

# Horizontal Data Fusion for Integrative Modelling: the MedINRIA Fusion Toolbox

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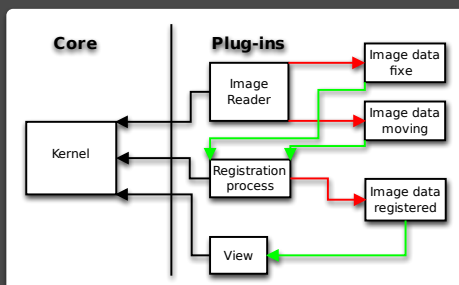
## 1 Introduction

- Follow up on an image based diagnosis, superposing simulated volumes and acquired data or multi-modal series all require a "**Horizontal Data Fusion**", which registers in the same spatial coordinates different data sets.
- Explosion of data and equal explosion of algorithms, input/output formats, user interfaces and visualisation tools.
- Use by **non-experts** therefore **challenging**.
- Need for **standards** in horizontal fusion.
- Our project at INRIA within the **Virtual Physiological Human Network Of Excellence** :  
Toolbox for importation and exportation of registration algorithms, aimed at **researchers** and **clinicians**.

## 2 Architecture

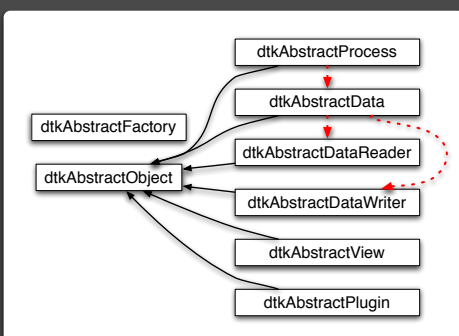
- Core/plugin architecture
- Experience accumulated in MedINRIA 1.x [1] and VTKINRIA3D [2].

- Core provides abstraction layer for plugins to register and talk to each other.



Registration Workflow

- API providing Abstract Objects.
- Data linked to multiple readers and writer for more versatility



Part of the API Object Hierarchy

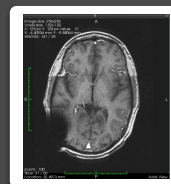
[1] N. Toussaint, J.C. Souplet, and P. Fillard. Medinria: Medical image navigation and research tool by inria. In Proc. of MICCAI'07 Workshop on Interaction in medical image analysis and visualization, Brisbane, Australia, 2007.

[2] N. Toussaint, M. Sermesant, and P. Fillard. vtkinria3d: A vtk extension for spatiotemporal data synchronization, visualization and management. In Proc. of Workshop on Open Source and Open Data for MICCAI, Brisbane, Australia, October 2007.

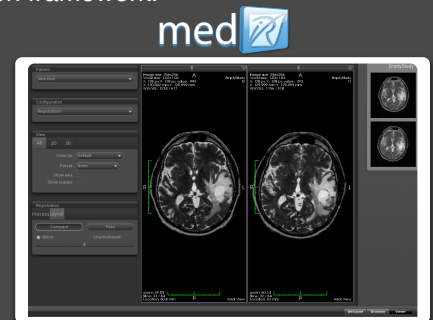
## 3 Demonstrator

- MedINRIA-Fusion: subset of a larger platform: MedINRIA.
- Tests integration of registration plug-ins
- Algorithm : rigid transformation estimation, based on the ITK registration framework.

- Comparison tools help diagnosis and test the accuracy of a registration.

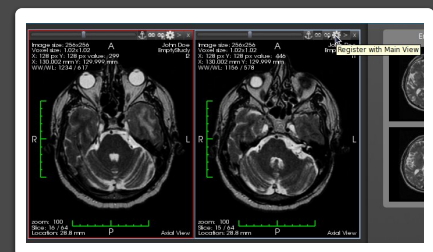


Checkerboard blending



Registration workspace

- Intuitive and slick interface : particularly appealing to clinicians.
- One-click rigid registration : 1-2s depending on the volume.



One-click automatic registration

## 4 Conclusions

- VPH Toolkit's mission : aggregate tools existing in the community.
- Still very young framework, but showed an **ease to import an existing algorithm**, easy-to-use interface.
- The **open API** is our first attempt towards **standardisation**, to federate researchers or developers under the same common language.
- More demonstrators however needed to harden the concept. Next step : **interoperate with other toolboxes** from the VPH toolkit.

