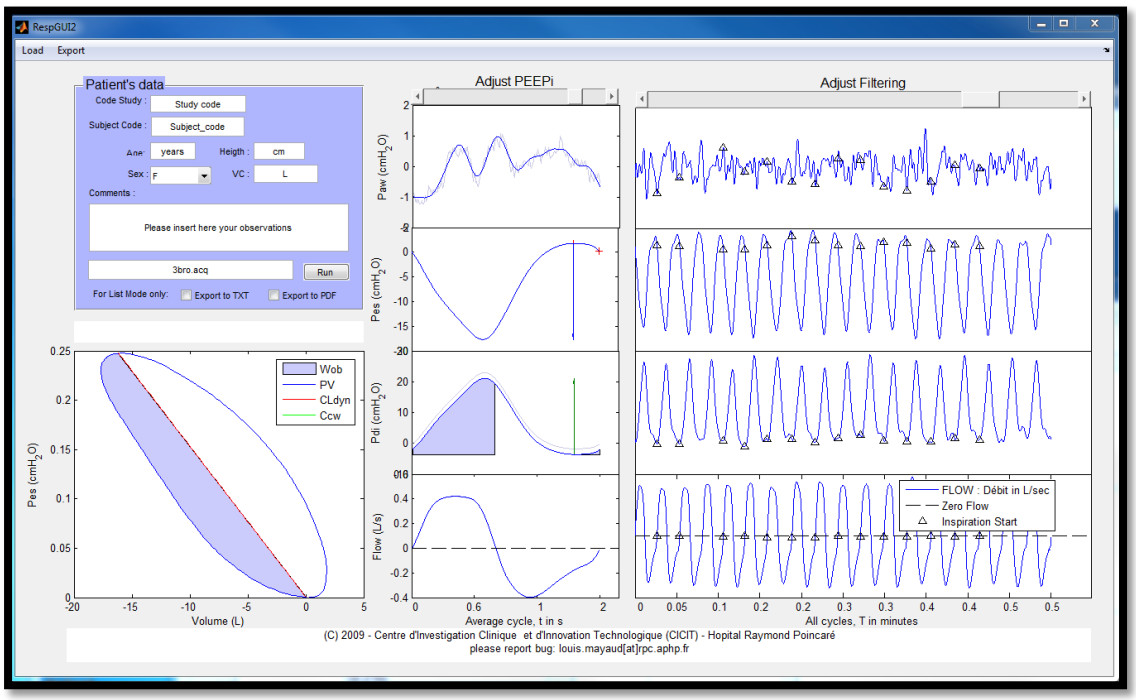
Additional Online Material

RespMAT

# Software user's guide

A Matlab deployed component for automated processing of invasive respiratory signals and work of breathing estimation.




Louis MAYAUD
1/27/2012

## Introduction

This document is a user guide that will help you with downloading, installing and using the RespMAT software. RespMAT is a Matlab generated application that is deployed as a standalone application. It processes files with invasive respiratory signals (oesophageal and gastric) in order to provide several parameters related to lung function (works of breathing, resistance …).

We stress the fact that this application **must not be used for clinical purposes.** It has been developed by and for researchers. It can only be used by expert lung specialists. In no circumstance the results provided by the application should be used for diagnosis.

## Descriptions of the package

The RespMAT_package contains the following files:

- RespMAT.exe: the application (**only click on this file at the end**, MCR must be installed first)
- MCRInstaller.exe: the installer for the Matlab component
- DOC folder with:
  - Helpme.pdf: this document
  - RespMat.pdf: a document that describes the simple signal processing techniques involved
- DATA folder with samples of file to import:
  - Test_listing.lst: a file used to illustrate the listing function detailed below. It calls all the single files below and allows you to confirm the application is working.
  - test1.acq: a sample ACQ file to try your application
  - test1.csv: a sample CSV file
  - test1.txt: a sample TXT file
  - test1.xls: a sample XLS file

