CorrectScatter_multiCore_LMSW User's guide

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(previous version v1.02.2013)

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Purpose:

The aim of this software is to provide a scatter estimate for scatter correction of any dataset acquired with the ClearPEM scanner, by means of a fast Monte Carlo simulation. This tool uses a previously segmented emission image of the object. For that purpose, use the additional software "MaskCreator", also provided. CorrectScatter_multiCore_LMSW can only be used with ListMode reconstruction provided by DKFZ. For STIR reconstruction, a dedicated version is available.

1. Instalation

To run CorrectScatter_multiCore_LMSW the following programs may need to be pre-installed on the user's computer:

- ITK (http://www.itk.org/).

The following [executable] files are integrating parts of this tool and are provided with it:

- CorrectScatter_multiCore_LMSW.

Other tools/files necessary to run CorrectScatter_multiCore_LMSW:

- "cross_sectionH2O_2.txt" file;
- One of the following software: MaskCreator or MeshCreator.

2. Input/Output

Mandatory Input:

- Segmented image from a fast reconstruction of the emission data, obtained with MaskCreator or MeshCreator;
- Prefix for output file;

- Minimum number of events that should be detected on the simulation;
- Distance between *crystals* and not DHs;
- Lower limit for energy window in keV;
- Total number of prompt-randoms events (aka non-random events) detected for the same energy window on the real acquisition.

Optional Inputs:

Outputs:

A list mode file .lm with the format defined for ListMode reconstruction (x1,y1,z1,x2,y2,z2,angle,weight), where the weight corresponds to (-nSimulatedPrompts/nRealPrompts). This list mode file is suitable as input to the Random_gen software.

(Two output files are currently being generated. One is scaled to the number of events on the real simulation (the name ends with *Sc.lm) and the other is not scaled, so it is just the list of events that underwent Compton Scatter interactions on the object for the simulation case).

3. How to run CorrectScatter_multiCore_LMSW

It is strongly advisable to configure and generate using the release mode, since it considerably accelerates the execution:

ccmake –DCMAKE_BUILD_TYPE=Release

Build:

make

Run:

./CorrectScatter_multiCore_LMSW [InputSegmentedImage.nii] [outputBinaryFile] [nMinEvents] [CRYSTALS_distance] [low-energy] [nRealPromptEv]

Input parameters are as detailed in the previous section.