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Detection, Recognition and Segmentation in Context

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Image and Shape Matching

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Abstract

In this lecture we will discuss image matching in the context of a simplified physical model of image formation. Image matching is the process of establishing correspondence between different images of the same scene, or scenes that have some common property, or portions of such scenes. We will derive an analytical model of the deformation induced on the image domain by changes of viewpoint and illumination. Correspondence can then be established either by explicitly finding such a deformation, or by extracting some descriptor from each image, and then comparing descriptors. We will show that the latter method does not allow distinguishing objects or scenes that have the same appearance but different (3-D) shape. Explicit correspondence based on shape characteristics can, however, be established as part of the matching process. We will discuss the conditions when this is possible, and point out relationship between existing approaches to image and shape matching that will help students place them into context.