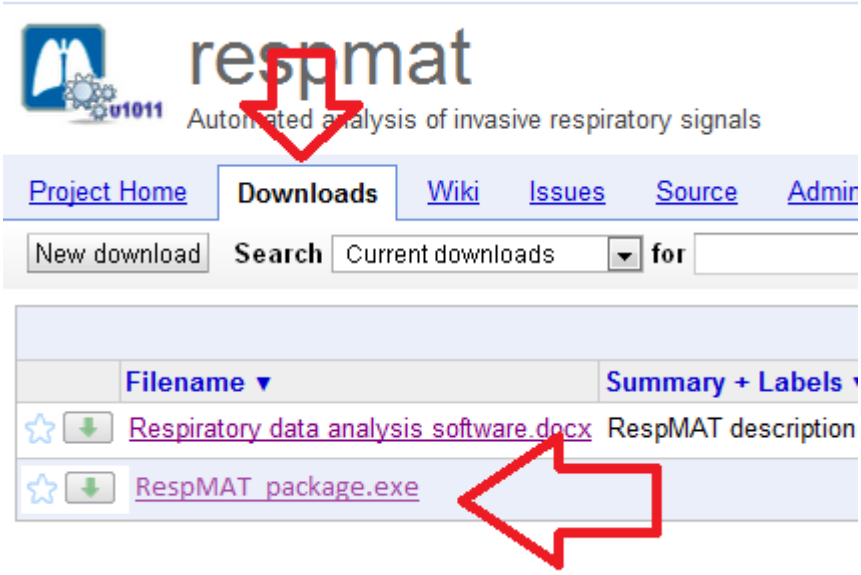
## Install

**YOU NEED THE ADMINISTRATOR'S RIGHT ON THE COMPUTER TO INSTALL THIS SOFTWARE**

### Download the software

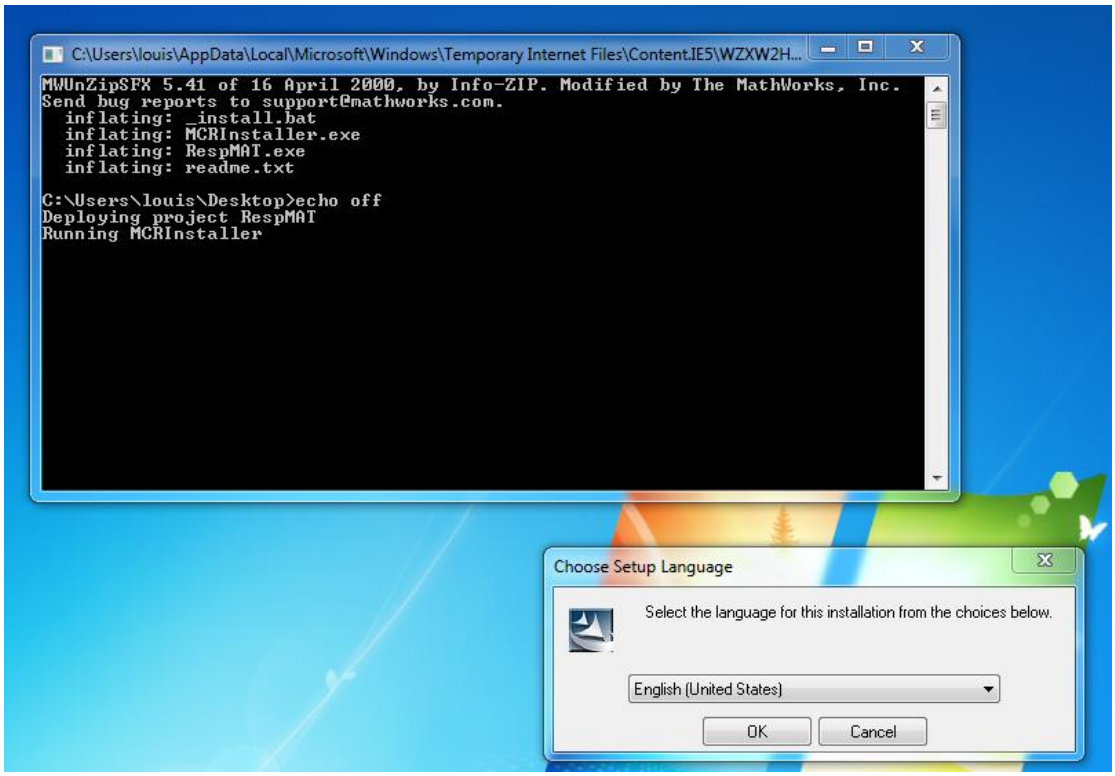
Currently, the software is available at the following address:

