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Statistical Models of Shape

Optimisation and Evaluation

- Addresses one of the key issues in shape modelling: that of establishing a meaningful correspondence between a set of shapes
- Uses a novel approach to establishing correspondence by casting model-building as an optimisation problem
- Includes practical examples of applications for both 2D and 3D sets of shapes
- Full implementation details, perviously unpublished, provided

The goal of image interpretation is to convert raw image data into meaningful information. Images are often interpreted manually. In medicine, for example, a radiologist looks at a medical image, interprets it, and translates the data into a clinically useful form. Manual image interpretation is, however, a time-consuming, error-prone, and subjective process that often requires specialist knowledge. Automated methods that promise fast and objective image interpretation have therefore stirred up much interest and have become a significant area of research activity. Early work on automated interpretation used low-level operations such as edge detection and region growing to label objects in images. These can produce reasonable results on simple images, but the presence of noise, occlusion, and structural complexity often leads to erroneous labelling. Furthermore, labelling an object is often only the first step of the interpretation process. In order to perform higher-level analysis, a priori information must be incorporated into the interpretation process. A convenient way of achieving this is to use a flexible model to encode information such as the expected size, shape, appearance, and position of objects in an image. The use of flexible models was popularized by the active contour model, or 'snake' [98]. A snake deforms so as to match image evidence (e.g., edges) whilst ensuring that it satisfies structural constraints. However, a snake lacks specificity as it has little knowledge of the domain, limiting its value in image interpretation.

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