A Multiscale Particle Filter and Winding Number Constrained for Contour Detection

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Abstract

This paper compares the basic contour detection algorithms. A contour detection algorithm which jointly tracks at two scales small pieces of edges called edgelets. This multiscale edgelet structure naturally embeds semi-local information and is the basic element of the recursive Bayesian modeling. The underlying model is estimated using a sequential Monte Carlo approach, and the soft contour detection map is retrieved from the approximated trajectory distribution. The winding number constrained contour detection (WNCCD) is an energy minimization framework based on winding number constraints. In this framework, both region cues, such as color/texture homogeneity, and contour cues, such as local contrast and continuity, are represented in a joint objective function, which has both region and contour labels. This technique is based on the topological concept of winding number. Using a fast method for winding number computation, a small number of linear constraints are derived to ensure label consistency. Experiments conducted on the Berkeley Segmentation data sets show that the Multi Scale Particle Filter Contour Detector method performs a comparable result with the winding number constrained contour detection method.
References

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**Index Terms**

Computer Science

System Architecture

**Keywords**

Particle filtering, sequential Monte Carlo methods, statistical model, multiscale contour detection, BSDS