http://code.google.com/p/respmat

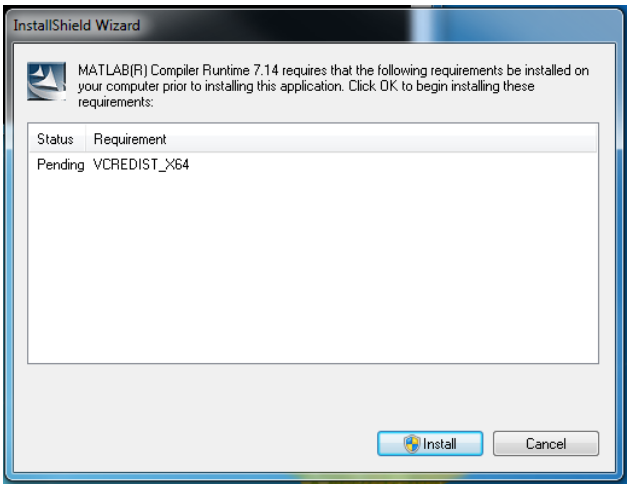



1. Select the **Downloads** tab and click on **RespMAT_package.exe**
2. Save the file to the directory of destination. If you don't know where to locate this file, we advise you to create a *RespMAT* folder in your home directory.
3. The file contains the Matlab Runtime Componant (MRC) and could take up to 30min to download if your connection is weak.
4. Double-click on the package named *RespMAT*_pkg.exe. (***From now on, if you hit any problem during installation, please refer to the* troubleshooting *section at the end of this document***)
5. This extracts the MCR Installer from the archive, along with all the files that make up the MCR. Once all the files have been extracted, the MCR Installer starts automatically. (If you missed or cancelled this step, you can always go back to your home directory and double click on "MCRInstaller.exe")

