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# Learning Spatially Regularized Similarity for Robust Visual Tracking

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## Abstract

Matching visual appearances of the target object over consecutive frames is a critical step in visual tracking. The accuracy performance of a practical tracking system highly depends on the similarity metric used for visual matching. Recent attempts to integrate discriminative metric learned by sequential visual data (instead of a predefined metric) in visual tracking have demonstrated more robust and accurate results. However, a global similarity metric is often suboptimal for visual matching when the target object experiences large appearance variation or occlusion. To address this issue, we propose in this paper a spatially weighted similarity fusion (SWSF) method for robust visual tracking. In our SWSF, a part-based model is employed as the object representation, and the local similarity metric and spatially regularized weights are jointly learned in a coherent process, such that the total matching accuracy between visual target and candidates can be effectively enhanced. Empirically, we evaluate our proposed tracker on various challenging sequences against several state-of-the-art methods, and the results demonstrate that our method can achieve competitive or better tracking performance in various challenging tracking scenarios.

*Keywords:* Visual tracking, part-based representation, metric learning, local similarity, spatially regularized

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