

Respiratory signal from PPG of 7 datasets

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I. OBJECTIVE

- 1) To summarize the PPG signal in 7 datasets
- 2) To run respiratory rate toolbox algorithms to the datasets

II. COMPLETED TASKS

A. Analysis of PPG in Datasets

Table I shows the details of the datasets. All the PPG datasets have been uploaded to 'bspprojects9\OURR' except Picram which is still in progress. The data also shows the SQI for all the datasets except Picram. Respiratory signals extraction from these PPG waveforms have been started to most of the datasets using the algorithms explained in the Section B. At this moment, information on the reference RR for Calms2 dataset is being identified.

TABLE I
PHOTOPLETHYSMOGRAPHY DATA ANALYSIS

Name	MIMICII	CapnoBase	Fantasia	Dialysis 1	Dialysis 2	Dialysis 3	Calms-2	Picram
PPG Data Available	✓	✓	✗	✓	✓	✓	✓	✓
PPG Data ↑ 'bspprojects9\OURR'	✓	✓	–	✓	✓	✓	✓	in progress
PPG Records (based on IDs)	954	42	–	96	574	373	336	Ox:199 , Rd:68
Reference Resp	950	42	–	96	574	373	(getting info)	Ox: 0 , Rd: 0
Recording time	8 m	8 m	–	4.9~5.2 h	2.3~4.4 h	0.8~6.0 h	0.2 h~30.9 d	in progress
Sampling Frequency (Hz)	125	300	–	75	75	256	75	75
Median PPG SQI > 0.8	400 (42%)	42 (100%)	–	71 (74%)	306 (53.3%)	295 (79%)	316 (94%)	in progress
Respiratory Signal Extraction	✓	✓	–	✓	✓	✓	✓	✓

B. Respiratory Signal Extraction

After PPG SQI, respiratory signal extraction process have been applied to all 7 datasets using the algorithms from the Respiration Estimation Toolbox. The algorithms are (1) delineator (2) corrDelineator (3) interp_RR and (4) getModulation. The PPG waveforms and the RIAV, RIIV, and RIFV results of each dataset are shown in this report where MIMIC – Fig. 1 and 2, CapnoBase – Fig. 3 and 4, Dialysis 1 – Fig. 5 and 6, Dialysis 2 – Fig. 7 and 8, Dialysis 3 – Fig. 9 and 10, Calms2– Fig. 11 and 12, and Picram – Fig. 13 and 14. The respiratory signals are extracted but a few refining steps need to be carried out in this preprocessing stage.

