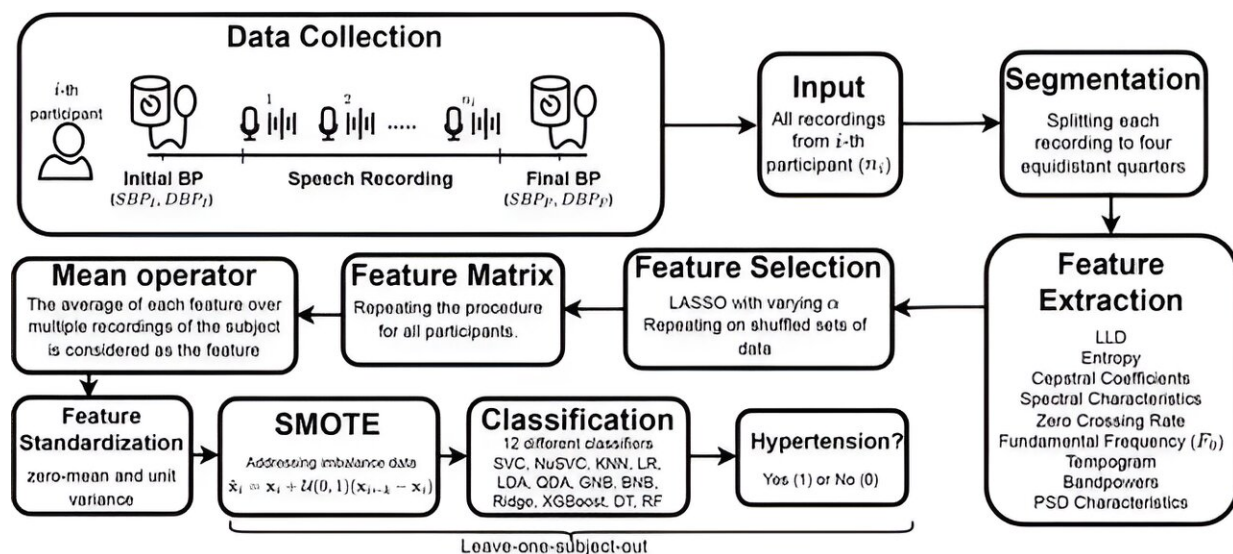# Scientists use AI to detect chronic high blood pressure in people's voice recordings

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Overview of the proposed ML-based acoustic model for hypertension screening. Abbreviations: BP-blood pressure; SBP-systolic blood pressure; DBP-diastolic blood pressure; LLD-low-level descriptor; LASSO-Least Absolute Shrinkage and Selection Operator; SMOTE-Synthetic Minority Oversampling Technique. The subscripts I and F refer to initial and final measurements, respectively. Credit: *IEEE Access* (2024). DOI: 10.1109/ACCESS.2024.3443688

Researchers at Klick Labs unveiled a cutting-edge, non-invasive technique that can predict chronic high blood pressure (hypertension) with a high degree of accuracy using just a person's voice. Just [published](#) in the journal *IEEE Access*, the findings hold tremendous potential for

advancing early detection of chronic high blood pressure and showcase yet another novel way to harness vocal biomarkers for better health outcomes.

The study's 245 participants were asked to record their voices up to six times daily for two weeks by speaking into a proprietary mobile app, developed by the Klick scientists, which detected high blood pressure with accuracies up to 84% for females and 77% for males.

The app uses machine learning to analyze hundreds of vocal biomarkers that are indiscernible to the human ear, including the variability in pitch (fundamental frequency), the patterns in speech energy distribution (Mel-frequency cepstral coefficients), and the sharpness of sound changes (spectral contrast).

"By leveraging various classifiers and establishing gender-based predictive models, we discovered a more accessible way to detect hypertension, which we hope will lead to earlier intervention for this widespread global health issue. Hypertension can lead to a number of complications, from heart attacks and kidney problems to dementia," said Yan Fossat, senior vice president of Klick Labs and principal investigator of the study.

## More accessible screening for the 'silent killer'

The World Health Organization (WHO) refers to hypertension as the "silent killer," as well as a global public health concern that affects over 25% of the global population. Half are unaware of their condition, and more than 75% of those diagnosed live in low- or middle-income countries.

Conventional methods of measuring blood pressure (and, accordingly, identifying hypertension) include using an arm cuff

(sphygmomanometry) or an automatic blood pressure measurement device. However, these methods may require technical expertise, specialized equipment, and may not be readily accessible to people in underserved areas.

This study marks Klick Labs' first venture into using voice technology to identify conditions beyond diabetes, as the company expands its research to assess its AI algorithms' effectiveness in detecting and managing a broader range of health conditions.

Klick Labs has been collaborating with hospitals, academic institutions, and public health authorities worldwide since its research revealed that voice analysis combined with AI can accurately screen for type 2 diabetes in *Mayo Clinic Proceedings: Digital Health* in October 2023. Last week, *Scientific Reports* published another Klick Labs' study confirming the link between blood glucose levels and voice pitch.

"Voice technology has the potential to exponentially transform health care, making it more accessible and affordable, especially for large, underserved populations," said Jaycee Kaufman, Klick Labs research scientist and co-author of the study.

"Our ongoing research increasingly demonstrates the significant promise of vocal biomarkers in detecting hypertension, diabetes, and a growing list of other health conditions."

Provided by Klick Applied Sciences