Registration code instructions manual

I. Introduction:

This code was developed in order to combine different slab into a single high resolution slab. For any use of this code, the following paper has to be cited:

L Marrakchi-Kacem, A Vignaud, J Sein, J Germain, TR Henry, C Poupon, L Hertz-Pannier, S Lehéricy, O Colliot, PF Van de Moortele, M Chupin. Robust imaging of hippocampal inner structure at 7T: in vivo acquisition protocol and methodological choices. Submitted.

The inputs of this code are:

- four high resolution slabs
- one low resolution volume

The final output of this code is a high resolution volume. Before using this code, an adequate environment which is described in the configuration paragraph has to be installed.

II. Configuration:

This code relies on two softwares available online:

- BrainVISA: http://brainvisa.info/download.html (we used brainvisa 4.4.0)
- SPM: http://www.fil.ion.ucl.ac.uk/spm/software/ (we used SPM8)

Both softwares have to be first installed. Then some lines of our code have to be changed in order to provide the path of each software (all the changes that have to be made are written in red color in this instruction manual):

In the script "spm_registration .sh", the paths of matlab and SPM have to be provided:

path_SPM="your SPM path"
path_MP="your matlab path"

Before launching "registration_pipeline_part1.sh" or "registration_pipeline_part3.sh" the following line has to be executed in the terminal in order to set the appropriate BrainVISA environment:

./brainvisa_path/bin/bv_env.sh ./brainvisa_path

Brainvisa_path should be replaced by the name of the folder where BrainVISA was installed.

III. Use:

The pipeline is composed of three main bash scripts:

- registration_pipeline_part1.sh
- registration_pipeline_part2.sh (which calls another bash script “spm_registration.sh”)
- registration_pipeline_part3.sh

The scripts have to be launched in the terminal with respect to their order. The pipeline was separated into three bash scripts because registration_pipeline_part1.sh and registration_pipeline_part3.sh require a BrainVISA environment whereas registration_pipeline_part2.sh is incompatible with this environment. Therefore registration_pipeline_part2.sh has to be launched in a separate terminal for which the BrainVISA is not set.

Here is an example of use:

In terminal 1:

./brainvisa_path/bin/bv_env.sh ./brainvisa_path

Registration_pipeline_part1.sh rep1_s1.nii rep1_s2.nii rep2_s1.nii rep2_s2.nii lr.nii output_file

Where:

rep1_s1.nii is the first slab of the first repetition

rep1_s2.nii is the second slab of the first repetition

rep2_s1.nii is the first slab of the second repetition

rep2_s2.nii is the second slab of the second repetition

lr.nii is the low resolution volume

output_file is the name of the folder where the results will be written

In terminal2:

Registration_pipeline_part2.sh output_file

In terminal3:

./brainvisa_path/bin/bv_env.sh ./brainvisa_path

Registration_pipeline_part3.sh output_file

The output_file will contain the final results and the results of the processings. The final result that should be examined is “rs_float_ponderated.nii”