Project 3: time-series classification

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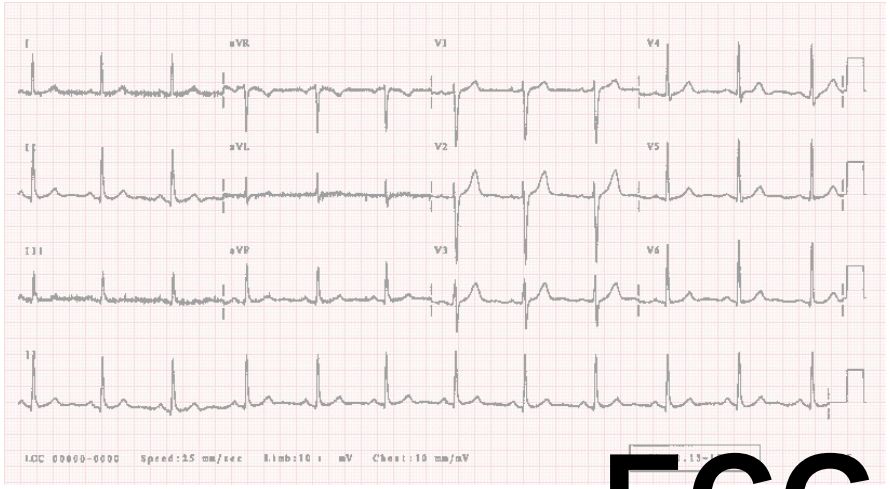
November 20 - 22
Advanced Machine Learning, Autumn 2019