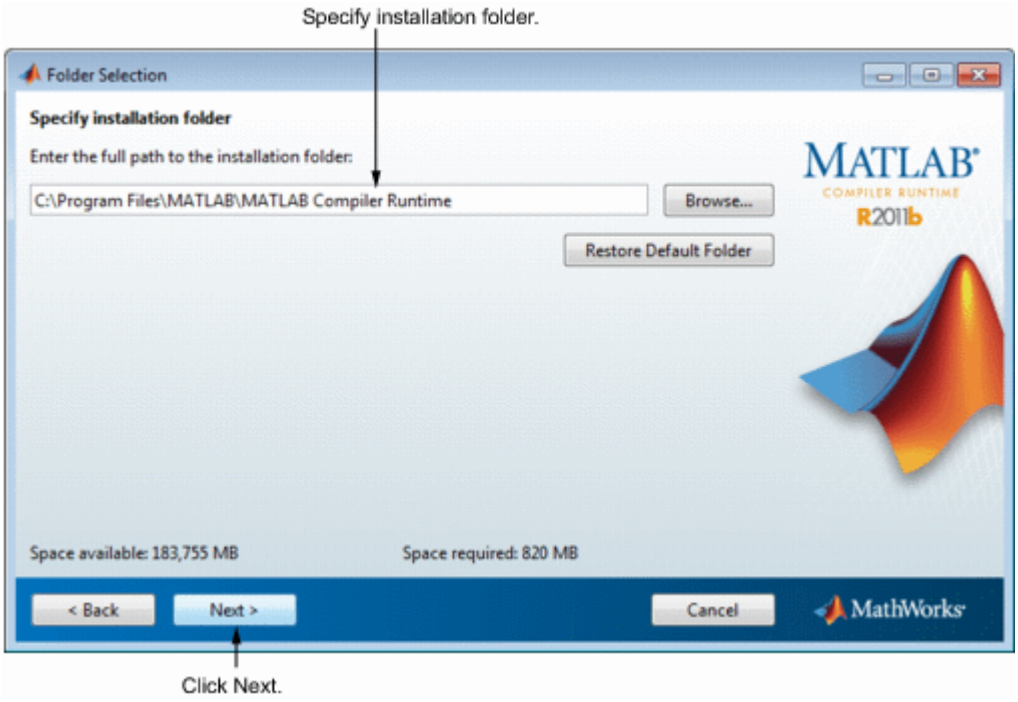
## Install the Matlab MRC



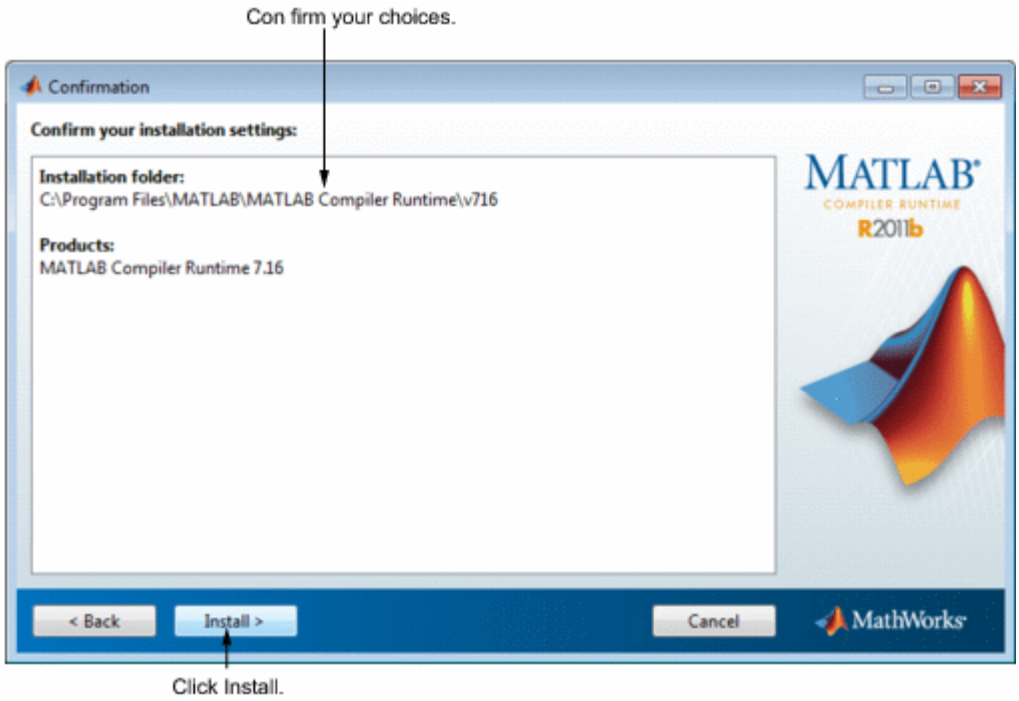

1. Open the file you downloaded
2. A command window will automatically open (black window on the left)
3. A second window “Choose Setup Language” automatically open
4. Select language and press OK
5. Perhaps your system is going to complain about missing components as illustrated below:



