Ensemble Learning for Detection of Short Episodes of Atrial Fibrillation

Early detection of atrial fibrillation (AF) is of great importance to cardiologists in order to help patients suffer from chronic cardiac arrhythmias. This paper proposes a novel algorithm to detect short episodes of atrial fibrillation (AF) using an ensemble framework. Several features are extracted from long term electrocardiogram (ECG) signals based on the heart rate variability (HRV). The most significant subset of features are selected as inputs to the four classifiers. Outputs of these classifiers are then combined for the final detection of the AF episodes. Results from an extensive analysis of the proposed algorithm show high classification accuracy (around 85%) and sensitivity (around 92%) for classifying very short episodes of AF (10 beats per segment, which is approximately 6 seconds). The accuracy and sensitivity of the proposed algorithm are improved significantly to 96.46% and 94%, respectively, for slightly longer episodes (60 beats per segment) of AF. Compared to the state-of-the-art algorithms, the proposed method shows the potential to pave the way to extend to real-time AF detection applications.