

Patient-Centered Biofeedback Headset Can Isolate, Monitor, and Analyze Vocal Output in Real Time for Optimal Voice Modulation in Patients with Parkinson's Disease

Voice therapy options for patients with dysphonia lack patient-centric technologies and long-term success rates

The inability to communicate effectively due to poor voice quality (dysphonia) and reduced intelligibility (dysarthria) are common, devastating symptoms of Parkinson's Disease (PD). Dysphonic patients do not know when they are speaking inaudibly and require reminders to speak loudly and clearly enough to be understood. It can have a profound impact on patients by putting their physical safety at risk, creating social isolation, and preventing them from relating their daily living needs.

The current standard of care for patients with PD-related dysphonia is intensive behavioral voice therapy consisting of four sessions per week over four weeks, with additional home practice between sessions. This intervention puts the burden of treatment directly on the patient to recall and implement the therapeutic skills in typical, daily conversations and on the caregiver to enforce the treatment plan. There is a high incidence of therapeutic failure due to financial and scheduling burdens as well as patients' inability to translate learned skills to real-life communication situations.

Innovative headset offers real-time feedback to improve communication abilities in multi-etiology dysphonia patients

This groundbreaking, compact headset offers real-time feedback to patients allowing them to increase or decrease speech volume or pitch to improve intelligibility. Using preset, individualized, and adjustable thresholds, this technology actively isolates, monitors, and analyzes vocal output for time, loudness, and speech rate, supplying periodic feedback to the patient for maximum therapeutic benefit. This comfortable headset has a long-lasting, lightweight battery and stores easily accessible data for intermittent adjustment by speech therapists to continually improve the patient's feedback from the device. Unlike current therapeutic options, this affordable

technology delivers vocal autonomy for PD patients, potentially improving their quality of life.

Summary Bullets

- Innovative headset offers real-time haptic feedback for vocal improvement and increased patient autonomy.
- Device stores easily accessible data for therapist review and fine-tuning of preset therapeutic thresholds to continually improve vocal output.
- Lightweight, low-profile, battery-powered headset are favorable for all-day wear and use omnidirectional microphones for optimal comfort.

Solution Advantages

- **Patient-Centered:** The headset detects, monitors, and analyzes speech in real-time, providing feedback specifically calibrated to the patient for instant vocal adjustment.
- **Programmable:** Therapists can easily access stored speech and voice data for regular review and fine-tuning of preset thresholds.
- **User-Friendly:** The headset is designed to be lightweight and low-profile for all-day wear and offer a user-friendly design compared to other technologies.
- **Comfortable:** In addition to being light and unobtrusive, the headset uses standard omnidirectional microphones that offer greater patient comfort than throat microphones found in other devices.
- **Affordable:** The estimated cost for this technology is \$340.

Potential Commercial Applications

- Parkinson's Disease-related voice and speech disorders
- Voice and speech disorders stemming from other medical conditions
- Individuals transitioning between genders who want to increase or decrease their speaking pitch
- Prevention of vocal trauma by heavy vocal users who may be speaking too loudly

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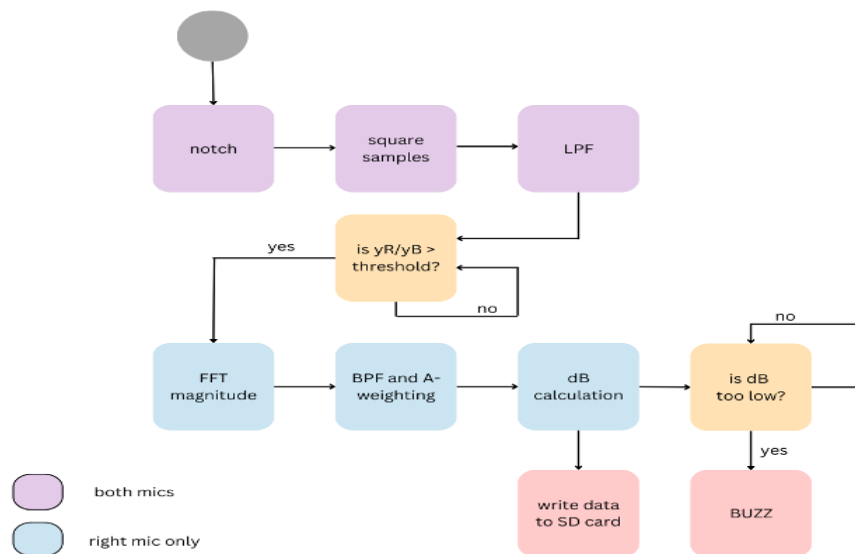
IP Status

<p>Patent application has been filed</p>: US63/501131

Publications

[SAMMS - a speech assisting multi-microphone system for voice therapy](#), YouTube - July 9, 2023

Images



Flow chart of the Speech Assisting Multi-Microphone System (SAMMS) device with haptic feedback.



SAMMS device microphones.

Visit the Technology here:

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<https://s3.sandbox.research.gatech.edu/print/pdf/node/4060>