Development and Testing of Ventricular Fibrillation Detection Software Module

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Cardiovascular diseases

- Major health problem
- Greatest risk group
- Constant monitoring
CardiaCare

- Smartphone
- Application
- User-friendly
- Customizable ECG viewer
- Analyzer
- Emergency call
How it works?
Sudden death

Increased heart rate → Ventricular tachycardia → Ventricular fibrillation → Death
Requirements for the algorithm

- Real-time
- Reliability
- High speed
- Simplicity
Phase Space Reconstruction
Phase Space Reconstruction
Arithmia detection

\[ d = \frac{\text{Number of visited boxes}}{\text{Number of all boxes}} \]

If \( d > d_0 \), then classify ECG episode as VF,

\[ d_0 = 0.15 \]
Testing of the algorithm

- MIT-BIH
- PhysioNet
- Open-source software
- WFDB-library
- WFDB-applications
- ECG records
Testing: Normal ECG record
Testing: VF ECG record

count = 288
\[ d = 0.18 \]
WARNING! Ventricular fibrillation!
interval # 222
count = 256
\[ d = 0.16 \]
WARNING! Ventricular fibrillation!
interval # 223
count = 296
\[ d = 0.185 \]
WARNING! Ventricular fibrillation!
interval # 224
count = 296
\[ d = 0.185 \]
WARNING! Ventricular fibrillation!
Thanks for your attention!

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