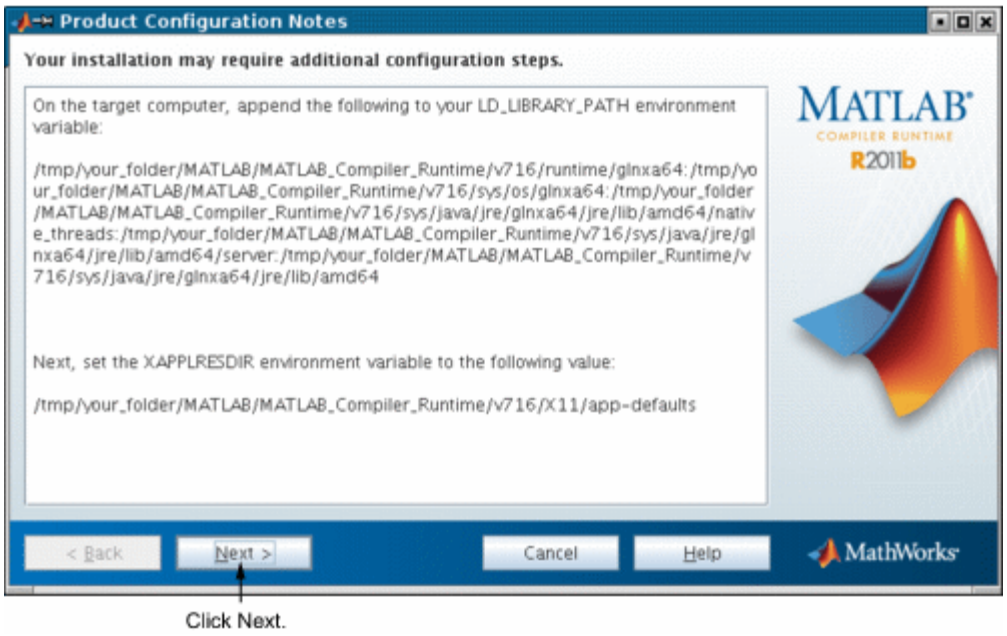

6. Press “Install”



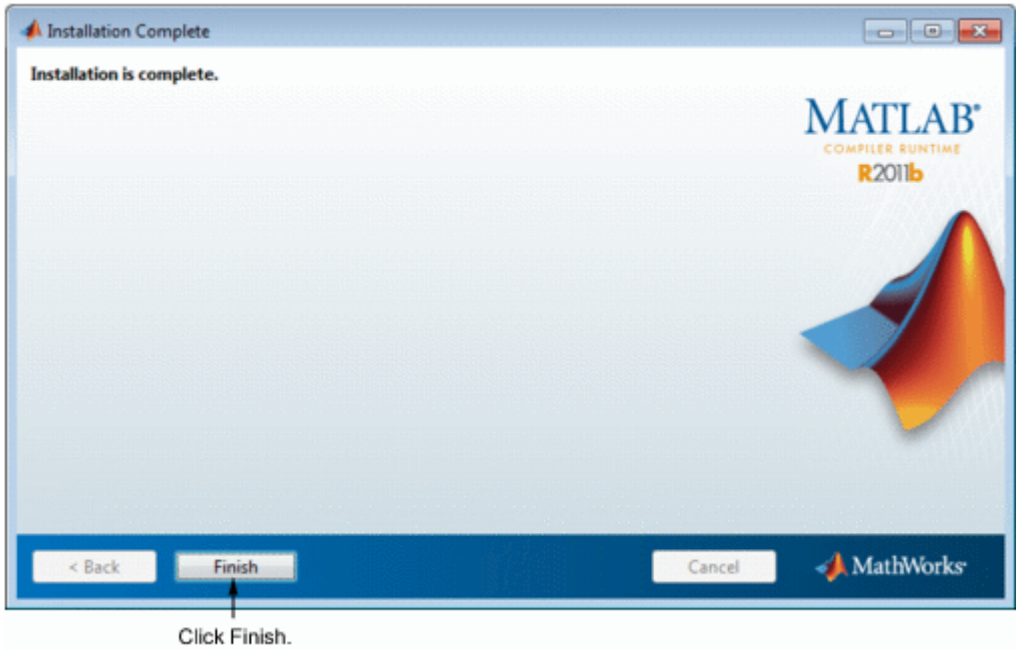

7. Confirm your choices and click **Next**. The MCR Installer starts copying files into the installation folder.




8. On Linux and Macintosh systems, after copying files to your disk, the MCR Installer displays the Product Configuration Notes dialog box. This dialog box contains information necessary for setting your path environment variables. Copy the path information from this dialog box and then click **Next**.




