

Potential Product use cases for ECGs in Cepstrum-Matrix mode

**Wider Visualization of Heart Beats
For
Deeper Interpretation of Beat Pattern**

Example of Extended CEPSTRAL Approach using Physionet Data

Record 105 (MLII, V1; female, age 73)

Rhythm	Rate	Episodes	Duration
Normal sinus rhythm	78-102	1	30:06

Signal quality	Episodes	Duration
Both clean	31	22:18
Upper noisy	3	0:10
Lower noisy	28	3:27
Both noisy	23	4:06
Unreadable	4	0:04

Points of interest:

[22:02](#) Noise [5:27](#) Artifact
[26:45](#) PVC [7:57](#) PVC
[27:27](#) Noise [15:16](#) Normal sinus rhythm
[28:08](#) Noise [17:52](#) Artifacts
[29:07](#) Noise

Notes:

The PVCs are uniform.
The predominant feature of this tape
is high-grade noise and artifact.

<https://physionet.org/cgi-bin/atm/ATM>
MIT-BIH Arrhythmia Data Base (mitdb)

Three steps from time domain to frame domain

Figure 4

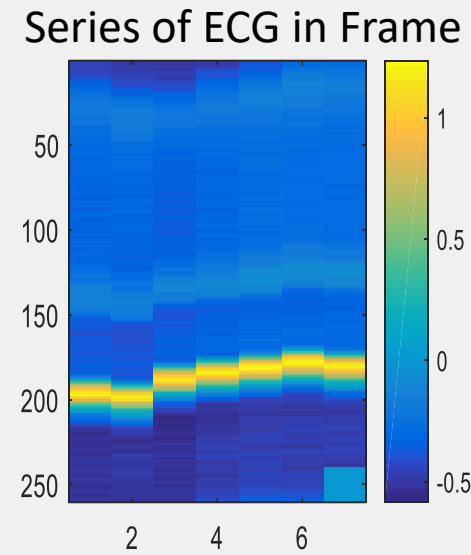
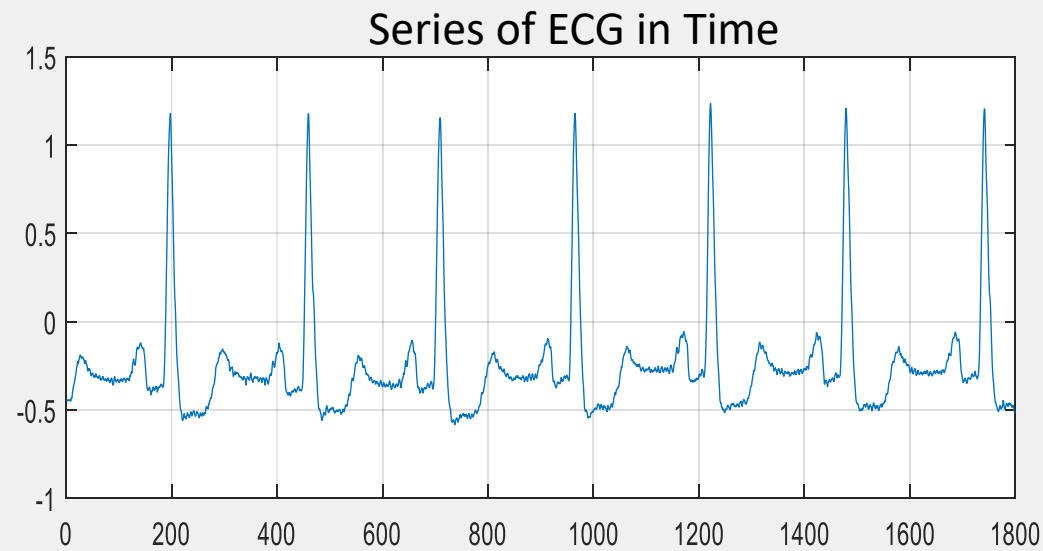
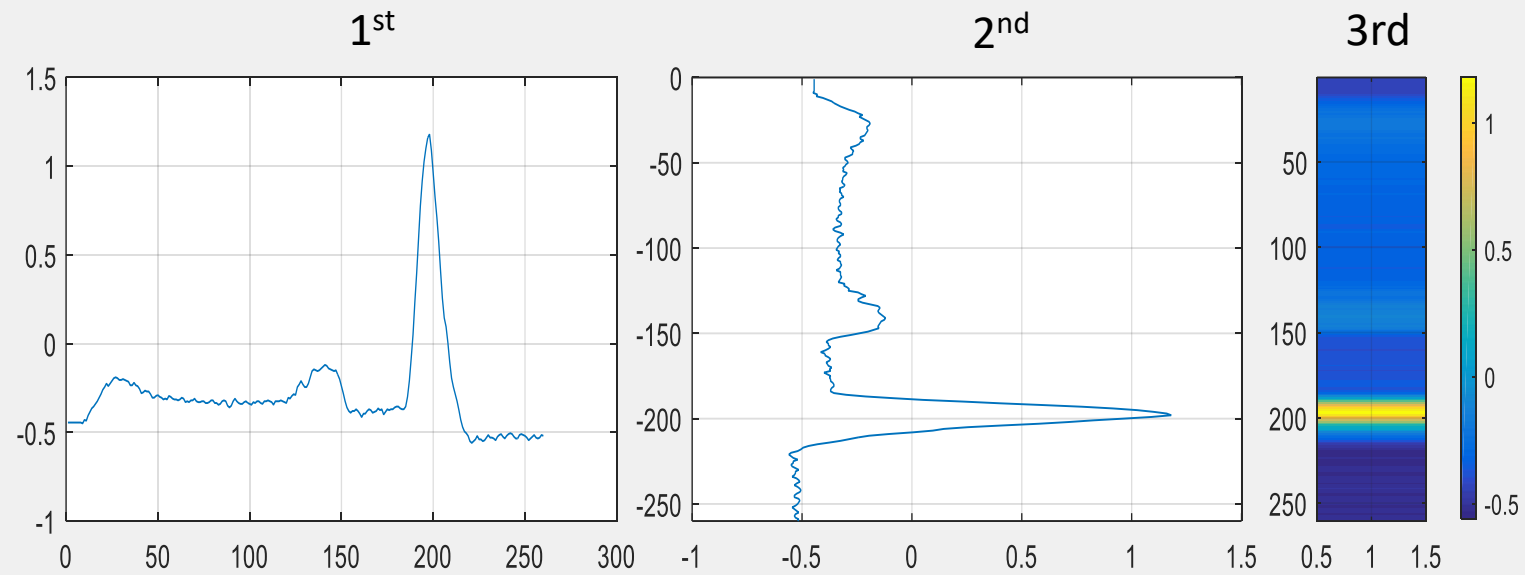
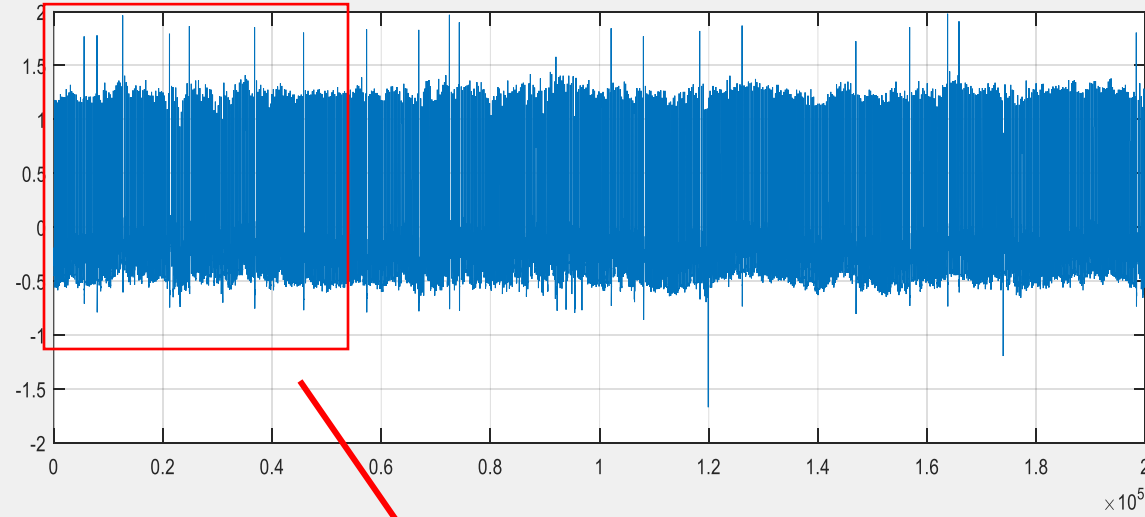


