

Can Machine Hear a Failing Heart?

Neha Chaudhary, Saaidal Razalli Azzuhri

Dept. CST FCSIT, UM

Ever wondered that the next stethoscope might just listen to your voice. Oftentimes, when we think of a heart disease, we think of a jagged ECG line, a number on the blood test or perhaps another biomarker that maybe be episodic and requires specific clinical settings. Although these methods are effective, but they require specialized equipment and trained staff making remote monitoring challenging.

For a condition that develops continuously, it should meet the telemedicine needs that voice can aim to solve.

Access is the Prize here!

Voice recording only needs a microphone making it more accessible even for the rural and poor and underserved communities. It can flag a cardiac anomaly which aids in the earlier detection of the disease. This is why I find voice based cardiac assessment one of the most exhilarating ideas in the digital health right now.



A voice check can be done through a microphone which is carried by almost everyone and can help with the remote needs. For a technology that asks nothing more than a few seconds of your voice recording, this can be considered a remarkably exciting prospect.

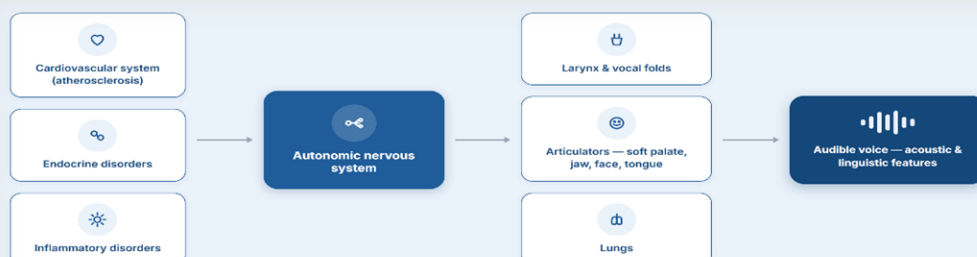
Signal Appears to be Real

The premise that speech contains the signal regarding the heart health is biologically significant. As shown in the figure below, speech is produced by the coordinated efforts of larynx, lungs and the articulators. These systems are disturbed through fluid retention, changes in the pulmonary pressure and shifts. In the autonomic nervous system, which can induce

changes in the vocal fold function and breath support. Although these changes may appear to be subtle by the human year, they can produce measurable acoustic signatures in speech such as pitch stability, breathing pauses and changes in spectral shapes. Acoustic features vary according to demographics clinical voice datasets are still small. But that's exactly what makes this such a promising area to

work. Voice can be ought to be scalable companion and can be coupled with AI techniques that can assist in the signaling towards a deteriorated heart health. The heart has always spoken through its rhythm. A growing body of evidence suggests it speaks through our voices too and we are only beginning to learn how to listen.

Envision future where your voice recording can provide a heart check, no clinic visit, reduced cost. We are not there yet, but the direction of travel is clear, and the possibilities for accessible, everyday heart care are worth paying attention to.



How cardiac changes reach the voice.