PPG SQI

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I. OBJECTIVE

1) To run PPG Signal Quality Indices (SQI) of the PPG of 5 datasets and summarize the result.

II. COMPLETED TASKS

A. SQI for datasets

In the previous reports (ProgReport11), PPG SQI for a few samples of MIMICII have been shown. In this report, the PPG SQI for all the samples in MIMICII, CapnoBase, Dialysis 1, Dialysis 2 and Dialysis 3 will be presented. Fantasia dataset does not have PPG data. Matlab pool has been used to increase the processing time for MIMICII and Dialysis datasets. The two function used in this analysis of PPG SQI are 'delineator' and 'calcSQI_PPG_CO' taken from the RR Estimation Toolbox. Using this template matching method (as explained in ProgReport11), the SQI result for PPG is binary, i.e. either '1' or '0'. The summary of the PPG SQI analysis is shown in Table I.

TABLE I
SUMMARY OF PPG SQI

Name	MIMICII	CapnoBase	Dialysis 1	Dialysis 2	Dialysis 3
PPG Data ⇑ 'bspprojects9\OURR'	1017	42	96	575	374
Median ECG SQI = 1	372 (36.6%)	42 (100%)	77 (80.2%)	272 (47.3%)	289 (77.3%)
Median ECG SQI = 0.5	19 (1.9%)	0 (0.0%)	0 (0.0%)	0 (0%)	0 (0.0%)
Median ECG SQI = 0	626 (61.6%)	0 (0.0%)	19 (19.8%)	300 (52.2%)	85 (22.7%)
IQR ECG SQI = 0	611 (60.1%)	42 (100%)	48 (50.0%)	473 (82.3%)	249 (66.6%)

1) MIMICII: The Med PPG SQI for MIMICII is as shown in Fig. 1. A closer analysis to validate this result has been carried out on one sample where the high and low quality signal is being identified using the blue and red color as demonstrated in Fig. 2.
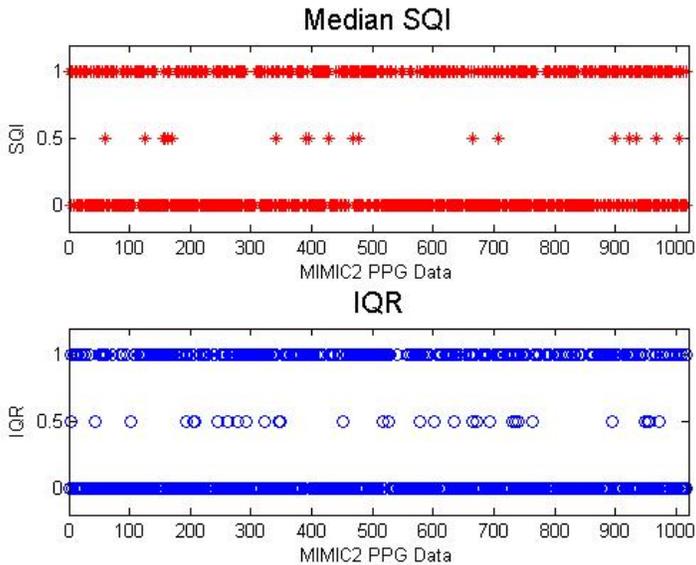

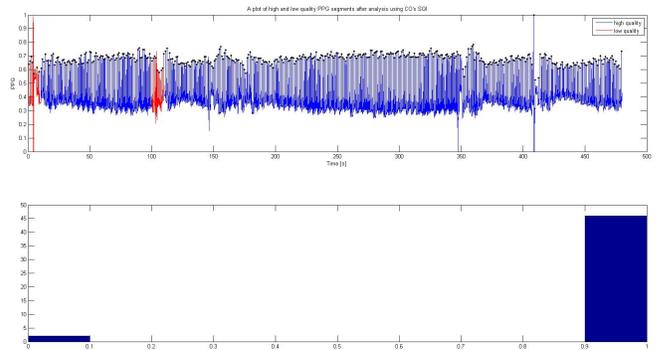Fig. 1. Median SQI and IQR SQI for PPG of MIMICII data set

Fig. 2. Analysis on one of the patient PPG data in MIMICII

2) CapnoBase: The Med PPG SQI for CapnoBase is as shown in Fig. 3. Further analysis to validate this result has been carried out to one sample as depicted in Fig. 4.

3) Dialysis1: The Med PPG SQI for Dialysis1 is as shown in Fig. 5. A closer examination to validate this result has been carried out to one sample as depicted in Fig. 6.