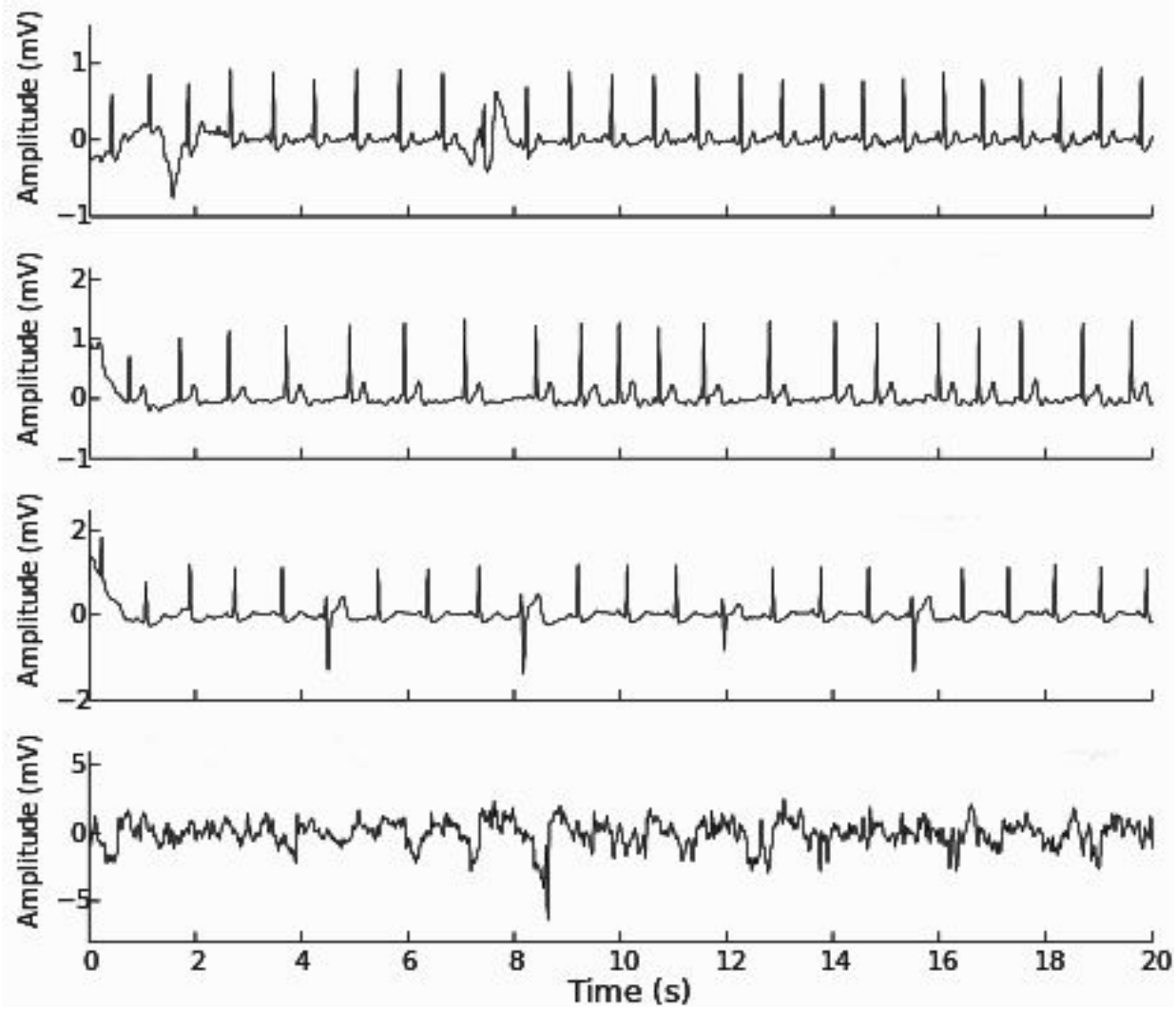

I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
Speed:25 mm/sec
Limb:10 mm/mV
Chest:10 mm/mV


Record EKG
How are you feeling?
Kardia

ECG signal


CheckMe
10s
68
%SpO2 98


10:09
Back
Normal
64
BPM



Class 0

Class 1

Class 2

Class 3

Data profile

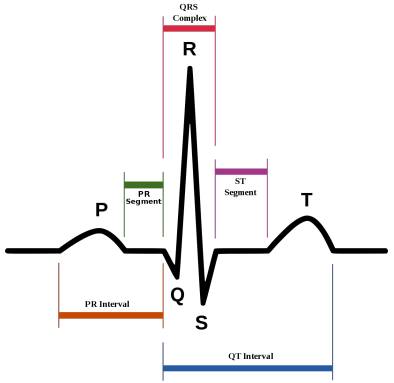
Label	Number of recordings	Time length (s)				
		Mean	SD	Max	Median	Min
Class 0	3030	29.8	9.4	59.0	27.8	8.1
Class 1	443	29.8	11.8	58.3	27.9	9.3
Class 2	1474	31.9	11.0	59.4	28.1	8.7
Class 3	170	22.1	9.8	55.8	24.4	9.2
Total	5117	30.1	10.3	59.4	27.9	8.1