9. Click **Finish** to exit the MCR Installer.




**MCR Installer Readme File.** A `readme.txt` file is included with the MCR Installer. This file, visible when the MCR Installer is expanded, provides more detailed information about the installer and the switches that can be used with it.

Now you should be able to double-click and start RespMAT.exe (**the loading time can be as long as minutes if your computer is old**).

You will find at the root of the working directory (where you should have found this document) a data directory that allows you to test the application.

# Using RespMAT

## Importing data

It can use four input file formats: *acq*, xls, *csv* and *txt* plus a wrapper to process a series of files at a time, the *lst* format.

### ACQ files

This file format comes from Acqknowledge™ recordings. The use of this type of file is kind of straight forward. It does not require any pre-processing (filtering, smoothing), you just have to make sure that your file contains enough data samples and to sort signals in the following order: Peso, Pga, Flow and Paw.

***For all other file formats, if your system by default specifies commas ',' as decimal separator instead of dots '.' Oopen the file in a regular text editor (right-click on the file, "open with...") and replace all the commas with dots by selecting "Replace" in the "Edit" menu of your text editor.***

### CSV files

If you have any other type of acquisition system, you might be able to export data as ASCII format. It is thus possible to import CSV files into the software where data separated by a **semi-column character ';'**. Columns should be sorted as follow: Flow, Peso, Paw and Pga.

Since there is no header in the CSV file, you will need to specify the sampling frequency of the record when prompted.

### XLS files

It is also possible to import XLS files into the software. Make sure that the columns are sorted from left to right as follow: Peso, Pga, Flow, Paw with no headers describing the columns. Since there is no header in the XLS file, you will need to specify the sampling frequency of the record when prompted.

### TXT files

Make sure that the columns are sorted from left to right as follow: Peso, Pga, Flow, Paw and separated with a **tab space**. Since there is no header in the TXT file, you will need to specify the sampling frequency of the record when prompted.

### LST file

If you wish to automatically process a set of files, you will have to write a LST file. The format of the LST file should be one line per exam (file to process) with the following data separated by a blank space (**all the following are case sensitive**):

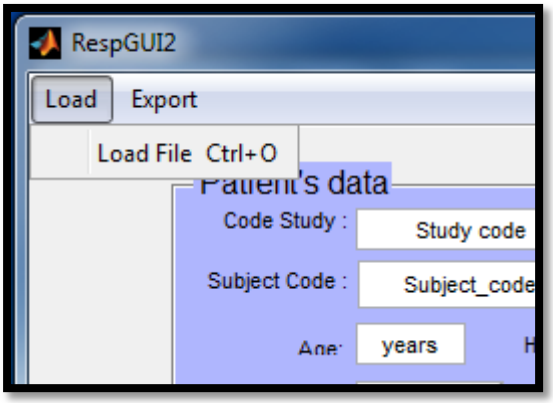
- File type (acq/csv so far)
- Name_field
- Number_field
- Age
- Size
- Sex
- Comments (within double quotes)

The script will then look for files in the same directory than the *lst* file. Each file will have a name composed from the first three items above: *Name_filedNumber_field.FileType*. Refer to the example file for more clarity.

