

---

Paper ID: 1570943534

---

Paper Title: High-precision Rhythm-based Detection of Atrial Fibrillation and Frequent Premature Contractions using Extreme Gradient Boosting

---

Authors: Tanawan Tearwattanakul (Chulalongkorn University, Thailand); Apiwat Lekuthai (Chulalongkorn University & Faculty of Engineering, Thailand)

---

Email: tanawan.t@yahoo.com

---

## Abstract

---

Atrial fibrillation and premature contractions are two of the most common types of arrhythmia which can lead to serious heart complications such as stroke and heart failure. Normally, these two arrhythmias are detected by inspecting the electrocardiogram (ECG) which requires medical expertise, making it unsuitable for home-based monitoring used by patients who have no medical background. This research aimed to develop a rhythm-based algorithm to detect atrial fibrillation and frequent premature contractions with 20% burden. The algorithm was trained using ECG data from publicly available MIT-BIH Arrhythmia Database and Long Term AF Database segmented into 30-second-long ECG segments. After QRS detection, relevant features, involving heart rate variability, Shannon's entropy, and sample entropy, were extracted from the RR interval and classified using state-of-the-art extreme gradient boosting (XGBoost). The final model achieved the performance of 98.10% F1-score on an independent test set. Thus, this algorithm can be applied on home-based monitoring which can be used as a screening intervention for the healthcare system.

---