

Exploring Vector Representations for Phonological Similarity

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Abstract

Recent research has compared representation models of word meaning (Brown et al., 2023, *Cognitive Science* 47:e13291), however, less research has compared representation models of words' perceptual features. Thus, we compared vector-space word representation models that can be used to quantify words' phonological similarity. The main structure of the model was adapted from Cox et al.'s orthographic representation model (*Behavior Research Methods* 43:602-15, 2011). Variations of the model included phonetic mapping scheme, encoding scheme, the inclusion of lexical stress, and the combination of orthographic and phonological representations. We tested the model variants against human-rated phonological similarity and both phonological and orthographic Damerau-Levenshtein distance. Open n-gram encoding ($1 \leq n \leq 2$) performed better overall than terminal relative encoding across all phonological similarity metrics. Concatenated orthographic-phonological vectors improved the prediction of human ratings with terminal-relative encoding only. Using more fine-grained phonetic mapping or including lexical stress had minimal effects.