Student Talks
Presentation Abstract

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Note: This abstract is intended for its target audience. More background is described at the expense of experiments.

Abstract

Comparison and interpretation of data sets requires the data to posses common features. Data can be manipulated to increase this commonality, essentially by transforming it while preserving certain constraints. This process is known as registration. Of particular interest is the case of bio-medical registration, where object variability is correctable.

Registration comprises data transformation which aims to maximise similarity – that which is measured over a set of images or volumes that capture the same object. Transformation is concerned with spatial warps and there are many different options for representing warps. Typically, all data is warped into a common frame of reference until corresponding features are aligned. Euclidean transformations are applied to the data at the start, but their limitations promote the use of more powerful *non-rigid* transformations. Such transformations do not preserve basic data attributes and are sometimes irreversible.

By registering sets of data, corresponding points can be identified. These correspondences can then be used to construct a statistical model which encapsulates variation in the data set. This leads to work on automatic model-building, based on registration and it is of high value to 3-D models where manual identification of correspondences becomes laborious.

The experiments thus far employed clamped-plate splines for transformation that is applied in a group-wise manner. The similarity measure of interest approximates description length of a model representation of all data. The advantages of a group-wise algorithm were investigated in 1-D before attempting similar 3-D registrations.

Results show that registration is practical using these criteria and models can be constructed automatically, without prior mark-up of the data.