Toward measurement of pitch alignment
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This paper discusses theoretical and practical issues underlying the measurement of pitch alignment. We define the alignment concept as the relationship between pitch trajectories and articulatory/acoustic trajectories. This concept is formalized within a general superpositional framework, according to which a pitch curve is viewed as the sum of component curves, such as phrase curves, accent curves, and segmental perturbation curves. According to a special case of the general superpositional concept, the Linear Alignment Model, a given intonational-phonological pitch accent class can be characterized as the combination of an underlying accent template (that represents the basic shape of the pitch excursion, e.g., rise, rise-fall) and an alignment parameter matrix (that specifies how to warp this template to be properly aligned with the segmental stream with which a pitch accent is associated, taking into account the segmental/durational structure of this stream).

Traditional measurement of alignment is customarily based on the surface-point-to-surface-point approach (P-P alignment in combination with unchanged segmental/ durational structure and pitch accent shape). We also show how the model can account for phonological-perceptual changes associated with small changes in alignment at all.

The Linear Alignment Model can account for the systematic dependency of pitch point timing on the segmental/durational structure of the segmental stream. Specifically, we show how apparent changes of alignment as measured by the P-P approach, resulting from some independent variable, are in fact predictable via the model as direct consequences of the effects of the independent variable on the segmental/durational structure, and thus may not be changes in alignment at all.

We also show how the model can account for phonological-perceptual changes associated with small changes in alignment in combination with unchanged segmental/ durational structure and pitch accent shape.

References


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