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Adaptive image segmentation for region-based object retrieval using generalized Hough transform. (English) Zbl 1205.68144
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Summary: Finding an object inside a target image by querying multimedia data is desirable, but remains a challenge. The effectiveness of region-based representation for content-based image retrieval is extensively studied in the literature. One common weakness of region-based approaches is that perform detection using low level visual features within the region and the homogeneous image regions have little correspondence to the semantic objects. Thus, the retrieval results are often far from satisfactory. In addition, the performance is significantly affected by consistency in the segmented regions of the target object from the query and database images. Instead of solving these problems independently, this paper proposes region-based object retrieval using the generalized Hough transform (GHT) and adaptive image segmentation.

The proposed approach has two phases. First, a learning phase identifies and stores stable parameters for segmenting each database image. In the retrieval phase, the adaptive image segmentation process is also performed to segment a query image into regions for retrieving visual objects inside database images through the GHT with a modified voting scheme to locate the target visual object under a certain affine transformation. The learned parameters make the segmentation results of query and database images more stable and consistent. Computer simulation results show that the proposed method gives good performance in terms of retrieval accuracy, robustness, and execution speed.

MSC:

68P20 Information storage and retrieval of data
68T10 Pattern recognition, speech recognition
68U10 Computing methodologies for image processing

Keywords:

object recognition; Hough transform; image segmentation; information retrieval

Software:

SIMPLIcity; ASIFT

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