ECG

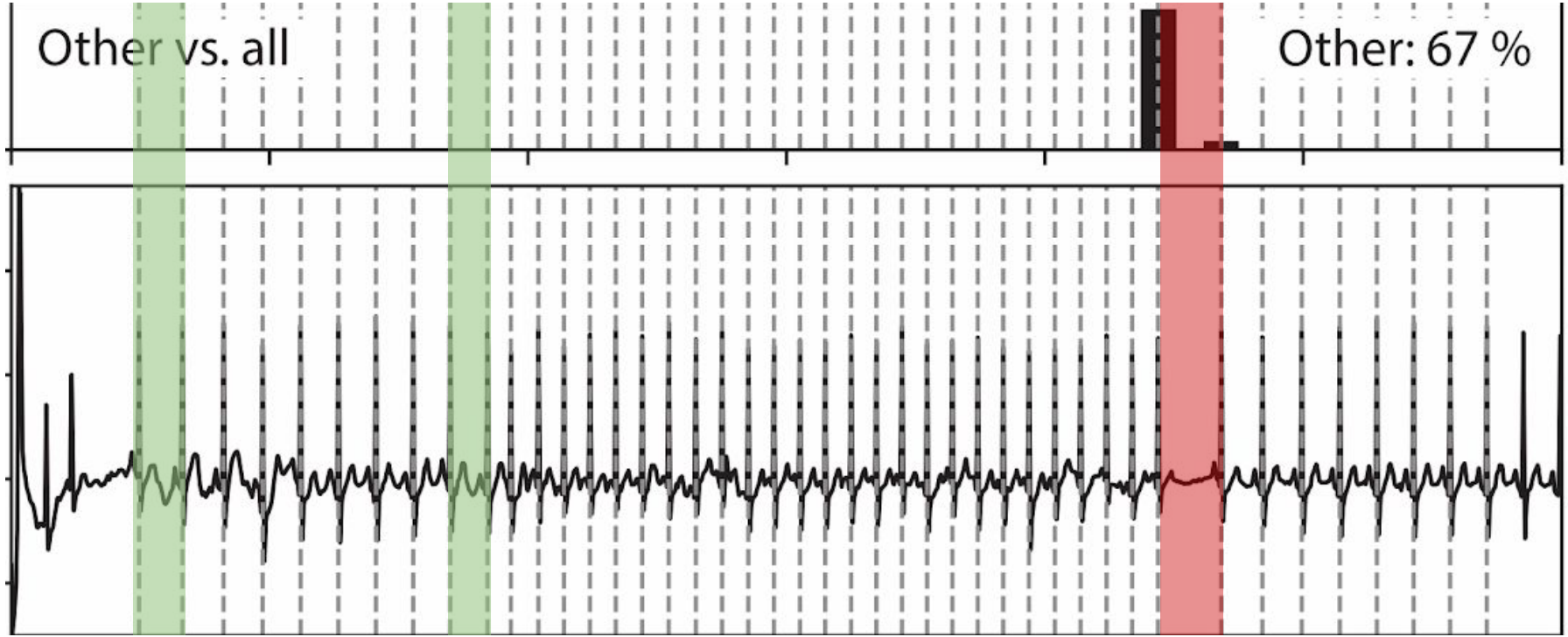
as a sequence of…

Data points

Heartbeats

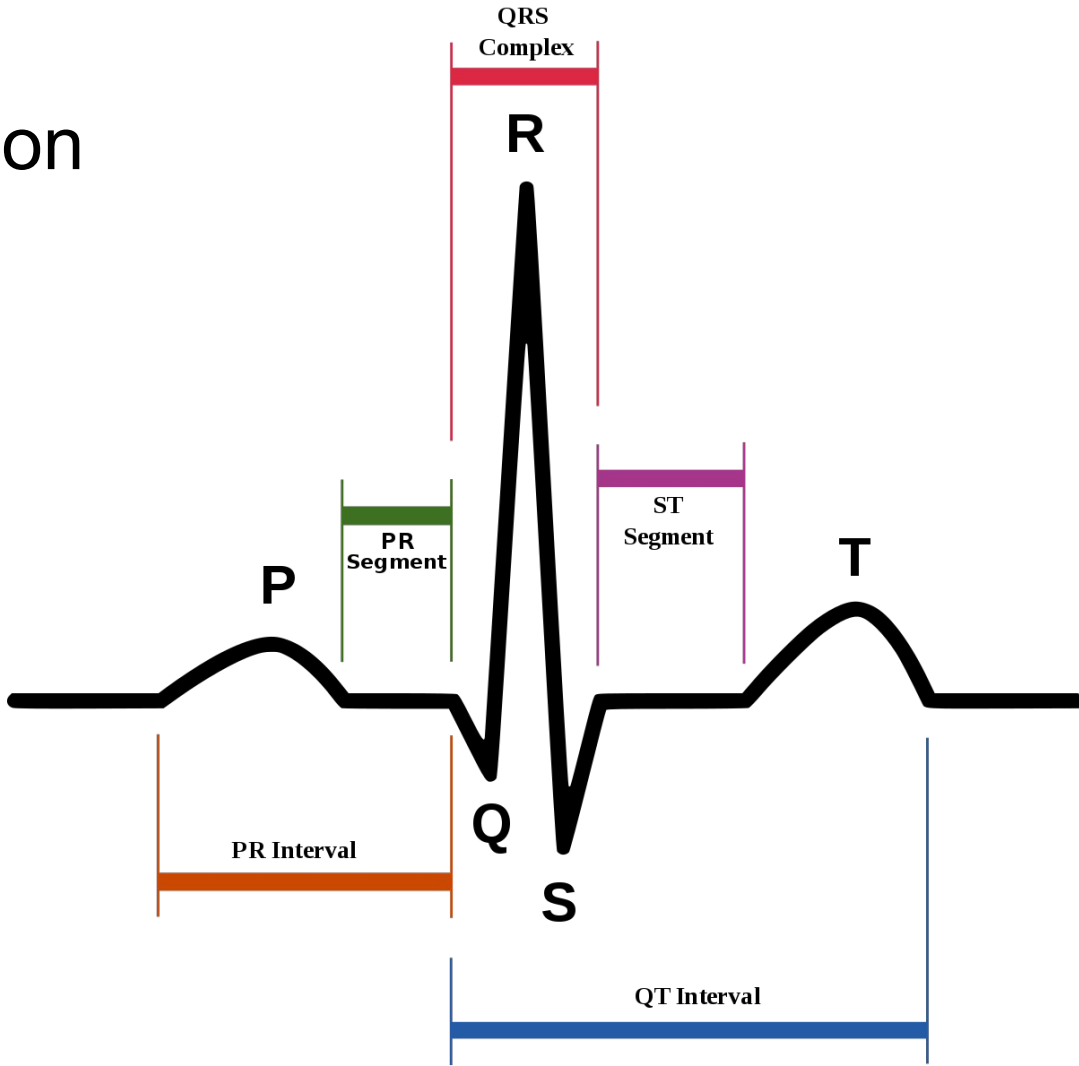


Splitting into heartbeats

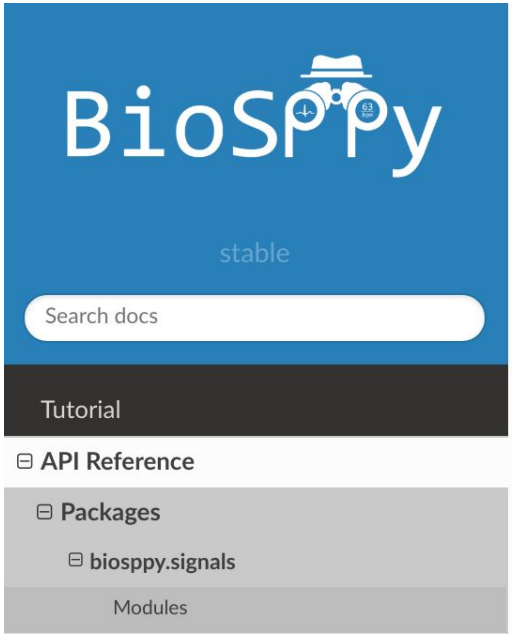


Manual feature extraction

- RR interval
- R amplitude
- Q amplitude
- QRS duration
- Heart rate variability
- Wavelet energy



import biosppy.signals.ecg **as** ecg



biosppy.signals.ecg.extract_heartbeats(*signal=None, rpeaks=None, sampling_rate=1000.0, before=0.2, after=0.4*)

