ECG SQI for Fantasia, Capnobase and Dialysis datasets

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I. OBJECTIVE

1) To examine the Signal Quality Indices (SQI) of the ECG waveforms for Fantasia, CapnoBase, Dialysis1, and Dialysis3 datasets.

II. COMPLETED TASKS

A. SQI for all raw Fantasia datasets

For previous report (ProgReport9), all 1017 MIMICII ECG recording SQI with 30s non- overlapped window have been done. In this report, the SQI for the other four datasets will be carried out. For Fantasia, there are 40 ECG recordings,2-hour for each recording. The overall SQI result using the same peak detectors i.e. qrsdetect2(Joachim) and rpeak(Zhang) and SQI using bxb_compare.m are as shown in Fig.1. From this results, there are some recording, e.g. data no. 21 has SQI of around 1 but has IQR of 1 as well. As shown in Fig.2, for when ECG data =0 i.e.. after 3500 s, SQI is decided to be zero. Therefore, the histogram shows an equal percentage of SQI=1 and SQI=0, which resulted in IQR of 1.
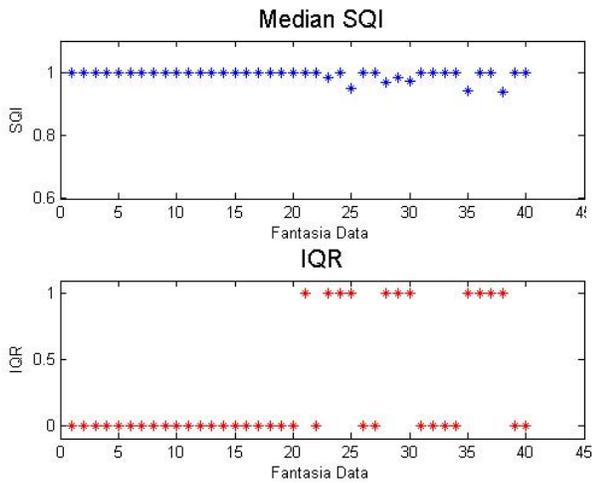


Fig. 1. Median SQI and IQR SQI for Fantasia data
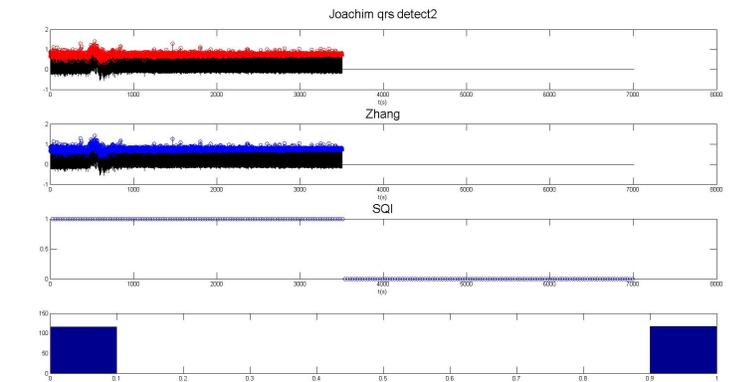
Fig. 2. IQR SQI=1 due to no data detected, data no. 21

B. CapnoBase datasets

For Capnobase ECG data, there are 42, 8-min recording ECG. The result shows good SQI for all the recording as depicted in Fig.3 except data no. 37. Analysis on this data has been carried out to confirm the low SQI, as demonstrated in Fig.4.

C. Dialysis3 datasets

For Dialysis3, DF, there are 374 data with maximum of 4 hours recording time. The result of the SQI analysis is shown in Fig.5. There are 7% data with below 0.8 threshold. The analysis on the low-SQI data 33 is shown in Fig.6.

D. Dialysis1 datasets

For Dialysis 1, there are 96 of maximum 4-hour ECG recording. In this dataset a lot more low SQIs are seen as in Fig.7. From the analysis in Fig8, the setting are rpeak detector (Zhang's) need to changed to make it detect low amplitude signal. However, the changes need some more evidence. This is going to be the work to be done next week.

