

Team #5

Measuring the Larynx Using Light: A Low-Cost Photoelectroglottography Tool

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Abstract

There is a need for a non-invasive, low-cost instrument capable of reliably recognizing changes in laryngeal aperture during speech. An 850 nm infrared LED was positioned superior to the thyroid cartilage (Adam's apple), allowing light to pass through the glottal and vocal fold cross-sectional area, where the diffused light was detected using a BPW34 photodiode sensor. To evaluate the efficacy of the device, project members and the faculty advisor performed phonatory tasks including glottal stops, tidal breathing, and sustained vowels at varying pitches. Initial testing demonstrated that the device could distinguish between these vocal behaviors under limited experimental conditions. With proof of concept established, future work will focus on transitioning the current prototype into a more refined design while improving signal quality, noise reduction, and overall system robustness.