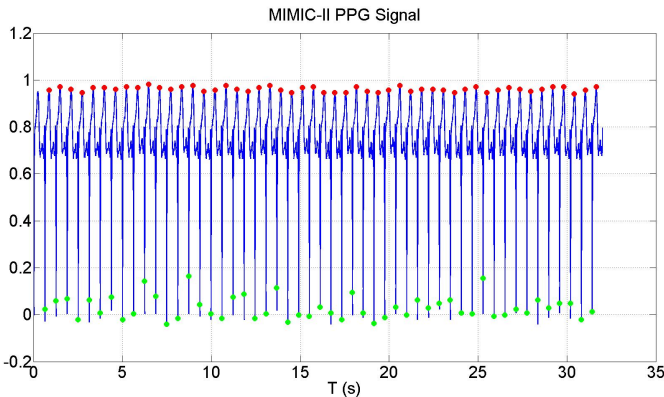


Fig. 1. PPG data s01978_2790_10_04_21_15.mat of MIMICII

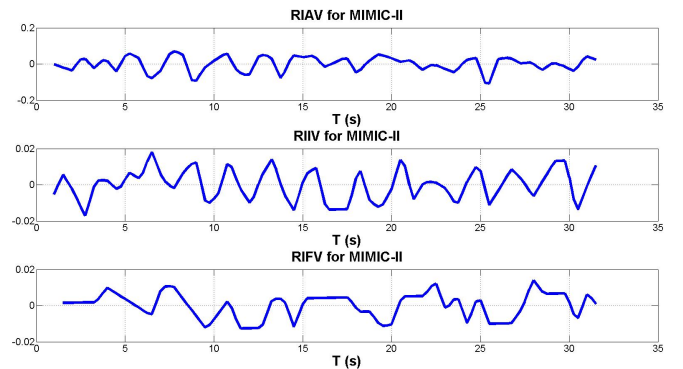


Fig. 2. Respiratory Signal using IAV, IIV and IFV

III. CONCLUSION

The updates on the PPG waveforms of 7 datasets have been reported. All 7 PPG datasets have been used for respiratory signal extractions using three well known signal modulations. Further refining need to be done before moving to the next step.