4) Dialysis2: The Med PPG SQI for Dialysis2, 575 PPG data is as shown in Fig. 7. A further examination to validate this result has been carried out to one sample as depicted in Fig. 8.
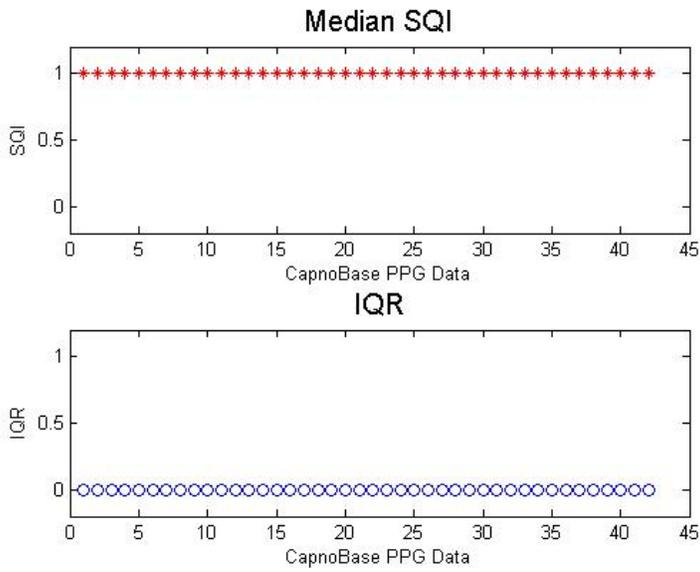
Fig. 3. Median SQI and IQR SQI for PPG of CapnoBase data set
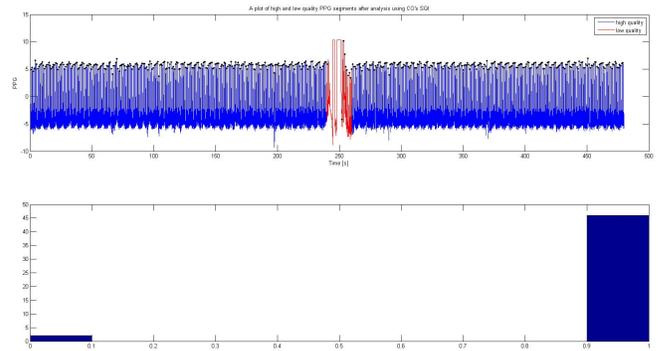

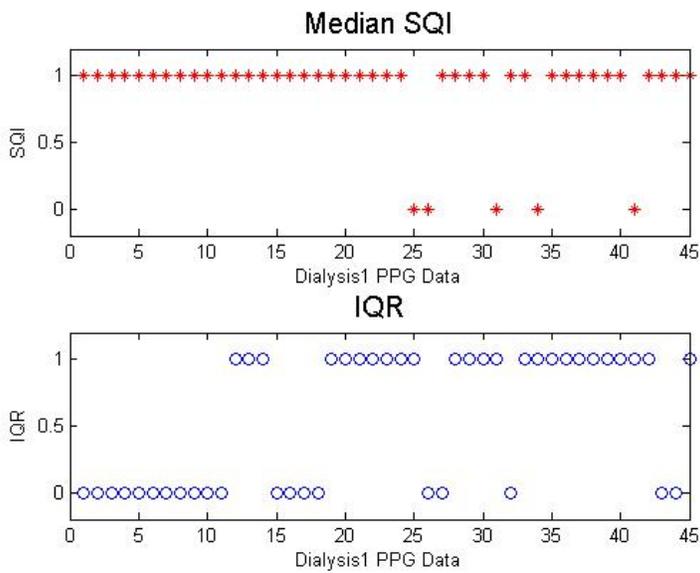Fig. 4. Analysis on one of the patient PPG data in CapnoBase data set

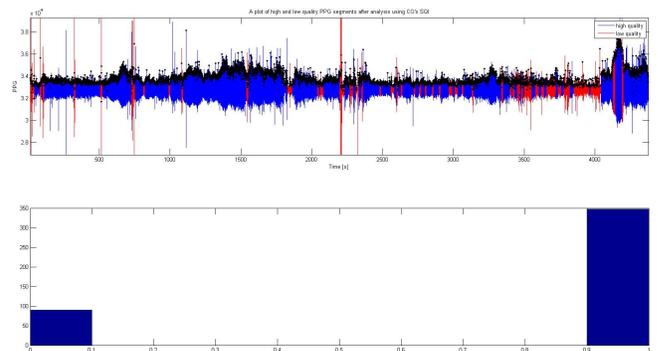Fig. 5. Median SQI and IQR SQI for PPG of Dialysis 1

