

Joint GATE-STIR Proposal (draft)

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(Released under GNU, and welcome all kinds of comments, suggestions, etc.)

Object:

Building tools to joint two software package Gate and STIR together. This will lead to a free available front-end tool for PET instrument design.

Method:

- *To provide standard interface between Gate and STIR*
- *Branch to the main stream source code, or best if possible, join their team.*
- *Easy to use.*

** As I know, STIR team is ready to accept patches to enhance STIR, I think Gate team is similar toward this..*

Analysis:

GATE, PET/SPECT dedicative Mont-Carlo simulation tools, based on Geant4. So its correctness is self-evident.

STIR, free available tomographic reconstruction framework and toolkit.

What the Gate do?

Simulations Gate can do are the following:

- Cylinder System (ECAT is a simplification of the Cylinder System)
- Multi-head System
- PET & SPECT Systems without geometry constrains.

What the STIR (Open version) do?

- Reconstruction framework (buildblock).
- 3D cylinder PET reconstruction using OSMAPOSL algorithm.

Most Possible Interface:

Gate produce PET output in ASII, LMF, ECAT, Sinogram

STIR accept ECAT and Interfile

All format can be converted into Interfile. This makes Interfile the most possible interface.

Implementation:

- Interface, as discussed above, the Interfile 3.3 is the most possible interface now.
- Modulization is always the best choice which requires a clear standard interface and as less as coupling between. Expanding Gate and STIR ability through external modules, namely branches to the main stream projection is the best choice. Since this meathod can avoid conflicting with their oringal purpose and make no modification to their source code.

To do so, first introduce a global marco: B_JOINT_GATESTIR

Then, if we want to modify a source file sfile.cxx:

```
#cp sfile.cxx sfile_bran.cxx && mv sfile.cxx sfile_orig.cxx
```

```
#vim sfile.cxx (the orginal file, now empty)
```

Add the following lines:

```
#ifndef B_JOINT_GATESTIR
```

```
#include "sfile_orig.cxx"
```

```
#else
```

```
#include "sfile_bran.cxx"
```

```
#endif
```

Modify the sfile_bran.cxx.

Usage:

Patch:

```
#gunzip bjoint.patch.gz | p0
```

Modify ./local/config.mk

```
LLN_INCLUDE_DIR=path_to_your_ecat7_include
```

```
LLN_LIB_DIR=path_to_your_ecat7_lib
```

TODO:

- ✓ Add Scanner type Userdefined_Scanner
- ✓ Add mechanism to get three extra geometry parameter

Bug fix for null file_type field in ECAT head.

ifheaders_for_ecat7

lmf support

...