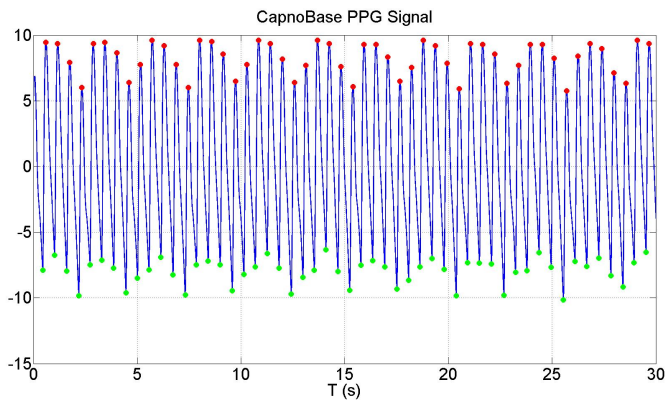


Fig. 3. PPG data 0023_8min.mat of CapnoBase

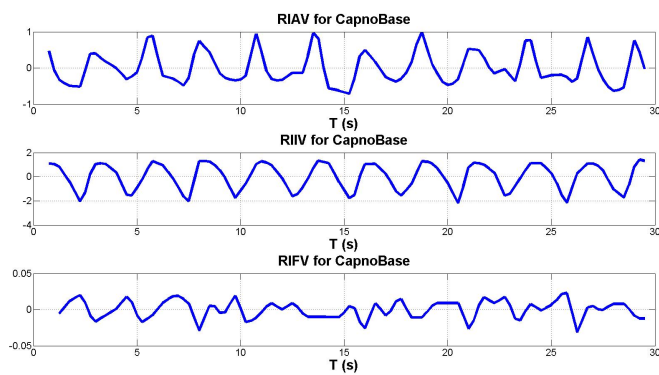


Fig. 4. Respiratory Signal using IAV, IIV and IFV

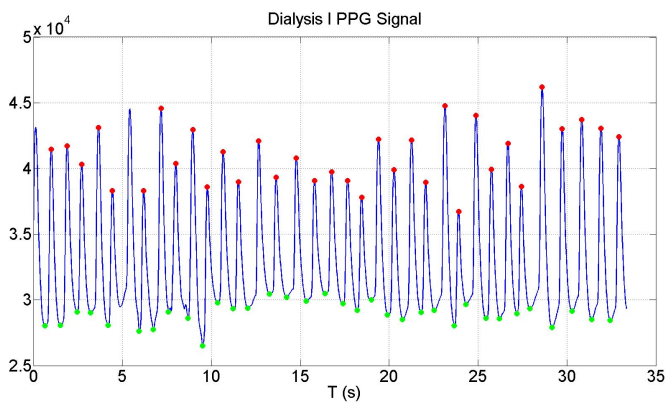


Fig. 5. PPG dataHM6 110225.mat of Dialysis I

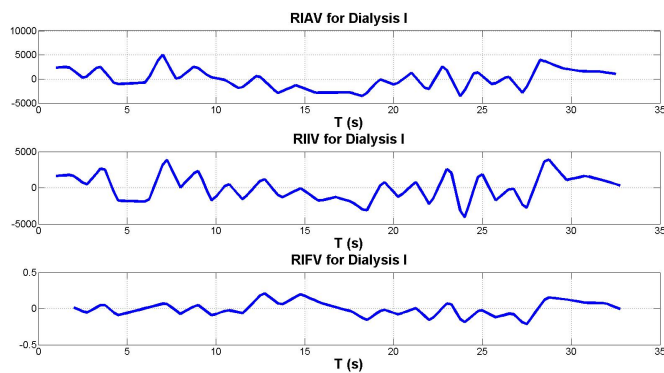


Fig. 6. Respiratory Signal using IAV, IIV and IFV

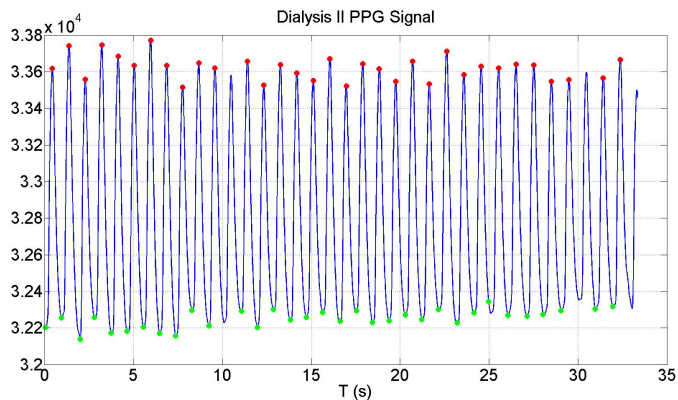


Fig. 7. PPG data OB1 120518.mat of Dialysis II

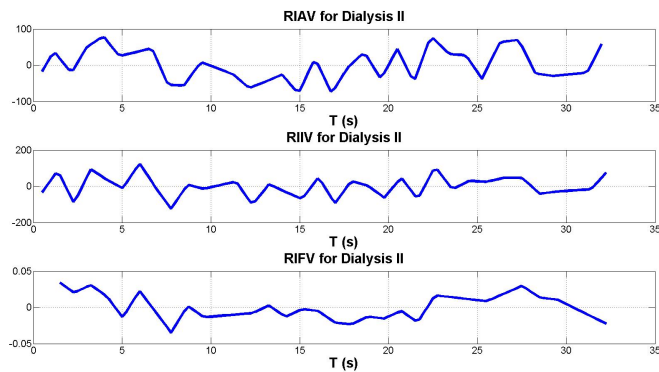


Fig. 8. Respiratory Signal using IAV, IIV and IFV