III. CONCLUSION

The SQI's Median and IQR for Fantasia, Capnobase and Dialysis3 and Dialysis1 have been carried out. Overall result, the SQI are good for all the datasets except Dialysis 1. Further analysis and improvement of the codings will be done before proceed with Dialysis 2 in the next report.
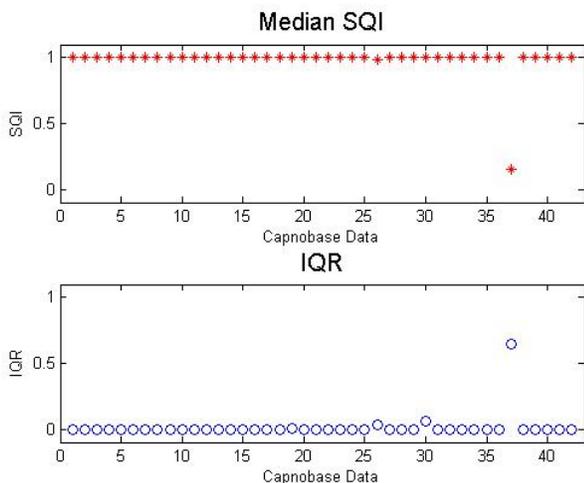
Fig. 3. Peak detectors and SQI
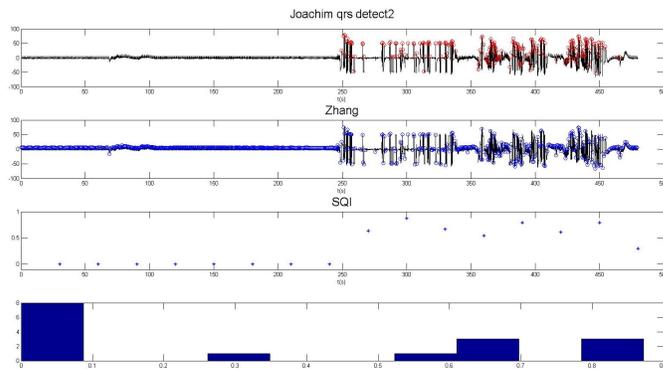
Fig. 4. SQI explanation for data no. 37
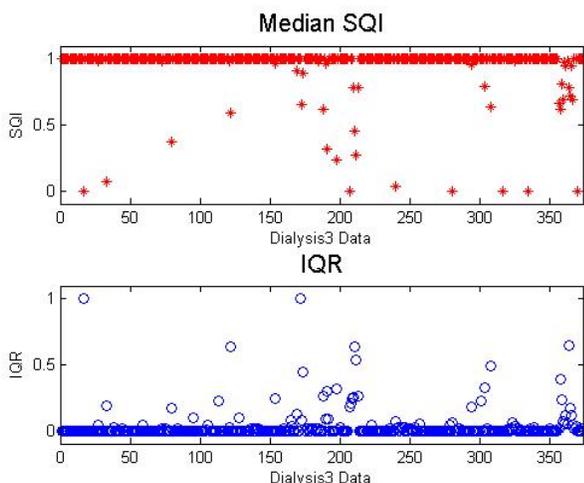
Fig. 5. Median SQI and IQR SQI for Dialysis3 data
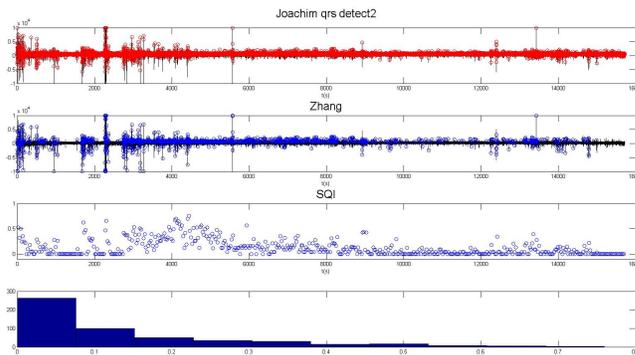
Fig. 6. Analysis on data 33, (bad SQI)
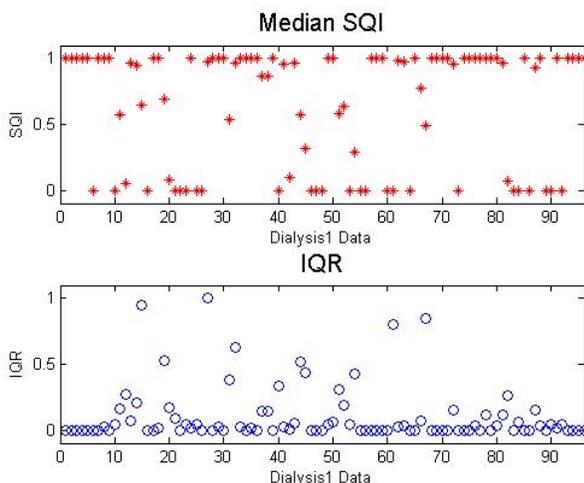
Fig. 7. Median SQI and IQR SQI for Dialysis1 data
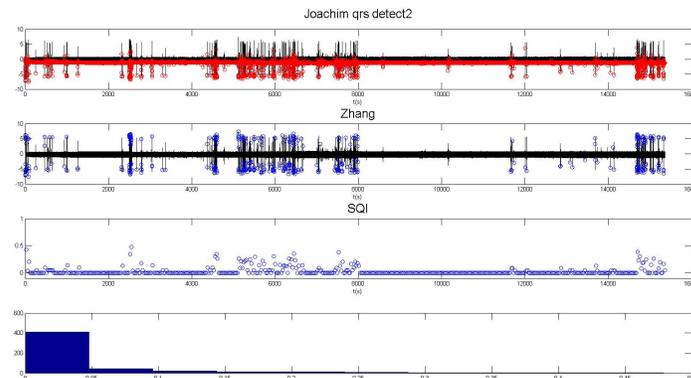
Fig. 8. Analysis on data 6, (bad SQI)