Machine Classification of Dysarthric Productions as an AAC Input Modality
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Some speakers with dysarthria may exhibit relatively precise control of prosodic features compared to their ability to control vocal tract shape. Leveraging prosodic cues as an alternative and augmentative communication (AAC) signal would allow for richer and more efficient interactions. Current AAC devices, which traditionally make use of pointing and/or scanning input, fail to afford the natural, complex, and efficient exchange of speech-based communication. Harnessing the residual, albeit limited, prosodic control of individuals with dysarthria may serve as a means of increasing the rate and naturalness of AAC-based communication.

The present study explored the effectiveness of several machine learning algorithms for classifying prosodically-varying vocalizations produced by speakers with dysarthria and healthy controls. The algorithms were assessed using two datasets, one involving modulation of prosody during sustained vowel production and the second involving placement of contrastive stress within an utterance. The results from both studies suggest that machine classification of prosodically-varying dysarthric productions is feasible using pre-existing machine learners and rather minimal training data. Classification proved robust both in terms of task complexity and across age group. These preliminary findings provide support for designing voice-driven AAC aids that leverage vocal control of prosodic cues in speakers with dysarthria.