Interoperable Medical Image Registration Grid Service

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Image Registration is widely used in medical image analysis for determining the geometrical transformation, or mapping, relating two or more images. These images can be of the same subject using different modalities, or the same modality at different time points, or of different subjects. There is a large literature on medical image registration, which has become a core technology in a number of medical imaging applications. Current registration algoritms that can determine non-rigid mappings are extremely computationally demanding, with run times of 10s of minutes or hours on desktop computers. Despite the large amount of research activity in this field, there has been up to now very few comparitive evaluations of these algorithms on reference datasets.

We propose that the grid can enable more effective collaboration between scientists and industry working in this field, and enable detailed comparison of algorithm performance on shared datasets. In this project we have combined grid registration algoritms developed by researchers in France [1] and the UK [2], with a common interface to data and algorithms made available as grid services. This small scale project is designed as a starting point for a larger scale international collaborative project using the grid to provide a more effective approach to collaboration between researchers, and also a means of making the technology available to users.

[1] Stefanescu R, Penec X, Ayache N. Grid enabled non-rigid registration with a dense transformation and a priori information. MICCAI 2003 Springer Lecture Notes in Computer Science 2879:804-811 2003
[2] Hill DLG, Hajnal JV, Rueckert D, Smith SM, Hartkens T, McLeish K. /A Dynamic Brain Atlas/. MICCAI 2002 Springer Lecture Notes in Computer Science 2488:532-539 2002