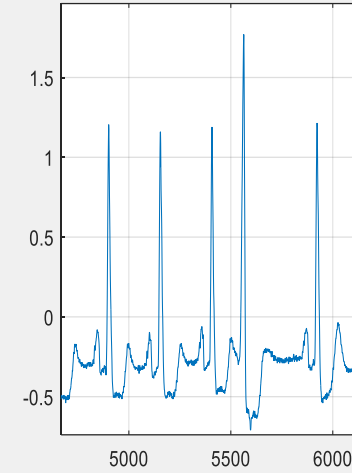
Figure 5

The advantage of Frame over time based on Cepstrum

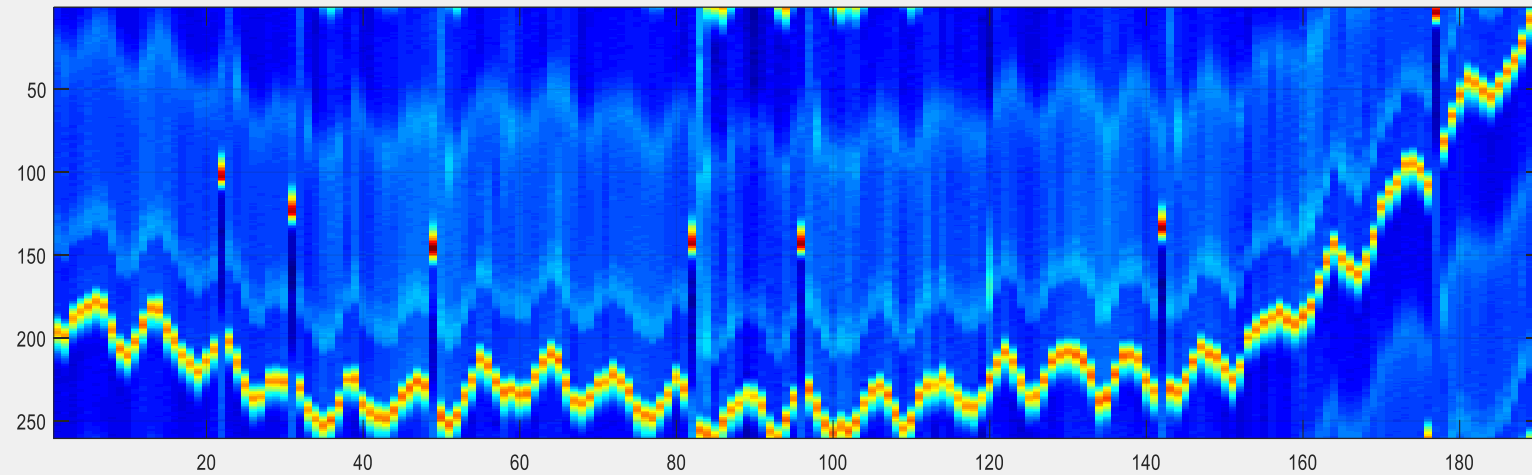
1. Dense plot of 1000 ECGs in time

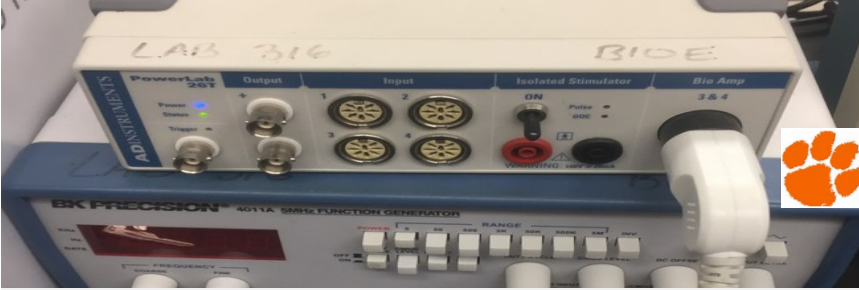


ECGs with a PVC



Frame domain of 200 ECGs in Red Box above





Clemson student

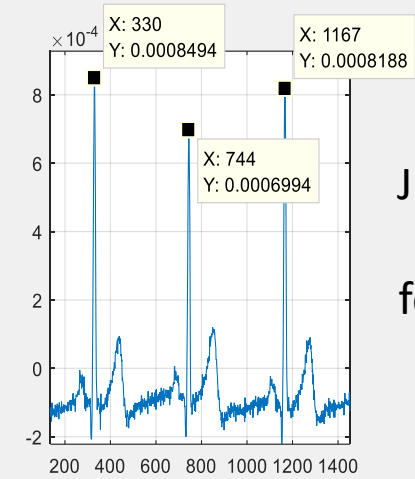
