VOICE RANGE PROFILES OF VOICE MODELS

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Abstract:
The ability of an analysis tool to characterize the quality of the voice largely depends on the sound material such a system was tested with, and normalized to. There is a large benefit of using a parametric source-filter synthesizer for this purpose, one that can mimic and control all relevant acoustic aspects of the real voice in isolation. With such a paired setup a reverse translation can simply be made, and analysis results can be efficiently described in terms of parameters of the synthesis model. A potential danger with this closed-loop approach is that the system becomes self-referential; it will endorse our view on the relevance and generality of the modeled metrics. However, in case of VRP recording the opposite is experienced. The moment that the extremes of the voice range are sought and the full power of the variation within, and between voices is experienced, the discrepancies between model and reality become strikingly manifest.
An extensive study of the spectrum change over the VRP, revealed a series of phenomena that are hard to explain in terms of a linear source-filter model. These are phenomena like: (1) the persistence of the second harmonic, (2) the breaking up of the spectrum slope continuum, and (3) the lack of effect that harmonic-formant interactions have on the maximum SPL. Some of these phenomena could be explained by non-linear source filter interactions. Physical models of the voice -where a low-dimensional vocal fold model is operating in between sub, and supra-glottal tracts- evidence the realism of these non-linear source-filter interactions. This study reports on the attempts to explain these strange real-voice phenomena, by recording the VRP of such a physical model of the voice. The observed dynamic spectrum changes are compared to results obtained with parametric (linear) source-filter synthesis model.