



Atrial Fibrillation detection using a wristband device

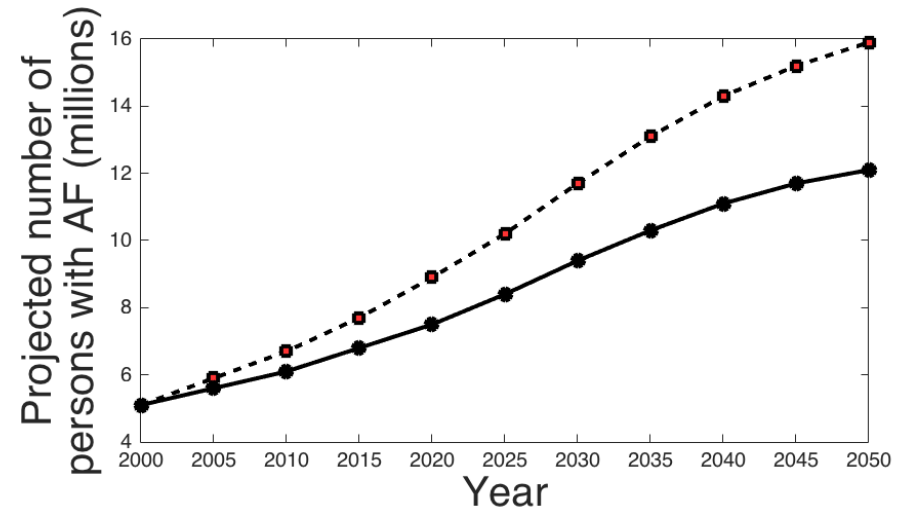
Atrial Fibrillation (AF) is the most common sustained arrhythmia.

33.5 million

Number of people with AF



Prevalence doubling with each advancing decade of age over 50 years, reaching almost 10% in octogenarians.



Freely adapted from Miyasaka et al, Circulation. 2006;114:119-125, originally published July 10, 2006.

AF can be paroxysmal, i.e., intermittent, **and asymptomatic**, thus resulting **very difficult to detect** and leading to loss of lives and high healthcare cost. New methods of screening to detect AF are necessary.





M-Health suggestion

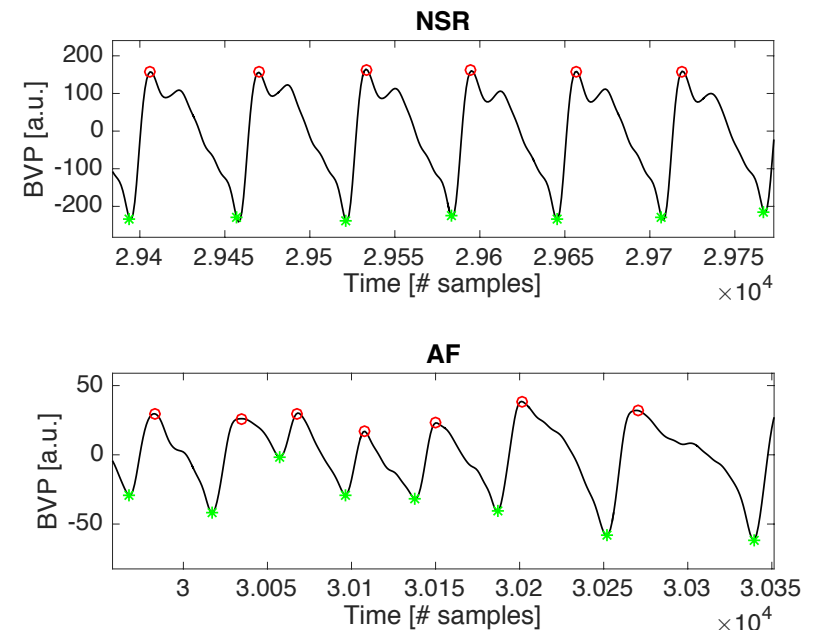
A wearable, non-invasive and potentially highly accepted wristband device is the Empatica E4.



It measures:

- BVP through Photoplethysmography (PPG) [12 bit, 64 Hz]
- 3-Axis Accelerometer Data
- Temperature
- Electrodermal Activity

The PPG signal of patients with AF (bottom) can be differentiated from healthy subjects (top), because of the different morphological and rhythmic features of the PPG signal.





Protocol - Recordings of PPG signals using Empatica E4:

- ✓ In patients in AF and in sinus rhythm to train a classifier (Data 1)
- ✓ At the family physician to screen all the people over 60 during routine visits (Data 2)

Methods:

- ✓ Removal of noisy signal's segments through threshold's application on accelerometer data
- ✓ Computation of parameters assessing variability and irregularity of the inter-diastolic interval series
- ✓ Computation of morphological parameters assessing PPG signal's waves
- ✓ Features selection, training and classification (Data 1)
- ✓ Identification of new patients with AF (Data 2)