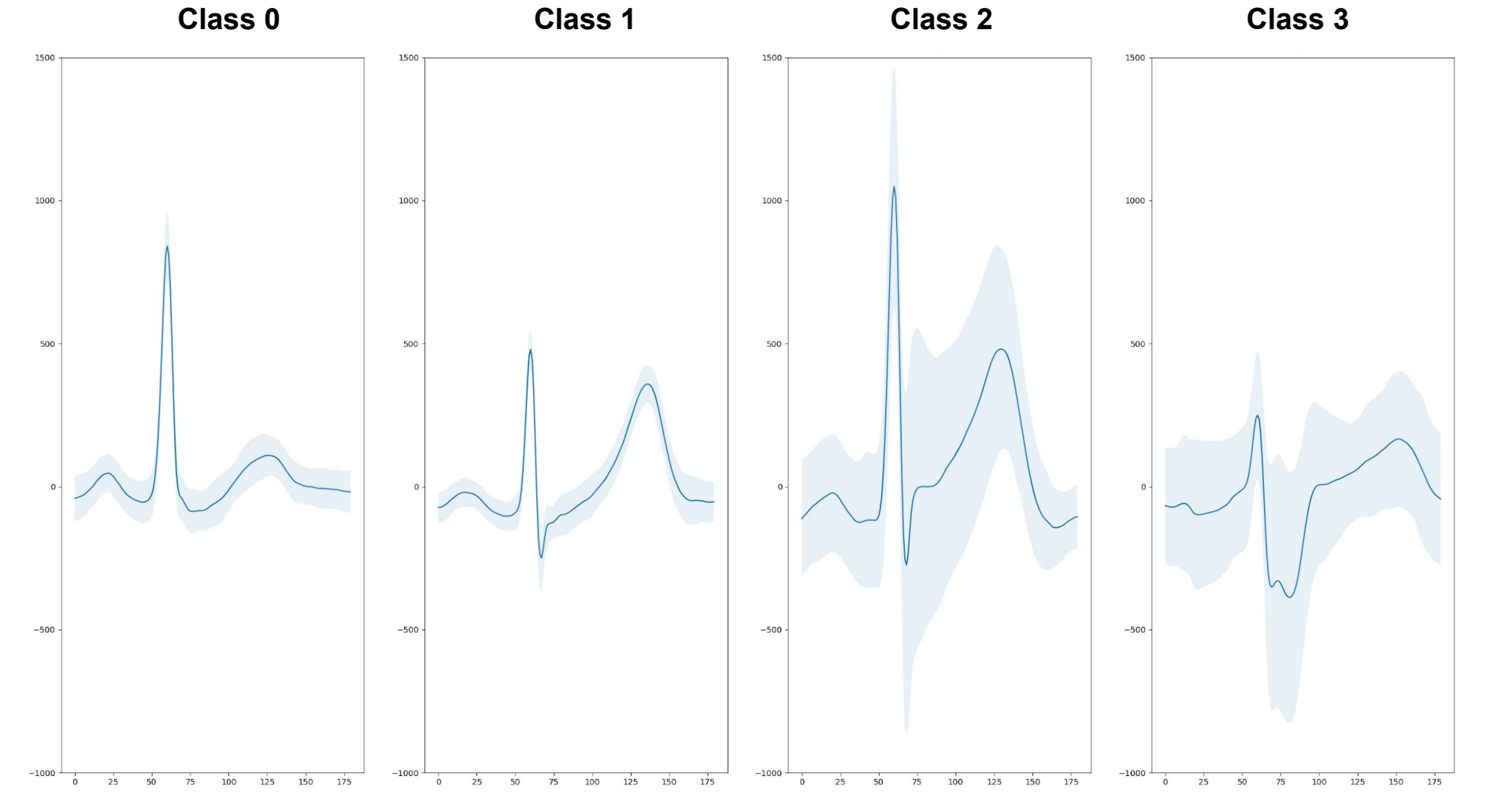
Extract heartbeat templates from an ECG signal, given a list of R-peak locations.

