Voice2heart

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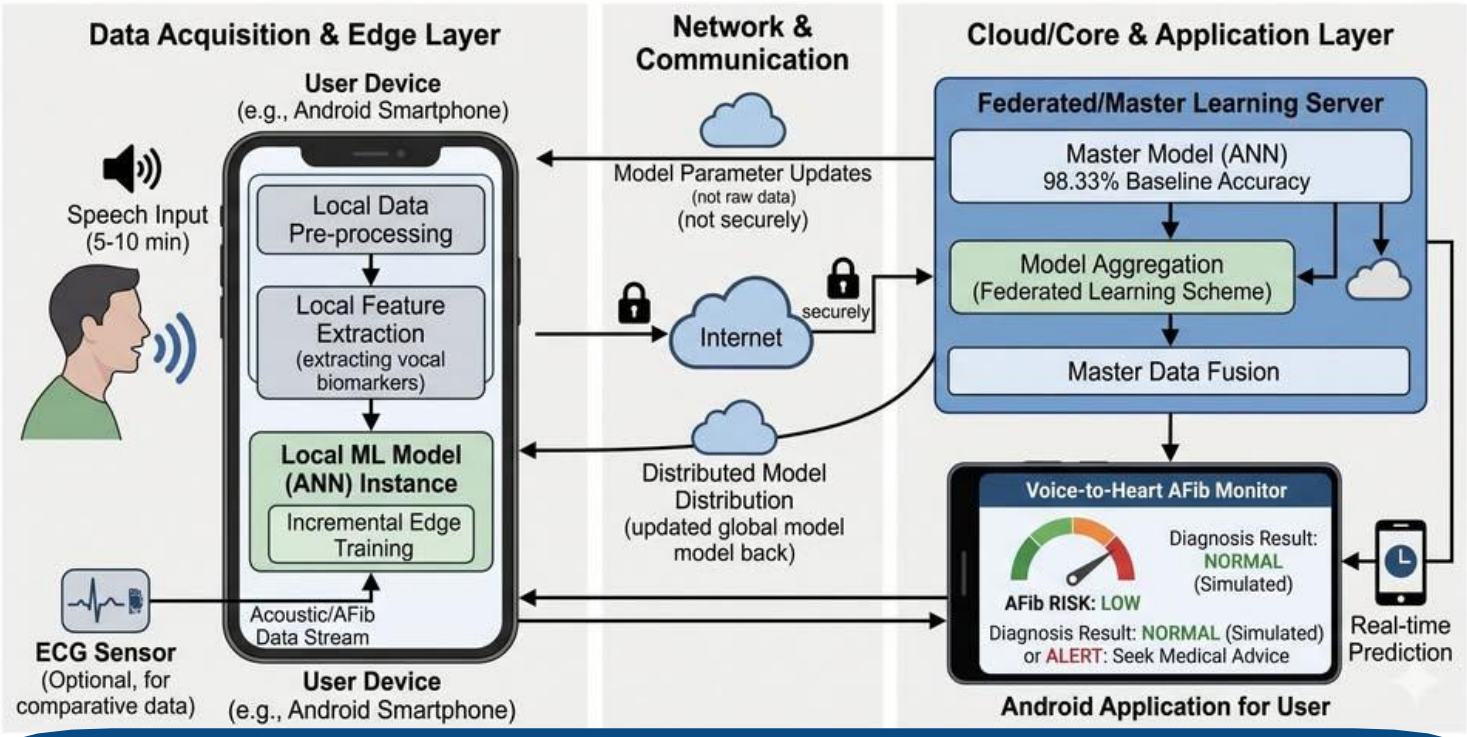
Cardiovascular diseases (CVDs) remain a leading cause of mortality in Malaysia and globally. A critical challenge in combating this threat lies in the limitations of traditional electrocardiogram (ECG) analysis. Current methods are largely reactive, confined to clinical settings, and often only capture cardiac events as they occur, leaving high-risk individuals vulnerable to undetected, life-threatening episodes between hospital visits. This gap in continuous, accessible monitoring directly impedes Malaysia's progress toward Sustainable Development Goal (SDG) 3, which aims to ensure healthy lives and promote well-being for all at all ages. This proposes a novel framework that uses deep ensemble models (DEMs) to analyze fused voice and ECG features. The methodology involves collecting synchronized speech and ECG data from patients, extracting key biomarkers (P wave, QRS complex, T wave, and vocal characteristics), and implementing dense fusion techniques to create a robust predictive model. This model will be validated through clinical trials and integrated into a prototype for smart, wearable monitoring. The expected outcome is a transformative technology capable of detecting conditions like atrial fibrillation and premature ventricular contractions with high accuracy (~98%) outside the hospital environment. This will enable real-time alerts and facilitate early medical intervention. By decentralizing critical cardiac care and making it continuously accessible, this project promises to significantly reduce CVD-related fatalities, alleviate the burden on Malaysia's healthcare system, and make a substantial contribution to achieving the nation's SDG 3 targets for health and well-being. In below graphical abstract gives a detail view of the project

