A Heads-On Speech Monitoring System To Increase Speech Clarity
For Disordered Speech

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Abstract
We developed SpeechOmeter - Google Glass application - to improve speech clarity for individuals with speech impairments due to neuromotor disorders such as Multiple Sclerosis, Cerebral Palsy and Parkinson’s disease.

Background
More than 2.5 million individuals in the U.S. are estimated to present with soft and slurred speech due to Parkinson’s disease, multiple sclerosis, cerebral palsy and stroke alone. The impaired speech hinders speech clarity and restricts interpersonal interactions[1]. For many individuals the inability to communicate is one of the most difficult aspects of their speech impairment[2] and require speech therapy to cope[3].

Adherence and generalizability of existing treatments is limited by:
• Lack of feedback cues in regular conversations
• Lack of adaptation to situational context
• Lack of adherence and performance reports

Approach
• Provide realtime feedback in absence of clinician cues
• Adapt target loudness to ambient noise level
• Enable clinicians to monitor performance and adherence to treatment between consultations

Usability Study
In a 6-week usability study, 10 individuals with MS increased vocal loudness by an average of 4.67 dB during feedback. This increase is comparable to the average 4.68 dB increase achieved after traditional intervention[4]. Participants with a baseline loudness of under 70 dB increased their loudness by 9.01 dB.

Next Steps
• Implement speech rate monitoring
• Develop adaptability layer to personalize interface for specific client needs (eg fatigue, level of speech impairment)
• Implement remote personalization of training
• Automatic identification of scenarios with higher difficulty in maintaining speech targets

References