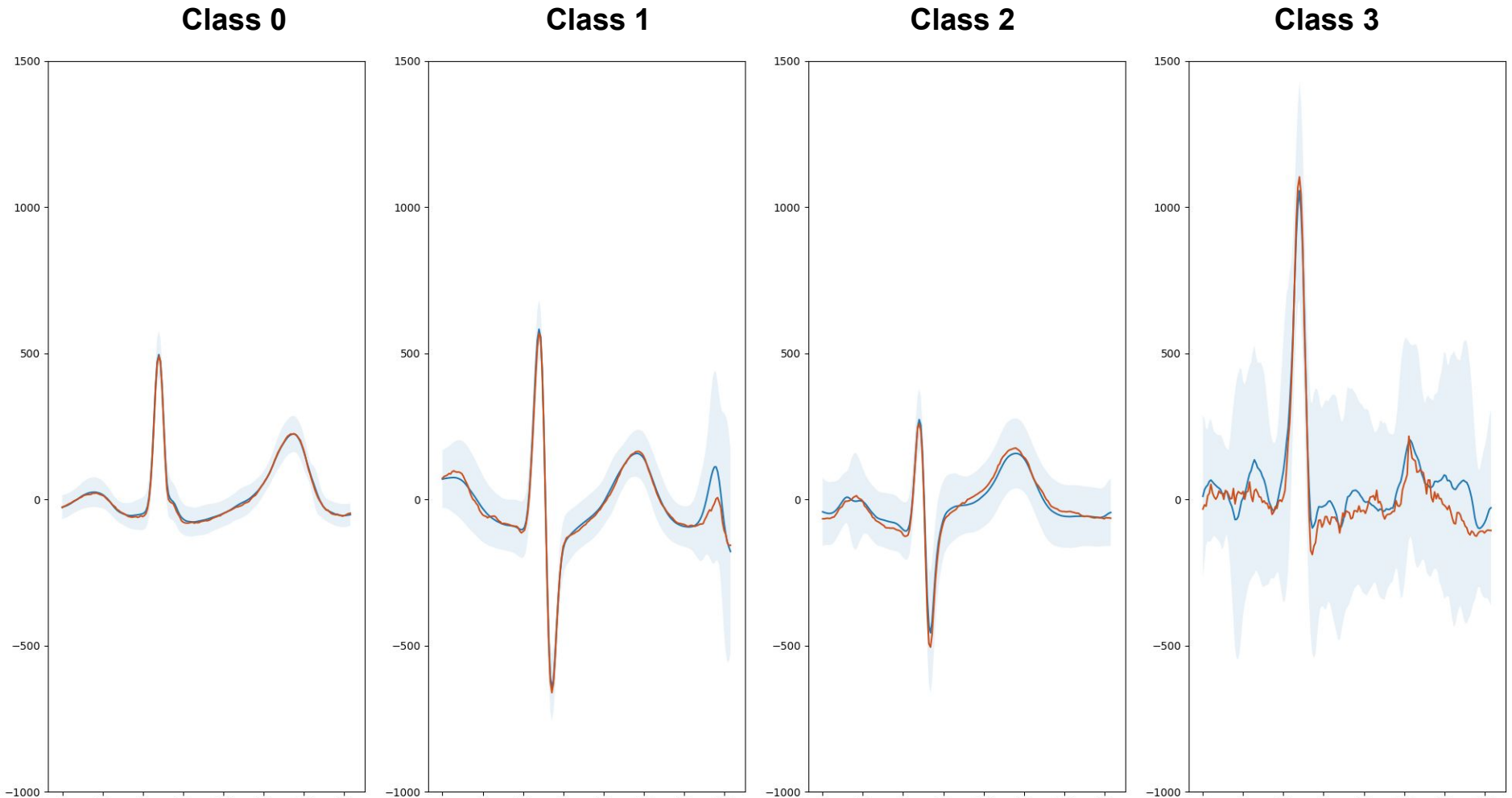
Parameters:

- **signal** (*array*) – Input ECG signal.
- **rpeaks** (*array*) – R-peak location indices.
- **sampling_rate** (*int*, *float*, *optional*) – Sampling frequency (Hz).
- **before** (*float*, *optional*) – Window size to include before the R peak (seconds).
- **after** (*int*, *optional*) – Window size to include after the R peak (seconds).

Returns:

- **templates** (*array*) – Extracted heartbeat templates.
- **rpeaks** (*array*) – Corresponding R-peak location indices of the extracted heartbeat templates.


Class 0
Class 1
Class 2
Class 3
1500
1000
500
0
−500
−1000
0
25
50
75
100
125
150
175


Class 0
Class 1
Class 2
Class 3
1500
1000
500
0
−500
−1000
0
25
50
75
100
125
150
175

Questions?