

RR estimation MAE

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I. OBJECTIVE

- 1) To update the RR estimation Mean Absolute Error (MAE) of six datasets.

II. ALGORITHM USED

In this report, the MAEs of RR estimation for MIMIC-II, CapnoBase, Dialysis-1, Dialysis-2, Dialysis-3 and Vortal are presented. Prior to that, the algorithms that have been used to extract RR from PPG and respiratory signals are listed. The algorithms in the RR toolbox which was developed by Dr. Marco Pimentel and had been used in this estimation study are delineator, corrDelineator, getModulation, adaptPulseSegment and smartFusionAdapt for RR extraction from PPG signals. For reference respiratory signal pre-processing, lp_signal and downsample_data, which was introduced by Mr. Peter Charlton have been used. For RR estimation from reference respiratory signal, two algorithms, which need to agree to each other, arspec (Dr. Pimentel) and ref_cto (Mr. Charlton) have been used. The errors of the RR from reference respiratory and the RR estimated from PPG signals, have been taken for each 32 sec-window, throughout the length of the signals. From these errors, the MAE of each patient data is calculated.

III. MAE RESULTS AND DISCUSSION

The results of the MAE are as shown in Figs. 1 to 6. The combined results is demonstrated in the box and whisker plot in Fig.7. From this plot, it is shown that Vortal has Median MAE (5.4) breath/min, followed by CapnoBase (5.6), Dialysis-3 (10.5), MIMIC-II (11.6), Dialysis-2 (34.0) and Dialysis-1 (36.6). The results show that continuous improvements are needed to achieve estimated RR as close as possible to the gold standard for all the datasets. The respiratory estimation paper has been requested to Dr. Pimentel to compare the MAE of MIMIC-II and CapnoBase. Several other algorithms will be tested and compared in the next report.

