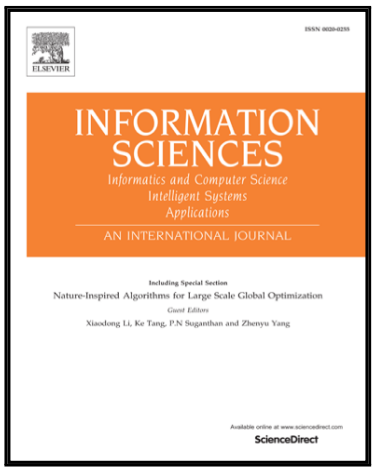

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Visual Object Tracking via Enhanced Structural Correlation Filter

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Abstract

In this study, we aim to build a robust correlation-based visual object tracking system. The function of traditional correlation filters for visual tracking is to search the most likely position of target by circularly shifting the search image patch. However, the search image patch needs to be large enough to cover both the object and background, which results in the algorithm being sensitive to changes in background. To alleviate this problem, we first propose an efficient object-surrounding histogram model to suppress the background. In this model, we build a Bayes classifier based on the initial given object, and we then apply it to each pixel in subsequent frames. With this model, the original image can be enhanced in order to eliminate the impact of circular shifting. Moreover, we develop a structural correlation filter that consists of both holistic and local object parts. The multiple object parts are adaptively weighted and further aggregated to predict the relative motion from the last frame. We conduct extensive experiments on frequently used benchmarks with 51 video sequences. The experimental results show that the proposed algorithm achieves outstanding performance, especially in terms of heavy occlusion and severe deformation.

Keywords: Visual tracking, correlation filter, object-surrounding histogram model, object-scale estimation

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