ECG and Activity Monitoring: what can we learn?

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Electrocardiogram: electrical activity of your heart
My ECG at rest

16 beats in 18 seconds = 53 bpm

1/RR interval = instantaneous HR
My ECG at rest

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1/RR interval = instantaneous HR
\( F = ma \)
Gravity = \(-9.8 \text{ m/s}^2 = -1g\)
\[ F = ma \]

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Data sets:
1. Daily activities
2. Sleep
An evening in data

Heart rate (bpm)

Walk  Bike  Cooking  Eating  Work Errands  Work

Cleaning

Acceleration (g)

Time (minutes)

X  Y  Z
Heart rate: 57 bpm

Respiration: Me resting

Sitting

Acceleration (g):
- Accel X
- Accel Y
- Accel Z

Time (minutes)
Heart rate: 97 bpm

Respiration

Steps
Heart rate: 147 bpm

Me cycling

Respiration

False steps?
Lesson 1: HR changes a lot.
Lesson 2: HR changes are interesting, but need more data over time.
Falling asleep Left side   Right Side       Toss/Turn

Fitbit sleep efficiency: 95%
Time to fall asleep: 6 min
Sleep - night one

Fitbit sleep efficiency: 95%
Time to fall asleep: 6 min

Heart rate (bpm)

Falling asleep

Artifact

Turn

Stomach

Turn Shift

Time (minutes)

Acceleration (g)

Left side Right Side Toss/Turn

x y z
Each data point = 60 beat average
NOT NOISE!!!

Heart rate variability
NOT NOISE!!!

Heart rate variability

RR interval - night 1

Time (minutes)
Premature atrial contractions - night 1

- Premature beat
- Compensatory pause
Lesson 3: ECG data reveals Premature Atrial Contractions, primarily during sleep.
Takeaways
Other cool stuff:
- HRV
- Resp. rate
- CV dynamics
- Trends over time
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