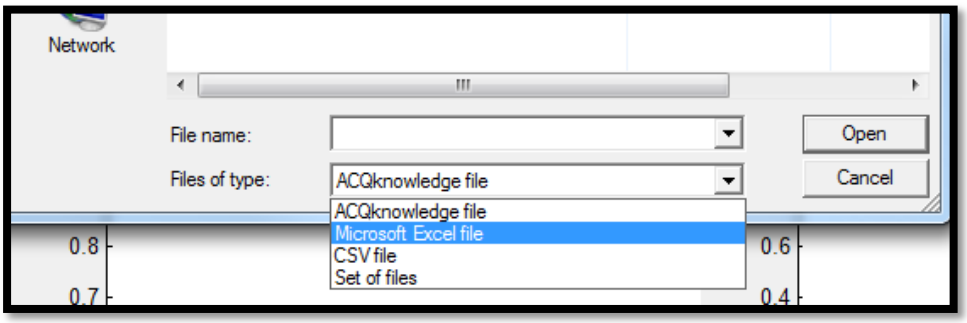
### Loading your data

Once you have your data ready, open the RespMAT. In the upper left hand side corner of the application you will have to:

1. Fill your entire patient's information in the blue frame: study_name, Subject_code, age, height and sex. The VCI field will update automatically unless you have the value from a previous exam. If you have any observations about the patient fill the appropriate box.
2. Select a file by clicking on load (or pressing Ctrl+O)

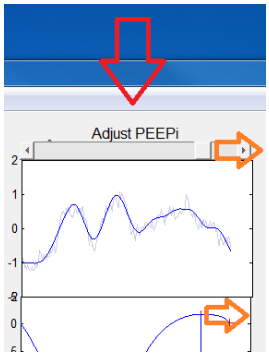



3. A prompt window will ask you to select the file. To select the file type, click on the drop down menu



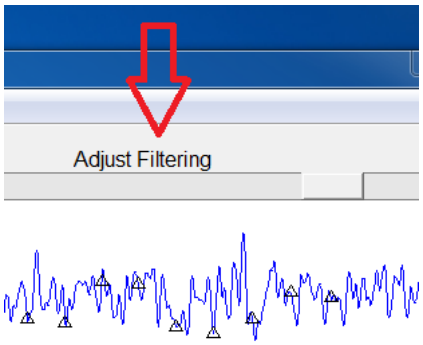

4. At this stage you should see the name of your file appear in the top left-hand side corner.
5. Fill the patient's data:
    a. Code study or first name
    b. Subject code or last name
    c. Age in years
    d. Height in cm
    e. Sex (Male or Female off course)
    f. (optional) Vital Capacity in L. If you don't have this parameter it will be estimated according to the patient's data. Refer to the technical guide for more details.
6. Press *RUN*. This should run the analysis and populate the graphs. **Check that each signal waveform corresponds to the label on the left of the plot.**

## Analyse your data




### Tune AutoPEEP if necessary

You can tune the iPEEP point by moving the cursor the red arrow. If you slide the cursor on the right, you will move the AutoPEEP point on the right as indicated by oranges arrows.




### Change the filtering parameters

Similarly, the Filtering sliding command will allow you to tune the amount of filtering. If you slide it to the left you will see black triangles (indicating the beginning of the inspiratory effort) disappearing. It indicates a stronger filter being applied on the data. On the contrary, if you slide the filter to the right, you will see new cycle being included in the analysis.

## Export your results

Finally, once you are happy with you parameters, you can select the “export” menu in the top-left hand side of the application. It will prompt you for a file to export the results to.

You will have the choice between the following options:

- PDF to save a screen shot of the current exam
- XLS to export the numerical results in an XLS sheet

# Troubleshooting

## Installation

Unfortunately, the installation of the MCR from Matlab has been proven to be a non-trivial task, in particular, the strict software security policies within hospitals, makes the installation sometimes problematic. If you experience trouble, it is wise at this stage to contact your network administrator or a local computer scientist.