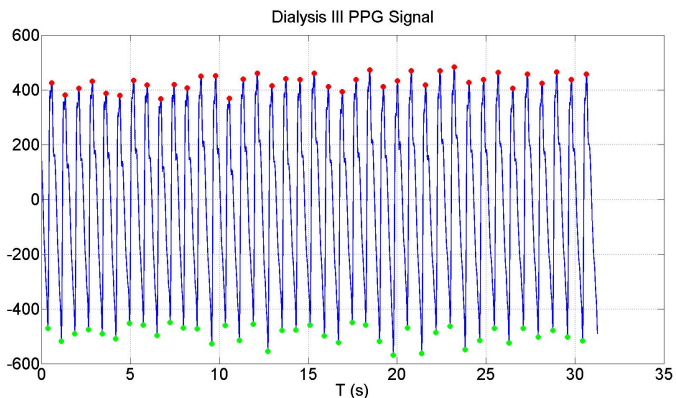


Fig. 9. PPG data DF01_131122.mat of Dialysis III

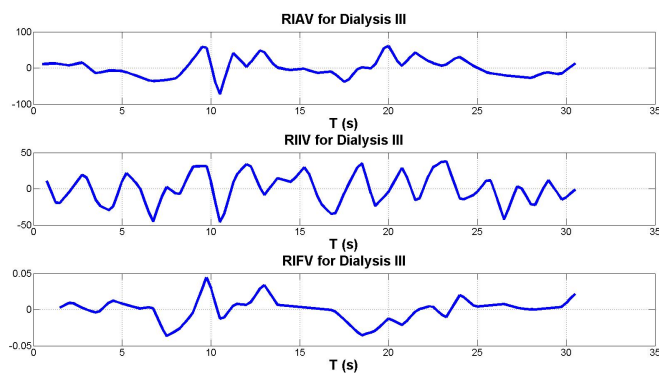


Fig. 10. Respiratory Signal using IAV, IIV and IFV

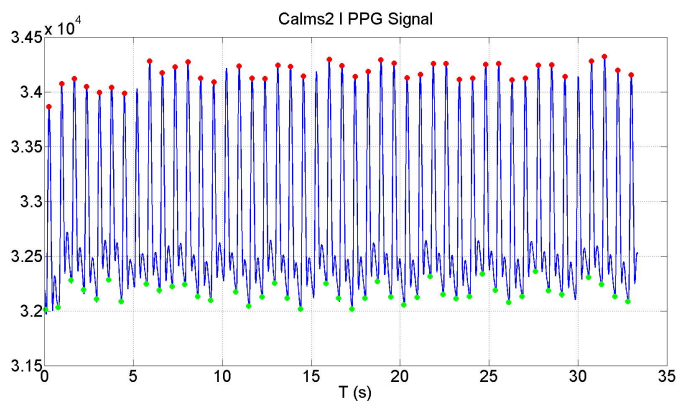


Fig. 11. PPG data pt482waveform.mat of Calms2

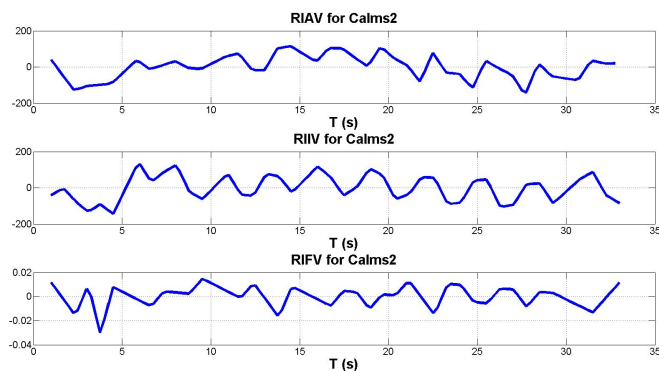


Fig. 12. Respiratory Signal using IAV, IIV and IFV

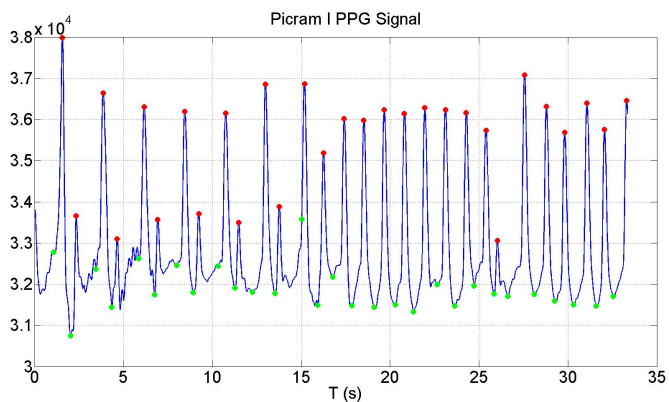


Fig. 13. PPG data 106PPG.mat of Picram

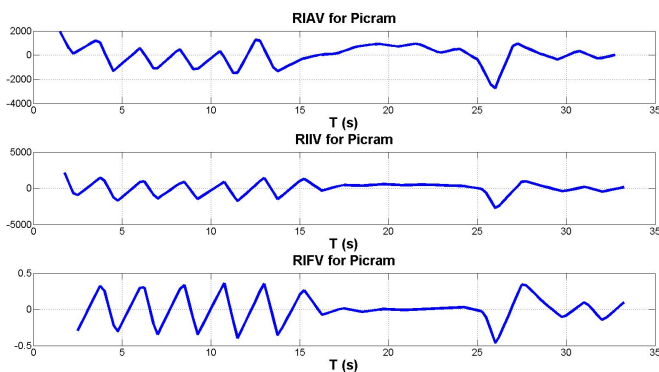


Fig. 14. Respiratory Signal using IAV, IIV and IFV