Analysis of the possibility of using mobile phone heart sound recordings to estimate blood pressure

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This study investigates the feasibility of using mobile phone-recorded heart sounds to estimate blood pressure. Phonocardiographic signals were collected from a healthy adult using both a smartphone microphone and an electronic stethoscope, synchronized with standard blood pressure measurements. A database of 10-second signal fragments was created and analysed using spectral and temporal features. A noise detection algorithm and heart sound segmentation based on Hierarchical Segmental Hidden Markov Models were applied. Various machine learning models were trained to predict systolic and diastolic pressure, with Random Forest achieving the highest correlation (R = 0.82 for systolic, R = 0.81 for diastolic). Results indicate that smartphone recordings can provide comparable accuracy to professional devices, supporting their potential use in non-invasive, cuffless blood pressure monitoring. Further development includes a mobile application for guided heart sound acquisition.