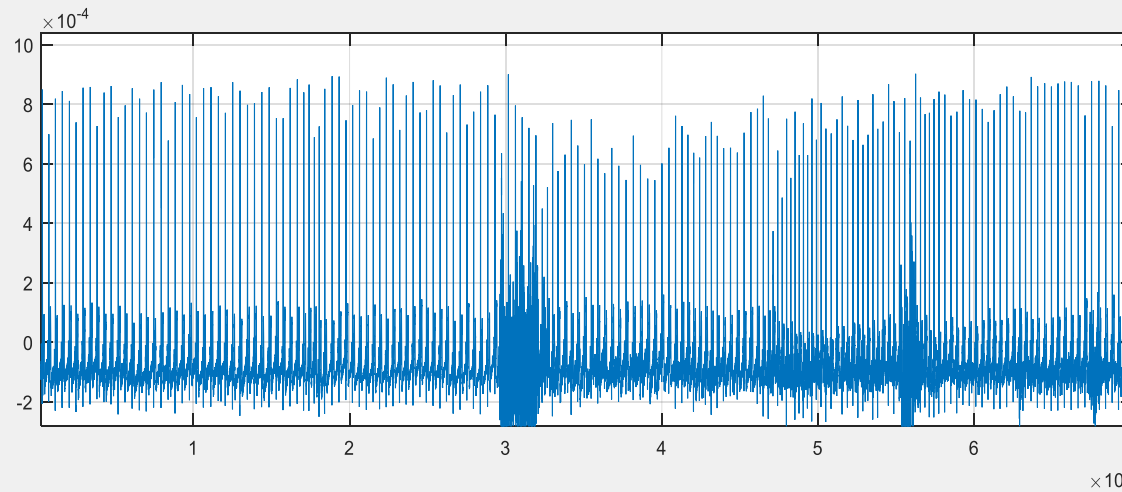
ADInstruments, PowerLab 26T, Model ML856

22 year old BioMed student, *my prodigal son*

3 minutes of ECG recorded at 400 samples/second

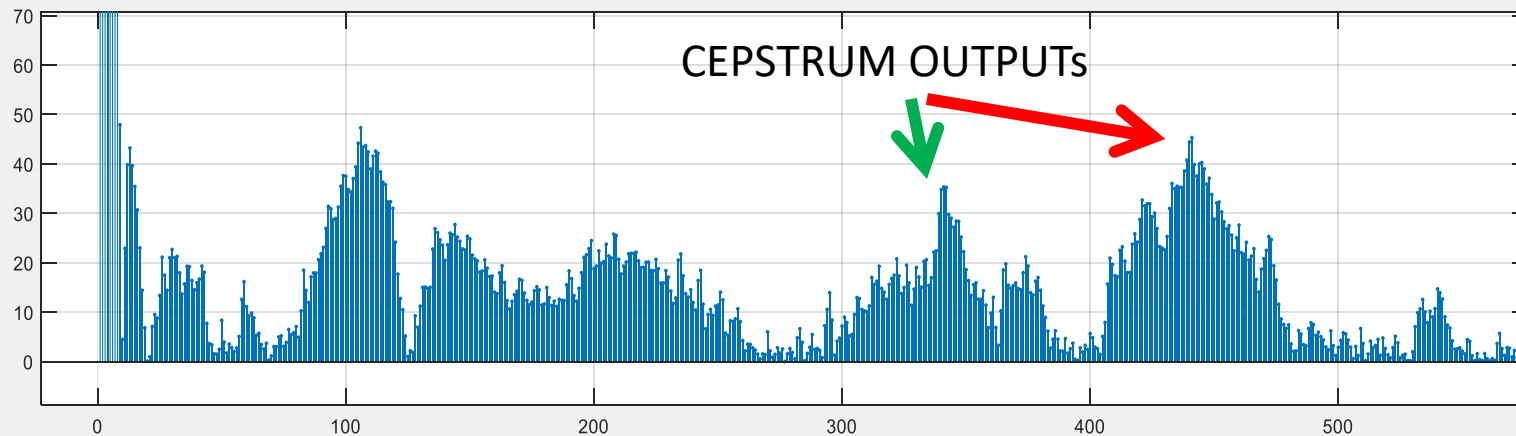
Relaxed state at beginning, fast breathing at end.

Series
of
ECG



Just
a
few

Figure 10



Zoom in to find three sets of quadruplets

Figure 13

