Datasets for Respiratory Rate Estimation

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I. Objective

To gather all available datasets in the format used in Oxford Respiratory Rate Toolbox. Based on the discussion with the group members, the format is in .mat (Matlab).

II. Completed tasks

A. Shared folder

All publicly and privately available datasets (waveforms) are to be stored on our local network to save some bandwidth and speed up code. A request for a shared folder for our anonymised datasets on IBME server has been sent to IBME IT Dept on 12 Feb 2015. From the discussion with them, a size of 1.5 Terabyte will be allocated for this project under "ibme_bsp_OURR". List of the researchers who can access this folder has been sent including the security setting, who can access (read only / read write). A folder where everyone can have the rw access, possibly for the result of the analysis has also been requested.

The information of some of the datasets which was mentioned during the first group meeting on 3 February 2015 has been received and the updated version is as shown in Table I

III. Datasets

A. CapnoBase

An initiative of Dr Walter Karlen and Dr. Mark Ansermino at Electrical Computer Engineering in Medicine research group, Univ. of British Columbia, Canada in 2009. On the 11 February 2015, a new revision which adds the demographics information such weight, age and the ventilation mode to the meta structure. The database has been downloaded[1]. It is in my folder and will be uploaded to the OURR shared folder once the IBME IT has completed the setup. For a publication using these datasets, citations of Dr. Karlen's two papers are required.

B. MIMIC II

Multiparameter Intelligent Monitoring in Intensive Care II (MIMIC) is a public-access ICU database. It is a database which stores information regarding a large number of patients admitted to intensive care units (ICUs) in the Beth Israel Deaconness Medical centre in Boston, MA, United States. The database is split into two parts: the MIMIC II clinical database, and the MIMIC II waveform database. The clinical database contains data in the patients chart (heart rate every hour, blood pressure every hour, blood measurements etc.). The waveform database contains the raw signals from the monitors on the patient (ECG, PPG, etc.). An effort to match the MIMIC II waveform database to the MIMIC II clinical database has been done and is then referred as *matched subset*. The info on this matched subset is available[2]. Dr. Alistair Johnson has downloaded the matched subset and store into IBME (Server: delphi, share: physionet1). Howeve due to some technical issues, IT dept has yet to indentify the datasets eventhough they have added myself to the security group. From the conversation with Dr. Johnson in the email, IT says 'it appears that the physionet share is not actually published on the Z Drive'. I am sure that IT Dept is doing their best to find the correct location of the dataset. Citations of a paper by M. Saeed et al. and a standard citation for Physionet are required for publication.

C. CALMS2

Computer Alerting Monitoring System 2 (CALMS-2 study) is designed to assess whether continuous monitoring of vital signs with automated alerting to detect patient deterioration reduces patient length of stay in hospital by alerting staff to clinical deterioration more effectively than the current paper-based track-and-trigger systems[3]. From the information received from Mr. Marco Pimentel, the dataset is not publicly available. However, like MIMIC II dataset, it is available in IBME network share folder under bspprojects5. A request to access this folder will be sent to IBME IT soon.

[1] http://www.capnobase.org/database/pulse-oximeter-ieee-tbme-benchmark/

[2] http://physionet.org/physiobank/database/mimic2wdb/matched/

[3] http://www.ibme.ox.ac.uk/research/biomedical-signal-processing-instrumentation/prof-l-tarassenko/monitoring-patients-after-cancer-surgery-calms-2

D. PICRAM

Post-Intensive Care Risk-adjusted and Monitoring (PICRAM)[4] dataset is divided into 2 parts; 1. ICU data and 2. ward data. Its objective is to analyse the vital signs of ICU-discharged patients taken using wearable sensors. Clinical testing is done in Oxford (306 subjects) and Reading (135 subjects).

E. VORTAL

Vortal and Listen are the substudies of Hospital Of The Future (HOTF) project. The key researchers for this project are Mr. Peter Charlton <peter.charlton@gstt.nhs.uk> and Dr. Tim Bonnici <timbonnici@gmail.com>, a medical doctor.

F. LISTEN

The dataset recorded from patients in hospital who are recovering from cardiac surgery. They are recorded at ICU for 2 days and another 5 days in ambulatory ward. For the ward data, reference respiratory rate are not taken. Other than Vortal and Listen, there are another 4 substudies under HOTF. However these datasets have no reference RR.

G. DIALYSIS and FANTASIA

In progress to get the information

TABLE I

Name	CapnoBase	MIMIC II	Listen	Vortal	CALMS	PICRAM
Updated	2015	2012	2014	2014	2014	2015
Publicly Available	✓	✓	✗	✗	✗	✗
Available locally	✓	✓	✗	✗	✓	✓
Share	local drive	physionet1	✗	✗	bspproject5	bspproject12
ECG Signal	✓	✓	✓	✓	✓ (very few)	ICU ✗, ward ✓
PPG Signal	✓	✓	✓	✓	✓	ICU ✗, ward ✓
Subject Population		patient	post-cardiac surgery	healthy, elderly	post-surgery[a]	adult
Clinical Setting		ICU	ICU, ward	laboratory	post-op ward	ICU, ward
Breathing (s/c/v) [b]	s, c	s,v	s,v	s,c	s	ICU s,v / ward s,v[c]
No. of Subjects	42	>13,500	196	42 healthy, 14 elderly	$\sim$ 250	ICU >9000, ward 441
Neonates (<2 y.o.)		✓	✗	✗	✗	✗
Paediatrics (2-18)			✗	✗	✗	✗
Young Adult (18-40)	✓		✓	✓	✓ (very few)	✓
Adult		✓	✓	✗	✓	✓
Elderly (>70 y.o.)	✓		✓	✓	✓	✓
Unwell?	✓	✓	✓	✗	✓	✓
Chronically Unwell?		✗	✗	✗	✗	✗
Acutely Unwell?	✓	✓	✓	✗	✓	✓
Ambulatory?	✓	✗	✓, ✗	✓, ✗	✓	ward ✓
Recording Time	8 min		2d ICU, 5d ward	[d]	2d (ave)	ward 1-2 d
ECG/PPG Acq. Equip.			ICU[e], ward[f]	[g]	[h]	[i]
Continous RR Signal	CO_2		ICU[j], ward[k]	Nasal-oral pressure	✗	✗
Other Reference RR			ICU[l], ward[m]	✗	[n]	[o]
Avalability	✓	✓	>6mo	>3mo	approval needed	approval needed

[a] gastro-intestinal
[b] spontaneous/ controlled/ ventilated
[c] non-invasive
[d] 10 mins at rest (supine), (2 mins walking approx 5 mins running)- 10 mins at rest (supine) after exercise
[e] Philips bedside monitor (PPG 125 Hz, ECG 125 Hz)
[f] Philips telemetry (PPG, ECG)
[g] Philips bedside monitor (ECG 125 Hz, PPG 125 Hz), Nonin wearable sensor (PPG 75 Hz)
[h] PPG: Nonin 4100 Bluetooth Enabled
[i] PPG: Nonin (75 hz), ECG: Hidalgo (256 Hz)
[j] Impedance
[k] none
[l] ventilator or manual
[m] nurse observations
[n] nurse observations
[o] nurse observations

IV. NEXT MOVE

For 23 Feb 2015 to 7 Mar 2015, below actions will be executed

- To complete the information of all the dataset and to identidy all the location of the available datasets, import data into .mat format and store into the new UO RR shared folder.

[4] http://www.ibme.ox.ac.uk/research/biomedical-signal-processing-instrumentation/prof-l-tarassenko/post-intensive-care-risk-adjusted-monitoring-picram