratios estimated from their coefficients. Evaluation with the log likelihood ratio cost validity metric Cllr shows an optimum fit is obtained, surprisingly, with lower order polynomials, with F2 requiring a cubic fit, and F1 and F3 quadratic. Fusion of F-pattern and F0 results in considerable improvement over the individual features, reducing the Cllr to ca. 0.1. The forensic potential of the daihyat data is demonstrated by fusion with F-pattern data from Cantonese /i/, which reduces the Cllr still further.

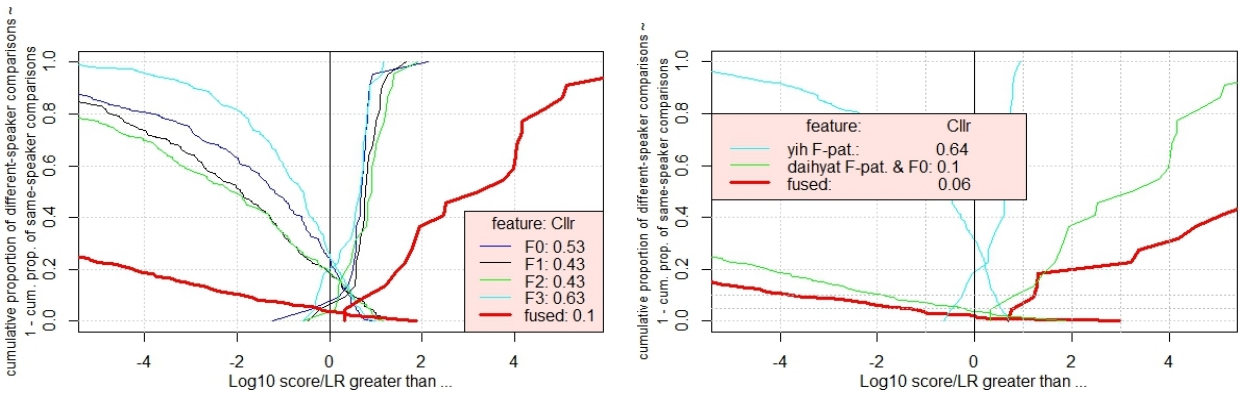

Figure 1. Tippet plots of results. Left = daihyat word F-pattern and tonal F0. Right = fusion of daihyat and yih data. Legend shows Cllr values for individual and fused features.