

PICRAM Respiratory Signal and StAR II

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I. OBJECTIVE

- 1) To update the status of PICRAM PPG dataset.
- 2) To explain the understanding of StAR II project.

II. DETAILS

A. Data consolidation and respiratory rate estimation

Table I shows the updated details of the datasets. Picram's Oxford PPG (Ox) has been uploaded into 'bspprojects9\OURR'. It has 199 patient IDs and each patient has up to seven recording session. The maximum length of a single, continuous PPG recording session (patient 060) is 75.2 days. Data consolidation for Picram's Reading (Rd), a total of 68 patient IDs is now being carried out. It shall be completed by next Tuesday. In this report, PPG SQI of the longest single recording session, i.e. patient 060 has been run. The result is as shown in Fig.1. It shows a median SQI of 0.918. The full SQI for all Picram Oxford's PPG will be reported in ProgReport 20. By using the respiratory signal extraction functions from the Oxford respiratory toolbox, as used in Progress Report 18, respiratory signal extraction of patient 060 from day 7 to day 11 has been done. The result is as shown in Fig. 2. Then on the 11th day, another 60s close up respiratory signal was monitored. The raw PPG data with pulse peak detector image is demonstrated in Fig.3. The extracted respiratory signal is as depicted in Fig.4. From the result, further analysis of the RIFV need to be done. It shall be reported in the next report too.

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'	✓	✓	-	✓	✓	✓	✓	Ox: ✓ Rd: 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	Ox: max single 75.2 days
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. StAR II study

In SMS-text Adherence Support (StAR) study, the trial was to test whether SMS-based intervention improves treatment adherence and lowers blood pressure in hypertension patients. The 1372 participants for this study was divided into two trial intervention and one enhanced usual care group (control). The main outcome is to see the change in mean systolic BP between the control and the other groups. From the reference paper written by D Springer, the system mainly consists of the three elements; data collection, data management and intervention management. The data collection is done using smart mobile phones/ tablet which run Sana Mobile application. Sana Mobile is an Android-based open-source app, which can be customized, and it helps the creation of report forms, collection and transmission of data. Sana can be customized/run and tested by installing Android Studio and the latest SDK. The data management system consists of servers and OpenMRS as its software. OpenMRS is an open source, web-based medical record system. The intervention management, as explained in the paper, uses the third party company (txtnation.com) to send and receive message from/to the participants and OpenMRS. In StAR II, a few additions to the current StAR module were discussed. In StAR II study, diabetic patients are also included. Therefore, blood glucose information module will be added in Sana and OpenMRS. The other module which will be included is the tag (RFID) reader, which provide the participant's information into Sana. At this point of time, I am expected the main role in the project will be the customization of Sana Mobile application and/or OpenMRS by adding patient information and blood glucose modules. The next skype meeting with David Springer and the rest of the team is on the 10th February. I am preparing some questions to ask the team on this project.

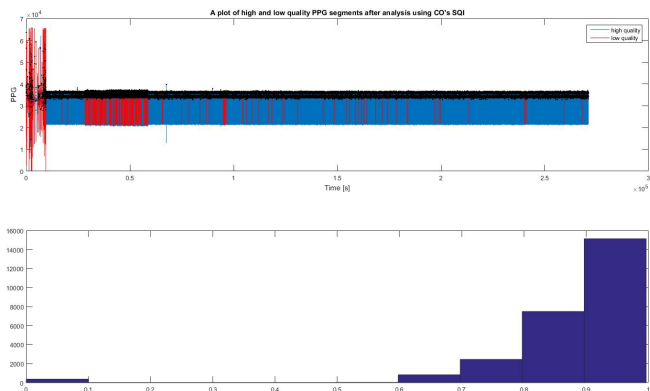


Fig. 1. PPG SQI of PICRAM's Oxford patient 060 which was the longest single recording

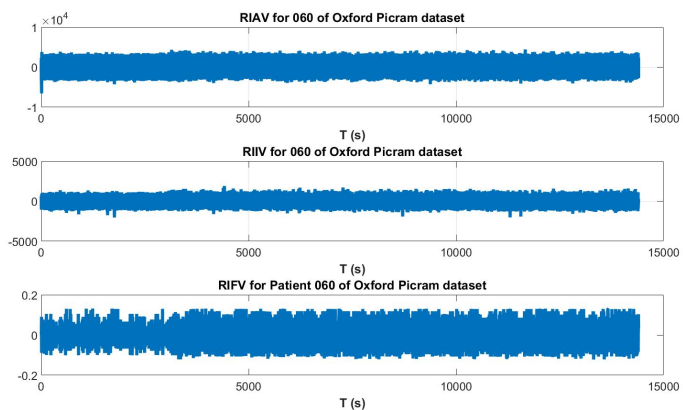


Fig. 2. Respiratory Signal extraction using IAV, IIV and IFV for 7th to 11th day of patient 060

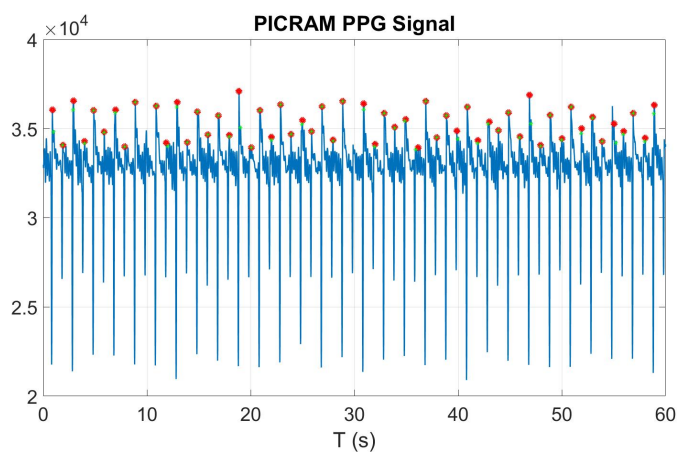


Fig. 3. PPG and pulse peak detection for 1 min on the 11th day of patient 060

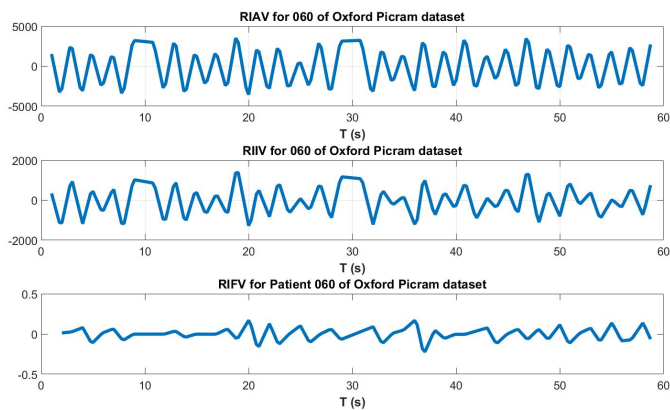


Fig. 4. Respiratory Signal extraction using IAV, IIV and IFV for 1 min on the 11th day of patient 060