An artificial intelligence-enabled ECG algorithm for the identification of patients with ventricular premature contraction during sinus rhythm

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An interesting **photo** related to your technology
(be careful not to disclose key technology)

Experience:

Ventricular premature complex (VPC) is a common arrhythmia in the clinical practice. Generally, VPC is benign or asymptomatic, but it could trigger ventricular tachycardia/fibrillation or VPC-induced cardiomyopathy in susceptible patients. Existing screening methods require prolonged monitoring and are limited by cost and low yield.

Market Needs:

Among various examinations, 12- lead electrocardiogram (ECG) is low cost, rapid, and widely available for diagnosis of cardiovascular diseases. We used artificial intelligence (AI) and machine learning based ECG reading to rapidly identify patients with VPC when they are in normal sinus rhythm, which is substantially needed in the medical care and market.

Our Technology:

We developed AI-enabled ECG algorithm using a convolutional neural network to detect the ECG signature of VPC present during normal sinus rhythm using standard 10-second, 12-lead ECGs. A total of 398 patients were diagnosed with VPC and 2,515 ECG records from them were collected. Only ECG records of normal sinus rhythm without VPC (1617 ECG records) were parsed. A total of 753 normal ECG records from 387 patients under normal sinus rhythm were used for comparison. Both image and time-series datasets were parsing for the training process by the CNN models. The computer architectures were optimized to select the best model for the training process. Both the single-input image model (InceptionV3, accuracy: 0.895, 95% confidence interval [CI] 0.683-0.937) and multi-input time-series model (ResNet50V2, accuracy: 0.88, 95% CI 0.646-0.943) yielded satisfactory results for VPC prediction, which were better than the single-input time-series model (ResNet50V2, accuracy: 0.84, 95% CI 0.629-0.952).

Strength:

AI-enabled ECG acquired during normal sinus rhythm permits rapid identification at point of care of individuals with VPC. AI with the deep-learning CNN could be emerged as a powerful tool to interpret two-dimensional data mimicking human-like interpretations of the ECG. It has the potentiality to predict VPC episodes automatically rather than traditional interpretations.

Competing Products:

Nil

Intellectual Properties:

AI with the deep-learning CNN model interprets two-dimensional ECG data mimicking human-like interpretations and predicts patients with VPC when they are in normal sinus rhythm.

Contact (do not need to fill out):

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