Project Presentation
Introduction and Work Plan

R. S. Schestowitz
Imaging Science and Biomedical Engineering
Stopford Building
University of Manchester
United Kingdom

Project Supervisor: Chris Taylor

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Abstract

Establishment of registration, which is concerned with correspondence across a collection of images or volumes, is a fundamental problem whose resolution allows for robust analysis of visual data. This problem involves data transformation which aims to increase the similarity observed in data couples, although ultimately, maximisation of similarity across a larger set is desirable.

Transformation, which frequently comprises spatial warps, is a fundamental step in the process and it can be tackled by various different schemes. Euclidean transformations rarely suffice to achieve the main goals and their apparent weaknesses promote the use of more intricate and powerful *non-rigid* transformations. Different warps cater for flexible deformation of structures and complete registration is obtained by repeated application of warps, followed by similarity estimation that indicates the usefulness of the warps applied. The evaluation of similarity loosely-defined and remains an active research area. The calculation of similarity is commonly histogram-based and is reliant on information-theoretic principles.An optimisation regime is guided by the objective function and initial investigative work is intended to benchmark different registration methods with distinct functions as such.

More properly, registration can be conveniently posed as a model-construction task. To establish group-wise registration, we construct an appearance model that consists of all data and strive to optimise warps that result in the simplest model which still fits the data. Furthermore, the overlap obtained by registration is a pre-processing step which positively affects appearance models construction; hence, the contribution of registration and modelling unification is two-fold.