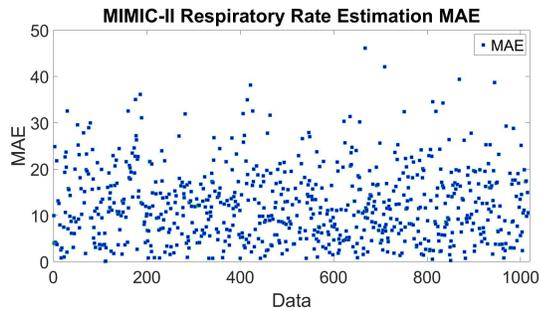


Fig. 1. MIMIC-II

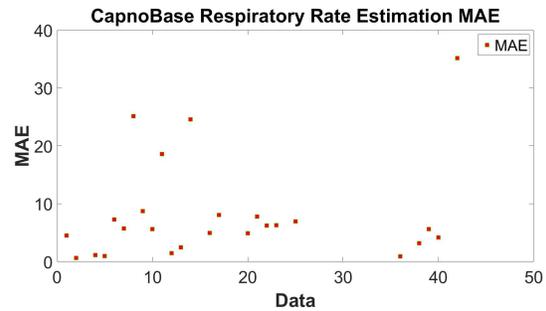


Fig. 2. CapnoBase

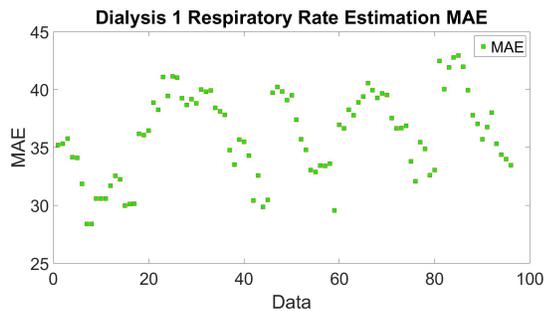


Fig. 3. Dialysis 1

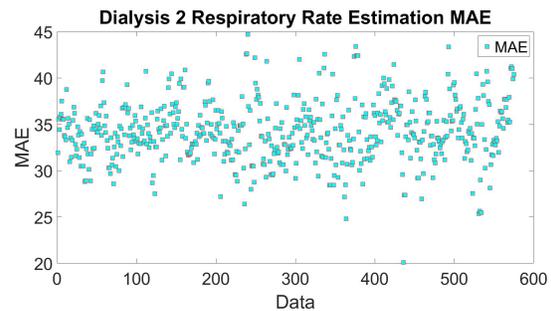


Fig. 4. Dialysis 2

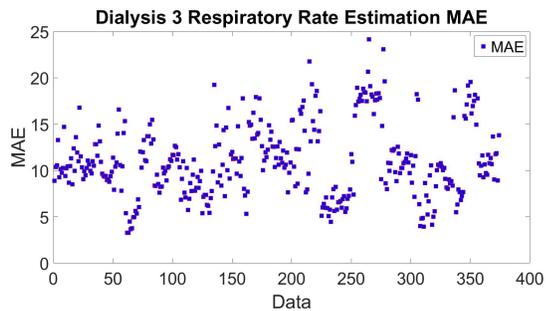


Fig. 5. Dialysis 3

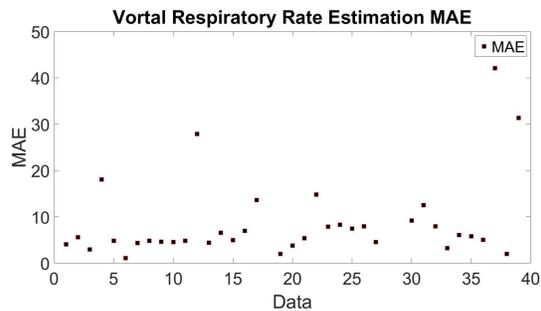


Fig. 6. Vortal (at rest)

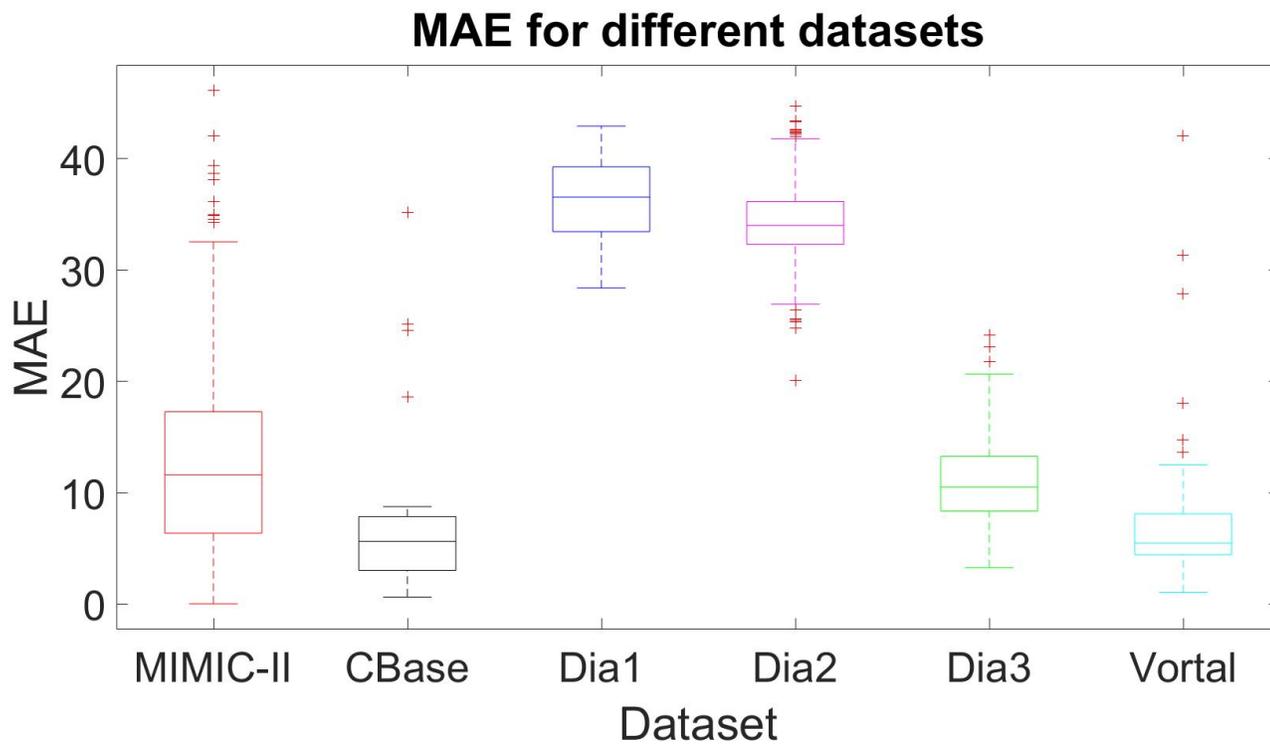


Fig. 7. Boxplot