Real-Time Source-Agnostic ECG Monitoring for the use of Artificial Intelligence

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Enabling the world's first mobile embedded real-time source agnostic ecg AI monitoring system

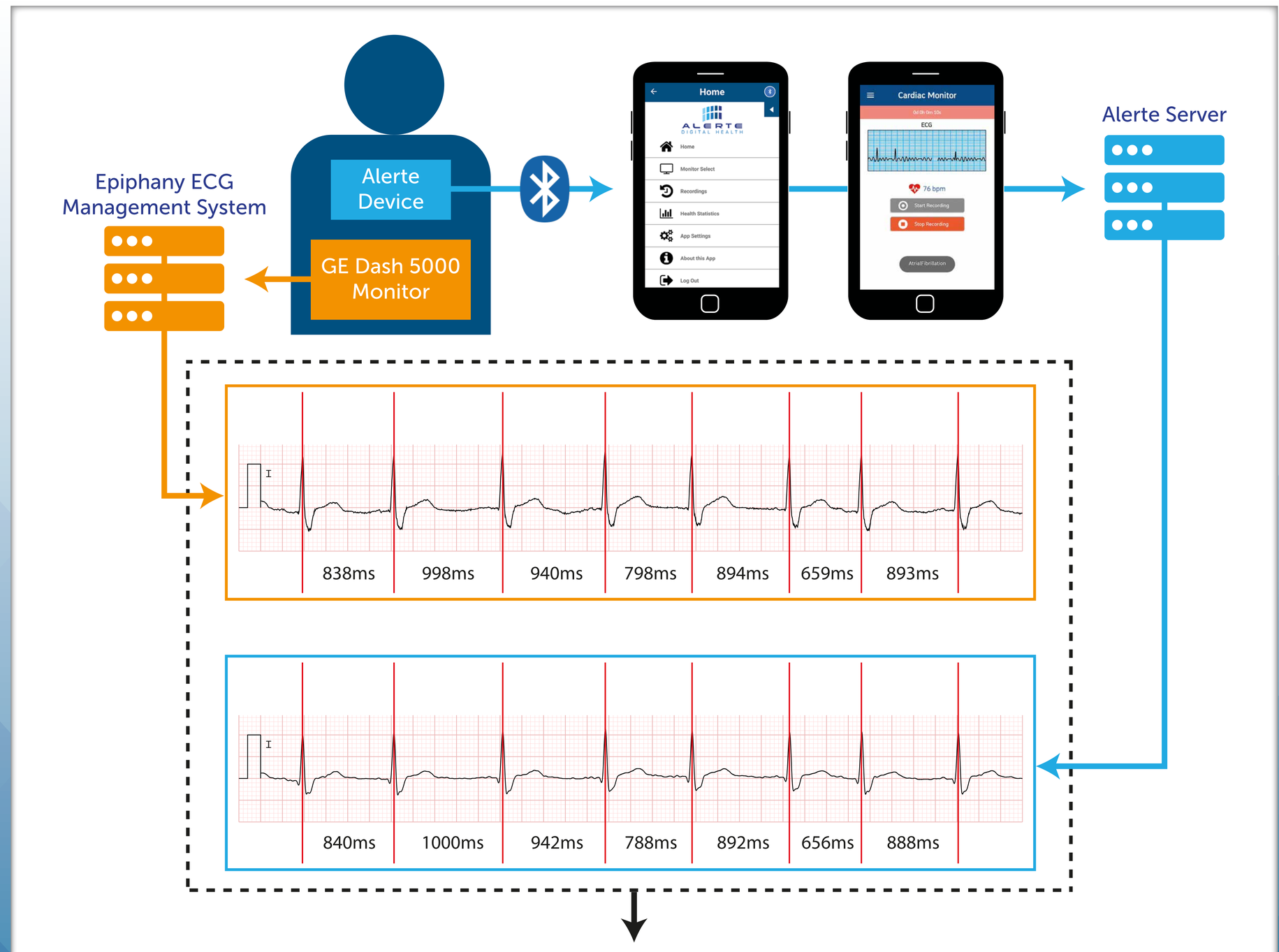
BACKGROUND

Current non-invasive ECG devices are limited by duration of monitoring, size and weight of the device, discomfort, lack of real time transfer and lack of accurate automation.

Our goal was to produce long term, continuous real-time ECG monitoring for arrhythmia detection.

We have developed a framework that involves three independent but linked methodologies:

1. ECG acquisition on a small wearable device
2. Continuous wireless digital transfer of ECG data to a mobile device
3. Real-time arrhythmia-detection using artificial intelligence (AI).



With matched signal data, the Alerte device proves itself to be highly reliable. The device enables the use of Artificial Intelligence to be able to detect arrythmias and predict future outcomes.

AIM

To validate the ECG signal acquired by the Alerte continuous ECG acquisition device, by comparing simultaneously the Alerte device with a commercially available critical care ECG monitoring system.

METHOD

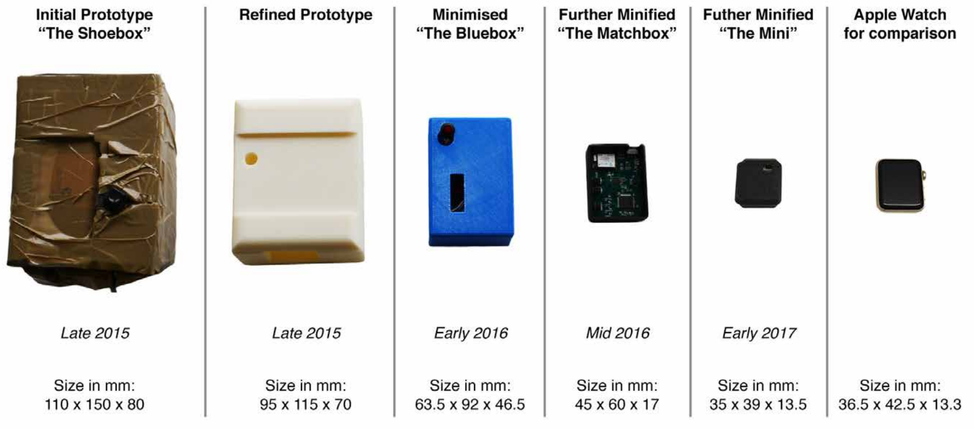
The current study was performed to compare the automated system described above, against simultaneous ECG monitoring in a coronary care unit using a standard patient monitoring system. ECGs were de-identified and randomized, and blinded R-R interval measurements were performed using manual digital calipers by three independent cardiologists.

RESULT

ECG acquisition and continuous wireless transmission showed excellent data integrity and no significant dropouts. Storage and encryption of data was robust. The ECG signals acquired by our device appeared visually identical to the standard monitoring system. Agreement of R-R interval measurement between devices and observers was good, with RMSE and Bias at 26 and 6 ms, respectively. The rhythm comparison showed an accuracy of 93%.

CONCLUSION

Our continuous, wearable ECG device with real time wireless data transmission to a mobile device provides robust data integrity, and good agreement compared with a standard ECG monitoring system. The framework provides a suitable platform for automated continuous arrhythmia detection on a smart phone, using AI.



ADDITIONAL INFORMATION

Using a trained artificial intelligence model, we have been able to correctly classify between atrial fibrillation and sinus rhythm. Please refer to our separate communication on validation of our AI models: *A Validation Study of Automated Atrial Fibrillation Detection using Alerte Digital Health's Artificial Intelligence System*