Fig. 6. Analysis on one of the patient PPG data of Dialysis 1 data set

5) Dialysis3: The Med PPG SQI for Dialysis 3 is as shown in Fig. 9. A closer examination to validate this result has been carried out to one sample as depicted in Fig. 10.
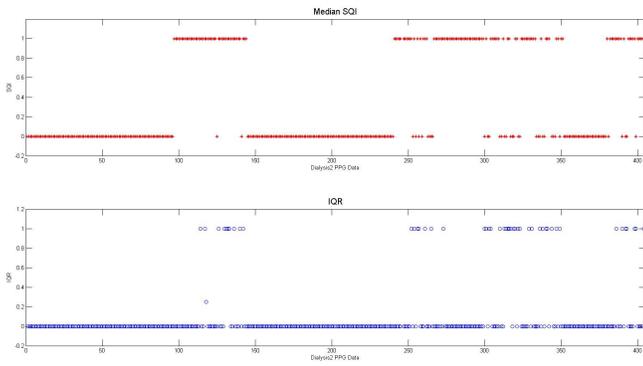
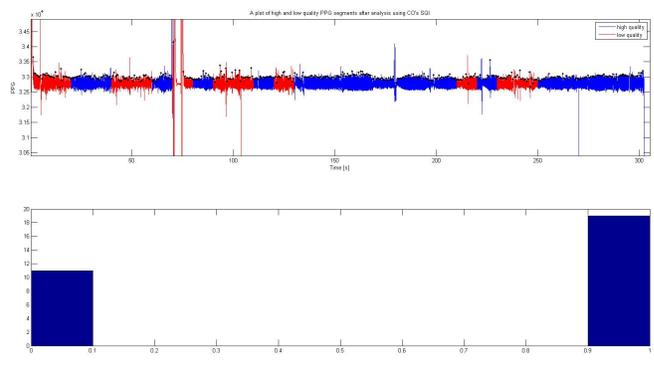Fig. 7. Median SQI and IQR SQI for PPG of Dialysis 2 data set

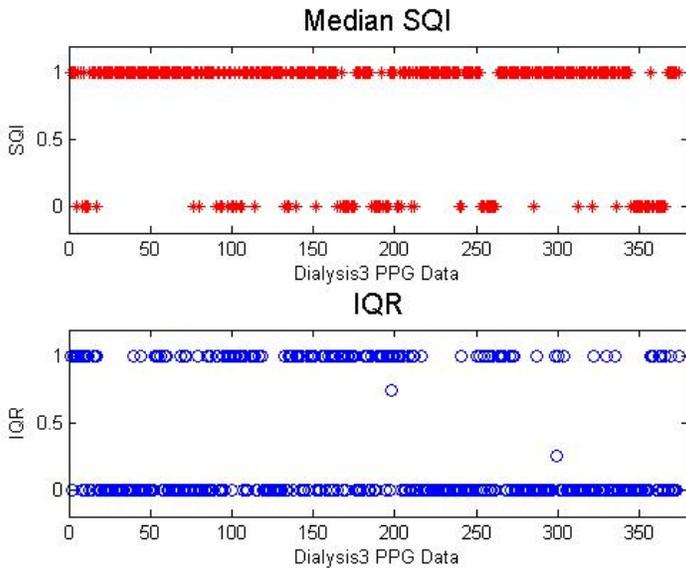Fig. 8. Analysis on one of the patient PPG data of Dialysis 2 data set

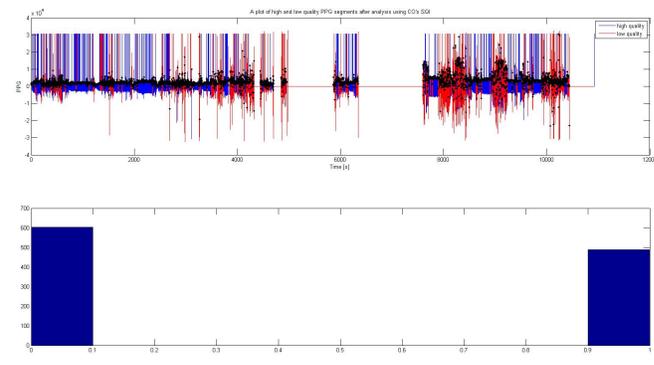Fig. 9. Median SQI and IQR SQI for PPG of Dialysis 3

Fig. 10. Analysis on one of the patient PPG data of Dialysis 3

III. CONCLUSION

The SQI for the PPG of five datasets have been carried out. From the summary, based on the percentage of Med SQI of 1, CapnoBase contributes the most with 100%, followed by Dialysis 1 (80.2%) and Dialysis 3 (77.3%).