High-Level Adaptive Machine Learning Architecture for Acoustic AFib Detection



The rise of feature fusions in healthcare systems

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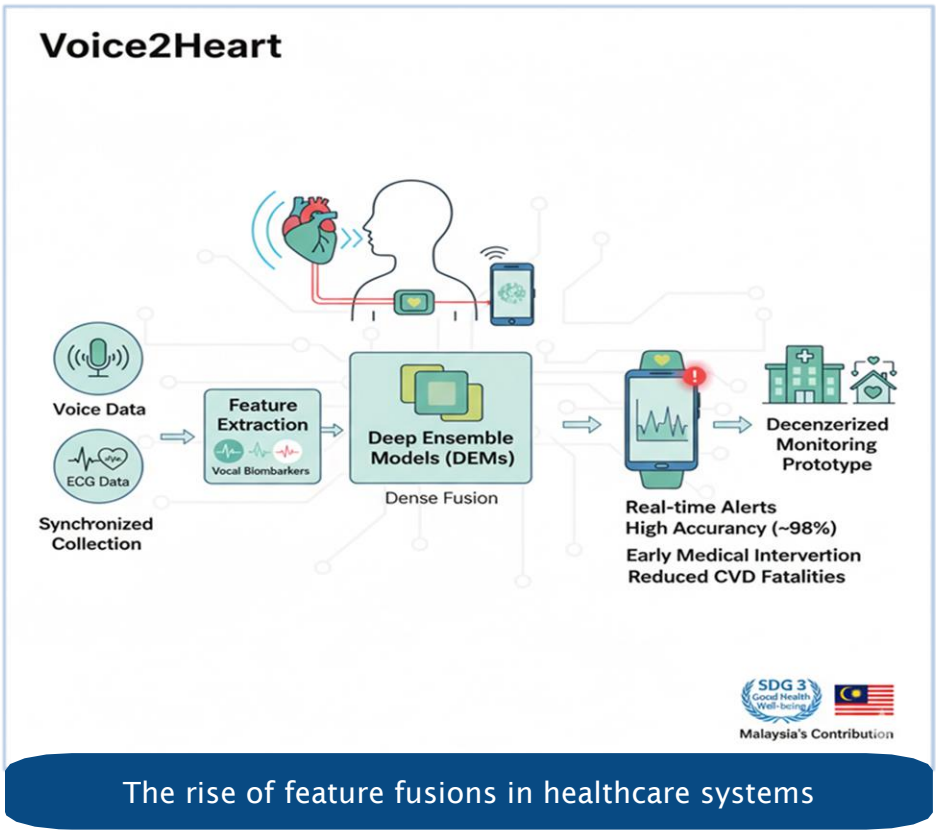

The rise of feature fusions in healthcare systems

Cardiovascular diseases still remain the chief killers across the globe, accounting for 32% of deaths worldwide (WHO, 2023). In spite of the advances in electrocardiography, however, two factors are paramount in limiting prevention: late detection and lack of access. More than 50% of sudden cardiac arrest patients have had no prodromal symptoms further emphasizing the research needed to develop proactive screening tools that extend beyond hospital settings. Classical ECG, while clinically robust, gives snapshots in time and hardly ever captures irregular heart beats occurring in the periods away from clinical observation. ECG devices generally require specialized facilities and prohibit access to populations in rural or underserved regions.

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