You can alternatively:

- Read more about the installation process at http://www.mathworks.fr/help/toolbox/compiler/f12-999353.html
- look a user's report similar to yours or post your problem on http://www.mathworks.fr/matlabcentral/?s_cid=global_nav

Here are the "error messages" we know about and their way around:

- *Impossible to copy autorun.ini* :
  - Right click on the installer and select "extract here"
  - Lauch Setup.exe manually
- *Microsoft Visual Studio 2005 redistribuable "command line option syntax error"*
  - Ignore and continue installation
- *Mclmcr initialization failed*
  - No way around yet ☹
- *0xc000…5 MCRInstaller could not initialize correctly*
  - Manually unzip the installer and start installation manually

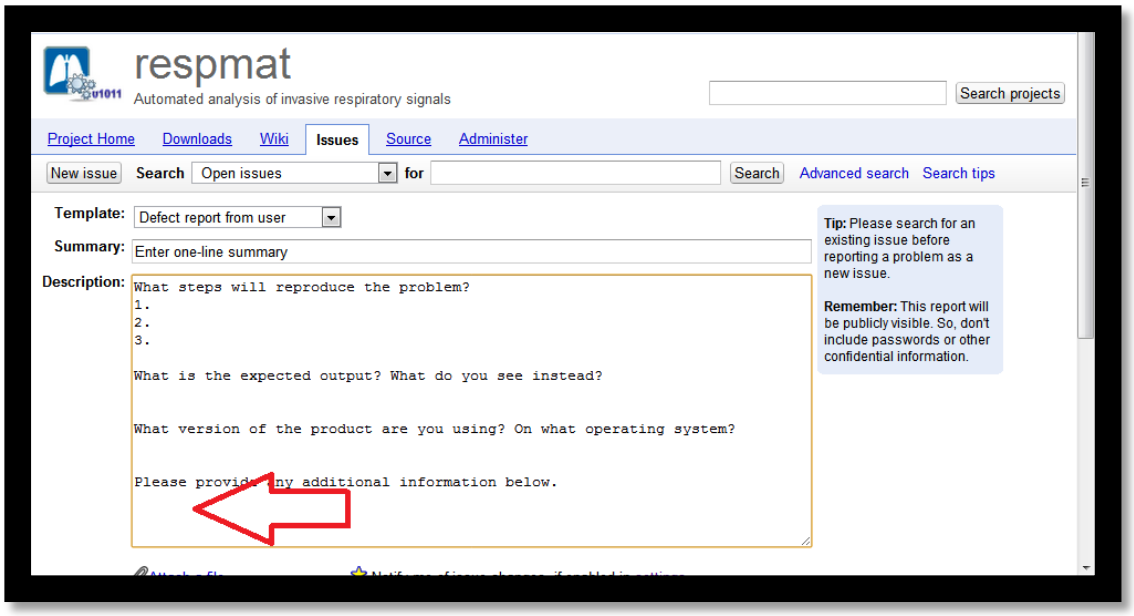
## Software use

We have done all we could to make sure the software meets the need for dissemination and use by non computer experts and have therefore extensively tested the program before its first release. However it can still happen that you experience issues during the execution.

If the software itself identifies an issue, it will automatically try to open the following page for you to report you experience:
http://code.google.com/p/respmat/issues/entry?template=Defect%20report%20from%20user

The error message will be automatically be updated in your clipboard and you will only have to paste (ctrl+v) this message in the section indicated by the red arrow on the following figure.

Fill the rest of the report, attach any file that you think could help us understand what happened and submit your defect report.


respmat
Automated analysis of invasive respiratory signals
Search projects
Project Home
Downloads
Wiki
Issues
Source
Administer
New issue
Search
Open issues
for
Search
Advanced search
Search tips
Template:
Defect report from user
Summary:
Enter one-line summary
Description:
What steps will reproduce the problem?
1.
2.
3.
What is the expected output? What do you see instead?
What version of the product are you using? On what operating system?
Please provide any additional information below.
Tip: Please search for an existing issue before reporting a problem as a new issue.
Remember: This report will be publicly visible. So, don't include passwords or other confidential information.